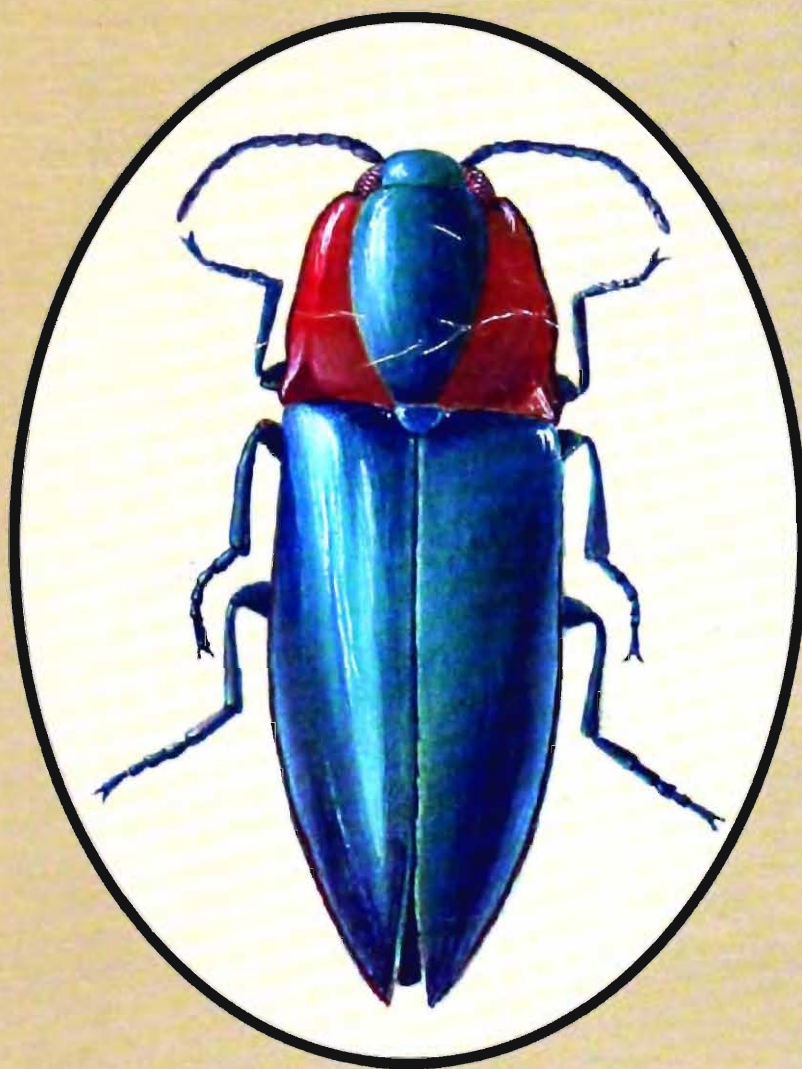


A contribution to the
FAUNA OF CLICK-BEETLES

(Coleoptera : Elateroidea : Elateridae)
of West Bengal

PARAMITA CHAKRABORTY
SAMIRAN CHAKRABARTI



Zoological Survey of India

OCCASIONAL PAPER No. 254

**RECORDS OF THE
ZOOLOGICAL SURVEY OF INDIA**

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of West Bengal**

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Dedicated to
Mrs. Kalpana Chakraborty
&
Mr. Prabir Kumar Chakraborty

INTRODUCTION

The representatives of the family 'Elateridae' commonly called as 'click-beetles' are very widely distributed all over the world. They are scientifically interesting, ecologically and economically important and taxonomically difficult group of beetles belonging to the superfamily Elateroidea under the suborder Polyphaga of the order Coleoptera.

These beetles are easily recognized by their elongated, somewhat depressed shape, freely articulating prothorax, posterior angles of pronotum being prolonged pointedly, sometimes strongly so and the prosternum having a pointed process at middle called 'prosternal spine' which fits into a cavity or socket on the mesosternum enabling the beetles to 'click' when lying on its back, to shoot up in the air and coming down on its ventral surface again. Some of these beetles possess photogenic organ like that of Lampyridae. These 'fire-flies' (*Pyrophorus* spp.) are mainly Neotropical in distribution. The eggs and larvae are also luminous.

Superfamily Elateroidea is quite a large group of Coleoptera containing 7 families of which Elateridae is the largest one. The name of the family Elateridae Leach, 1815 was based on the tribe Elaterites Leach, 1815. *Elater* Linnaeus, 1758 was the type genus of the tribe Elaterites. Elateridae includes about 9000 species under 400 genera (Lawrence, 1982) from different parts of the world. So far, approximately 600 species under 70 genera are known from India.

Prior to 1995 altogether 104 species under 25 genera were known from West Bengal. At the end of the present work the number of species of Elaterid beetles from West Bengal has increased to 172 under 37 genera.

The present work on click beetles of West Bengal is based on a total collection of 415 examples collected from different districts of the state and those present in the Zoological Survey of India and the materials received from other institutes and private collectors. In the present work, 10 new species under the genera *Adelocera*, *Agrypnus*, *Lanelater*, *Melanotus* and *Ludigenus* have been described. The new species viz, *Adelocera prabiri*, *A. triptii*, *Agrypnus darjeelingensis*, *A. shyamrupi*, *Lanelater kalimpongensis*, *Cardiophorus moni*, *Melanotus bengalicus*, *M. himalayanus*, *M. kolkatai* and *Ludigenus kalpanas* are described. Dichotomous keys to the subfamilies, genera and species are provided for those materials which were available for study.

While studying the identified or unidentified materials present in the Zoological Survey of India and also the name of the materials listed by different foreign workers it was observed that these were collected a long time ago. They did not give any particular locality of the materials collected. The published locality, of a number of species was either 'Indes-Orientales' or 'Bengal' or 'Bengal border' Only in recent days the workers have tried to give the exact locality of the species. Here attempts have been made to give

the exact locality of the species wherever possible, otherwise in few cases published locality have been given. It has also been observed that maximum concentration of 52 species is found in the area from plain land to the lower Hill forest (up to 450 m) and only 8 species are recorded in the Upper Hill forest zone (1500m–3636m). From the study on abundance of these beetles from the State it was observed that these beetles are predominant during monsoon and are rare during winter.

HISTORY

Prior to study no comprehensive account on Indian elaterid fauna is available. Candeze (1857–1897) published a catalogue (1891) in which a list of 200 species from India was provided which includes 58 species under 22 genera from Bengal (undivided Bengal, the Bengal before 1947). Fleutiaux (1889–1947) extensively studied the Indo-Chinese and Indian fauna and proposed a scheme of classification and published in 1941 a key to the subfamilies of this region. He has also described several new species from this area. The classification proposed by him is widely accepted by most of the chief workers of this group. Schwarz (1906–1907) has described the genera of Elateridae in Wytsmann Genera Insectorum. Ohira (1970–1978) has published a list of the beetles of this area that are present in Hungarian Natural History Museum. Ohira and Becker (1971–1974) have published several papers on this group and recorded 15 species from northeastern part of sub-Himalayan region. von Hayek (1973) has proposed a reclassification of the subfamily 'Agrypninae' and later in 1979, she published some additions and corrections on that paper. She has recorded altogether 89 species under 7 genera of the subfamily Agrypninae from India. She has also given the total account of 'Melanotus (subfamily : Melanotinae) group of genera' (1990). Stibick (1979) recently provided a classification of this family with 12 subfamilies and 37 tribes, 5 of these tribes are again divided into 20 sub-tribes. But this classification is mainly based on his work on the materials from America. He has also published the revisionary works on subfamily Hypnoidinae (1976–1980) of the world. Platia and Schimmel (1991 onwards) have described 30 new species from India. They have worked on the subfamily Senodoninae and also 'Dima group of species' The other workers who worked on this group are Arnett (1952, 1955), Casari-Chen (1993, 1994), Dolin V.G. (1975), Dolin W.G. (1987, 1993), Eschscholtz (1829-1836), Gurjeva (1974), Hope (1831, 1842) Hyslop (1917-1921) and Suzuki (1982-1990).

In India, Stebbings (1914) and Beeson (1941) have commented on the economic importance of this group. Vats (1990) initiated the taxonomic study of this group, along with his collaborators in North Western part of India and have recorded about 130 species including one new genus, mainly from the states of Himachal Pradesh, Uttar Pradesh and Haryana. Of which 114 species are new to science till 1997.

With regard to the fauna of West Bengal is concerned, Hope (1831) for the first time recorded the species, viz., *Campsosternus stephensi*, *Diploconus* (now *Priopus*) *miniaticollis*, *D. miniatus*, *D. trimaculatus* and *Penia eschscholtzi* from this State. Later, Candeze (1891) in his catalogue has recorded 27 species under 19 genera from West Bengal. Further, in 1892,

Candeze added a few species viz., *Cardiophorus bombycinus*, *C. ferrugatipes*, *Silesis nigriceps* and *Agonischius metallicus* and in 1893, another 4 species *Silesis granarius*, *S. grisescens*, *Melanotus telum* and *Penia opatroides* from the State. Candeze (1895) recorded *Agnischius simulator* from West Bengal. In 1900, Candeze recorded the species *Zoroehrus tactus* from West Bengal. Schwarz in 1902 recorded *Silesis longipennis* from the State. Schwarz (1905) recorded *Agrypnus niger*, *Penia lateralis* and *P. nigra*. Fleutiaux (1941) described *Paracsikia indica* from the State. Ohira & Becker (1971, 1973) have described 2 species under *Silesis* and one species under *Meristhus* from West Bengal. Suzuki (1982) described the species *Neocsikia krishna* from West Bengal. Suzuki and Dolin (1984) described 2 new species of *Penia*. Recently, Platia and Schimmel (1991) have published the descriptions of 25 new species under *Silesis*, 2 new species under *Dima*, 2 new species under *Paracsikia*, 13 new species under *Penia* and 1 new species under *Senodonia*. In 1992, Platia and Schimmel described 1 new species of *Penia*. In 1993, Dolin has described 4 new species under the genus *Quasimus* and Platia and Schimmel described 2 new species of *Silesis* from West Bengal. In 1997, Platia and Gudenzi described *Drasterius confusus* from the State.

BIOLOGY

Information on the biology of Click-beetles are very very scanty. These beetles are holometabolous insects having eggs, larvae, pupae and adult stages in their life cycles. Stebbings (1914), Beeson (1941) and Pedigo (1996) provided a general account on the biology of elaterid beetles.

Egg : Mature female generally lay eggs singly in the soil, in 2-15 cm deep during the spring or early summer. Eggs hatch within 14-30 days. Young larvae move within the soil to locate food source.

Larva : The larva of these beetles are commonly known as 'wire worms' The shape of the larva is elongated 'wire-like' cylindrical, orthosomatic, sometimes subdepressed, sometimes annulated and very tough skinned; size 15-60 mm in length; colour usually shining reddish brown or yellow or darker above and below. Larval life may be 1-5 years with overlap of generation. Heavy mortality occurs if food and environmental condition is scarce.

The habit and food of the larvae are rather diverse but may be roughly classified in three groups :

(a) *Larvae living in soil and feeding on living or decaying vegetable matter.*

This group is injurious to roots, small plants, seedlings etc. and generally found in North America and Europe.

(b) *Larvae living in wood or bark and feeding on wood.*

This wood boring larvae belongs to the genera like *Agrypnus* and *Melanotus*. They are possibly predators. The wood where the larvae live is in decaying or rotten state when they mature.

(c) *Larvae living in soil or in wood and feeding on other insects.*

The larvae usually are predaceous. The species under the genera *Lanelater*, *Adelocera* and *Heteroderes* live in soil, capture and eat other soil dwelling insects (specially Scarabaeid grubs). But the species of *Calais* live in wood tunnel made by large wood borers (especially Cerambycid grubs). The larvae and pupae of these Cerambycid grub are eaten by the elaterid larvae. *Calais sordidus* is an important destructive factor during the periods of epidemics of *Hoplocerambyx spinicornis*

Pupa : Pupation occurs in soil. The Pupa are white, yellow or orange in colour, having the head bent vertically downwards, the wings cases curved on to the thorax, and the abdomen elongate and often serrate on the lateral edges.

Life cycle : The life cycle is generally completed within one year.

ECOLOGY

The members of this family are although widely distributed in the forests throughout India. Very little is known at present as to their habits. These beetles are frequent on foliage of trees, bushes, flowers and soil. The larvae feed on both plant and animal material, or they are carnivorous on other invertebrates. They live in leaf litter, leaf garbage, stubble of paddy, rotten tree trunks, bark of logs and in the haystack or in loam, clay or sandy soils, under stone in forest, under sand of hilly rivers and streams, or sometimes within mosses. They are often found on rose, china-rose (*Hibiscus rosa-sinensis*) and Tagar (*Tabaernemonntana coronaria*) plants. They are largely nocturnal in habit and are attracted by light.

ECONOMIC IMPORTANCE

The forest elaterid grubs are, however, in all probability mostly predaceous upon other bark and wood-feeding insects, especially the bark and wood boring beetle pests. It would appear that some of these grubs, if not actually wood-borers themselves throughout their development, at any rate tunnel into the hard wood of trees to pupate, thus ruining its appearance and structure.

In the Himalaya, there is at least one elaterid grub that feeds on the roots of the young deodar seedlings and causes serious damage both in nursery and forests.

From Stebbings (1914) and Beeson (1941) the following information on some larvae has been collected.

The larva of *Lanelater fuscipes* lives in soil and is predaceous on cock-chaffer grub (Scarabaeidae) but also eats caterpillars, lepidopterous pupae and dead insects found on the surface of ground. The beetle is also predaceous on insect larvae and also feeds on sap. The beetles emerge in May, June and the adult stage is long-lived. The life cycle is normally annual but may be prolonged in the larval stage for more than 2 years.

Larva of *Heteroderes lenis* is long and found in soil and they are predaceous, eating larvae of Scarabaeidae amongst other diet. The beetles emerge in May–July.

The long cylindrical larvae of species of *Melanotus* live in rotten or soft-wood and bark of *Bombyx malabaricum*, *Erythrina suberosa*, *Spondias mangifera*, *Symplocos theaeifolia*. The life cycle is annual with emergence of beetles on April–June.

The beetle, *Pectocera cantori* has been reported to attack the Semul (*Bombyx malabaricum*) tree. The larvae are apparently predaceous, feeding upon one or more of the numerous wood-boring insects present in the tree. Certain species of the genus *Cardiophorus* has been reported to attack the trees like Bamboo (*Cephalostachyum pergracile*) and Casurina (*Casurina equisetifolia*).

The species of *Calais* viz., *C. sculptus* are predaceous on numerous species of wood-boring larvae of Sal (*Shorea robusta*). *C. sordidus* is predaceous on different species of Cerambycid larvae, boring the trees like *Bombyx malabaricum*, *Ficus infectoria*, *Shorea robusta*, *Spondias mangifera*. It emerges in June–August (mainly July) and its life cycle is annual.

Different species of this family at present are not considered as serious pests to the bark and wood of trees. To get more information on the relative importance of this family in the forest, its further careful study is required.

CLASSIFICATION

A satisfactory classification of this group is not available. There was a tendency of various authors to treat many, if not most of the higher taxa (subtribe, tribe, and subfamilies) as subfamilies of equal rank. This has resulted in a division of Elateridae into as many as 44 subfamilies (Stibick, 1979). For a number of reasons including purposes of references and classification this arrangement was not been satisfactory. However, Stibick (1979) has proposed a classification that states the existence of 12 subfamilies and 37 tribes; five tribes are again divided into 20 subtribes. Stibick (*op. cit.*) ranked most of the subfamilies (as ranked by other authors) as tribes. But, he mainly studied the materials from America and his classification was based on those materials only. While studying the Indian materials, some confusing characters have also been observed during the present study.

Hence, the scheme of classification proposed by Fleutiaux (1940) is followed in the present work, because, Fleutiaux (*op. cit.*) studied the Indo–Chinese fauna and proposed a classification based on his study to the fauna of Indo-Chinese region. Fleutiaux (*op. cit.*) has proposed 21 subfamilies in the classification and his classification is followed by almost all the chief workers on this group viz., Ohira (1970–1978), Vats (1991–1994).

MATERIAL AND METHODS

Material : The present study is mainly based on a fairly large collection of elaterid beetles present in Coleoptera Section of Zoological Survey of India, Kolkata that accumulated since the establishment of the Institute in 1916. The Institute also inherited

materials from the Indian Museum and the Asiatic Society of Bengal. The staff members of Zoological Survey of India made the large majority of the collection. In connection with publishing State fauna series, the Institute undertook intensive surveys of all the districts of the State since the year 1985 to 1995 and altogether 33 parties collected materials during different seasons of the year. Several collections were made by the first author herself, and few were also available from private collectors.

In earlier days, the Institute used to send the materials to the recognized authorities of different parts of the world. So, a large number of elaterid materials were accumulated in the Coleoptera section, identified by the celebrities like Candeze, Fleutiaux, von Hayek, etc. Thus, these authentically identified materials and the types pertaining to the species occurring in West Bengal have been studied in details that provided a complete faunal picture of the area. In addition, the materials present in Indian Agricultural Research Institute (IARI), Pusa, New Delhi, were also studied during the present work.

Methods

I. **Collection** : These beetles are collected by hand picking, light traps, sweeping, beating the bushes, foliage and herbs, lifting the bark by butcher knife etc. are the methods applied to collect 'click-beetles'. Few beetles were also available from flowers like rose, china rose (*Hibiscus rosa-sinensis*) and Tagar (*Tabaernemonntana coronaria*) and also from crop fields like (maize, wheat, mulberry etc.). Occasionally, these beetles are collected under stones and under sands from hilly riverbed.

(a) *Hand picking* : Elaterid beetles are best collected by hand either with the help of a fine hairbrush or by a forceps.

(b) *Light trap* : An artificial light like Petromax gas light or a high power bulb placed adjacent to a mulmul cloth in field attracts a number of elaterid beetles. The beetles attracted by the light would rest on the white cloth, from where they may easily be picked up by hand or by aspirator. Light trap is one of the best way in which a large number of click-beetles are collected.

(c) *Sweeping* : Sweeping with a proper net is often useful while collecting small elaterid beetles. But in this method the host plant data or specific habitat of the material is not available.

(d) *Beating* : Beating is usually employed to dislodge insects from foliage or trees. In this process, very few click-beetles are collected.

II. *Preservation* : The beetles collected are killed by exposing them to vapour of chloroform, benzene, ethyl acetate or sodium or potassium cyanide and by 70% ethyl alcohol. The materials are preserved in dry condition. After killing these beetles in a killing jar, they are usually relaxed and mounted over a pointed part of triangular hard paper or card by means of an adhesive glue or well set and pinned properly and kept in dry chambers for few days. The point of attachment on the board or the point of pinning

being in metathorax for facilitating examination of the specimen from both dorsal and ventral aspects. A few forms and type specimens were, however, mounted on small rectangular cards for greater safety.

Slide Preparation

The different body parts of taxonomic importance, including the genitalia of the specimens, were dissected out and boiled in 10% KOH until they became transparent. Thereafter, the KOH treated parts were washed carefully in distilled water to remove KOH and then transferred to absolute alcohol through 30%, 50%, 70% and 90% grades of alcohol keeping the specimens for 2 to 10 minutes in each grade of alcohol for the purpose of dehydration. After dehydration, these parts of the specimen were dipped in clove oil, then placed onto a clean glass slide with a drop of Canada balsam. The dissected and separated head, mouthparts, prothorax, front leg, meso- and metathorax, abdomen, genitalia etc. in turn were permanently mounted in Canada balsam.

Labeling : All insects when preserved permanently must be provided with identification and data labels. Data labels are written on good quality board-paper with permanent ink, and contain names of the district and locality of collection, date of collection, name of the collector. Identification labels contain the complete scientific name with name of the author and the name of the person determining the identity of the specimen.

Illustrations : The materials were studied under the Stereoscopic Binocular Microscope and the illustrations have been drawn with the aid of a prism type camera Lucida. Rough drawings were made in pencil, then traced in ink onto good quality tracing paper. Correction for suitability of size and symmetry were maintained wherever possible. Generally diagrams of the whole body (dorsal view) and genitalia (when and where available) were drawn.

Body length has been measured from the tip of the head to the apex of the elytra along sutural margin. The length of the pronotum is measured along the midline and does not include the projection of prosternolateral "hind angles" The width is measured as the widest part of the pronotum before the hind angles and is not affected by their expansion if they are wider than the rest of the prothorax.

Following the terminology of Snodgrass (1957), the male genitalia consist of a central 'aedeagus' (median lobe) which is flanked by a pair of "parameres" (lateral lobes, gonostyli). These are supported by the "phallobase" The paramere may be plain at the tip or expanded into an "apical process" In this work, the term 'median lobe' is used for 'aedeagus'

GENERAL STRUCTURE OF ADULT ELATERIDAE

Body shape and Size

Representatives of Elateridae are usually elongated, flat and varies from ovoid (*Penia* and few species of *Cardiophorus* and *Adelocera*) to shell shaped (*Hemiops*). The shape varies

from stout, long and broad to small and depressed. The overall size varies from few millimeters (4-5 mm as in *Meristhus*, *Zorochrus*, *Drasterius*, *Quasimus*, *Aeoloderma*) to 5-6 cms (*Campsosternus*, *Lanelater*, *Calais*). The smallest species studied is *Quasimus subovalis* measuring 1.5 mm and the largest one is *Campsosternus stephensi* measuring 37 mm in length.

The body colour is usually sombre or blackish, few of them are very colourful, red, yellow or yellowish brown (*Hemiops*, *Calais*) or reddish brown (*Plectrosternus*, *Pectocera*, *Melanotus*) or blackish brown (in species of *Agrypnus*, *Cardiophorus*) and often with bluish and greenish reflection (*Campsosternus*) and even metallic colours. It has been observed that the larger beetles are brightly coloured while the smaller ones are usually dull coloured, black and brown colours predominating.

Head : Usually flattened and prognathous, often oval, deflexed (*Campsosternus*, *Pectocera*, *Silesis*, *Melanoxanthus*, *Drasterius*). Frontal surfaces either convex or flat, very often concave and sculptured with punctures. Frontal carina may be distinct (*Heteroderes*, *Pachyderes*, *Melanotus*, *Lanelater*, *Aeoloderma*) or weak or incomplete (in few species of *Agrypnus*, *Hemiops*, *Plectrosternus*, *Campsosternus*), and even absent [*Pectocera*, *Calais*, *Silesis* (few species), *Meristhus*].

Mouth parts : Normally inferior but more or less prognathous in member of Negastrinae and Senodoniinae. Mandibles moderate, stout, arcuate or sharply curved, usually setiferous, apices acute, bifid, or trifid; maxillary palpi four-segmented, the apical segment triangular. Clypeus not distinct, usually deflexed beneath a frontal ridge. Labrum visible and free, small, arcuate; labium usually covered at least in part by the prosternal lobe. Mentum small, quadrate; ligula without paraglossae; labial palpi three segmented, the apical segment triangular.

Antennae : 11-segmented and inserted near (not between) to the eyes above the base of mandibles, normally serrated or often filiform or pectinate or long and laminate (in ♂ of *Pectocera cantori* and in *Plectrosternus rufus*). Antennae sometimes received in prosternal grooves (in members of subfamily *Agrypninae*). Scape usually robust, narrowly elongated, pedicel and 3rd segments may be equal or subequal, sometimes pedicel smaller than the 3rd (*Cardiophorus*, *Plectrosternus*, *Hemiops*) or vice versa (in few species of *Agrypnus*), normally 4th is longer than the previous two segments; in *Melanotinae* 2nd and 3rd segments together longer than the 4th; 4-8th segments are normally serrate, last segment dorso-ventrally flattened. Eyes both small and almost invisible (*Adelocera* or *Agrypnus*) or large and prominent (*Calais*, *Pectocera*).

Thorax

Pronotum : The shape of pronotum varies from quadrate (*Pectocera cantori*), subquadrate (*Lanelater*, *Meristhus*, *Adelocera*); elongated (*Melanotus*, *Melanoxanthus*) or almost ovoid (*Penia*); borders of pronotum usually margined with acute posterior angles projecting posteriorly along the outer margin of the elytra. Lateral margin usually straight, often

arcuate (*Lanelater*, *Calais*, *Agrypnus*), normally entire but crenulate in few species of *Agrypnus*. The hind angles of the pronotum normally pointed but in some cases they are subpointed (in some species of *Agrypnus* and *Anchastus*) or even truncated (in some species of *Agrypnus*, *Melanoxanthus*, *Singhalenus*); hind angles may be acarinate (*Agrypnus*, *Anchastus*, *Aeoloderma*) or unicarinate (*Meristhus*, *Melanoxanthus*, *Melanotus*, *Heteroderes*) or bicarinate (*Calais*). The front angle of pronotum is normally slightly pointed and variations are not observed normally.

Pronotal disc may vary from gently convex (few species of *Agrypnus*) to moderately convex (*Campsosternus*, *Aeoloderma* & *Melanoxanthus*) and strongly convex (*Calais*, *Lanelater*, *Adelocera*, *Melanotus*, *Cardiophorus*). The surfaces of pronotum smooth, punctate, or rugose; punctures normally simple often double (*Heteroderes*).

Prosternum : Broad, either truncate or more usually lobed in front, extremely long in front of the coxae, narrowly produced posteriorly between the coxae into a spine which receives into the mesosternal fossa. Prosternum punctate either densely or moderately densely. Procoxal cavities lateral to prosternal spine, opens behind. Procoxae usually transverse and widely separated. Prothorax freely joined to mesothorax and usually capable of rapid movement on basal joint that usually produces the jumping movement of the body, often with audible snapping noise.

Mesosternum and Metasternum : Narrows always with the prominent fossa between the coxae; mesocoxal cavities open behind. Metasternum long and broad.

Scutellum : Generally pentagonal or subpentagonal (*Melanotus*, *Calais*), often subtriangular (*Campsosternus*) or subquadrate (*Singhalenus*, *Anchaotus*, *Heteroderes*) or even cordate (*Cardiophorus*); in few cases the scutellum is margined by blackish line (*Melanoxanthus* and few species of *Agrypnus*).

Elytra : Normally elongated, entire, apically rounded or sometimes produced or even truncated (*Melanoxanthus*); striae usually distinct with linear rows of single punctures joined by moderately impressed lines; interstriae usually convex to flat, smooth or rugose; in some cases striae not visibly distinct (*Campsosternus*).

Shape of elytra varies from short and flattened (*Penia*, *Adelocera*, *Zoroehrus*) to elongated and convex (*Agrypnus*, *Lanelater*, *Pachyderes*, *Melanotus*; *Singhalenus* *Campsosternus*), lateral sides subparallel either along basal half (*Singhalenus*, *Anchastus*, *Plectrosternus*) or basal third (in few species of *Agrypnus*, *Lanelater*).

Legs : Moderately long, sometimes received in mesosternal or metasternal grooves (in *Agrypnus*) ; trochantines of fore and middle legs exposed; anterior coxae globular, separate; middle coxae globular, separate; middle coxae flat, narrowly separate; hind coxae narrowed outwardly, transverse, often with a prominent femoral plate expanded internally; trochanters moderate to large, fore and middle pair interstitial; hind pair triangular; femora slender to swollen; tibia slender finely spinose, apical spurs small to moderate; tarsal formula 5-5-5, the segments simple or with one or more segments lobed beneath

(*Penia*, *Aeoloderma*); claws simple, toothed or pectinate (*Melanotus*, *Silesis*) with or without empodium between the claws.

Abdomen

Usually longer than broad, with five (very rarely six) visible sternites; sutures usually entire; surface micropunctate or rugose; last abdominal tergite or pygidium is longer and almost flat, often convex (in few species of *Agrypnus*).

ABBREVIATIONS USED

The following abbreviations have been used in the text :

alt.	-	Altitude;
coll.	-	Collected by
det.	-	Determined by
dist.	-	District
ex.	-	Example
exs.	-	Examples
Genera Insect.	-	Genera Insectorum
H.P.		Himachal Pradesh
Lat.	-	Latitude
Loc.	-	Locality
Long	-	Longitude
Lit.	-	Literature
M.P.	-	Madhya Pradesh
Misc.	-	Miscellaneous
N.	-	North
Pty.	-	Party
S.	-	South
W. B.	-	West Bengal
U. P.	-	Uttar Pradesh
Z. S. I.	-	Zoological Survey of India.

SYSTEMATIC LIST OF SPECIES RECORDED FROM WEST BENGAL

A. Subfamily AGRYPNINAE

I. Genus *Adelocera* Latreille, 1829

- + 1. *A. pentagonalus* Vats & Kashyap, 1992
- # 2. *A. prabiri* n. sp.

3. *A. triptii* n. sp.

4. *Adelocera* sp.

II. Genus *Agrypnus* Eschscholtz, 1829

++5. *A. afflictus* (Candeze) 1874

+6. *A. bipapulatus* (Candeze) 1865

++7. *A. coenosus* (Hope) 1831

++8. *A. colonicus* (Candeze) 1881

+9. *A. costicollis* (Candeze) 1857

#10. *A. darjeelingensis* n. sp.

+11. *A. haedulus* (Candeze) 1857

+12. *A. jurulosus* (Candeze) 1889

+13. *A. lapideus* (Candeze) 1851

+14. *A. maisus* Vats & Kashyap, 1992

+15. *A. melancholicus* (Candeze) 1890

++16. *A. mustellinus* (Germar) 1840

*17. *A. niger* (Schwarz) 1905

+18. *A. piger* (Candeze) 1889

+19. *A. serrula* (Candeze) 1857

#20. *A. shyamrupi* n. sp.

++21. *A. sinensis* (Candeze) 1857

+22. *A. tostus* (Candeze) 1857

23. *Agrypnus* sp.

III. Genus *Lacon* Castelnau, 1836

*24. *L. oliveri* (Candeze) 1874

IV. Genus *Lanelater* Arnett, 1952

+25. *L. attonitus* (Candeze) 1857

+26. *L. cinereus* (Candeze) 1857

+27. *L. fuscipes* (Fabricius) 1775

#28. *L. kalimpongensis* n. sp

+29. *L. luridus* (Fabricius) 1781

+30. *L. rufipes* (Candeze) 1874

V. Genus *Meristhus* Candeze, 1857

+31. *M. (Sulcimerus) crenulatus* Mukhopadhyay & Chakraborty, 2003

++32. *M. (Sulcimerus) lotharensis* Ohira & Becker 1973

+33. *M. (Sulcimerus) quadripunctatus* Candeze, 1857

B. Subfamily CARDIOPHORINAE

VI. Genus *Cardiophorus* Eschscholtz 1829

- *34. *C. bombycinus* Candeze, 1892
- *35. *C. ferrugatipes* Candeze, 1892
- 36. *C. gangeticus* Candeze, 1860
- #37. *C. moni* n. sp.
- +38. *C. moorei* Candeze, 1860
- +39. *C. serratus* Mukhopadhyay & Chakraborty, 2003

C. Subfamily HEMIOPSINAE

VII. Genus *Hemiops* Castelnau, 1833

- ++40. *H. crassa* (Gyllenhal) 1817
- +41. *H. flava* Castelnau, 1836

VIII. Genus *Plectrostermus* Lacordaire, 1857

- +42. *P. rufus* Lacordaire, 1857

D. Subfamily MELANOTINAE

IX. Genus *Melanotus* Eschscholtz, 1829

- #43. *M. bengalicus* n. sp.
- 44. *M. fuscus* (Fabricius) 1801
- #45. *M. himalayanus* n. sp.
- #46. *M. kolkatai* n. sp.
- +47. *M. longicornis* Candeze, 1860.
- *48. *M. telum* Candeze, 1893

X. Genus *Metriaulacus* Schwarz, 1902

- *49. *M. gobioides* (Candeze) 1860

XI. Genus *Priopus* Castelnau, 1840

- *50. *P. miniaticollis* (Hope) 1831
- *51. *P. miniatus* (Hope) 1831
- +52. *P. oranatus* (Candeze) 1891
- *53. *P. trimaculatus* (Hope) 1831
- *54. *P. vafer* Erichson 1841

XII. Genus *Szombatya* Platia, 1986

- +55. *S. hodgarti* Platia and Schimmel, 1995

E. Subfamily CONODERINAE

XIII. Genus *Aeoloderma* Fleutiaux 1928

- +56. *A. brachmana* (Candeze) 1859

++57. *A. chrysites* (Candeze) 1859

++58. *A. sinensis* (Candeze) 1859

XIV. Genus *Heteroderes* Latreille, 1834

59. *H. lenis* Candeze, 1859

+60. *H. macroderes* Candeze, 1859

+61. *H. spinicollis* Candeze, 1859

62. *H. spinosus* Candeze, 1890

XV. Genus *Pachyderes* Guerin-Meneville, 1829

63. *P. bengalensis* Candeze, 1889

*64. *P. niger* Candeze, 1878

XVI. Genus *Monocrepidius* Eschscholtz, 1829

*65. *M. longicollis* Candeze, 1878

F. Subfamily PHYSORRHININAE

XVII. Genus *Anchastus* Le Conte, 1853

++66. *A. falsus* Candeze, 1895

++67. *A. imitans* Candeze, 1895

G. Subfamily DICREPIDINAE

XVIII. Genus *Singhalenus* Candeze, 1859

++68. *S. candezei* Schwarz, 1896

H. Subfamily HEMIRRHIPINAE

XIX. Genus *Anthracalaus* Fairmaire, 1888

69. *A. bengalensis* (Candeze) 1889

XX. Genus *Calais* Castelnau, 1836

+70. *C. sculptus* (Westwood) 1848.

+71. *C. sordidus* (Westwood) 1848

I. Subfamily OXYNOPTERINAE

I. Tribe Campsosternini

XXI. Genus *Campsosternus* Latreille, 1834

*72. *C. brunneicornis* Candeze, 1889

+73. *C. dohrni* Westwood, 1848

+74. *C. stephensi* Hope, 1831

II. Tribe Pectocerini

XXII. Genus *Pectocera* Hope, 1842

+75. *P. cantori* Hope, 1842

J. Subfamily ADRASTINAE
XXIII. Genus *Silesis* Candeze, 1863

- *76. *S. beckeri* Platia & Schimmel, 1993
- 77. *S. bengalensis* Candeze, 1889
- *78. *S. bhaktai* Platia & Schimmel, 1991
- *79. *S. brancuccii* & Platia & Schimmel, 1991
- *80. *S. brignolii* Platia & Schimmel, 1991
- *81. *S. canaliculatus* Platia & Schimmel, 1991
- 82. *S. candezei* Platia & Schimmel, 1991
- *83. *S. catei* Platia & Schimmel, 1991
- *84. *S. convexicollis* Platia & Schimmel, 1991
- *85. *S. convexus* Platia & Schimmel, 1991
- *86. *S. cylindriformis* Ohira & Becker, 1971
- *87. *S. dilatatus* Platia & Schimmel, 1993
- *88. *S. excavatus* Platia & Schimmel, 1991
- *89. *S. fruhstorferi* Platia & Schimmel, 1991
- *90. *S. granarius* Candeze, 1893
- *91. *S. grisescens* Candeze, 1893
- *92. *S. humilis* Platia & Schimmel, 1991
- *93. *S. inficetus* Candeze, 1892
- *94. *S. lateralis* Candeze, 1897
- *95. *S. lebischi* Platia & Schimmel, 1991
- *96. *S. longipennis* Schwarz, 1902
- *97. *S. nepalensis* Ohira & Becker, 1971
- 98. *S. nigriceps* Candeze, 1892
- *99. *S. numerosus* Platia & Schimmel, 1991
- *100. *S. pasangi* Platia & Schimmel, 1991
- *101. *S. raii* Platia & Schimmel, 1991
- 102. *S. rugosus* Platia & Schimmel, 1991
- *103. *S. sabatinelli* Platia & Schimmel, 1991
- *104. *S. schawalleri* Platia & Schimmel, 1991
- *105. *S. semirufus* Candeze, 1863
- *106. *S. sericeus* Candeze, 1878
- *107. *S. sherpana* Ohira & Becker, 1971
- *108. *S. simulatus* Candeze, 1863

*109. *S. spiniformis* Platia & Schimmel, 1991

*110. *S. vignai* Platia & Schimmel, 1991

*111. *S. wewalkii* Platia & Schimmel, 1991

112. *S. wittmeri* Platia & Schimmel, 1991

K. Subfamily SENODONIINAE

XXIV. Genus *Dima* Charpentier, 1825

*113. *D. convexiculata* Schimmel & Platia, 1991

*114. *D. pseudoleistoides* Schimmel & Platia, 1991

XXV. Genus *Neocsikia* Ohira & Becker, 1972

*115. *N. krishna* Suzuki, 1982

XXVI. Genus *Paracsika* Schimmel & Platia, 1991

*116. *P. brunnea* Schimmel & Platia, 1991

*117. *P. indica* (Fleutiaux) 1941

*118. *P. parvula* Schimmel & Platia, 1991

XXVII. Genus *Penia* Hope, 1831

*119. *P. canaliculata* Candeze, 1863

*120. *P. eschscholtzi* (Hope) 1831

*121. *P. girardi* Schimmel & Platia, 1991

*122. *P. hayekae* Schimmel & Platia, 1991

*123. *P. hirtella* Candeze, 1863

124. *P. holzschuhi* Schimmel & Platia, 1991

*125. *P. horrida* Schimmel & Platia, 1992

*126. *P. jansoni* Schimmel & Platia, 1991

*127. *P. kaszabi* Dolin & Suzuki, 1987

*128. *P. lateralis* Schwarz, 1905

129. *P. longipes* Candeze, 1863

*130. *P. longiuscula* Schimmel & Platia, 1991

*131. *P. martensi* Schimmel & Platia, 1991

*132. *P. minima* Schimmel & Platia, 1991

*133. *P. nebrioides* Candeze, 1863

*134. *P. nigra* Schwarz, 1905

*135. *P. ohirai* Suzuki & Dolin, 1987

136. *P. opatroides* Candeze, 1893

*137. *P. plagiata* Candeze, 1891

*138. *P. pseudolateralis* Schimmel & Platia, 1991

*139. *P. rustica* Schimmel & Platia, 1991

*140. *P. similis* Schimmel & Platia, 1991

*141. *P. suzuki* Schimmel & Platia, 1991

*142. *P. tomentosa* Candeze, 1863

143. *P. wittmeri* Dolin & Suzuki, 1984

XXVIII. Genus *Senodonia* Castelnau, 1836

*144. *S. brancuccii* Schimmel & Platia, 1992

*145. *S. emodi* (Candeze) 1863

L. Subfamily ELATERINAE

XXIX. Genus *Agonischius* Candeze, 1863

146. *A. altus* Candeze, 1889

*147. *A. cinctus* Candeze, 1878

*148. *A. metallicus* Candeze, 1892

*149. *A. simulator* Candeze, 1895

XXX. Genus *Aphanobius* Eschscholtz, 1829

*150. *A. alaomorphus* Candeze, 1863.

+151. *A. touffus* Vats & Chauhan, 1992

XXXI. Genus *Drasterius* Eschscholtz, 1829

+152. *D. brahminus* Candeze, 1859

+153. *D. collaris* Candeze, 1859

*154. *D. confusus* Platia & Guidenzi, 1997

*155. *D. discicollis* (Walker) 1859

+156. *D. sulcatulus* Candeze, 1859

XXXII. Genus *Ludigenus* Candeze, 1863

#157. *L. kalpanas* n. sp.

XXXIII. Genus *Megapenthes* Kiesenwetter, 1863

*158. *M. linearis* Candeze. 1857

XXXIV. Genus *Melanoxanthus* Eschscholtz., 1833

+159. *M. anticus* Candeze, 1892

++160. *M. bimaculatus* Fleutiaux, 1918

+161. *M. dimidiatipennis* Candeze, 1859

+162. *M. melanocephalus* (Fabricius) 1781

++163. *M. melanurus* Candeze, 1865

*164. *M. rubiginosus* Candeze, 1889

M. Subfamily HYPNOIDINAE

XXV. Genus *Hypnoidus* Dillwyn, 1829

*165. *H. beckeri* Stibick, 1980

N. Subfamily NEGASTRINAE

XXXVI. Genus *Quasimus* Gozis, 1886

*166. *Q. (Quasimus) brancuccii* Dolin 1993

167. *Q. (Quasimus) meghlayanus* Dolin 1993

168. *Q. (Quasimus) obovatus* Dolin 1993

*169. *Q. (Quasimus) persimilis* Dolin 1993

*170. *Q. (Quasimus) subovalis* Fleutiaux 1930

XXXVII. Genus *Zorochrus* Thompson 1858

++171. *Z. birganjianus* Ohira & Becker, 1973

++172. *Z. godavariensis* Ohira & Becker, 1974

*173. *Z. (S.Str.) tactus* (Candeze) 1900

Remarks : The species which are recorded from India as well as West Bengal for the first time has been marked ‘++’

The species which are recorded from West Bengal for the first time has been marked ‘+’

The species which are new to science has been marked ‘#’

The species which were not available for study has been mark ‘*’

Note : The species recorded from ‘Bengal’ but could not be confirmed their exact locality have been omitted from this list and listed separately under “List of species recorded from Bengal but without their exact localities.”

Key to the Subfamilies of ELATERIDAE of West Bengal

- 1. Mesocoxae open to mesepimeron and/or mesepisternum, mesepimeron of normal size, setae present on base of claws 2
- Mesocoxae closed to mesepisternum by mesepimeron and metasternum and a reduced mesepimeron by connation of mesosternum and metasternum or mesepimeron normal sized, setae absent on base of claws 12
- 2. Prosternal suture opened or deeply grooved for receiving the antennae at repose, occasionally prosternopleural sutures grooved for reception of anterior tarsi AGRYPNINAE
- Prosternal suture closed or very often narrowly grooved, the latter closed or often open at front with shallow excavation at best 3

3. Frontal carina distinct or prominent, often with a hole on the top of the anterior border 4
 - Frontal carina faint or weak in the middle (between the eyes), sometimes two pieces joining at the anterior border 9
4. Frontal carina equally well distinct during its extension 5
 - Frontal carina more or less weakened at middle 8
5. Tarsi simple, claws pectinate MELANOTINAE
 - Tarsi with one or two articles dialated or lamellated, claws simple 6
6. Tarsi with two articles, 3rd and 4th dialated or lamellated DICREPIDIINAE
 - Tarsi with only one article dialated or lamellated 7
7. Third article dialated or lamellated PHYSORRHININAE
 - Fourth article dialated or lamellated CONODERINAE
8. Mesosternum and metasternum either connate (suture indistinct or absent) or distinct (joined by a definite suture); claws simple, without setae, body robust, larger in size, surface smooth with metallic shining appearance (*Campsosternus*) or brownish in colour with laminate antennae (*Pectocera*) OXYNOPTERINAE
 - Mesosternum and metasternum connate, suture absent or indistinct; claws simple, setae present at base and sometimes elsewhere on claws; body robust, larger in size, covered with plentiful pubescence of various colours (*Calais* or glabrous with shining black (*Anthracalaus*)) HEMIRRHIPINAE
9. Head capsule flattened, mouth parts prognathous, tarsi with 2,3 and 4 or 3 and 4 articles dialated or lamellated, claws simple SENODONIINAE
 - Head capsule oval, de-flexed, mouth parts inferior, tarsi simple, often 3rd or 4th segment lobed, claws simple or pectinate or serrate 10
10. Tarsi simple or 3rd or 4th segment lobed; claws strongly serrate ADRASTINAE
 - Tarsi simple or with lobe on 1 or more segments; claws simple 11
11. Body normally shell-shaped; frons without ridge between and above antennae; pronotum not or weakly margined laterally; prosternal suture concave and double or secondarily closed (excavated line present) and straight; tarsi simple or with lobe on 1 or more segments HEMIOPSINAE
 - Body normally elongated and flattened; frontal ridge various often obsolete in middle to thick and protruding; pronotum clearly margined laterally; prosternal sutures entire or excavated in front usually single, rarely double; tarsi simple ELATERINAE

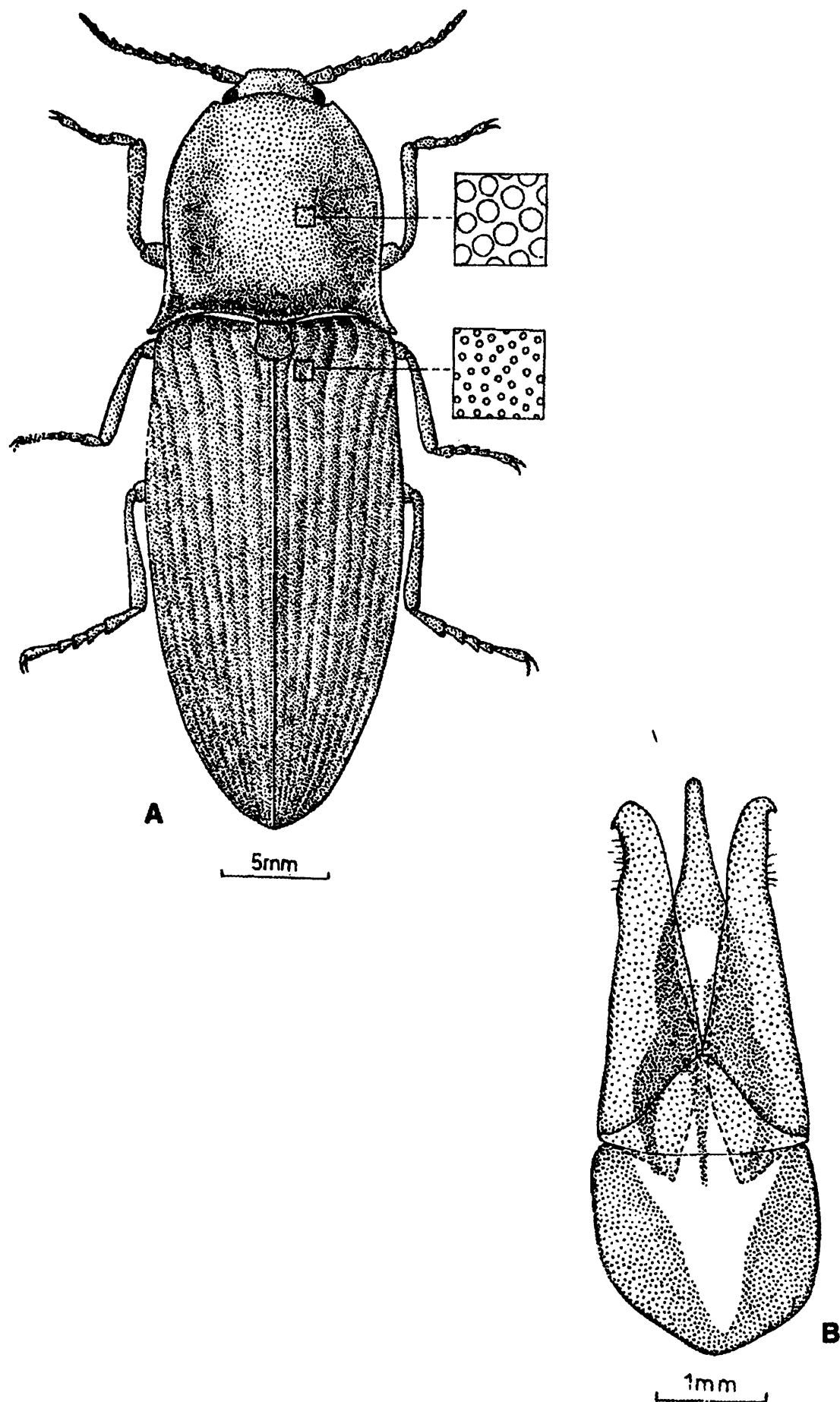


Fig. A-B : A. Dorsal view of an adult Elateridae; B. Dorsal view of male genitalia.

12. Mesepisternum cut off from mesocoxal cavity but mesepimeron is open to the cavity; tarsi simple, without pads, claws simple HYPNOIDINAE
- Mesepimeron and mesepisternum cut off from mesocoxal cavity by meso- and metasternum; tarsi variable, simple or 4th or 3rd and 4th lobed or 4th only lobed or lamellated or cordate, claws variable, simple, feebly toothed, dented, pectinate, bicuspidate or flanged 13
13. Prosternal spine normally elongate, scutellum never cordate, claws variable, simple, bicuspidate, dentate or pectinate NEGASTRINAE
- Prosternal spine short, truncated; scutellum cordate, claws simple, often feebly toothed or flanged CARDIOPHORINAE

TAXONOMY OF ELATERIDAE OF WEST BENGAL

An account of the "Click- beetles" of West Bengal has been provided here. The detailed taxonomical studies of these beetles have been included in this chapter. 173 species under 37 genera are treated in this account that includes 87 species under 28 genera and 13 sub families actually available for studies. Ten new species have also been described.

The type, morphological characters, distribution, biology and habits of each genus have been included. The redescrptions of 48 species (except those that are not available in recent publications) and descriptions of the 10 new species and two unnamed species (*Adelocera* sp. and *Agrypnus* sp.) have been included. The dorsal views of 64 species [viz., 10 new species and two unnamed species (*Adelocera* sp. and *Agrypnus* sp.) and the rest 52 species whose figures are not available in recent publications] have been included. The type materials of all the new species (both Holotype and Paratypes) described here are kept in the Coleoptera section of Zoological Survey of India, New Alipur, Kolkata-700053.

A. Subfamily AGRYPNINAE

Diagnostic characters : Prosternal sutures with deep grooves for reception of antennae, rarely grooved posteriorly for reception of anterior tarsi; frontal carina absent, vague or more or less present above to variously developed between antennae, frons more or less concave, mouthparts inferior; prosternal lobes normally arcuate or even prominent, prosternum simple, without cross or transverse sutures, propleuron and metasternum may be either grooved for tarsae or antennae or not; mesosternum and mesepisternum simple, not divided by cross sutures, meso- and metasternum with distinct suture or suture indistinct or absent; scutellum shield-shaped, never cordate; tarsi various; claws with seta(e) at base.

Remarks : Most of the authors have preferred to treat the group as a subfamily except Stibick (1979) who has treated it as a tribe under subfamily Pyrophorinae mainly due to the presence of setae at the base of the claws. This is quite a large subfamily with about 1000 species under 19 genera from the world, the largest genus being the *Agrypnus* Eschscholtz. From India, von Hayek (1973, 1979) has listed seven genera, namely *Adelocera* (with 21 species), *Agrypnus* (with about 90 species), *Lacon* (with 13 species), *Lanelater* (with 20 species), *Meristhus* (with five species), *Octocryptus* (with two species) and *Rismethus* (with one species) and a total of 152 species. From West Bengal only two species under two separate genera namely, *Lacon olivieri* (Candeze, 1874) and *Agrypnus niger* (Schwarz, 1905) were recorded previously from Darjeeling district.

Here, a total of 33 species under five genera have been recorded from West Bengal, of which materials of 31 species were available for study. These include five species as new to science. The subfamily has been extensively studied by von Hayek in 1973 & 1979 and she has synonymized 35 genera under the appropriate oldest name and restored one genus that was previously synonymised. At the specific level, she has corrected the older mistakes, placing 23 names in synonymy, retrieving 11, and giving 471 new combination, in addition to providing the location of type materials and designating 406 lectotypes.

Key to the genera

- 1. Mesepisternum forming part of margin of middle coxal cavity; tibial spurs present; vestiture setose, scales entirely absent *Lanelater*
- Mesepisternum not forming part of margin of middle coxal cavity; tibial spurs absent; vestiture generally scaly 2
- 2. Mesepimeron forming part of margin of mesocoxal cavity *Adelocera*
- Mesepimeron not forming part of margin of mesocoxal cavity 3
- 3. Scutellum with longitudinal carina, propleurae without any tarsal grooves *Meristhus*
- Scutellum without longitudinal carina, simple, propleurae sometimes with tarsal grooves *Agrypnus*

I. Genus *Adelocera* Latreille, 1829

1829. *Adelocera* Latreille, In Cuvier, G.L.C.F.D., *Le regne animal*. Nouvelle ed. 4 : 451; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, *Suppl.*, 20 : 13.

1840. *Lacon* sensu Germar, *Z. Ent. (Germar)* 2 : 24 and subsequent authors nec 1836, Castelnau, *Pars., Revue Ent. (Silbermann)* 4 : 6.

1857. *Agraeus* Candeze, *Mon. Elat.*, 1 : 165.

1857. *Pericus* Candeze, *Mon. Elat.*, 1 : 167.

1858. *Brachylacon* Motschulsky, *Etudes entomologiques*, 7 : 60.
1858. *Trachylacon* Motschulsky, *Etudes entomologiques*, 7 : 61 [Synonymized with *Agraeus* Candeze by Schwarz, 1906, In Wytsmann *Genera. Insect.*, 46A : 27].
1928. *Cavicoxum* Pic, *Melanges exotico-entomologiques*, 51 : 21
1934. *Prolacon* Fleutiaux, *Bull. Soc. Ent. Fr.*, 39 : 179.
1967. *Aganolacon* Ohira, *Kontyu*, 35 : 55 (as a subgenus *Brachylacon*).

Type : *Elater ovalis* Germar by subsequent designation [Hyslop, 1921 : 632].

Diagnostic characters : The genus has been described in details by von Hayek (1973).

Distribution : Ethiopian and Oriental regions mainly. Only one species [*A. minutes* (Candeze)] has been recorded from Neartic.]

Biology and habits : Nothing is known of the biology and habits of *Adelocera* species. The adults have been found on plants and trees on the ground.

Remarks : von Hayek, 1973 recorded 3 species viz., *A. demissus* (Candeze), *A. discedens* (Candeze), *A. succinatus* (Candeze) from Bengal. But after a careful study reveals that these species belong to Chota Nagpore and Barwai which are under the State of Jharkhand (formerly Bihar) now. So, these species have not been included in the present study. Out of the total 87 species recorded from the world, 21 species are now known from India. Here, 4 species including 2 new species are recorded for the first time from West Bengal as well as from India.

Key of the species

1. Antenna reaching the middle of prothorax *prabiri* n. sp.
- Antenna extending beyond the middle of prothorax 2
2. Pronotum broader than long 3
- Pronotum longer than broad *triptii* n. sp.
3. Prosternopleural grooves extending beyond the middle of prosternopleural suture *pentagonalus*
- Prosternopleural grooves reaching the middle of prosternopleural suture *Adelocera* sp.

1. *Adelocera pentagonalus* Vats and Kashyap, 1992

1992. *Adelocera pentagonalus* Vats and Kashyap, *J. Ent. Res.*, 16(1) : 5.

Material examined : 1 ex., INDIA : West Bengal : Jalpaiguri : Subhasini Tea Garden, 3.V.1983., S. K. Chatterjee coll., collected at light.

Ditribution : India : West Bengal (Jalpaiguri), Haryana.

Remarks : The species described by Vats and Kashyap, 1992 in details, is recorded from West Bengal for the first time.

2. *Adelocera prabiri* n. sp.

(Fig. 1)

Description : Length 8.2 mm, breadth 3.1 mm. Body bicoloured—black and brown. Abdominal tergites brownish. Antennae and legs uniformly brown. Vestiture fine, moderately dense, black and golden yellowish coloured.

Head uniformly brownish black, as long as broad, slightly depressed longitudinally in middle. Frontal region densely punctate, depressed; frontal carina absent. Eyes invisible. Antennae short, not reaching the middle of prothorax; 1st segment robust and darker, 2nd segment small and subserrate, 3rd smallest and subserrate, the segments are all serrate from 4th segment onwards.

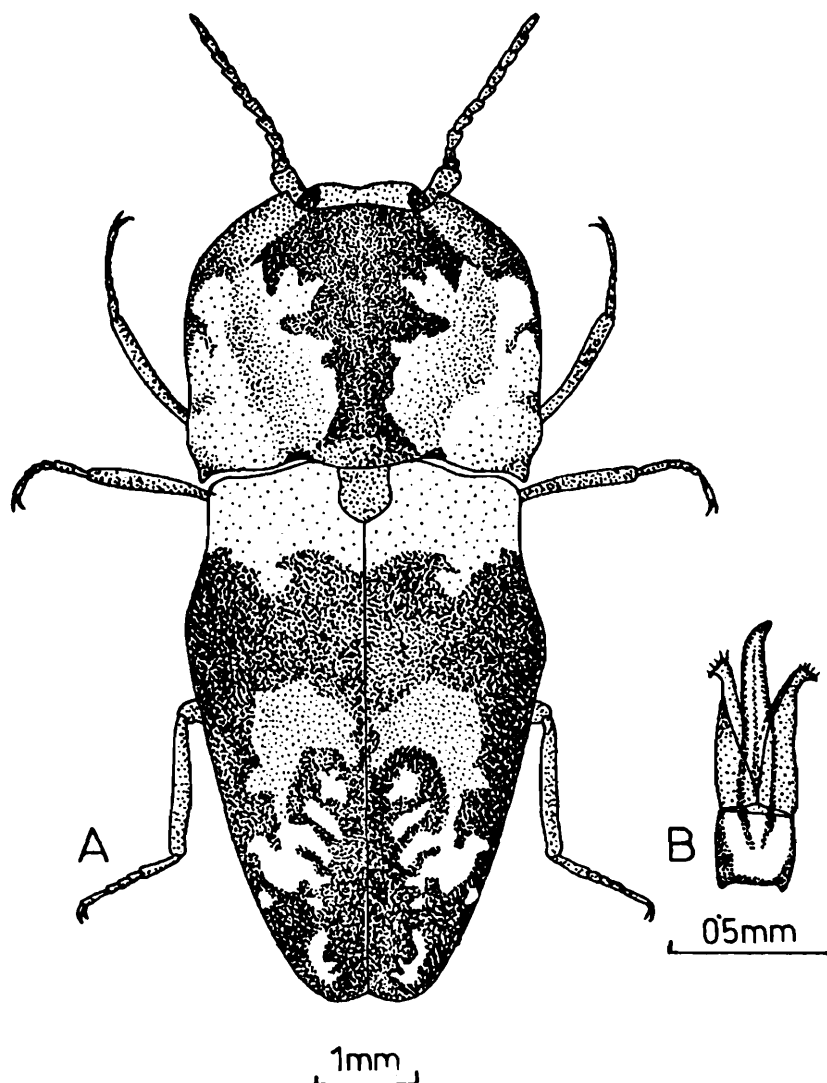


Fig. 1. *Adelocera prabiri* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

Pronotum distinctly broader than long (length 2.6 mm, breadth 3.3 mm), sides subparallel, lateral margin of pronotum entire, almost straight. Vestiture fine, moderately dense, golden brown on either side of the pronotum and black along anterior margin and in middle. Pronotal disc strongly convex, densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Posterior angles flatly pointed, small acarinate.

Prosternum longitudinally elevated in middle, densely punctate, punctures separated by less times their own diameter; integument between punctures not granulate. Prosternopleural grooves reaching the middle of prosternopleural sutures. Margins of mesosternal cavity slightly declined; anterior margin of metasternum truncated between mesocoxae; distal end of metasternal groove touching the lateral margin of metasternum in middle.

Scutellum blackish, pentagonal; emerginate anteriorly; longer than broad, surface convex; finely and moderately densely punctate; vestiture fine, dense.

Elytra 1.7 times longer than broad (length 5.2 mm, breadth 3.1 mm), with reddish brown spots, rounded at distal extremities, convex, sinuate at the base. Striae indistinct, surface with linear rows of punctures joined by moderately impressed lines. Punctures dense, separated by less than their own diameter. Vestiture fine, dense.

Male Genitalia : Phallobase with straight anterior margins; parameres elongated, slender, outer margin slightly sinuous, posterior end with a very short subapical process; median lobe broader, stouter and distinctly longer than parameres, narrows posteriorly to a rounded tip; furcae long and extending beyond the anterior margin of parameres.

Female : Cannot be distinguished from male externally.

Type material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & party. coll.

Paratypes : 4 exs., INDIA : WEST BENGAL : Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & party. coll.; 3 exs, Jaldapara, 4.V.1983, S. K. Chatterjee coll.; 2 exs, Subhansini, 3.V.1983, S. K. Chatterjee coll.

Distribution : India : West Bengal (Jalpaiguri).

Elsewhere : Previously it was reported from Java.

Remarks : This new species comes closer to *A. catulus* (Candeze) but differs in the pattern and size of the punctures in the frontal region, which is dense and larger in size in this species while moderately dense and smaller in size in *A. catulus* and the anterior margin of metasternum is truncated in this species, while that is rounded in *A. catulus*.

The species has been named after Mr. Prabir Kumar Chakraborty father of the first author, for his encouragement and help throughout her life.

3. *Adelocera triptii* n. sp.

(Fig. 2)

Description : Length 6.4 mm, breadth 2.0 mm. Body small, moderately elongated, bicoloured—blackish brown and reddish brown. Abdominal tergites brownish. Antennae and legs brownish. Vestiture fine, moderately long, dense, golden yellow coloured.

Head small, as long as broad, slightly depressed longitudinally in middle. Frontal region densely punctate, punctation simple; frontal carina absent. Eyes small but visible. Antennae long, reaching the hind angle of prothorax; first segment robust and darker, 2nd segment small and sub-globular, 3rd segment smallest and sub-globular 2nd and 3rd segment jointly shorter than the 4th, the segments from 4th onwards are all serrate. Mandibles dented.

Pronotum reddish brown on either side and blackish brown along anterior margin and in middle; slightly longer than broad (length 1.9 mm, breadth 1.8 mm), sides sub-parallel, lateral margin entire, almost straight. Vestiture fine, dense. Pronotal disc strongly convex, densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles pointed, small and carinate, front angles slightly pointed.

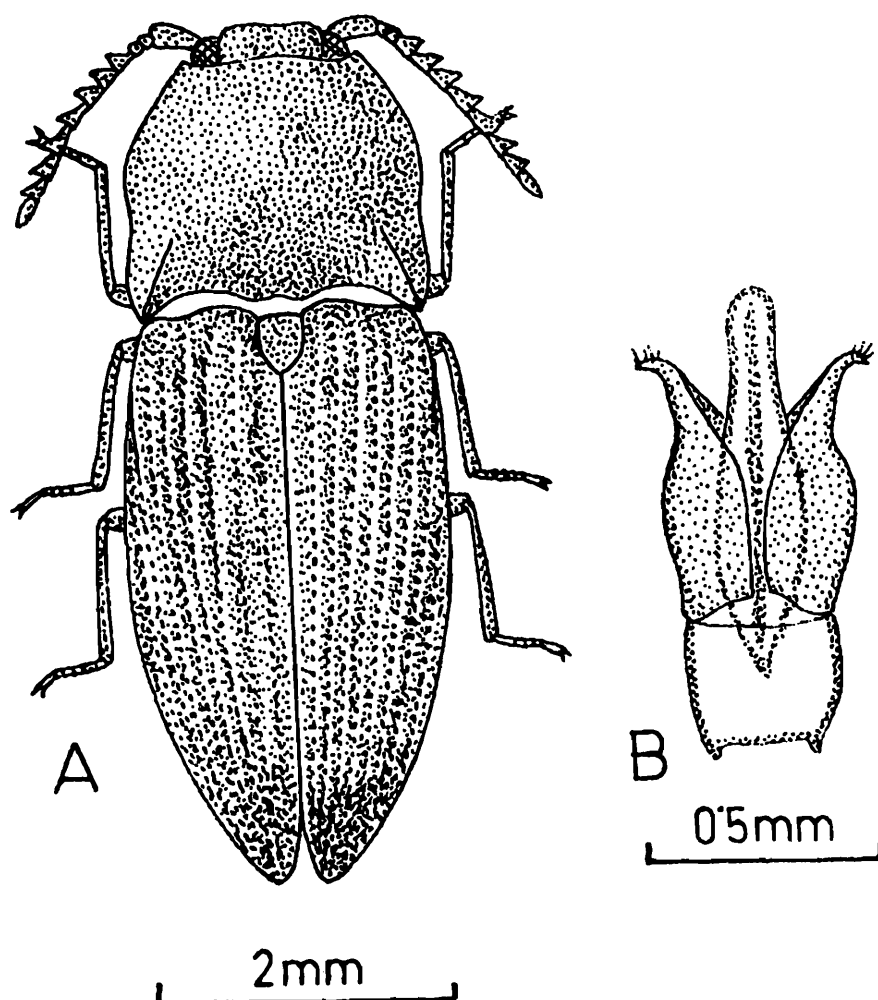


Fig. 2. *Adelocera triptii* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia

Prosternum longitudinally elevated in middle, densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternopleural grooves reaching the middle of prosternopleural sutures. Margins of mesosternal cavity declined slightly. Anterior margin of metasternum truncated between mesocoxae; distal end of metasternal groove touching the lateral margin of metasternum in middle.

Scutellum triangular, shield-shaped, laterally slightly emerginate at the middle; finely, densely punctate. Vestiture fine, dense; integument between punctures not granulate.

Elytra 2.05 times longer than broad (length 4.1 mm, breadth 2 mm), convex, sides gradually widening on basal half, then weakly rounded and gradually tapering towards rounded apex; apices rounded and very weakly spinose along middorsal suture. Striae indistinct, surface with linear rows of punctures, punctures separated by 1-2 times their own diameter; interstriae indistinct. Vestiture moderately dense.

Male Genitalia : Phallobase with anterior margin almost straight, elongate, parameres short and posterior end of each paramere with a very short sub-apical process, outer margin of parameres sinuous; median lobe distinctly broader and longer than parameres, tip rounded and truncated; furcae long upto the anterior margin of parameres.

Female : Cannot be distinguished from male externally.

Type material : Holotype : 1 ex., ♂, INDIA : West Bengal : Purulia : 15. II. 1996; S. Pratihari coll.

Paratypes : 2 exs., INDIA: WEST BENGAL: Purulia, 15. II. 1996, S. Pratihari coll.

Distribution : India : West Bengal (Purulia).

Remarks : This new species is very close to *Adelocera adspersus* (Candeze) but differs in having the smaller sized punctures on the pronotal disc which are bigger in *adspersus*. Besides, the elytra of *A. adspersus* (Candeze) has few reddish brown spots scattered, which is absent in this new species and the genitalia is different.

The species has been named after Dr. (Mrs.) Tripti Chakraborty who has always inspired and helped the first author to complete this work.

4. *Adelocera* sp.

(Fig. 3)

Description : Length 5.5 mm, breadth 2.5 mm. Body broad, small, uniformly brown. Abdominal tergites brownish, Antennae light brown, legs dark brown. Vestiture fine, sparse, small, yellowish white coloured.

Head brown with blackish margin, broader than long, depressed in middle. Frontal region flat, depressed, densely punctate; frontal carina absent. Eyes invisible. Antennae

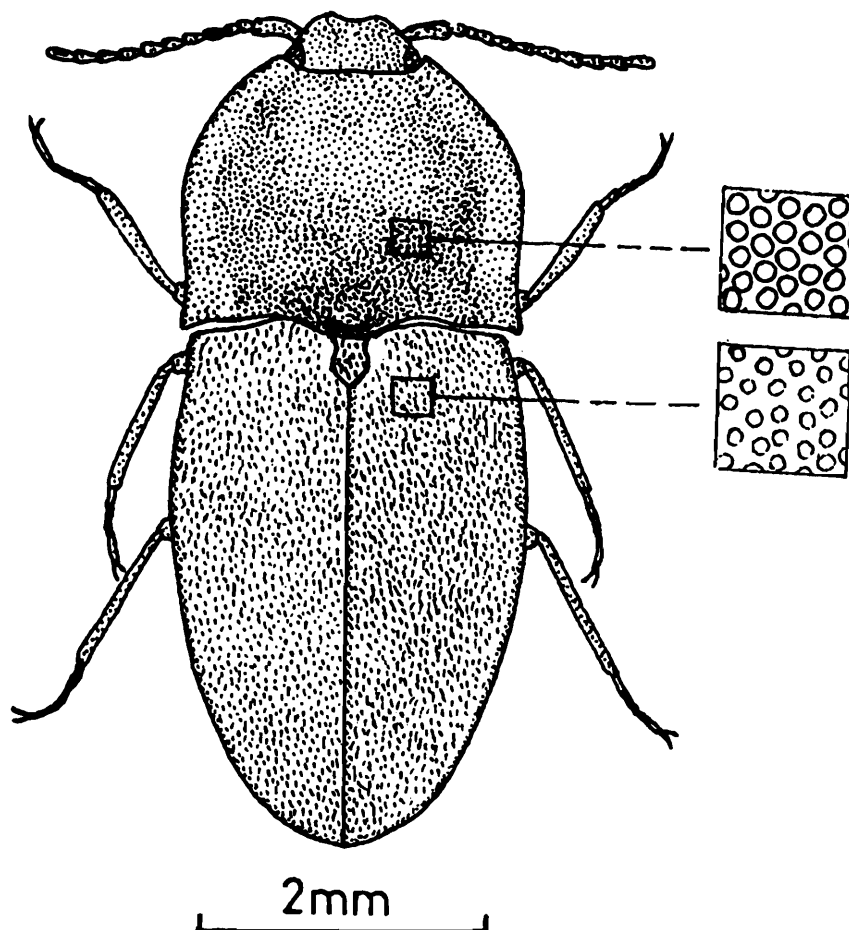


Fig. 3. *Adelocera* sp. : Dorsal view

moderately long, extended beyond the middle of the prothorax; basal segment robust and darker, 2nd segment small and subserrate, 3rd segment smallest and subserrate, 4th and 5th subequal, 4th segment onwards the segments are serrate, Mandibles dented.

Pronotum broader than long (length 1.8 mm, breadth 2.2 mm), sides subparallel, Lateral margin of pronotum entire, almost straight. Vestiture fine, moderately dense. Pronotal disc strongly convex, densely punctate, punctation simple; punctures separated by less than their own diameter; integument between punctures not granulate. Posterior angles pointed, acarinate. Before the scutellum a strong, small, tubercle present on the posterior margin of prothorax.

Prosternum elevated posteriorly, densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternopleural grooves reaching the middle of prosternopleural suture; margins of mesosternal cavity declined slightly; anterior margin of metasternum truncated between mesocoxae, distal end of metasternal groove reaching the lateral margin of metasternum in the middle. Prosternal spine short, pointed, with two longitudinal carina on two sides extended to the posterior margin of gena.

Scutellum pentagonal, shield shaped; surface convex, densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra bicoloured – blackish & reddish brown; 1.2 times longer than broad (length 3.2 mm, breadth 2.5 mm convex, sides gradually widening on basal third, then weakly rounded and gradually tapering towards rounded apex; apices rounded all along. Striae indistinctly punctate, punctures dense, separated by less than their own diameter; interstriae slightly convex to flat, with linear rows of punctures. Vestiture moderately dense.

Male Genitalia : Male was not available.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling; alt. 450 m., 19.IV.1976, A. R. Bhowmik coll.

Distribution : India: West Bengal (Darjeeling).

Remarks : The material comes closer to *A. catulus* (Candeze) but differs in the size of the antennae which reaches upto the middle of the prothorax in *A. catulus* and extends beyond the middle of the prothorax in this species and the head is as long as broad in *A. catulus* (Candeze) and broader than long in this species. The specimen under study in all probability belongs to a new species. However, due to non-availability of more material it is kept as *Adelocera* sp.

II. Genus *Agrypnus* Eschscholtz, 1829

1829. *Agrypnus* Eschscholtz, In : Thon, *Entomol. Archiv*, 2 (I) : 32; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 113; 1979, von Hayek., *Bull. Br. Mus. Nat. Hist. (Ent.)*, 38 (1-6) : 205; 1992 Vats & Kashyap, *J. Ent. Res.*, 16 (2) : 87.
1840. *Lacon* sensu Germar, *Z. Ent. (Germar)*, 2 : 241 and subsequent authors, nec. 1836, Castelnau, *Pars., In Silbermann Revue Ent.*, 4 : 6, Misinterpretation.
1840. *Tylotarsus* Germar, *Z. Ent. (Germar)*, 2 : 247.
1857. *Tylotarsus* Candeze, *Monogr. Elat.*, 1 : 170 [Unjustified emendation].
1857. *Myrmodes* Candeze, *Monogr. Elat.*, 1 : 168.
1890. *Pseudolacon* Blackburn, *Trans. R. Soc. S. Aust.*, 13 : 89.
1890. *Homeolacon* Blackburn, *Trans. R. Soc. S. Aust.*, 13 : 90.
1898. *Lobotarsus* Schwarz, *Dt. ent. Z.*, 1898 : 131.
1935. *Lobitarsus* Fleutiaux, *JIE Africa Uganda nat. Hist. Soc.*, 12 : 93 [Unjustified emendation]
1898. *Enoploderes* Schwarz, *Dt. ent. Z.*, 1898 : 131 [Junior homonym of *Enoploderes* Faldermann, 1837]
1898. *Centrostethus* Schwarz, *Dt. ent. Z.*, 1898 : 414. [Replacement for *Enoploderes* Schwarz]
1905. *Compsolacon* Reitter, *Verh. naturf. Ver. Brunn.*, 43 : 6. [Synonymized with *Lacon* auct. By Fleutiaux, 1918d : 198].
1905. *Paralacon* Reitter, *Verh. naturf. Ver. Brunn.*, 43 : 6, [Reduced to subgenus of *Agrypnus* Eschscholtz, Ohira, 1968 : 364].

1929. *Neolacon* Miwa, Trans. Nat. Hist. Soc. Formosa 19 : 235, [Reduced to subgenus of *Compsolacon* 1934, Reitter, Miwa : 14].
1952. *Colaulon* Arnett, Wasmann J. Biol., 10 : 116.
1955. *Cryptolacon* Nakane & Kishii, Bull. Osaka Mus. Nat. Hist. No., 2 : 1.
1955. *Sabikikorius* Nakane & Kishii, Bull. Osaka Mus. Nat. Hist. No., 2 : 3 [as subgenus of *Agrypnus* Eschscholtz; Raised to generic status by Kishii, 1964 : 15].
1964. *Sagojyo* Kishii, Bull. Heian High School, Kyoto, 8 : 30 [as a subgenus of *Colaulon* Arnett] [Raised to generic status, Ohira, 1967 : 103].
1968. *Pyrganus* Golbach, Acta Zool. Lilloana, 22(1967) : 198.

Type : *Elater murinus* Linnaeus, by subsequent designation [Westwood, 1838 : Synopsis, 26].

Diagnostic characters : The genus has been described by von Hayek (1973) in details.

Distribution : All parts of the world except South America.

Biology and Habits : Hardly anything has been published on the habits of the adult beetles. *Agrypnus murinus* (Linnaeus) is generally recorded as living under stones and in the ground. A number of species have been taken from the foliage of sandal (Fleutiaux, 1933 : 1). *A. eucalypti* (Blackburn) was found under the bark of *Eucalyptus*. Specimens in collection provide no information other than having been taken by sweeping, beating or in light traps (von Hayek 1973). According to Horion (1949 : 118) *A. murinus*, when turned on its back, refuses to right itself in the accepted elaterid fashion but defends itself by everything the paired stink glands lying near the tip of the abdomen.

The larvae of a number of species including *A. murinus* have been described and figured. They lie in the ground and so far as is known they are carnivorous though some (e.g. *A. murinus*) may feed on roots. van Emden (1945) and Ohira (1962) provided useful bibliographical informations on elaterid larvae.

Remarks : From the world more than 400 species has been recorded of which about 90 species are from India. From West Bengal previously 1 species viz., *A. niger* (Schwarz, 1906) was recorded. In the present study 18 species have been recorded for the first time from the state of which 2 species have been described as new to science.

Key to the species

1. Lateral margin of pronotum crenulate 2
- Lateral margin of pronotum entire 9
2. Propleurae and metasternum with grooves 3
- Propleurae and metasternum without grooves..... 4

3. Metasternum truncated between mesocoxae *afflictus*
- Metasternum acute between mesocoxae *tostus*
4. Prosternopleural suture grooved upto middle 5
- Prosternopleural suture grooved beyond middle 6
5. Prothorax longer than broad, hind angle of pronotum without carina, with two longitudinal ridges on the surface of prothorax *costicollis*
- Prothorax as long as broad, hind angle of pronotum with carina, no longitudinal ridges on the surface of prothorax *maius*
6. Punctuation on pronotum double *bipapulatus*
- Punctuation on pronotum simple 7
7. Antennae reaching beyond the middle of prothorax *lapideus*
- Antennae reaching only upto the middle of prothorax 8
8. Posterior angle of prothorax truncated *sinensis*
- Posterior angle of prothorax subrounded *serrula*
9. Propleurae and metasternum with grooves 10
- Propleurae and metasternum without grooves 14
10. Metasternum rounded between mesocoxae 11
- Metasternum truncated between mesocoxae 13
11. Prothorax broader than long *piger*
- Prothorax longer than broad 12
12. Punctuation on pronotum simple *melancholicus*
- Punctuation on pronotum double *haedulus*
13. Prothorax longer than broad, punctuation simple *shyamrupi* n. sp.
- Prothorax broader than long, punctuation double *jurulosus*
14. Metasternum truncated between mesocoxae, elytra inwardly curved at distal extremities *colonicus*
- Metasternum rounded between mesocoxae, elytra rounded at distal extremities
..... 15
15. Antennae extended beyond the middle of the pronotum 16

- Antennae extended not even upto the middle of the pronotum 17
- 16. Hind angle of prothorax truncated, two tubercles on the surface of prothorax
..... *coenosus*
- Hind angle of pronotum subrounded, without any tubercles on prothorax
..... *mustellinus*
- 17. Prosternopleural groove extended beyond the middle, hind angle of pronotum
rounded *darjeelingensis* n. sp.
- Prosternopleural groove extended upto the middle, hind angles of pronotum pointed
..... *Agrypnus* sp.

5. *Agrypnus afflictus* (Candeze), 1874

(Fig. 4)

1874. *Lacon afflictus* Candeze, Mem. Soc. r. Sci. Liege, (2)4; memoire no. I : 68.

1926. *Adelocera afflictu*; Fleutiaux, Annls Soc. Ent. Fr., 95 : 98.

1973. *Agrypnus afflictus*; von Hayek, Bull. Br. Mus. Nat. Hist. Ent. Suppl., 20 : 122.

Redescription : Length 7.5 mm; breadth 2.5 mm. Body moderately elongated, surface shining, blackish brown in colour. Abdominal tergites blackish brown. Antennae and legs dark brown. Vestiture thick, moderately dense, very small, light brownish coloured.

Head small, flattened, concave at middle. Frontal region densely punctate, punctation simple; frontal carina incomplete. Eyes small and concealed. Antennae moderately long, reaching beyond the middle of the prothorax; basal segment robust, 2nd and 3rd segments are small and globular, 3rd segment smallest, rest segments are serrate. Mandibles dented.

Pronotum slightly broader than long (length 2.3 mm, breadth 2.6 mm); sides subparallel; lateral margin crenulate, vestiture fine, dense, moderately long. Pronotal disc strongly convex, densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles sub-pointed, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine short, apex of prosternal spine acutely rounded, moderately densely punctate. Prosternopleural grooves extended beyond the middle of prosternopleural sutures; propleurae with grooves for accommodating the anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum truncated between the mesocoxae; metasternum truncated between the mesocoxae; metasternum with grooves for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, anterior margin slightly emerginate; moderately densely punctate; vestiture thick, small, moderately dense; integument between punctures not-granulate.

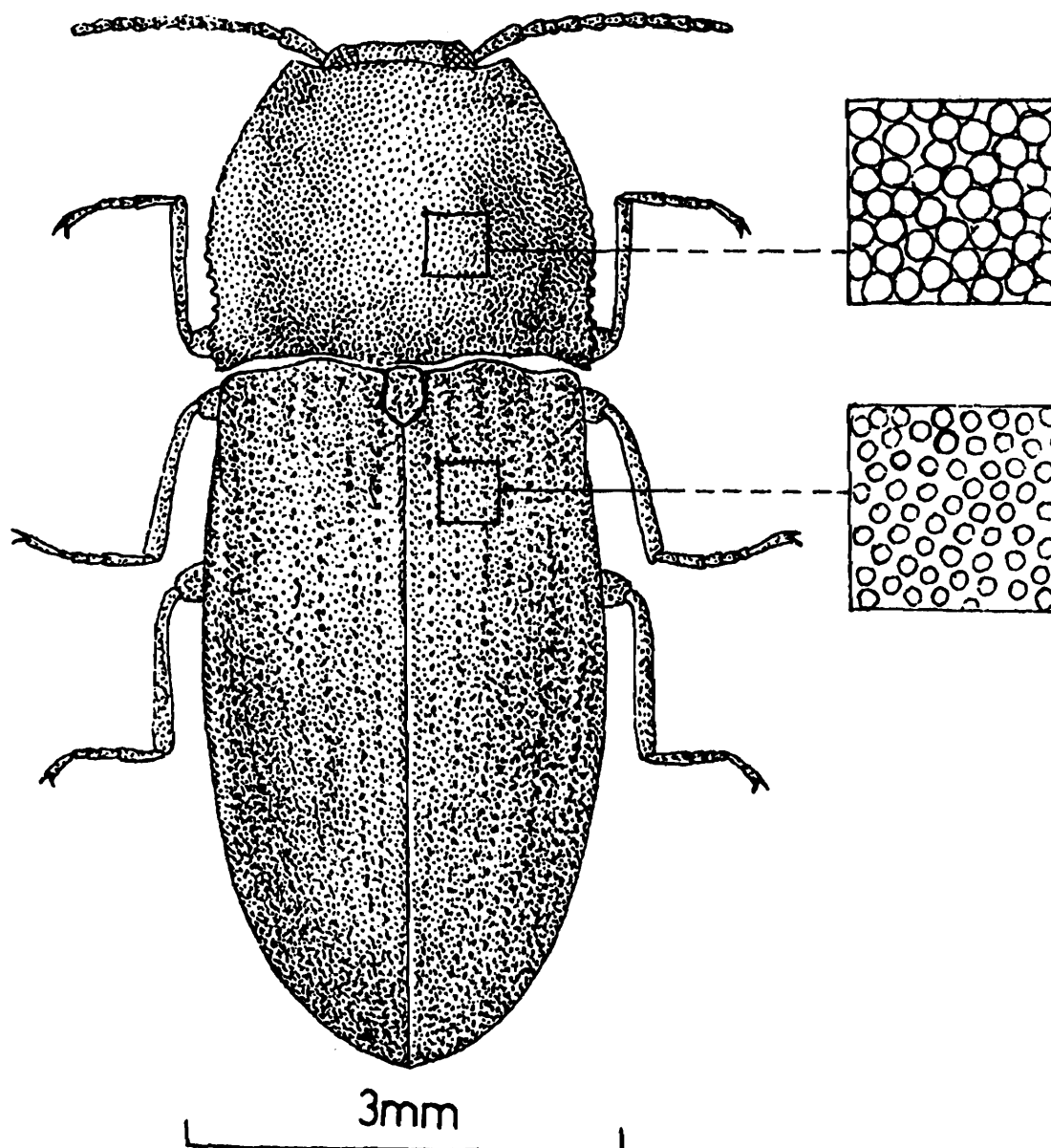


Fig. 4. *Agrypnus afflictus* (Candeze) : Dorsal view.

Elytra 1.9 times longer than broad (length 4.8 mm, breadth 2.5 mm), convex; sides straight, sub-parallel along basal third, then narrowed caudad. Apices rounded and very weakly spinose along middorsal suture. Striae consisting of rows of single punctures joined by moderately impressed lines, punctures separated by less than their own diameter. Interstriae slightly convex to flat; with scattered shallow, smaller punctures; not granulate. Vestiture thick, small and moderately dense. Last sternite of abdomen flat.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, date and coll. not recorded (det. Fleutiaux); 1 ex., Midnapore : Jhargram, 6.IX.1985, S. Biswas coll.

Distribution : India : West Bengal (Kolkata, Midnapore).

Elsewhere : Borneo; Malacca; Malaya; Siam.

Remarks : This species is recorded for the first time from India as well as from the state of West Bengal.

6. *Agrypnus bipapulatus* (Candeze), 1865
(Fig. 5)

1865. *Lacon bipapulatus* Candeze, *Mem. Cour. Acad. R. Sci. Belg.* (in 8°), 17, no. I : 11.
1955. *Agrypnus bipapulatus*; Nakane & Kishii, *Bull. Osaka Mus. Nat. Hist.* No. 2 : 4; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 132.
1967. *Agrypnus sakishimanus* Ohira, *Trans. Shikoku Ent. Soc.*, 9 : 100.
1969. *Agrypnus (Agrypnus) bipapulatus sakishimanus* Ohira, *Bull. Aichi Gakugei. Univ.*, 18 (Nat. Sci.) : 90.

Redescription : Length 16 mm, breadth 6.5 mm. Body elongated, surface shining, blackish brown in colour. Abdominal tergites blackish brown. Antennae and legs brownish. Vestiture small, moderately thick, dense, brown and whitish coloured.

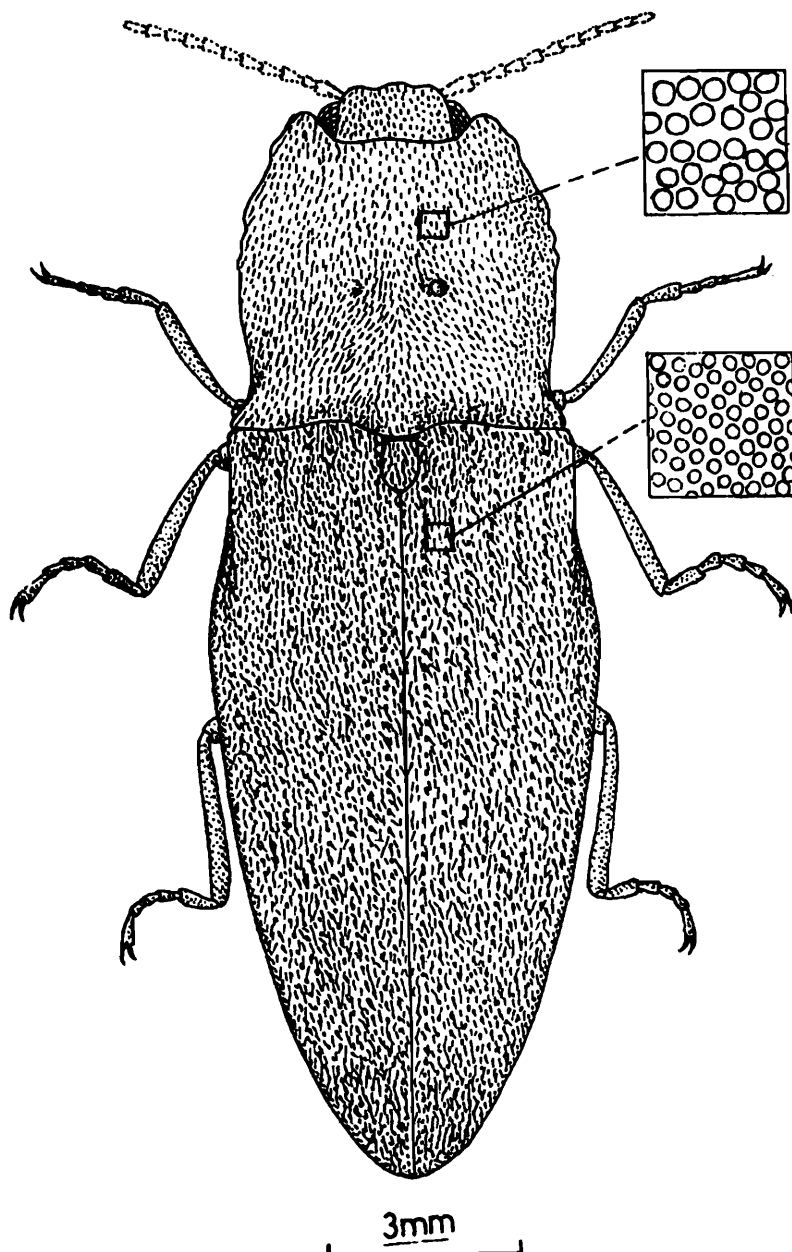


Fig. 5. *Agrypnus bipapulatus* (Candeze) : Dorsal view.

Head small, depressed, concave in middle. Frontal region densely punctate, punctuation simple; frontal carina incomplete. Eyes small and concealed. Antennae broken—can't be studied. Mandibles dented.

Pronotum broader than long (length 4.5 mm, breadth 6 mm); sides subparallel; lateral margin crenulate, sinuate before hind angles. Vestiture small, moderately thick, dense. Pronotal disc moderately convex, rounded, densely punctate, punctuation double; some punctures large, dense, separated by less than their own diameter; other punctures are comparatively smaller and scattered all throughout, these punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Hind angles rounded, carinate, carina extended upto the 1/4th length of the prothorax. Two very small tubercles are present on the pronotum at 2/3rd distance from the apex of pronotum.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine acutely rounded, moderately densely punctate. Prosternopleural grooves extending beyond the middle of prosternopleural suture; propleurae without any grooves for accommodating the anterior tarsi but a slight depression is present. Margins of mesosternal cavity declined. Anterior margin of metasternum truncated between mesocoxae; metasternum without grooves for accommodating the middle tarsi.

Scutellum small, pentagonal, shield-shaped, anterior margin slightly emerginate, densely punctate; vestiture moderately thick, small, dense; integument between punctures not granulate.

Elytra 1.7 times longer than broad (length 11 mm, breadth 6.5 mm), convex; sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and flat outer lateral margin almost entire throughout. Striae consisting of linear rows of bigger punctures, punctures not dense, separated by 2-3 times their own diameter. Interstriae slightly convex to flat without any punctures; not granulate. Vestiture dense. Last sternite of abdomen almost flat.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling, alt. 6000 ft.; rains 1912, Maj. Bennett. coll. (det. Fleutiaux.)

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : China; Japan.

Remarks : The species is recorded for the first time from West Bengal.

7. *Agrypnus coenosus* (Hope), 1831 (Fig. 6)

1831. *Elater coenosus* Hope, In : J. E. Gray, *Zoological Miscellany*, Part I : 25.

1843. *Agrypnus coenosus*; Hope, *Ann. Mag. Nat. Hist.* (I) 11 : 63; 1973, von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.) Suppl.*, 20 : 140.

1874. *Lacon nepalensis* Candeze, *Mem. Soc. R. Sci. Liege*, 4, memoire no. I : 72.

1926. *Adolocera nepalensis* Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 96.

Redescription : Length 16 mm, breadth 5.2 mm. Body elongated, surface shining, uniformly brownish in colour. Abdominal tergites deep brownish. Antennae and legs brownish. Vestiture moderately thick, moderately long, whitish and brownish coloured.

Head small, slightly depressed. Frontal region densely punctate, punctation simple; frontal carina incomplete across the frons. Eyes small. Antenna broken. Mandibles dented.

Pronotum broader than long (length 3.8 mm, breadth 5 mm); sides subparallel; lateral margin entire. Vestiture thick, dense, moderately long. Pronotal disc strongly convex, densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Middle of the pronotum with two tubercles, at a distance 2/3rd from the apex. Hind angles truncated; acarinate. Prosternum densely punctate, punctures separated by less times their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed,

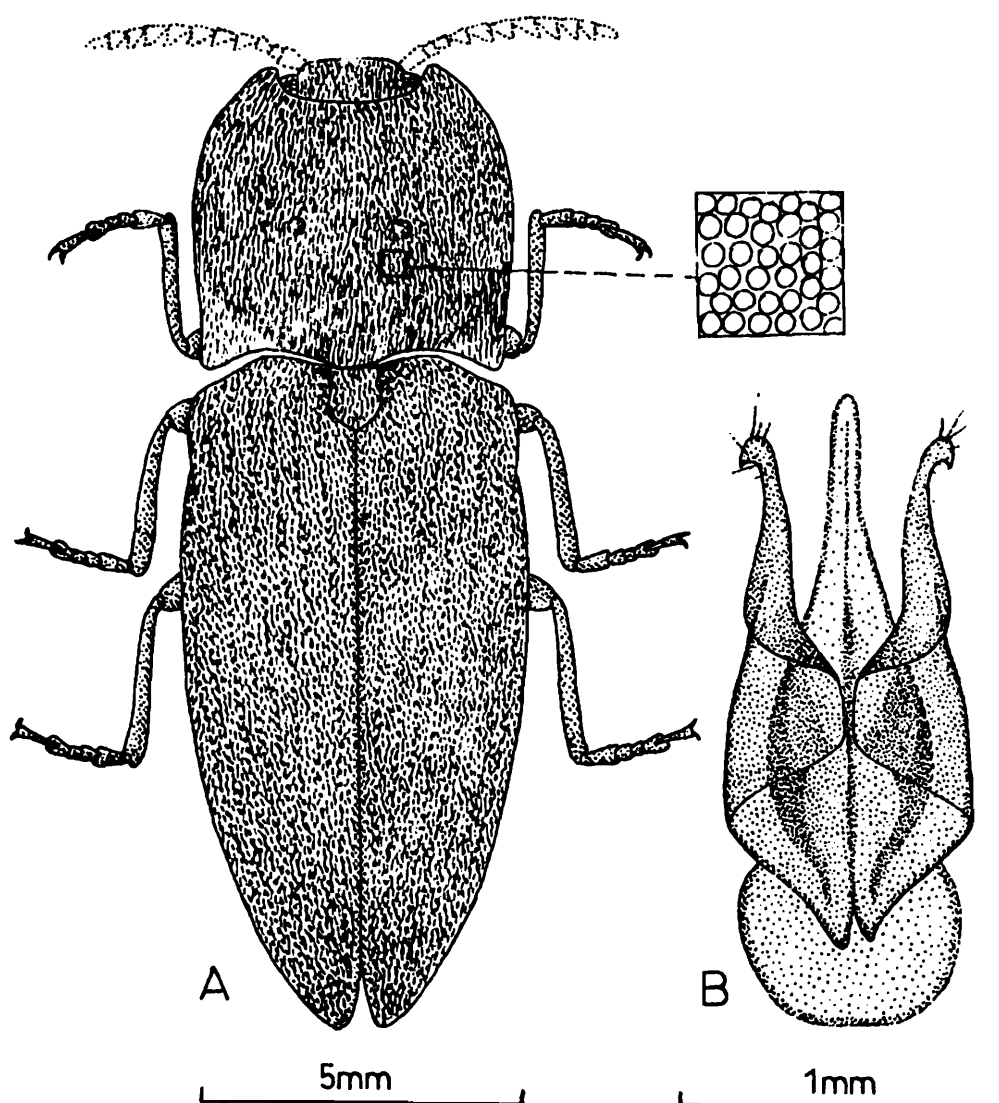


Fig. 6. *Agrypnus coenosus* (Hope) : A. Dorsal view; B. Dorsal view of male genitalia.

moderately densely punctate. Prosternopleural grooves extending upto the middle; propleurae with a faint depression for accommodating anterior tarsi. Margin of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum without any grooves.

Scutellum pentagonal, shield-shaped, surface little depressed in middle; densely punctate; vestiture thick, dense, small; integument between punctures not granulate.

Elytra 1.9 times longer than broad (length 10 mm, breadth 5.2 mm), convex; sides straight, subparallel along basal half, then narrowed caudad; apices rounded and weakly spinose along suture. Striae with linear rows of large punctures, puncture separated by 1-2 times their own diameter. Interstriae slightly convex to flat; with very small shallow punctures scattered. Vestiture thick, small, dense. Tarsi and claws simple. Last sternite of abdomen flat.

Male Genitalia : Phallobase with anterior margin rounded, outer margin of parameres slightly arcuate, posterior end of each paramere with a very minute subapical process; median lobe slightly longer than parameres, tubular, rounded at apex; furcae not reaching the anterior margin of paramere.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Ghumti, 1500–5000 ft. alt., VI. 1914, Carmichael collection (det. Fleutiaux); 1 ex, Kurseong, 11.VII.1925, I. M. Puri coll.; 1 ex., Kalimpong, 24.IV–10.V.1915, F.H. Gravely coll.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

Remarks : This species is recorded for the first time from India as well as from West Bengal.

8. *Agrypnus colonicus* (Candeze), 1882 (Fig. 7)

1882. *Lacon colonicus* Candeze, *Mem. Soc. r. Sci. Liege*, (2) 9 : 8.

1926. *Adelocera colonica* Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 96.

1973. *Agrypnus colonicus*; von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.) Suppl.*, 20 : 141.

Redescription : Length 12 mm, breadth 3.5 mm. Body moderately elongated, surface little shining, blackish brown in colour. Abdominal tergites brownish. Antennae and legs brownish. Vestiture small, thick and dense, brownish and yellowish in colour.

Head small, depressed in middle. Frontal region densely punctate, punctation simple; frontal carina incomplete across the frons. Eyes small, visible. Antennae extended beyond the middle of the pronotum and is inserted in the prosternopleural suture. Hence, the segments can't be properly studied. Mandibles dented.

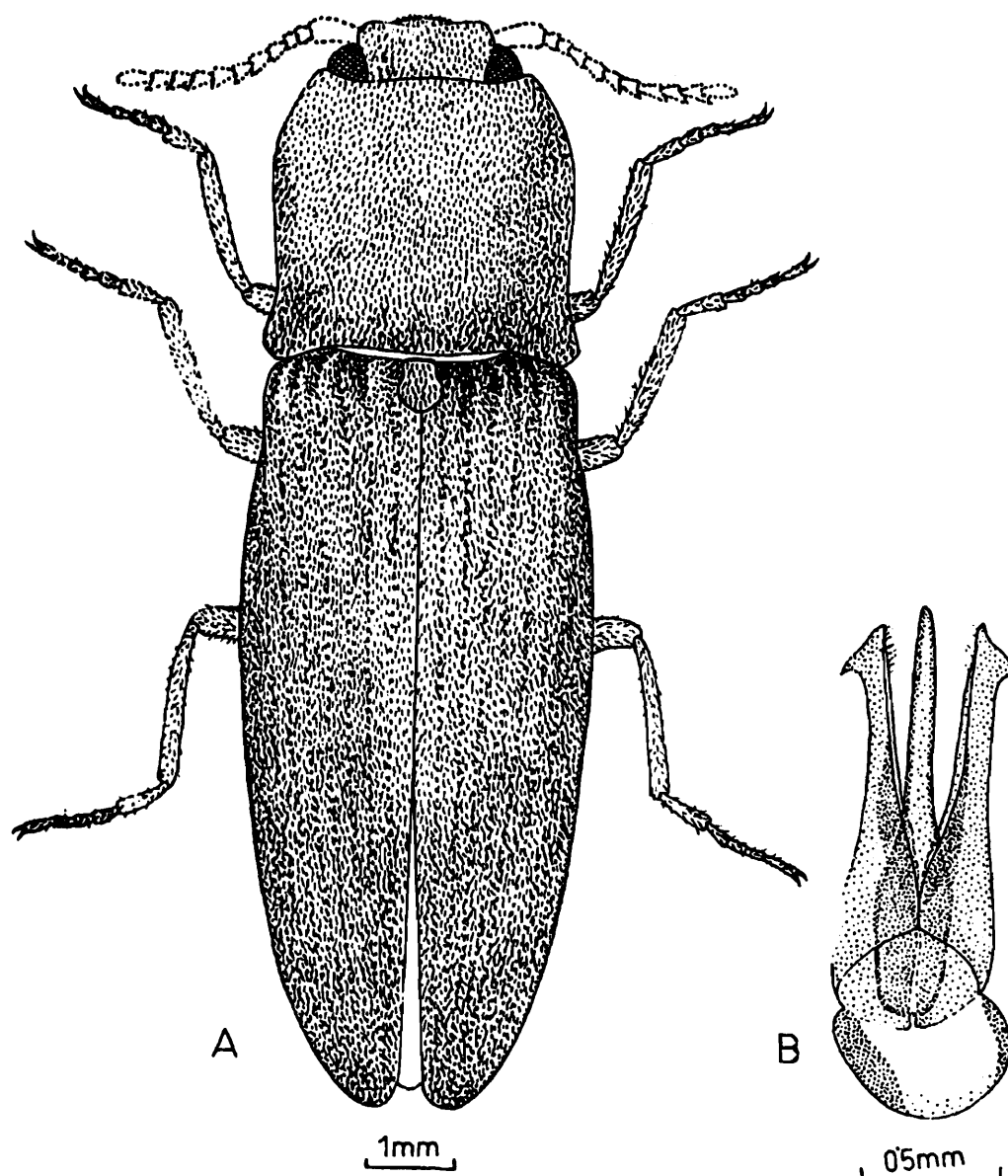


Fig. 7. *Agrypnus colonicus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Pronotum broader than long (length 3 mm, breadth 3.5 mm); sides sub-parallel; lateral margin entire, sinuate before hind angles, become narrow towards anteriorly. Vestiture small, thick and dense. Pronotal disc moderately convex, densely punctate, punctation simple, scattered, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles of pronotum rounded, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleural grooves extended beyond the middle of prosternopleural suture; propleurae with a shallow depression for accommodating anterior tarsi, no groove present. Margin of mesosternal cavity declined. Anterior margin of metasternum truncated between the mesocoxae; metasternum with grooves for accommodating the middle tarsi.

Scutellum pentagonal, shield-shaped, anterior margin emerginate; moderately densely punctate; vestiture thick, small; integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 8.2 mm, breadth 3.5 mm), almost flat; sides straight, subparallel along basal half, then narrowed caudad; apices inwardly curved and weakly spinose along middorsal suture. Striae with linear rows of punctures joined by moderately impressed line, punctures separated by less than their own diameter; interstriae flat, granulate, very small and shallow punctures. Vestiture moderately dense, with some yellowish scattered patches on the elytra. Tarsi and claws simple, with setae. Last segment of abdomen slightly convex.

Male Genitalia : Phallobase with rounded anterior margin like a cap; outer margin of parameres almost straight, slightly sinuate, posterior end of each paramere with small subapical process; median lobe longer than parameres, straight, almost narrows to a pointed tip; furcae not reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Calcutta : Suburban Calcutta, 21.IV.1908, J.B.R. coll. (det Fleutiaux); 1 ex., Darjeeling : Gake, 20.IV.1973, H. S. Sharma & Party coll.

Distribution : India : West Bengal (Calcutta, Darjeeling).

Elsewhere : Laos; S. Vietnam.

Remarks : This species is recorded for the first time from India as well as from West Bengal.

9. *Agrypnus costicollis* (Candeze), 1857 (Fig. 8)

1857. *Lacon costicollis* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 116.

1947. *Archontas costicollis*; Fleutiaux, *Notes Ent. Chin.*, 11 : 282.

1973. *Agrypnus costicollis*; von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 144.; 1992. Vats & Kashyap, *J. Ent. Res.*, 16(2) : 108.

Material examined : 3 exs., INDIA : West Bengal : Darjeeling : Kurseong; E. Himalaya, 5000 ft. alt., 3. VI – 8.VIII.1908, Ind. Mus. coll.; 1 ex., Soom; 4000 ft. alt., 9.V.1914, Ind. Mus. coll.; 1 ex., Chainabati, 9.III.1974, H. K. Bhowmik coll; 1 ex., Calcutta, date and collector not recorded.

Distribution : India : West Bengal (Kolkata & Darjeeling), Assam, Sikkim, U.P.

Elsewhere : Cambodia; Tonkin; Yunnan.

Remarks : This species is recorded for the first time from West Bengal. The species was redescribed by Vats & Kashyap (1992) and mentioned that the lateral margin of pronotum in this species is entire which they have written as crenulate in the description. During the present study 12 exs. of this species were examined from different states of India which corroborates the findings of Vats & Kashyap (*op. cit.*). However, the hind angle is not carinate and the distal extremities of elytra is subrounded instead of truncated as stated by Vats and Kashyap (1992).

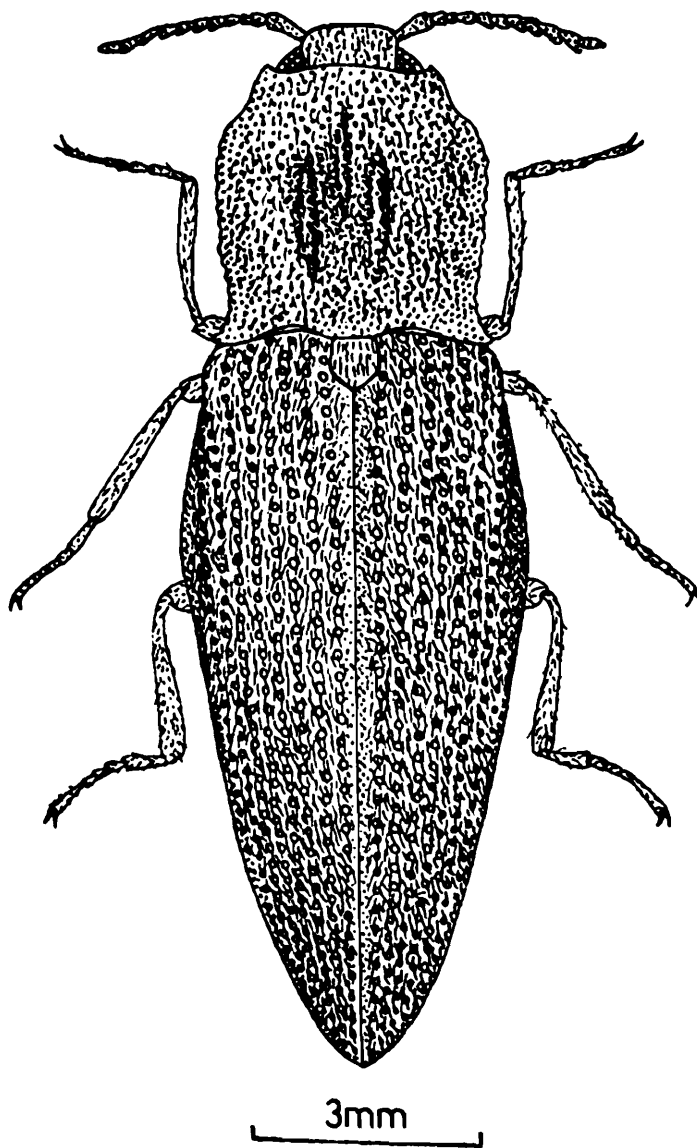


Fig. 8. *Agrypnus costicollis* (Candeze) : Dorsal view.

10. *Agrypnus darjeelingensis* n. sp.
(Fig. 9)

Description : Length 16 mm, breadth 5.6 mm. Body elongated, surface dull, blackish brown coloured. Abdominal tergites brownish. Antennae and legs brownish. Vestiture fine, moderately dense, moderately long, golden yellow and straw coloured.

Head small, depressed in middle. Frontal region densely punctate, punctation simple; convex laterally; frontal carina incomplete across the frons, extended before the eyes but not joined in middle. Eyes small. Antennae moderately long, extended beyond the middle of the pronotum, basal segment robust, 2nd and 3rd segments are comparatively smaller, 2nd sub-globular, 3rd segment smallest, 4th segment subequal with 2nd and 3rd jointly, 5th segment smaller than the 4th, 4th to 10th segments filiform, wider than long. Mandibles dented.

Pronotum slightly broader than long (length 4 mm, breadth 5 mm), widest behind

middle; sides sub-parallel, sinuate before hind angles, lateral margin entire. Vestiture fine, dense, moderately long, Pronotal disc strongly convex, densely and scatterdly punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles of pronotum rounded, acarinate. In the middle of the prothorax two prominent, well developed tubercles present at $1/4$ th distance from the posterior end of pronotum.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine broadly pointed, moderately densely punctate. Prosternopleural grooves extending beyond the middle of prosternopleural suture; propleurae without grooves for accommodating the anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum without groove for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, longer than wide; densely punctate; vestiture fine, moderately dense, integument between punctures not granulate.

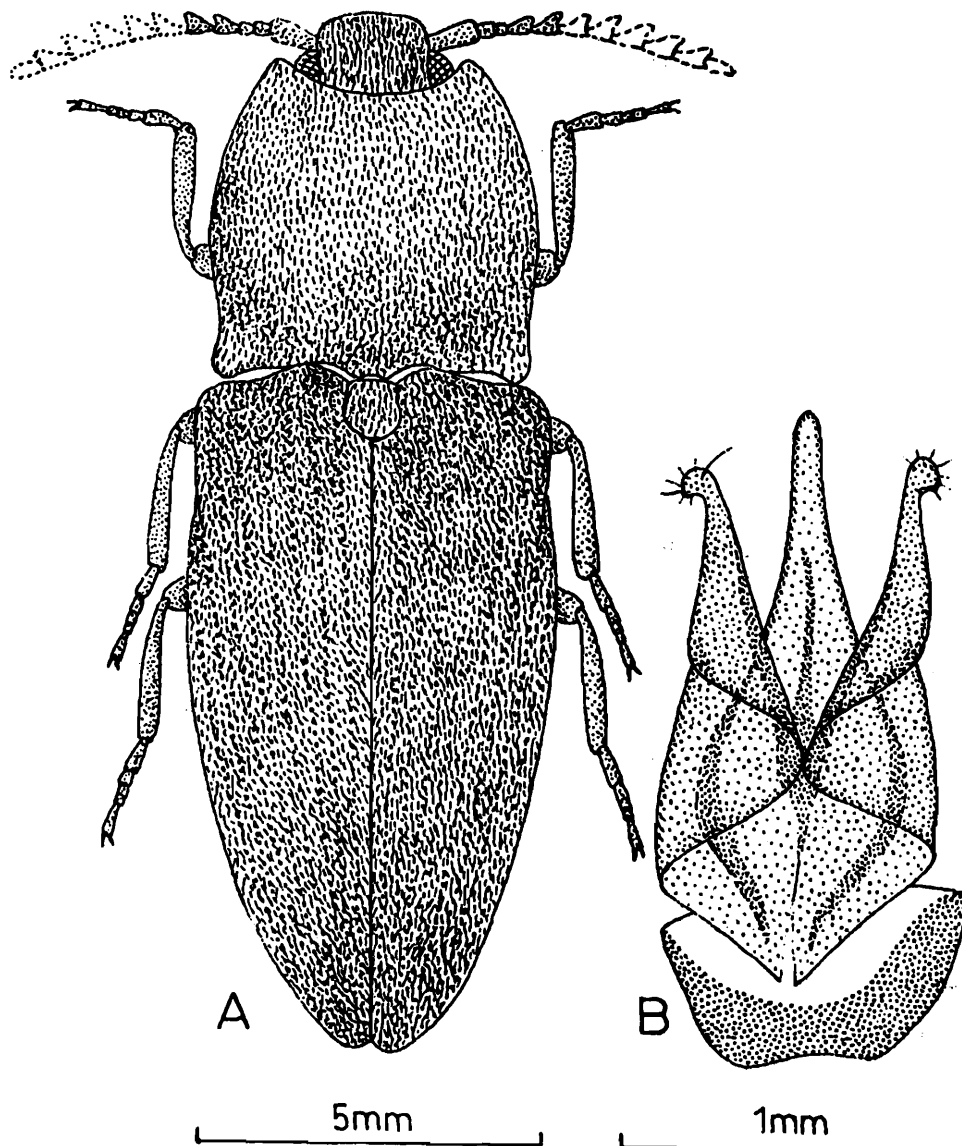


Fig. 9. *Agrypnus darjeelinensis* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia

Elytra 1.9 times longer than broad (length 11.2 mm, breadth 5.7 mm), convex, sides straight, sub-parallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae with linear rows of bigger punctures joined by moderately impressed lines; punctures separated by 1-2 times their own diameter; interstriae flat, very small, hardly visible punctures, the punctures are shallow. Last sternite of abdomen flat.

Male Genitalia : Phallobase with emerginate anterior margin. Outer margin of parameres folded at the middle; posterior angles of each paramere with a very short subapical process; median lobe distinctly longer than parameres, slender, sinuate, with a rounded tip; furcae not reaching the anterior margin of parameres.

Female : Can't be distinguished externally except the female are little stouter.

Type material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Darjeeling : Mungphu, date and collector not recorded.

Paratypes : 2 exs., same data as holotype.

Distribution : India : West Bengal (Darjeeling).

Remarks : This species is very close to *Agrypnus coenosus* (Hope) but differs in genitalia. Phallobase of this species is with emerginate anterior margin, whereas the anterior margin of phallobase in *A. coenosus* (Hope) is rounded ; the fold on the middle of the paramere is comparatively stronger in this new species. Again, body colour is distinctly reddish brown in *A. coenosus* whereas blackish brown in this new species. Also, the scutellum is not pentagonal in *coenosus*.

Itymology : It is named after the place from where it was collected for the first time.

11. *Agrypnus haedulus* (Candeze), 1857 (Fig. 10)

1857. *Lacon haedulus* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 122, pl. 2. fig. 10.

1926. *Adelocera haedulus*; Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 96.

1973. *Agrypnus haedulus*; von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.)*, Suppl. 20 : 162; 2000, Biswas S. and P. Chakraborty, *Fauna of Tripura, State Fauna Series*, 7(Part-3) : 99-108.

Redescription : Length 18.5 mm, breadth 6 mm. Body elongated, surface dull, reddish brown coloured. Abdominal tergites brownish. Antennae and legs brownish. Vestiture small, moderately thick, dense, straw coloured.

Head brownish black, small, depressed. Frontal region densely punctate, punctation simple; frontal carina incomplete across the frons. Eyes concealed. Antenna damaged. Mandibles dented.

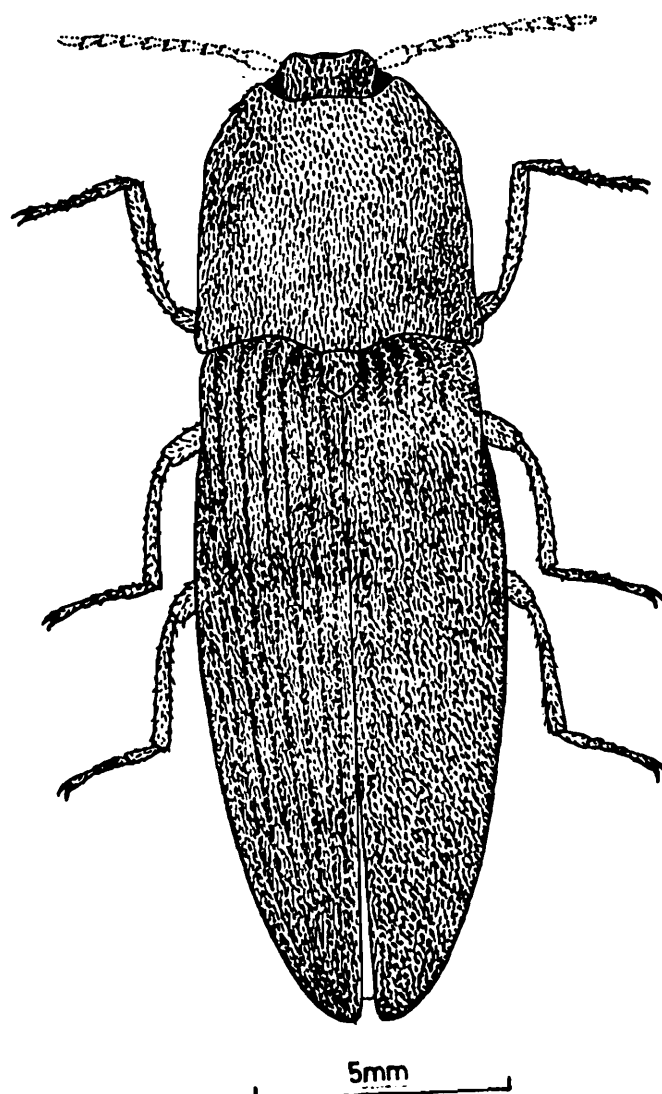


Fig. 10. *Agrypnus haedulus* (Candeze) : Dorsal view.

Pronotum longer than broad (length 4.8 mm, breadth 5.5 mm); sides subparallel, lateral margin entire. Vestiture thick, small, dense. Pronotal disc strongly convex, densely punctate, punctation double, larger punctures few, scattered and separated even 2-3 times their own diameter, while the smaller punctures are densely distributed, shallow and separated by less or 1-2 times their own diameter, integument between punctures not granulate. Hind angles of pronotum rounded, acarinate.

Prosternum densely punctate, punctures large, separated by less than their own diameter; integument between punctures not granulate. Prosternal spine with carina at middle, apex of prosternal spine broadly pointed, moderately, densely punctate. Prosternopleural grooves reaching upto the middle of prosternopleural sutures; propleurae with grooves for accommodating the anterior tarsi. Margin of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum with grooves for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, anterior margin flat, sides slightly emerginate; moderately densely punctate; vestiture thick, small, dense; integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 13 mm, breadth 6 mm), convex; sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and very weakly spinose along mid dorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, puncture separated by 2-3 time their own diameter. Interstriae slightly convex to flat with linear rows of smaller punctures. Last sternite of abdomen flat.

Material examined : 1 ex., INDIA : West Bengal : Maldah, date not recorded, Z.S.I. coll. (det. Candeze)

Distribution : India : West Bengal (Maldah), Tripura; originally reported from 'Indes Orientales Boreales'

Remarks : This species is recorded for the first time from West Bengal. Biswas, *et al.*, 2000 earlier recorded this species for the first time from India (Tripura).

12. *Agrypnus jurulosus* (Candeze), 1889
(Fig. 11)

1889. *Lacon jurulosus* Candeze, *Annls Soc. Ent. Belg.*, 33 : 73.

1973. *Agrypnus jurulosus*; von Hayek, *Bull. Br. Mus. Natn. Hist. Ent. Suppl.*, 20 : 172;

2000. Biswas S. and P. Chakraborty, *Fauna of Tripura, State Fauna Ser.*, 7(Part-3) : 99-108.

Redescription : Length 13.5 mm, breadth 4 mm. Body moderately elongated, surface dull blackish brown coloured. Abdominal tergites reddish brown except last segment; which is blackish brown. Antennae and legs reddish brownish. Vestiture small moderately thick, dense, yellowish coloured.

Head small, strongly depressed in middle. Frontal region densely punctate, punctation simple; frontal carina absent. Eyes totally concealed. Antennae moderately long, extended beyond the middle of the prothorax, basal segment robust, 2nd and 3rd segment small and subcylindrical, 3rd segment smallest, the rest segments distinctly serrated. Mandibles dented. Pronotum slightly broader than long (length 3.5 mm, breadth 4 mm); sides subparallel; lateral margin entire. Vestiture small, moderately thick, dense. Pronotal disc strongly convex, differently punctate, punctation double, bigger punctures scattered, separated by 2-3 times their own diameter while the smaller punctures dense, shallow and separated by less than their own diameter; integument between punctures not granulate. Hind angles of pronotum rounded, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine with shallow groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleurai grooves reaching upto the middle of prosternopleural suture; propleurae with grooves for accommodating the anterior tarsi. Anterior margin of metasternum truncated between mesocoxae; metasternum with grooves for accommodating the middle tarsi.

Scutellum small, pentagonal, shield-shaped, reddish brown, depressed; moderately densely punctate; vestiture thick, small, moderately dense; integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 9.2 mm, breadth 4 mm), convex; sides straight, sub-parallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along mid- dorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed line, punctures separated by less than their own diameter. Interstriae slightly convex to flat, very finely and densely punctate, punctures shallow. Vestiture moderately dense. Last sternite of abdomen flat.

Male Genitalia : Phallobase with rounded anterior margin; outer margin of parameres almost straight, posterior end of each paramere with a subapical process; median lobe is very slightly longer than the parameres, tubular, almost straight, posterior end truncated; furcae does not reach the anterior margin of parameres.

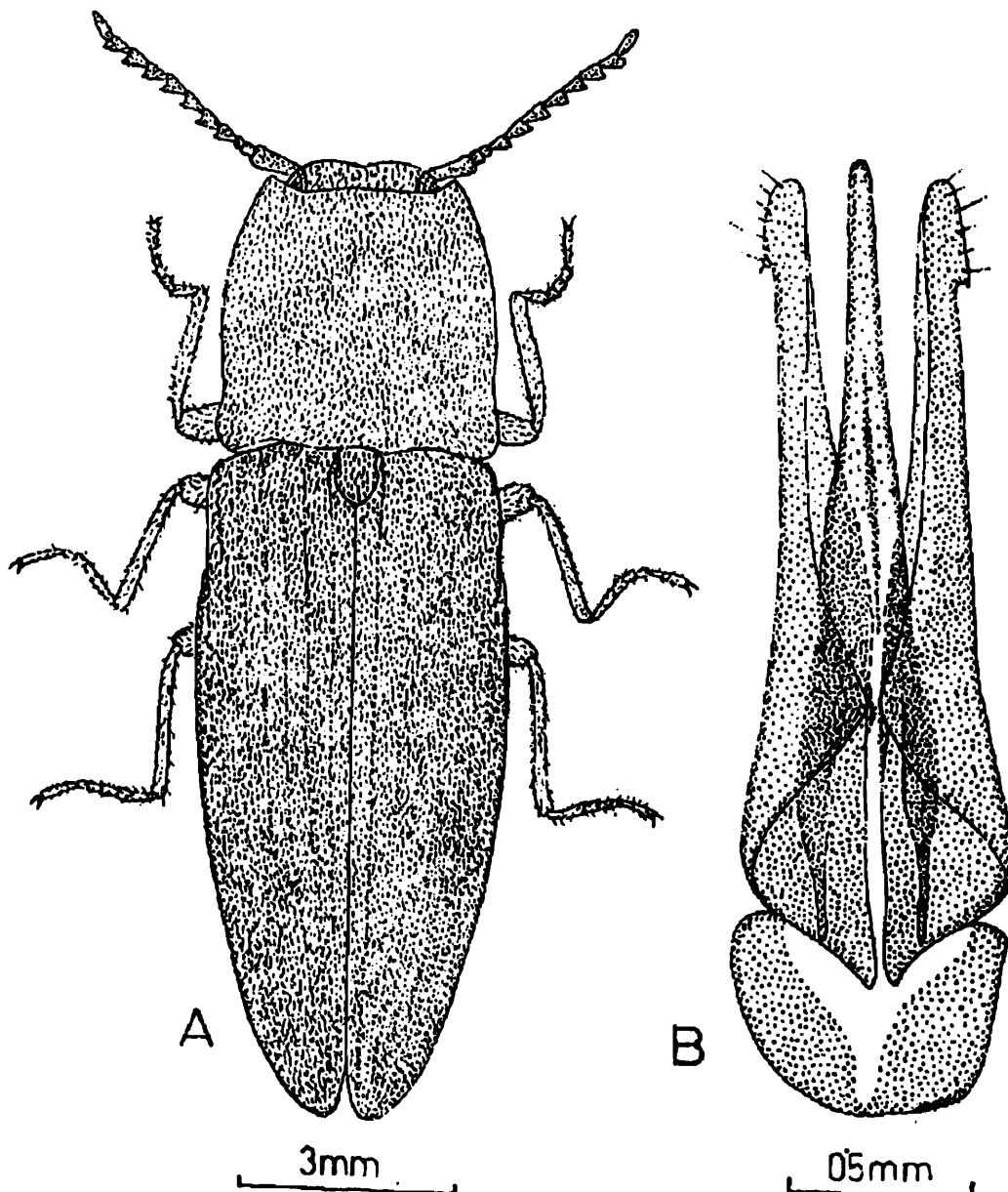


Fig. 11. *Agrypnus jurulosus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, date and collector not recorded (det Fleutiaux); 2 exs., Darjeeling : Terai, 18.VI. 1914, Gravely coll.; 1 ex., Jalpaiguri : Rajabhatkhawa, 5.V.1983, B. N. Das & pty. coll.

Distribution : India : West Bengal (Kolkata, Darjeeling & Jalpaiguri), Bihar, Sikkim, Tripura, U.P.

Remarks : This species is recorded from West Bengal for the first time.

13. *Agrypnus lapideus* (Candeze), 1857
(Fig. 12)

1857. *Lacon lapideus* Candeze, Mem. Soc. r. Sci. Liege, 12 : 141.

1947. *Compsolacon lapideus*; Fleutiaux, Notes Ent. Chin., 11 : 286.

1973. *Agrypnus lapideus*; von Hayek, Bull. Br. Mus. Nat. Hist. (Ent.) Suppl., 20 : 174.

Redescription : Length 12.5 mm, breadth 3.6 mm. Body elongated, surface dull, blackish coloured. Abdominal tergites reddish brown. Antennae and legs reddish brown. Vestiture fine, very small, moderately dense, golden brown and yellowish coloured.

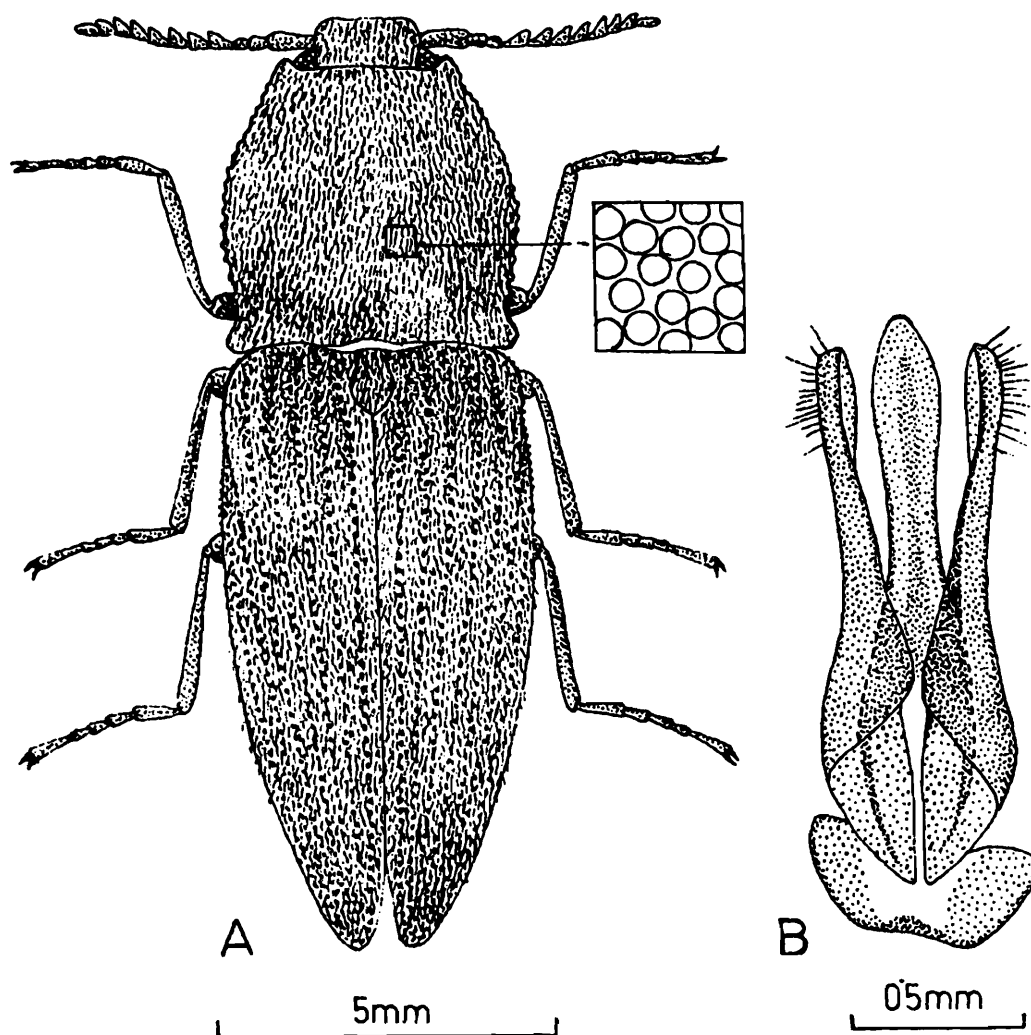


Fig. 12. *Agrypnus lapideus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Head small, depressed. Frontal region densely punctate, punctation simple; frontal carina incomplete across the frons. Eyes small and concealed. Antenna moderately long extended upto the procoxae; basal segment robust, 2nd and 3rd segments subequal and subglobular, rest segments are serrate. Mandibles dented.

Pronotum slightly broader than long (length 3.1 mm, breadth 3.5 mm); sides subparallel; lateral margins crenulate, sinuate before hind angles. Vestiture fine, very small, moderately dense. Pronotal disc strongly convex, punctate, punctation simple, shallow and dense, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles truncated, acarinate.

Prosternum moderately densely punctate, punctures separated by 2-3 times their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleural grooves slightly extending beyond the middle of prosternopleural sutures; propleurae with very faint markings. Anterior margin of metasternum rounded between mesocoxae; metasternum without grooves or depression for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, moderately densely punctate; vestiture small, moderately thick, moderately dense, integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 7.3 mm, breadth 3.6 mm), convex; sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and very weakly spinose along mid-dorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter. Interstriae flat with few small shallow punctures; not granulate. Last sternite of abdomen flat.

Male Genitalia : Phallobase with slightly emerginate anterior margin, outer margin of paramere arcuate, posterior end of each paramere with a very minute subapical process; median lobe slightly longer than parameres, broad, constricted in the middle, posterior end rounded, furcae not reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Sitong, near Mangphu, alt. 3800-4000 ft., 2-5.VII.1918, S. Kemp coll. (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling), Sikkim; the species was originally reported from 'India Orientales'

Remarks : This species is recorded for the first time from West Bengal.

14. *Agrypnus maisus* Vats & Kashyap, 1992

1992. *Agrypnus maisus* Vats & Kashyap, J. Ent. Res., 16(2) : 130.

Material examined : 1 ex., INDIA : West Bengal : 24 Parganas(S) : Sundarban : Jharkhali, 26.VI.1986, B. P. Haldar coll.

Distribution : India : West Bengal, H.P., U.P.

Remarks : This material in all characters is very similar to *A. maisus* Vats & Kashyap (1992). But due to availability of only one specimen, the genitalia could not be studied. This species is recorded from West Bengal for the first time.

15. *Agrypnus melancholicus* (Candeze), 1890
(Fig. 13)

1890. *Lacon melancholicus* Candeze, *Annls Soc. Ent. Belg. (Bull.)*, 34 : CXLVIII.

1926. *Adelocera melancholicus*; Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 98.

1973. *Agrypnus melancholicus*; von Hayek, *Bull. Br. Mus. Nat. Hist. Ent. Suppl.*, 20 : 181.

Redescription : Length 14.5 mm, breadth 4 mm. Body elongated; surface little shining, entirely blackish coloured. Abdominal tergites blackish brown. Antennae and legs blackish brown. Vestiture small, moderately thick, moderately dense, golden brownish coloured.

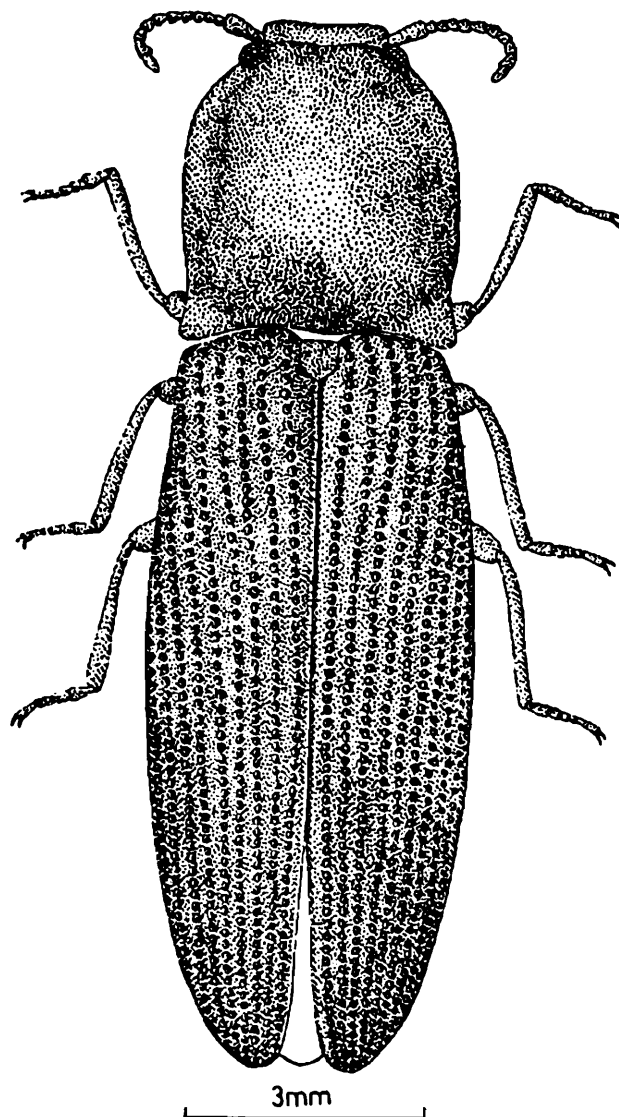


Fig. 13. *Agrypnus melancholicus* (Candeze) : Dorsal view

Head small, depressed. Frontal region moderately densely punctate, punctation simple; frontal carina incomplete across the frons, present only before the eyes. Eyes small but visible. Antennae short, reaching only upto the middle of prothorax; basal segment robust, 2nd and 3rd segments are subequal, smaller and subglobose rest segments are serrate. Mandibles dented.

Pronotum slightly longer than broad (length 4 mm, breadth 3.5 mm); sides subparallel, lateral margins entire, sinuate before hind angles. Vestiture small, moderately dense, moderately thick. Pronotal disc strongly convex, moderately densely punctate, punctation simple, punctures large, separated by 1-3 times their own diameter; integument between punctures not granulate. Hind angles truncated, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleural groove extending upto the middle of prosternopleural suture; propleurae with small groove for accommodating anterior tarsi. Anterior margin of metasternum rounded between mesocoxae, metasternum without grooves.

Scutellum small, pentagonal, shield shaped, anterior margin straightly emerginate; moderately densely punctate; vestiture thick, small, moderately dense; integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 9.5 mm, breadth 4.0 mm), convex; sides straight, sub-parallel along basal half, then narrowed caudad. Apices rounded and very weakly spinose along mid-dorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines; punctures separated by less than their own diameter. Interstriae convex, with smaller punctures, punctures shallow, moderately dense, separated by 2-3 times their own diameter. Last sternite of abdomen flat.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, 17.VI.1909, Ind. Mus. coll. (det. Fleutiaux)

Distribution : India : West Bengal (Kolkata), Bihar, Maharashtra.

Remarks : This species is for the first time recorded from West Bengal.

16. *Agrypnus mustellinus* (Germar), 1840 (Fig. 14)

1840. *Lacon mustellinus* Germar, Z. Ent. (Germar), 2 : 264.

1874. *Lacon birmanicus* Candeze, Mem. Soc. r. Sci. Liege (2)4, memoire no. I : 71.

1926. *Adelocera mustellinus*; Fleutiaux, Annls Soc. Ent. Fr., 95 : 96.

1973. *Agrypnus mustellinus*; von Hayek, Bull. Br. Mus. Nat. Hist. Ent. Suppl., 20 : 188.

Redescription : Length 16 mm, breadth 5 mm. Body elongated, surface dull, blackish brown in colour. Abdominal tergites blackish brown. Antennae and legs dark brown. Vestiture small, thick, dense, yellowish brown coloured.

Head small, concave, slightly depressed in middle. Frontal region densely punctate, punctation simple; frontal carina absent. Eyes concealed. Antenna moderately long, extended beyond the middle of the prothorax; basal segment robust, 2nd and 3rd segments are smaller and globular, 3rd segment smallest, rest segments are serrate. Mandibles dented.

Pronotum slightly broader than long (length 4.2 mm, breadth 4.5 mm); sides subparallel, lateral margin entire, sinuate before hind angles. Vestiture small, thick and dense. Pronotal disc moderately convex, scatterdly punctate, punctation simple; punctures separated by 2-4 times their own diameter; integument between punctures not granulate. Hind angles subrounded, emerginate, acarinate.

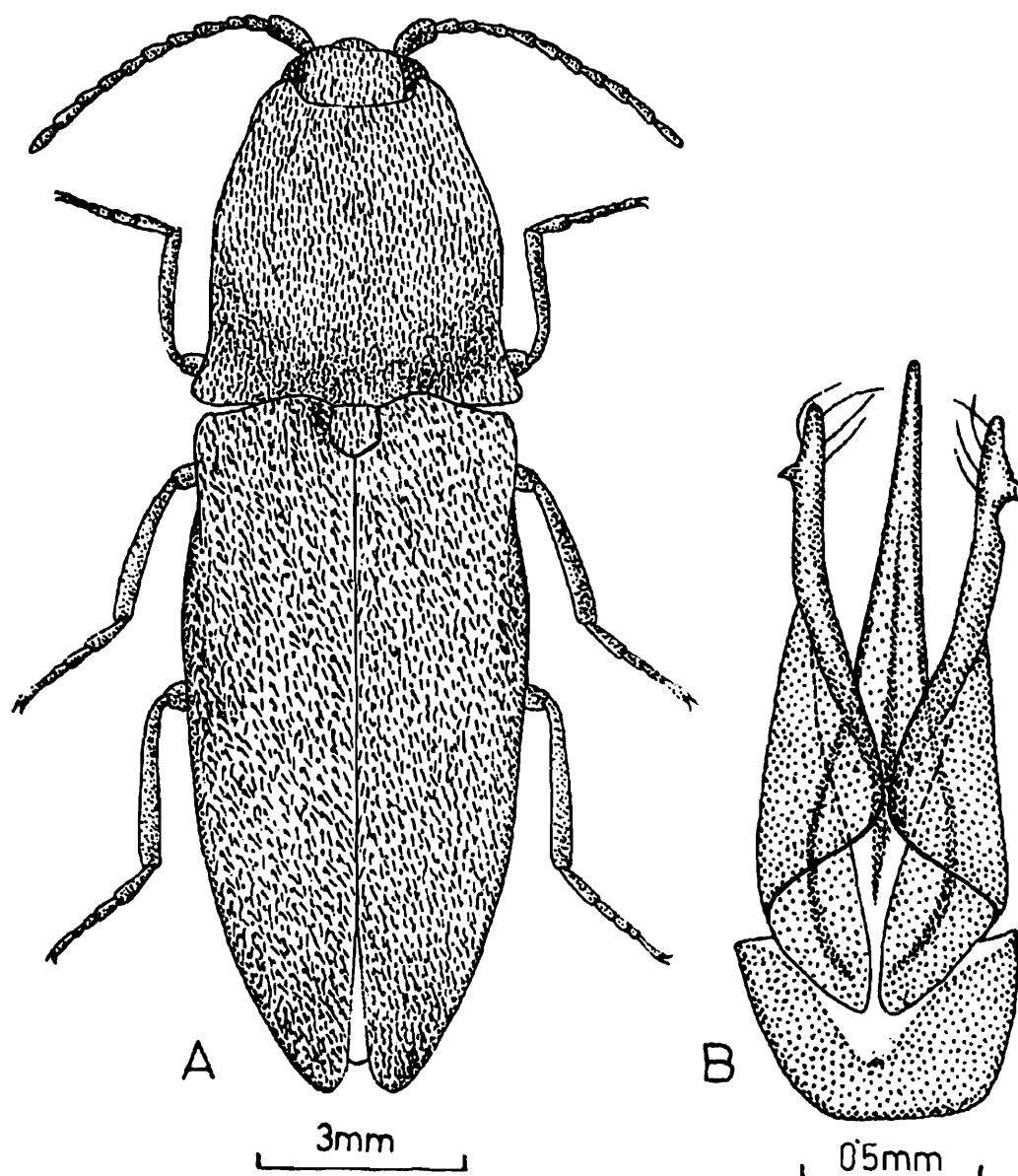


Fig. 14. *Agrypnus mustellinus* (Germar) : A. Dorsal view; B. Dorsal view of male genitalia.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleural grooves extending upto the middle of prosternopleural sutures; propleurae without any groove for accommodating the anterior tarsi, slight impression present. Margins of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum without grooves for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, anterior margin slightly emerginate; moderately densely punctate; vestiture small, thick, dense; integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 11 mm, breadth 5 mm), convex; sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae consisting of linear rows of punctures joined by moderately impressed lines punctures separated by 1-2 times their own diameter. Interstriae flat, without punctures, not granulate. Last sternite of abdomen convex.

Male Genitalia : Phallobase with straight anterior margin; outer margin of parameres folded at the middle, posterior end of each paramere with small subapical process and obliquely truncated; median lobe distinctly longer than parameres, tubular, posterior end rounded; furcae not reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Ghumti, alt. 1500-3000 ft., VI. 1914, Lord Carmichael coll. (det Fleutiaux)

Distribution : India : W.B. (Darjeeling).

Elsewhere : Burma; Siam.

Remarks : von Hayek (1973) reported that the species was recorded from Rangoon: India, but Rangoon is not in India, but in Myanmar (Burma) now. So, this species is recorded here for the first time from India.

17. *Agrypnus niger* (Schwarz), 1905

1905. *Lacon niger* Schwarz, Dt. Ent. Z., 1905 : 258.

1926. *Adelocera niger*; Fleutiaux, Annls Soc. Ent. Fr., 95 : 96.

1973. *Agrypnus niger*; von Hayek, Bull. Br. Mus. Nat. Hist. Ent. : Suppl., 20 : 190.

Material examined : None was available for study.

Distribution : India : West Bengal, originally reported from Darjeeling.

18. *Agrypnus piger* (Candeze), 1889
(Fig. 15)

1889. *Lacon piger* Candeze, *Annls Soc. ent. Belg.*, 33 : 73.

1926. *Adelocera piger*; Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 96.

1973. *Agrypnus piger*; von Hayek, *Bull. Br. Mus. Nat. Hist. Ent.*, Suppl., 20 : 198.

Redescription : Length 14 mm, breadth 4 mm. Body elongated, surface dull, blackish brown in colour. Abdominal tergites reddish brown in the middle while the two lateral sides are blackish brown. Antennae and legs brownish. Vestiture fine, dense, small, straw coloured.

Head small, concave, slightly depressed in middle. Frontal region densely punctate, punctation simple, frontal carina incomplete across the frons. Eyes concealed. Antenna moderately long, extended beyond the middle of the prothorax; basal segment robust, 2nd and 3rd segments subrounded, subequal, the rest segments serrate. Mandibles dented.

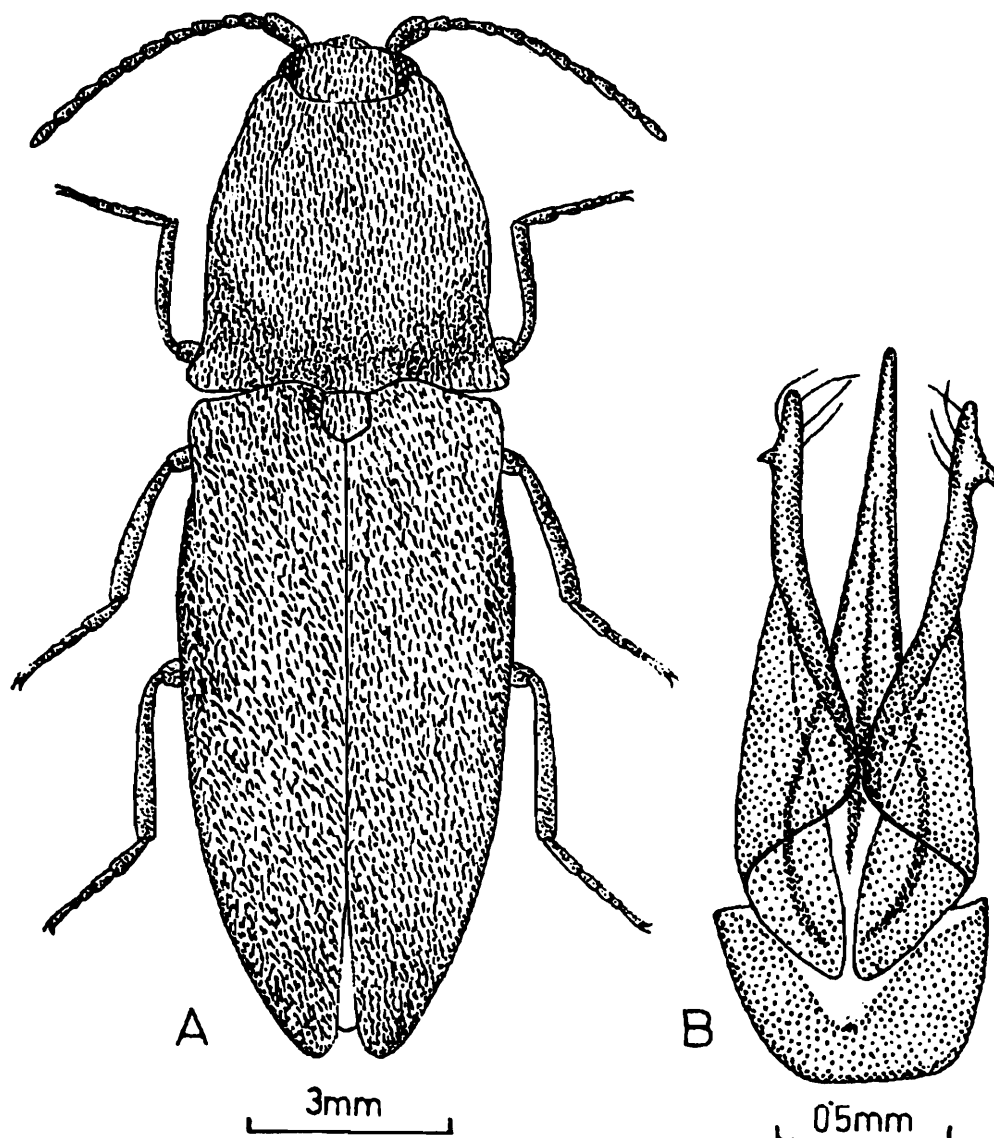


Fig. 15. *Agrypnus piger* (Candeze) : Dorsal view.

Pronotum broader than long (length 3.2 mm, breadth 4 mm); sides subparallel, lateral margin entire, strongly sinuate before hind angles; vestiture fine, moderately dense, small. Pronotal disc strongly convex, densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles distinctly truncated, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine pointed, moderately densely punctate. Prosternopleural grooves extending beyond the middle of prosternopleural suture; propleurae with grooves for accommodating the anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum with grooves from accommodating the middle tarsi.

Scutellum small, pentagonal, shield-shaped, anterior margin slightly emerginate, densely punctate; vestiture fine, small, dense; integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 9 mm, breadth 4 mm), convex; sides straight, subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae with linear rows of punctures, punctures separated by less than their own diameter. Interstriae slightly convex to flat, with smaller punctures, shallow and dense, vestiture small, dense. Last sternite of abdomen convex.

Material examined : 1 ex., INDIA : West Bengal : E. Himalaya : Darjeeling : Peshoke, 2000–3000 ft. alt., 23.IV.–15.V.1911, F.H.Gravely coll. (det Fleutiaux).

Distribution : India : West Bengal (Darjeeling); originally reported from Tetara, Bengal by Renard' (von Hayek, 1973)

Remarks : von Hayek (1973) reported the species from 'Tetara, Bengal', but 'Tetara' is not in West Bengal. So, the species is recorded here for the first time from West Bengal.

19. *Agrypnus serrula* (Candeze), 1857 (Fig. 16)

1857. *Lacon serrula* Candeze, Mem. Soc. r. Sci. Liege, 12 : 122.

1947. *Compsolacon serrula*; Fleutiaux, Notes Ent. Chin., 11 : 285.

1973. *Agrypnus serrula*; von Hayek, Bull. Br. Mus. Natn. Hist. (Ent.) Suppl., 20 : 210.

Redescription : Length 12 mm, breadth 4.5 mm. Body elongated, surface little shining, blackish brown in colour. Abdominal tergites brownish. Antennae and legs brownish. Vestiture small, thick, dense, whitish coloured.

Head small, broader than along, slightly depressed. Frontal region densely punctate, punctation simple, punctures large; frontal carina absent. Eyes totally concealed. Antenna short, reaching only upto the middle of the prothorax; basal segment robust, 2nd and 3rd

segments rounded and small, 3rd segment slightly shorter than the 4th, rest segments serrate. Mandibles dented.

Pronotum almost subquadrate, slightly broader than long (length 3.5 mm and breadth 4.2 mm); sides subparallel, lateral margin crenulate, sinuate before the hind angles. Vestiture small, thick, dense. Pronotal disc moderately convex, densely punctate, punctation simple; punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles subrounded, acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine moderately acutely pointed, moderately densely punctate. Prosternopleural grooves reaching beyond the middle of prosternum; propleurae with slight depression for accommodating anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae, metasternum without any groove for middle tarsi.

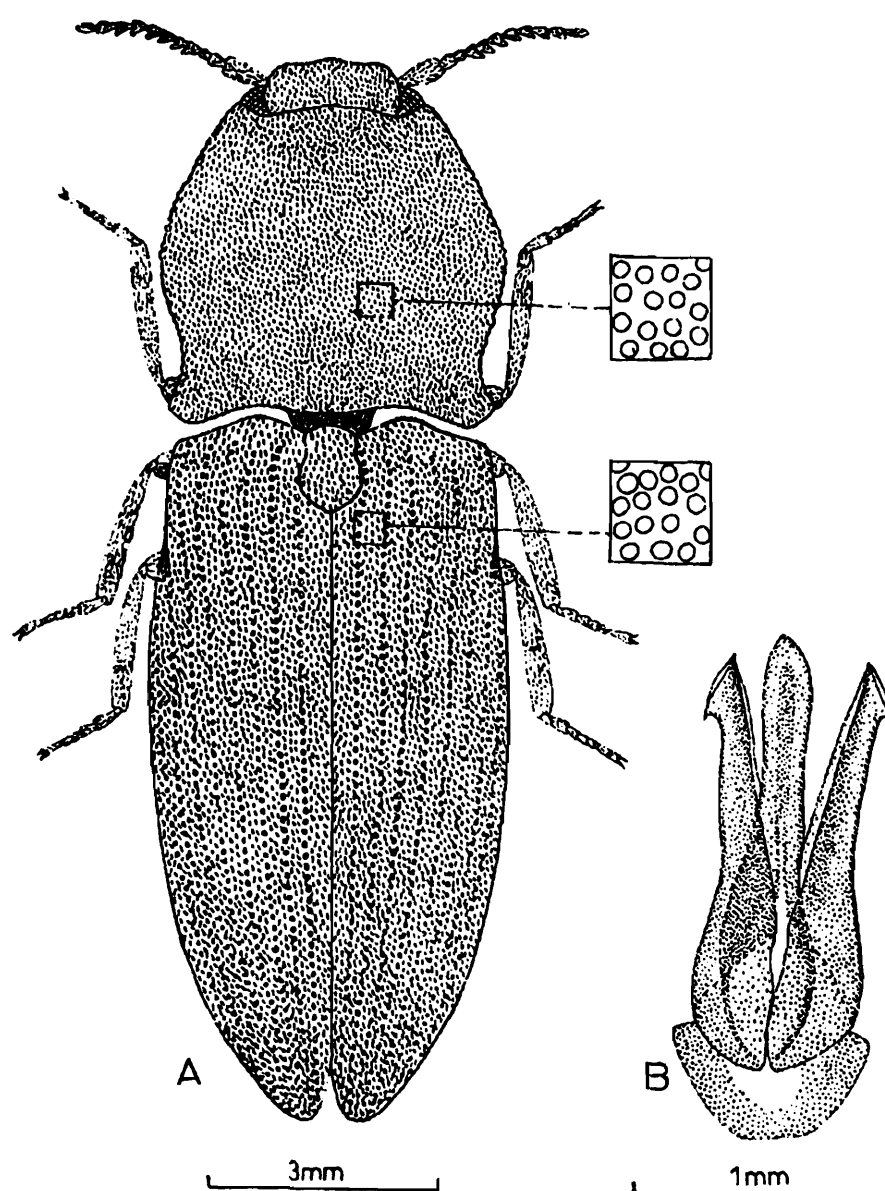


Fig. 16. *Agrypnus serrula* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Scutellum small, pentagonal, shield-shaped, longer than wide; vestiture fine, moderately dense; moderately densely punctate; integument between punctures not granulate.

Elytra 1.7 times longer than broad (length 7.8 mm, breadth 4.5 mm), convex, sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and very weakly spinose along suture. Striae with linear rows of punctures, which are separated by less than their own diameter; interstriae flat with scattered, smaller punctures, not granulate. Last sternite of abdomen flat.

Male Genitalia : Phallobase with anterior margin flat; outer margins of parameres slightly sinuate, with a triangular process on both the outer margin of the parameres near the middle, posterior end of each paramere with small subapical process; median lobe longer than parameres, straight, robust, narrowed to a pointed tip; furcae not reaching the anterior margin of parameres.

Material examined : 4 exs., INDIA : West Bengal : Darjeeling : Singla, 1500 ft. alt., V. 1913, Lord Carmichaels coll. (det Fleutiaux); 2 exs., Kurseong, 8.III.1924, B. M. Chopra coll.; 35 exs., Dange, 1. IV.1978, A. R. Bhowmik coll., collected under stone; 6 exs., Jhepi, 31.III.1978, A. R. Bhowmik coll., collected under stone; 4 exs., Kalimpong, 1.IV.1995, P. Chakraborty coll., collected under stone; 1 ex., Singla, 2.I.1976, G. K. Srivastava coll., collected under bark; 2 exs., Murshidabad : Berhampur, date & coll. not recorded.

Distribution : India : W.B. (Darjeeling & Murshidabad), the published locality is 'Indes-Orientales'

Remarks : This species is recorded from West Bengal for the first time.

20. *Agrypnus shyamrupi* n. sp. (Fig. 17)

Description : Length 12.5 mm, breadth 3.7 mm. Body moderately elongated, surface dull, bicoloured-blackish brown and reddish brown. Abdominal tergites blackish brown. Antennae and legs brownish. Vestiture fine, dense; moderately long, whitish yellow coloured.

Head small, depressed in middle. Frontal region evenly and densely punctate, punctation simple, strongly concave medially, convex laterally; frontal carina complete across the frons. Eyes small. Antennae moderately long, extended beyond the middle of the pronotum, basal segment robust, 2nd and 3rd segments are comparatively smaller, 3rd segment is smallest, 4th segment is longer than 2nd and 3rd jointly, 4th to 10th segments are strongly serrate, wider than long, last segment dorsoventrally compressed. Mandibles dented.

Pronotum slightly longer than broad (length 3.3 mm, breadth 3.1 mm), widest behind middle; sides sub-parallel, sinuate before hind angles, lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex, evenly and

moderately punctate medially, punctation simple, punctures separated by more than their own diameter; integument between punctures not granulate. Hind angles of pronotum rounded, without any carina.

Prosternum moderately densely punctate, punctures separated by slightly less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine acutely pointed, moderately densely punctate. Prosternopleural grooves extended upto the middle of prosternopleural sutures; propleurae with prominent grooves for accommodating the anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum truncated between the mesocoxae; metasternum with prominent grooves for accommodating middle tarsi.

Scutellum small, pentagonal, shield shaped, longer than wide, blackish brown; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

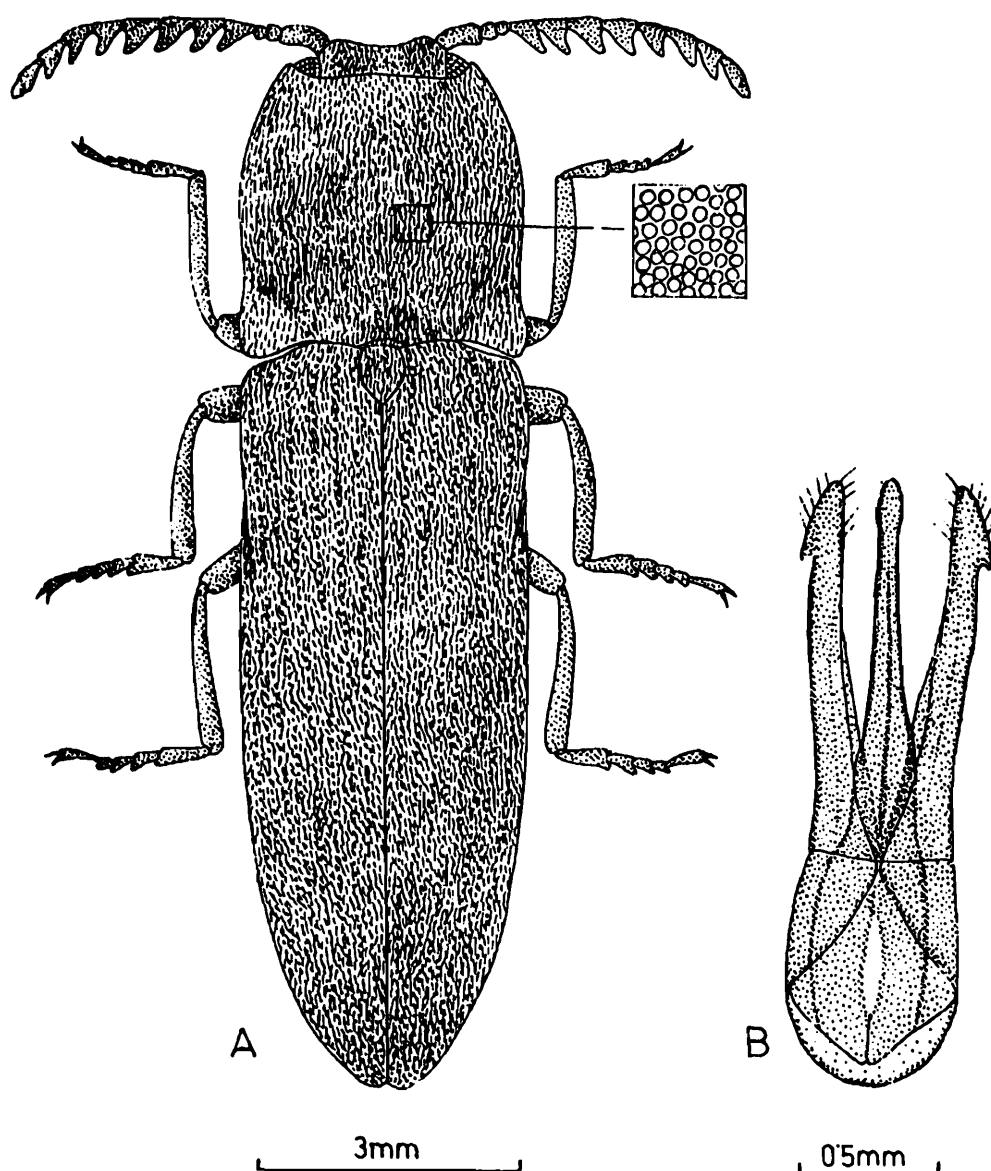


Fig. 17. *Agrypnus shyamrupi* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

Elytra 2.3 times longer than broad (length 8.5 mm, breadth 3.7 mm), blackish brown with reddish brown longitudinal markings, rounded, convex, sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and very weakly spinose along suture. Striae consisting of rows of single punctures joined by moderately impressed lines; punctures shallow, separated by 1-2 times their own diameter (becoming indistinct towards the base). Interstriae slightly convex to flat; very finely and densely punctate; not granulate. Last sternite of abdomen flat. Vestiture moderately dense.

Male Genitalia : Outer margins of parameres almost straight, posterior end of parameres with a small sub-apical process; median lobe as long as parameres, slightly broader at base; slender at the posterior half, posterior end rounded; furcae does not reach the anterior margin of parameres.

Female : Can't be distinguished externally; except the size and shape. It is observed that the female are more longer and stouter than the male.

Type material : *Holotype* : 1 ex. ♂, INDIA : West Bengal : Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & pty. coll.

Paratypes : 9 exs., INDIA : West Bengal : Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & pty. coll.; 5 exs., Jaldapara, 4.V.1983, B. N. Das & pty. coll.; 3 exs., Birpara, 6.V.1983, S. K. Chatterjee coll.; 1 ex., Nilpara, 4.1.1983, S. Chattopadhyay coll.; 1 ex., Kalchini, 7.V.1983, B. N. Das & pty. coll.

Distribution : India : West Bengal (Jalpaiguri).

Remarks : The present new species is very similar to *Agrypnus jurulosus* (Candeze) but differs from the later by having complete frontal carina, pronotum being longer than broad and elytra subparallel along basal half, frontal carina is absent and pronotum is broader and elytra is subparallel along basal third in *A. jurulosus*. Also, the new species comes closer to *A. striatulus* Vats & Kashyap, 1992, but differs from it by pronotum being longer and hind angle of pronotum being rounded in this species, while pronotum is broader and hind angle of pronotum is truncated in *A. striatulus*.

The species has been named after Dr. Shyamrup Biswas, who made Coleoptera understandable to the first author and contributed a lot to complete the present work.

21. *Agrypnus sinensis* (Candeze), 1857 (Fig. 18)

1857. *Lacon sinensis* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 139.

1895. *Lacon massiei* Fleutiaux, *Annls Soc. ent. Fr.*, 63(1894) : 685.

1947. *Compsolacon sinensis*; Fleutiaux, *Notes. Ent. Chin.*, 11 : 285.

1973. *Agrypnus sinensis*; von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.) Suppl.*, 20 : 212.

Redescription : Length 11 mm, breadth 3.8 mm. Body moderately elongated, surface little shining, blackish brown. Abdominal segments blackish brown. Antennae and legs brownish. Vestiture small dense and thick, straw coloured.

Head small, broader than long, slightly depressed in the middle. Frontal region densely punctate, punctation simple, punctures large; frontal carina incomplete across the frons. Eyes small and concealed. Antennae short, reaching only upto the middle of the prothorax; basal segment robust, 2nd and 3rd segments sub-equal and cylindrical, 3rd slightly shorter than the 4th, rest segments serrate. Mandibles dented.

Pronotum almost looking subquadrate, slightly broader than long (length 3.3 mm & breadth 3.5 mm), sides sub-parallel, lateral margin crenulate, sinuate before hind angles. Vestiture thick, small and dense. Pronotal disc moderately convex, moderately punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles truncated acarinate.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of

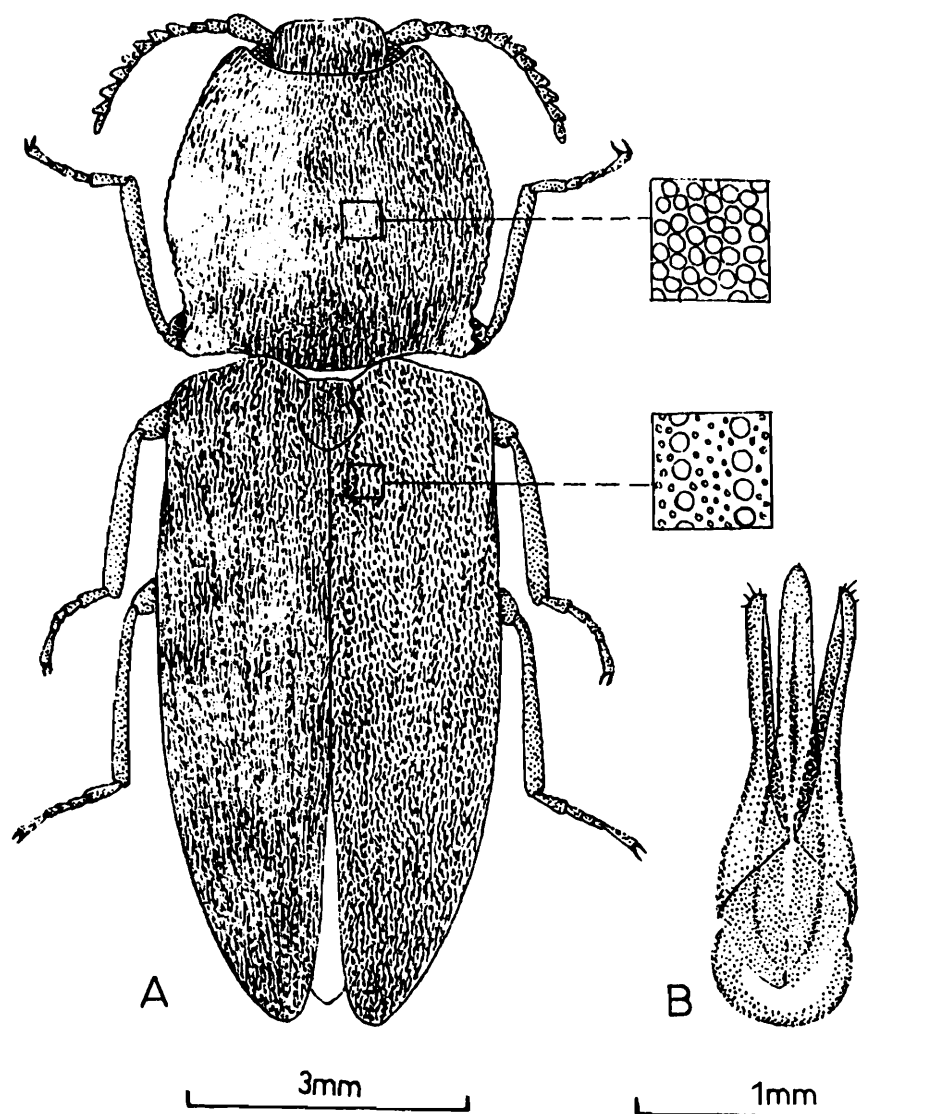


Fig. 18. *Agrypnus sinensis* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

prosternal spine acutely pointed, moderately densely punctate. Prosternopleural grooves reaching beyond the middle of prosternum, propleurae with a slight depression for accommodating anterior tarsi. Margins of mesosternal cavity emerginate. Anterior margin of metasternum truncated between the mesocoxae, metasternum without any groove for receiving middle tarsi.

Scutellum small, pentagonal, shield-shaped, longer than wide; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 1.8 times longer than wide (length 7 mm, breadth 3.8 mm), convex, sides straight, subparallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along mid-dorsal suture. Striae punctate, punctures prominent and large and separated by less than their own diameter; interstriae flat, surface rough, without prominent punctures. Last sternite of abdomen flat.

Male Genitalia : Phallobase with rounded anterior margin; outer margin of paramere sinuate, posterior end of each paramere without any sub-apical process, rather obliquely truncated, median lobe slightly longer than parameres, straight, with a rounded tip, furcae not reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Singla: 1500 ft. alt., V.1913, Lord Carmichael coll. (det. Fleutiaux); 8 exs., Murshidabad : Berhampur, date of coll. not recorded.

Distribution : India : West Bengal (Darjeeling & Murshidabad).

Elsewhere : China; Laos.

Remarks : This species is recorded for the first time from India as well as from West Bengal.

22. *Agrypnus tostus* Candeze, 1857 (Fig. 19)

1857. *Lacon tostus* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 129.

1926. *Adelocera tostus*; Fleutiaux, *Annls Soc. Ent. Fr.*, 95 : 98.

1973. *Agrypnus tostus*; von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 222; 1992, Vats & Kashyap, *J. Ent. Res.*, 16(2) : 113.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Singla, alt. 1500 ft., VI. 1913, Lord Carmichael coll.

Distribution : India : West Bengal (Darjeeling), Haryana, U.P.; Cambodia (Kampuchea); Indonesia; Laos; Myanmar; Tonkin.

Remarks : The species is recorded for the first time from West Bengal. The species has been described in details by Vats & Kashyap (1992).

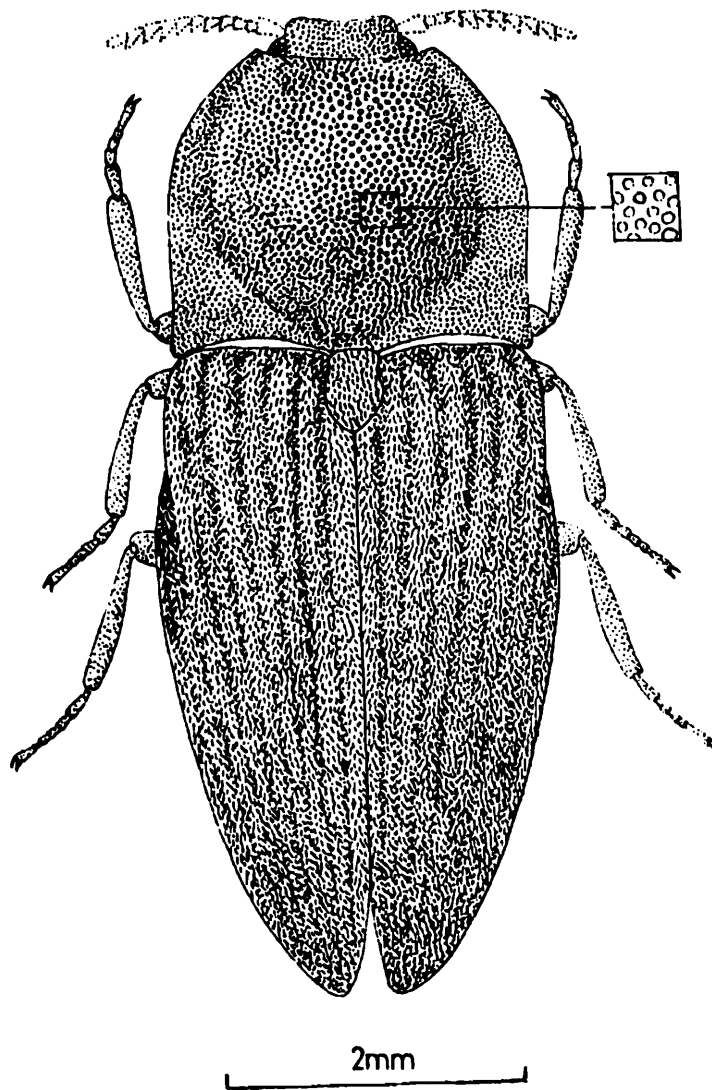


Fig. 19. *Agrypnus tostus* (Candeze) : Dorsal view.

23. *Agrypnus* sp.
(Fig. 20)

Description : Length 14 mm, breadth 4 mm. Body elongated, surface shining, blackish brown coloured. Abdominal tergites brownish. Antennae and legs brownish. Vestiture fine, moderately dense, moderately long, grayish yellow coloured.

Head small, concave, depressed in middle. Frontal region densely punctate, punctation simple; frontal carina complete across the frons. Eyes prominent. Antennae short, not even reaching the middle of prothorax, basal segment robust, 2nd and 3rd segments are comparatively smaller, 2nd segment smallest, 3rd segment longest and 4th shorter than the 3rd while bigger than the 5th, 4th to 10th segments serrate, wider than long. Mandibles dented.

Pronotum slightly broader than long (length 3.4 mm, breadth 4 mm), widest at middle; sides subparallel, and lateral margin sinuate before hind angles, lateral margin entire. Vestiture fine, moderately dense, moderately long, Pronotal disc strongly convex, densely

and coarsely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles emerginate, pointed, without carina.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine acutely pointed, moderately densely punctate. Prosternopleural grooves extending upto the middle of prosternopleural suture; propleurae without any groove for accommodating the anterior tarsi. Margins of mesosternal cavity declined. Anterior margin of metasternum rounded between the mesocoxae; metasternum without groove for accommodating the middle tarsi.

Scutellum small, pentagonal, shield shaped, longer than wide; moderately densely punctate; vestiture fine, moderately dense, integument between punctures not granulate.

Elytra 2.2 times longer than broad (length 9 mm, breadth 4 mm), convex, sides straight, subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae with linear rows of bigger punctures joined by moderately impressed lines; punctures separated by less than their own diameter. Interstriae flat, with smaller shallow punctures, punctures separated by 1-2 times their own diameter. Last sternite of abdomen convex

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Rangpo, 500 m. alt., 5.IV.1973, H. S. Sharma & pty. coll.

Distribution : India: West Bengal (Darjeeling).

Remarks : The species comes closer to *A. coenosus* (Hope), but differs in having complete frontal carina across the frons, which is incomplete in *A. coenosus* (Hope) and the hind angles of pronotum is pointed in this species where as truncated in the other species. Again, the tubercles present in the middle of the pronotum in *A. coenosus* (Hope) but absent in this species. The specimen under study in all probability belongs to a new species. However, due to non-availability of sufficient materials it is kept as *Agrypnus* sp.

III. Genus *Lacon* Castelnau, 1836

1829. *Adelocera* sensu auct. , nec Latreille, In Cuvier, G. L. C. F. D. , *Le regne animal*. Nouvelle ed. 4; Misinterpretation.

1836. *Lacon* Castelnau , In *Silbermann Rev. Ent.* 4 : II; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. Ent.* Suppl., 20 : 52

Type : *Elater atomaius* Fabricius, 1789. (= *Lacon punctatus*, Herbst, 1779) (von Hayek, 1973).

Diagnostic characters : The genus has been described in details by von Hayek (1973).

Distribution : Cosmopolitan.

Biology and Habits : Very little is known of the biology and habits of the members of this genus.

The adults of the European species are generally found under the bark or in the decaying stumps of coniferous trees. Adults of *L. modestus* (Boisduval) (Fleutiaux, 1947) and of certain American species (Kirk, 1922) have been found under the bark and in wood-borer galleries in the timber of deciduous tree. The larvae have found in the same places. Those of *L. marmovatus* (Fabricius) are known to feed on Bostrychid larvae (Kirk, 1922) and it seems probable that the larvae of other species are also predaceous on wood-boring larvae.

Remarks : The genus has been described in details by von Hayek, 1973. She recorded 106 species from the world of which 4 species were from India and a single species from West Bengal. Later, Vats & Kashyap (1992) described another 4 new species from U.P. and Haryana in North India. So, at present a total of 8 species are recorded from India.

24. *Lacon oliveri* (Candeze), 1874

1874. *Adelocera oliveri* Candeze, *Mem. Soc. r. Sci. Liege*, 4(1) : 20.

1926. *Lacon oliveri*; Fleutiaux, *Annls Soc. ent. Fr.*, 95 : 93; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. Ent. Suppl.*, 20 : 73.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling). The material was originally reported by Candeze (1874) from Darjeeling district of West Bengal.

IV. Genus *Lanelater* Arnett, 1952

1829. *Agrypnus* sensu auct., nec Eschscholtz, In : Thon, *Entomol. Archiv.*, 2(1) : 31 Misinterpretation.

1840. *Amaurus* Castelnau, *Histoire naturelle des insects, Coleopteres.*, 1 : 23

1835. Homonym of *Amaurus* Burmeister, Hemiptera]

1952. *Lanelater* Arnett, Wasmann *J. Biol.*, 10 : 105; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 240; 1979, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 38(5) : 246; 1993, Vats & Kashyap, *Ind. J. For.*, 16(3) : 214.

Type : *Agrypnus schotti* Le Conte, by original designation (Hyslop, 1921).

Diagnostic characters : The genus has been described in details by von Hayek (1973).

Distribution : All parts of the world except South America

Biology and Habits : The early stages of the larva of *L. fuscipes* (Fabricius) have been described and figured by Fletcher (1919). The larvae of this species and of *L. mastesi* (Madeay) are predaceous and may be of some economic importance. It seems probable that the larvae of *L. fuscipes* attack larvae of *Oryctes rhinoceros* Leshe in Mauritius and the

larvae of. *L. mastersi* are believed to play an importance part in keeping down the numbers of Rutelid and Melolonthid larvae, which are serious pests of sugar-cane plantations in Australia (von Hayek, 1973). In the present study adults have been found from soil surface of cultivated mulberry fields.

Remarks : The genus *Lanelater* was established by Arnett (1952) for those species which were formerly placed under *Agrypnus* Eschscholtz (1829). About 80 species from the world including more than 11 species from India are known under the genus. From West Bengal 6 species have been recorded during the present study, including 1 species which is new to science.

Key to the species

- 1. Antennae not even extended upto the middle of the prothorax *rufipes*
 - Antennae reaching upto or beyond the middle of the prothorax 2
- 2. Prothorax as long as broad, antennae reaching upto the middle of prothorax
.....*fuscipes*
 - Prothorax longer than broad, antennae reaching beyond the middle of prothorax
..... 3
- 3. Body typically muddy brown in colour with a longitudinal blackish spot on the pronotum *cinereus*
 - Body uniformly brownish or blackish in colour 4
- 4. Punctuation double *luridus*
 - Punctuation simple 5
- 5 Hind angle of pronotum pointed, carinate, carinae reaching the middle of pronotum
..... *kalimpongensis*
 - Hind angle of pronotum rounded, carinate, carinae extended beyond the middle of prothorax..... *attonitus*

25. *Lanelater attonitus* (Candeze), 1874
(Fig. 21)

1874. *Agrypnus attonitus* Candeze, Mem. Soc. r. Sci. Liege, (2)4 : 10.
1952. *Lanelater attonitus*; Arnett, Wasmann J. Bio., 10 : 105; 1973, von Hayek, Bull. Br. Mus. Nat. Hist. Suppl., 20 : 244.

Redescription : Length 33 mm, breadth 10 mm. Body elongated, broad, uniformly black in colour. Abdominal segments blackish. Antennae and legs brownish. Surface shining; vestiture fine, dense, moderately long, golden yellow coloured.

Head slightly depressed, as long as broad, frontal region densely punctate, frontal carina complete, two prominent longitudinal triangular spots in the frons. Pubescence golden yellow, punctation simple. Eyes large and concealed. Mandibles strong and concealed. Antennae damaged.

Pronotum longer than broad (length 10 mm, breadth 9 mm) strongly convex in middle. Sides sub-parallel, sinuate before hind angles. Vestiture fine, dense, moderately long. Pronotal disc strongly convex; densely punctate medially, punctures simple, separated by less than their own diameters. Integument between punctures not granulate. Lateral margin of pronotum entire, rounded anteriorly; posteriorly angles rounded; carinate, carinae long, extending beyond the middle of prothorax.

Prosternum densely punctate medially, punctures separated by less than their own diameters. Integument between punctures not granulate. Prosternal spine with a deep median longitudinal groove at the base. Margins of mesosternal cavity declined in middle. Anterior margin of metasternum emerginate between meso-coxae, separated from mesosternum.

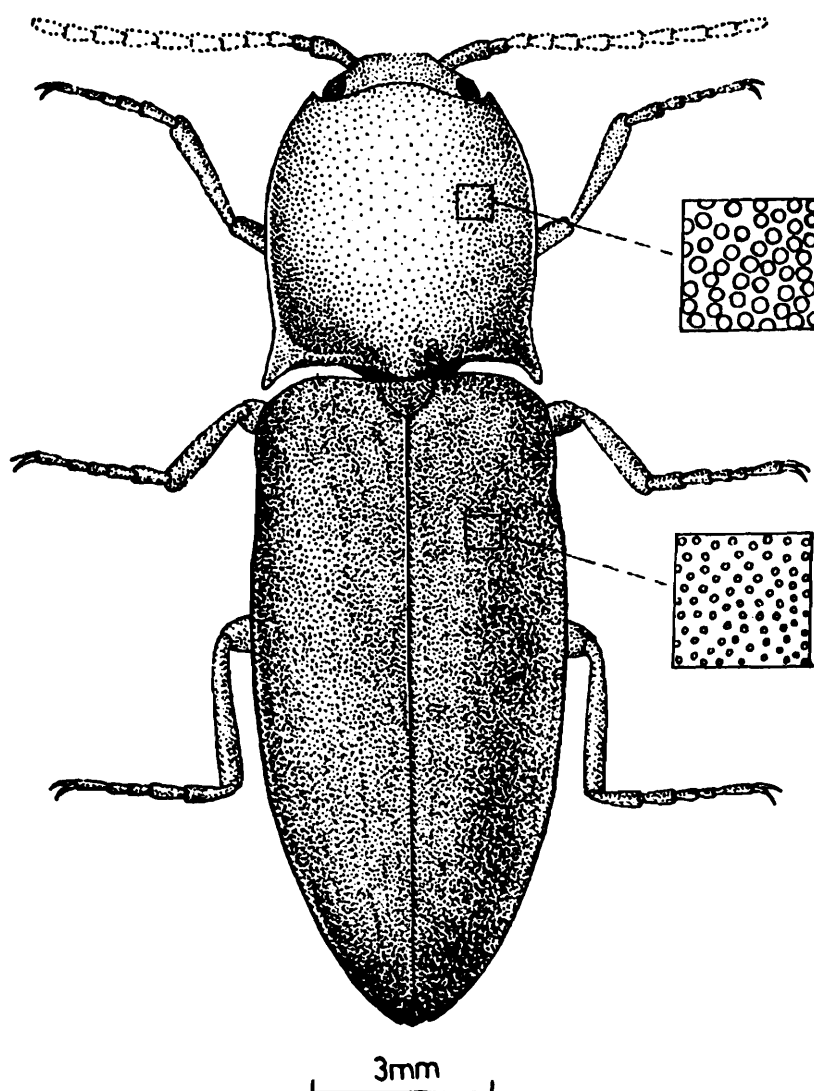


Fig. 21. *Lanelater attonitus* (Candeze) : Dorsal view.

Scutellum pentagonal, shield shaped, slightly broader than long, surface flat, anterior margin slightly concave, densely punctate, vestiture dense, moderately long.

Elytra 2.2 times as longer than broad (length 22 mm, breadth 10 mm), convex, sides straight, sub-parallel, rounded at the base, with little pubescence along the external margins. Striae consisting of punctures joined by moderately impressed lines; punctures small. Interstriae slightly convex to flat; finely and densely punctate, surface not granulate. Vestiture fine, dense, moderately long. Last sternite of abdomen flat. Legs slender with simple tarsi and claws.

Material examined : 1 ex., INDIA : West Bengal : Birbhum, K. A. Hallows coll., date of collection not known.

Distribution : India : West Bengal (Birbhum). The material was originally reported from India but the particular state was not mentioned.

Remarks : This species was originally reported from India though Candeze(1874) commented that he believes that the species comes from the 'Malayan peninsula' But due to lack of additional records this has not been confirmed (von Hayek, 1973). The material is recorded for the first time from West Bengal.

26. *Lanelater cinereus* (Candeze), 1857 (Fig. 22)

1857. *Agrypnus cinereus* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 40

1952. *Lanelater cinereus* Arnett; *Wasmann J. Bio.*, 10 : 105; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. Suppl.*, 20 : 246.

Redescription : Length 28 mm, breadth 8 mm. Body stout, elongated and muddy brown in colour, surface shining. Abdominal tergites muddy brown. Antennae and legs brownish. Vestiture moderately dense, straw brown coloured.

Head small, with a vertical depression between the antenna. Frontal region densely and closely punctate, punctation simple; frontal carina complete across frons. Eyes prominent. Antenna long, 12 segmented extending upto the anterior margin of mesocoxae, basal segment robust, 2nd segment is shortest, 3rd segment is shorter than the 4th, rest segments are distinctly serrate, last two segments are ovate; except the 2nd and 3rd segments all other slightly longer than wide.

Pronotum with a black longitudinal marking at the middle; sinuate before the hind angles, longer than broad (length 7.5 mm, breadth 7 mm); lateral margins entire, sides sub-parallel. Vestiture fine, dense. Pronotal disc moderately convex, closely and densely punctate, punctation simple, punctures shallow, simple; integument between punctures not granulate. Posterior angles sharply pointed, carinate; carina reaching upto 3/4th length of the pronotum.

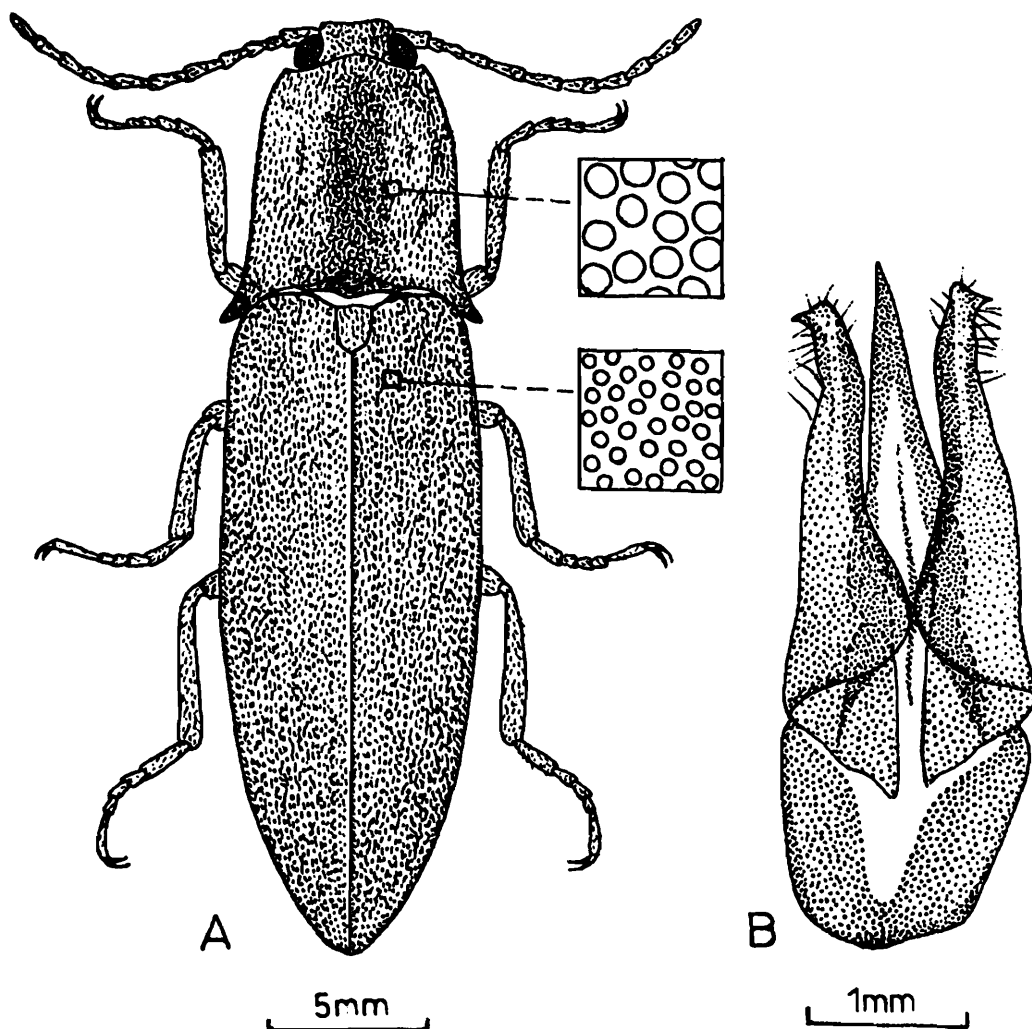


Fig. 22. *Lanelater cinereus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Prosternum densely punctate, punctures separated by less than their own diameters; integument between punctures not granulate. Prosternal spine without longitudinal groove, apex of prosternal spine sharply pointed. Margins of mesosternal cavity declined in middle; anterior margin of metasternum emerginate between mesocoxae.

Scutellum pentagonal, shield shaped, muddy brown, anterior margin slightly concave, finely and densely punctate, vestiture fine, dense, integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 19 mm, breadth 8 mm), convex, sides gradually widening on basal half, then weakly rounded and gradually tapering towards rounded apex; apices rounded and weakly spinose along middorsal suture. Striations on the elytra unimpressed; striae punctate, punctures small, coarse. Interstriae slightly convex to flat. Vestiture moderately dense. Legs slender, claws simple with setae.

Male Genitalia : Phallobase with anterior margin rounded, parameres broad, outer margin almost straight, posterior end of each paramere with a small subapical process; median lobe slightly longer than parameres, gradually narrows to a pointed tip, furcae reaching the anterior margin of paramere.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Terai, 18.VI 1914, Gravely coll., collected at light in train (det Fleutiaux); 1 ex., Masiambari : Pankhabari, 15-23.VIII. 1928, J. M. Puri coll.

Distribution : India : West Bengal, Sikkim, previously reported from 'Indes Orientales' Candeze comments than though labelled 'India' he believes that the species comes from the Malayan peninsula (von Hayek, 1973).

Remarks : This species is recorded for the first time from the area of study.

27. *Lanelater fuscipes* (Fabricius), 1775
(Fig. 23)

1775. *Elater fuscipes* Fabricius, *Systema entomologiae*, : 211.

1840. *Agrypnus fuscipes*; Germar, *Z. Ent. (Germar)*, 2 : 253.

1952. *Lanelater fuscipes*; Arnett, *Wasmann J. Bio.*, 10 : 105; 1973, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) Suppl.*, 20 : 249; 1979, *ibid*, *Bull. Br. Mus. Nat. Hist. (Nat. Hist.) Vol.*, 38(1-6) : 246.

1996. Biswas S., Chakraborty P. *et al.*, *Fauna of Delhi, State Fauna Series*, 6 : 346.

Redescription : Length 36 mm, breadth 11 mm, Body very stout, elongated, uniformly black in colour, surface shining. Abdominal tergites blackish. Antennae blackish, legs dark brownish. Vestiture dense, golden orange coloured.

Head small, depressed in middle. Frontal region closely and densely punctate, punctation simple; frontal carina complete across frons. Eyes small. Antenna short, extended upto the middle of prothorax; basal segment robust, 2nd segment smallest and subglobular, 3rd is stouter than the 4th, 3rd and 4th segment subequal, the segments are serrate. Mandibles simple without any dent.

Pronotum as long as broad (length & breadth 10 mm); lateral margins entire, narrow towards end; sides subparallel. Vestiture fine, dense. Pronotal disc convex closely and densely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Posterior angles sharply pointed, carinate; carina reaching beyond the middle of the pronotum.

Prosternum densely punctate, punctures separated by less than their own diameter. Integument between punctures not granulate. Prosternal spine with a longitudinal groove, apex of prosternal spine sharply pointed. Prosternopleural grooves extended upto the procoxal cavity for receiving the antenna while at rest; propleurae without grooves for accommodating the anterior tarsi. Anterior margin of metasternum truncated between mesocoxae, margins of mesosternal cavity declined.

Scutellum pentagonal, shield shaped, black, anterior margin slightly concave, finely and densely punctate. Vestiture fine dense. Integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 25 mm, breadth 11 mm), sides gradually

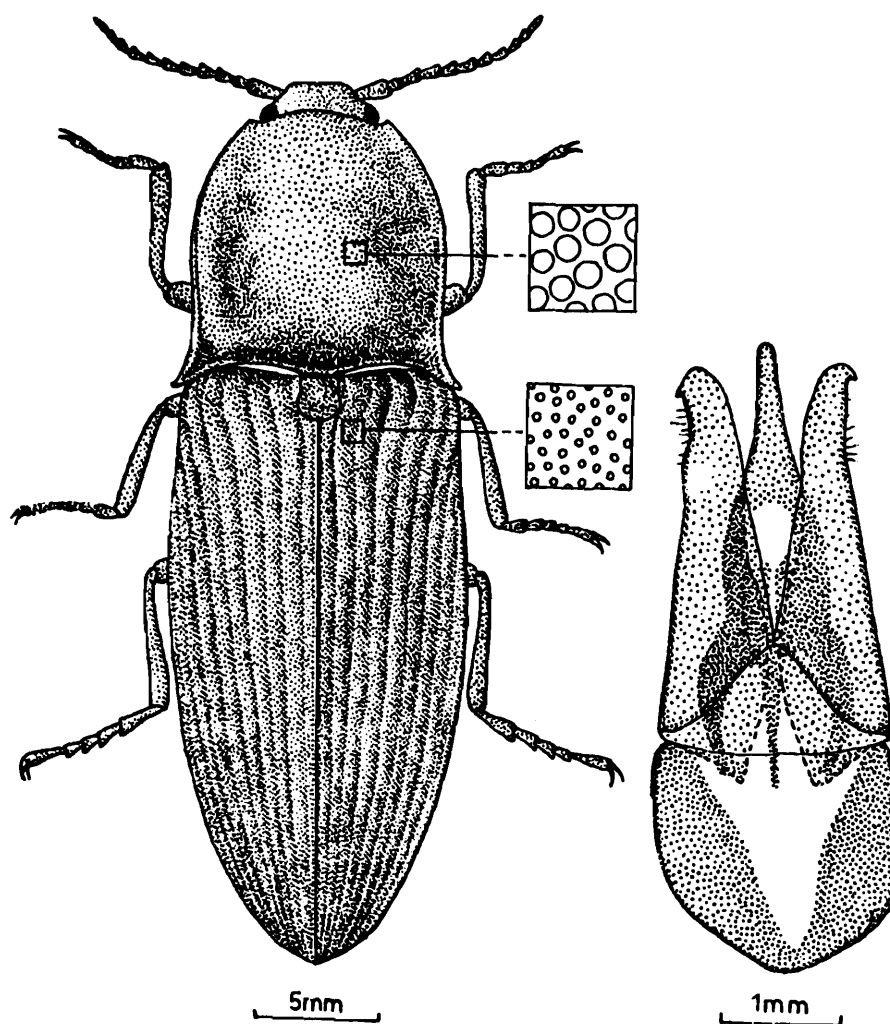


Fig. 23. *Lanelater fuscipes* (Fabricius) : A. Dorsal view; B. Dorsal view of male genitalia.

widening on basal half, then weakly rounded and gradually tapering towards rounded apex; apices rounded and weakly spinose along middorsal suture; lateral margin entire but slightly sinuate at the lateral side towards the base; 8 longitudinal striations on each elytron. Striae abruptly punctate. Interstriae flat with linear rows of punctures, Vestiture moderately dense. Abdominal segments subequal. Legs slender, claws simple with setae.

Male Genitalia : Phallobase with rounded anterior margin; parameres broad with outer margin almost straight, posterior end of each paramere flat with subapical process; median lobe slightly longer than parameres, gradually narrows to a very thin rounded tip; furcae reaching the anterior margin of paramere.

Material examined : 1 ex., INDIA : West Bengal : Midnapore : Kharagpur, 17-30.VI.1911, R. Hodgart coll.; 1 ex., Calcutta, 30.VII.1907, Annandale coll. (det Fleutiaux); 1 ex., Calcutta, 1930, A. C. Sen coll.; 2 exs., Calcutta, 2.XI.1906, collector not known.

Distribution : India : West Bengal (Kolkata, Darjeeling), Karnataka, New Delhi, Sikkim, Tamil Nadu, Uttar Pradesh.

Elsewhere : Indo-China; Madagascar; Reunion Island; Sri Lanka.

Remarks : This species is recorded from West Bengal for the first time.

28. *Lanelater kalimpongensis* n. sp.

(Fig. 24)

Description : Length 26.1 mm, breadth 8 mm. Body stout, elongated, blackish brown in colour, surface shining. Abdominal tergites brownish. Antennae and legs reddish brown. Vestiture dense, moderately long, golden brown in colour.

Head small, almost flat, no glabrous spot in the middle. Frontal region densely punctate, punctation simple; frontal carina complete across the frons. Eyes prominent. Antenna moderately long, reaching beyond the middle of the prothorax, basal segment robust, 2nd segment shortest, slightly shorter than the 3rd, 3rd shorter than 4th, segments are distinctly serrate. Mandibles simple, without any dent.

Pronotum distinctly longer than broad (length 6.6 mm, breadth 7.1 mm), sinuate before the hind angles, lateral margin entire, narrow towards end; sides subparallel. Vestiture fine, dense. Pronotal disc moderately convex, densely punctate, punctation simple, punctures separated by less than their own diameter. Integument between punctures not granulate. Hind angles pointed, carinate, carina reaching the middle of the pronotum.

Prosternum densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine with a shallow longitudinal groove, apex of prosternal spine broadly rounded. Prosternal suture deeply grooved upto

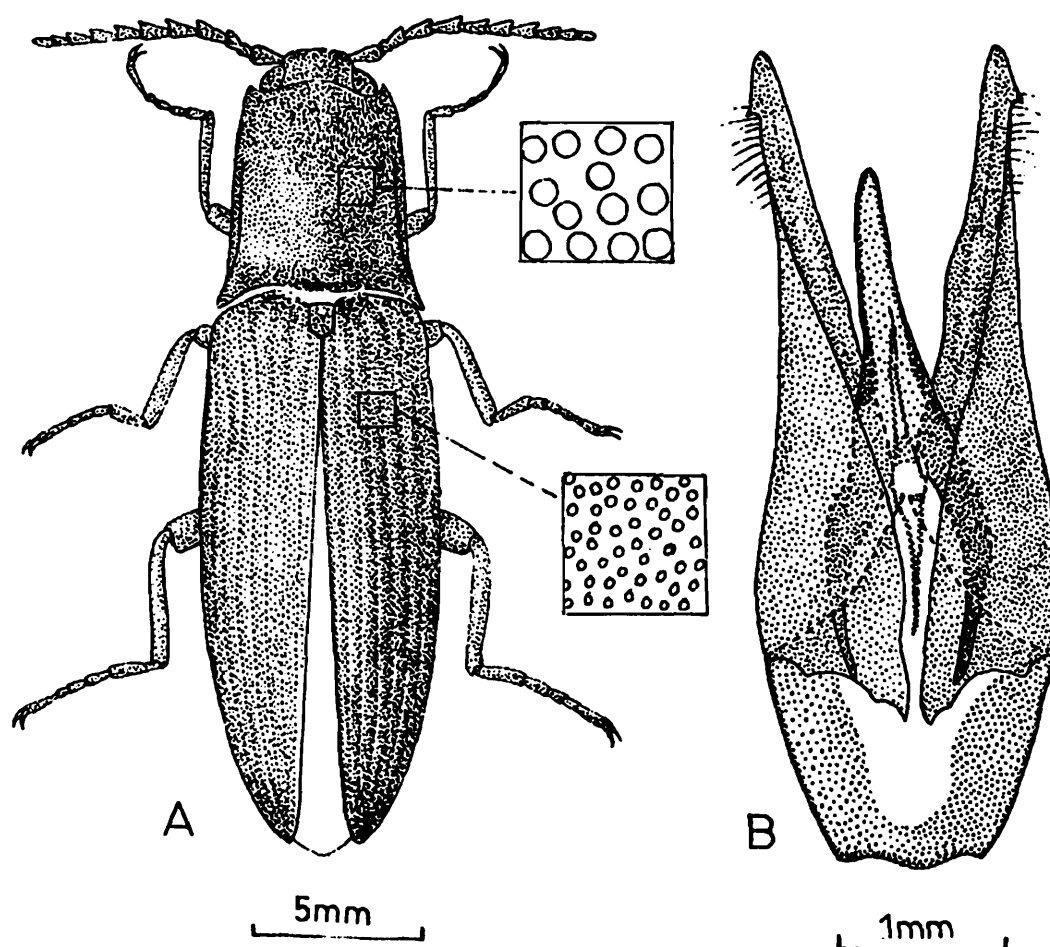


Fig. 24. *Lanelater kalimpongensis* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

the anterior margin of procoxae to receive the antennae, no tarsal groove at the prosternum. Margins of mesosternal cavity declined. Anterior margin of metasternum emerginate between mesocoxae, separated from mesosternum.

Scutellum short, pentagonal, shield shaped blackish, anterior margin slightly concave, densely punctate. Vestiture fine, dense and long, integument between punctures not granulates.

Elytra 2.4 times longer than broad (length 19 mm, breadth 8 mm), convex, surface reticulate with minute dot like punctures, surface gradually widening on basal half, then gradually rounded and gradually tapering towards rounded apex; apices rounded and weakly spinose along middorsal suture. Striae punctate, punctures separated by less than their own diameter, distinct. Interstriae flat, with small and dense punctures, shallow and separated by less than their own diameter. Legs slender, claws simple with setae.

Male Genitalia : Phallobase with straight anterior margin, parameres elongated, outer margin slightly arcuate, posterior end of each paramere with subapical process; aedeagus shorter than parameres, narrows posteriorly with a rounded tip; median lobe with a very small spike like structure at the middle of the left side; furcae reaching the anterior margin of parameres.

Female : Cannot be distinguished externally from male.

Type material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Darjeeling : Kalimpong, 3000 ft. alt., 3.V.1997, D. B. Khawas coll., collected from soil surface of cultivated mulberry filed.

Paratypes : 2 exs., same data as holotype.

Distribution : India : West Bengal (Darjeeling).

Remarks : The species *Lanelater kalimpongensis* comes closer to *L. luridus* (Fabricius) but can easily be separated from the former by pronotum with different type of punctures, absence of a median longitudinal carina on the pronotum and the median lobe of aedeagus shorter than the parameres [median lobe is as long as parameres in *L. luridus* (Fabricius)].

Itymology : It is named after the place from where it was collected for the first time.

29. *Lanelater luridus* (Fabricius), 1781

(Fig. 25)

1781. *Elater luridus* Fabricius, *Species Insectorum* : 265.

1952. *Lanelater luridus*; Arnett, Wasmann J. Biol., 10 : 105; 1973, von Hayek, Bull. Br. Mus. Nat. Hist. (Ent.). Suppl., 20 : 253.

1857. *Agrypnus punctatus* Candeze, Mem. Soc. r. Sci. Liege, 12 : 26.

1857. *Agrypnus sondaicus* Candeze, Mem. Soc. r. Sci. Liege, 12 : 34.

1857. *Agrypnus moestus* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 34.

Redescription : Length 28 mm, breadth 8 mm. Body elongated, stout, brown in colour, surface shining. Abdominal tergites blackish brown. Antennae and legs brownish. Vestiture fine, dense, moderately long, brownish yellow.

Head small, with middorsal depression. Frontal region densely punctate, punctation double and coarse; frontal carina complete across the frons. Eyes prominent. Antenna moderately long, reaching upto the hind margin of anterior coxae; the basal segment is robust, 2nd segment shortest, 3rd is shorter than 4th segment, 4th segment is longer than broad, other segments distinctly serrate. Mandibles simple.

Pronotum longer than width (length 9 mm, breadth 8 mm), sinuate before the hind angles, lateral margins entire, narrow towards end; sides subparallel with a median longitudinal carina on the pronotum. Vestiture fine, dense. Pronotal disc slightly convex; densely and finely punctate punctures separated by less than their own diameter. Integument between punctures not granulate. Posterior angles sharply pointed, carinate; carinae reaching the middle of prothorax. Punctation on pronotum double, dense, the bigger punctures are present mid-dorsally while the smaller ones are abruptly distributed.

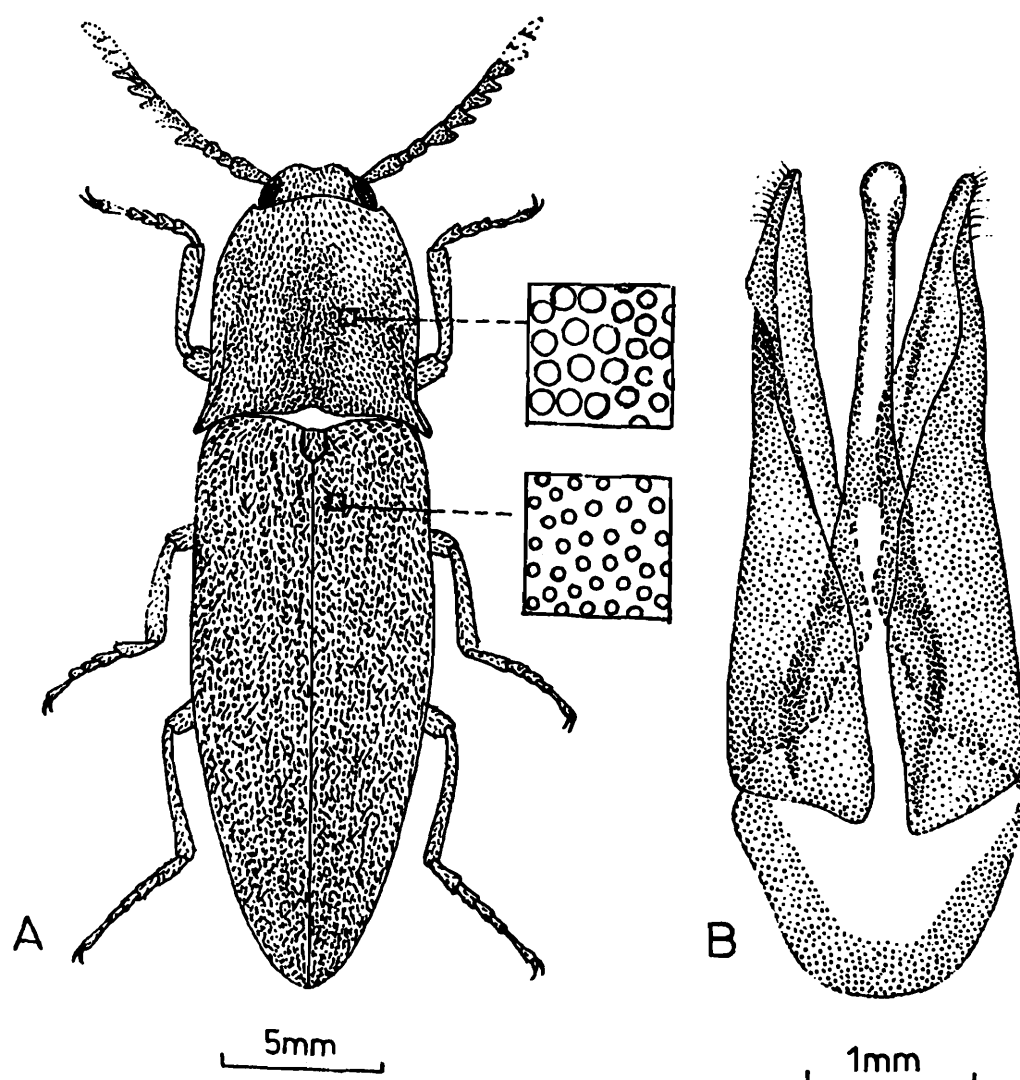


Fig. 25. *Lanelater luridus* (Fabricius) : A. Dorsal view; B. Dorsal view of male genitalia.

Prosternum densely punctate, punctures separated by less than their own diameter, integument between punctures not granulate. Prosternal spine short, apex of prosternal spine pointed, spine inserted into the cavity between two mesocoxae. Prosternal suture deeply grooved upto the anterior margin of procoxae for receiving antenna, no tarsal groove at the prosternum. Margins of mesosternal cavity declined.

Scutellum short, almost pentagonal, shield shaped; brownish black, anterior margin slightly flat, densely punctate. Vestiture fine, dense, integument between punctures not granulate.

Elytra 2.2 times longer than broad (length 18 mm, breadth 8 mm) convex, sides gradually widening on basal third, then rounded and gradually tapering towards rounded apex; apices rounded and weakly spinose along middorsal suture. Striae punctate, the punctures are bigger, while interstriae with coarsely distributed smaller punctures. Vestiture fine, dense. Legs slender, claws simple with setae.

Male Genitalia : Phallobase with straight anterior margin; parameres broad, almost straight, posterior end of each paramere with a small subapical process; median lobe as long as parameres, broad, margins sinuous, gradually narrows to truncated tip; furcae reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, XI. 1906, no other data (det Fleutiaux); 1 ex., Darjeeling : Rayang, 31.III.1973, H. S. Sharma and party coll; 1 ex., Teesta Bazar, 214 m alt., 18.IV.1976, A. R. Bhowmik & party coll.; 1 ex., Kalimpong, 3500 ft. alt., 16.IV.1997, D.B.Khawas coll.; 1 ex., Nadia : Kalyani, 1.V.1996, P. Chakraborty coll.

Distribution : India : West Bengal (Calcutta, Darjeeling, Nadia), Sikkim, Tamil Nadu.

Elsewhere : Arabia; Ethiopia; Java and Kenya.

Remarks : This species is recorded from West Bengal for the first time.

30. *Lanelater rufipes* (Candeze), 1874
(Fig. 26)

1874. *Agrypnus rufipes* Candeze, *Rev. de la Monogr. Des. Elat.*, 4 : 32.

1952. *Lanelater rufipes*; Arnett, Wasmann *J. Biol.*, 10 : 105; 1973, von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.) Suppl.*, 20 : 262.

Redescription : Length 24.5 mm, breadth 7.0 mm. Body elongated, stout, blackish brown, surface shining. Abdominal tergites dark brownish. Antennae and legs brownish. Vestiture small, brownish coloured.

Head small, with middorsal depression. Frontal region densely punctate, punctation simple, frontal carina complete across frons. Eyes small and prominent. Antennae short, not even extended upto the middle of the prothorax; the basal segment robust, 2nd segment shortest, 3rd segment shorter than the 4th, 3rd segment onwards the segments are distinctly serrate. Mandibles simple, not dented.

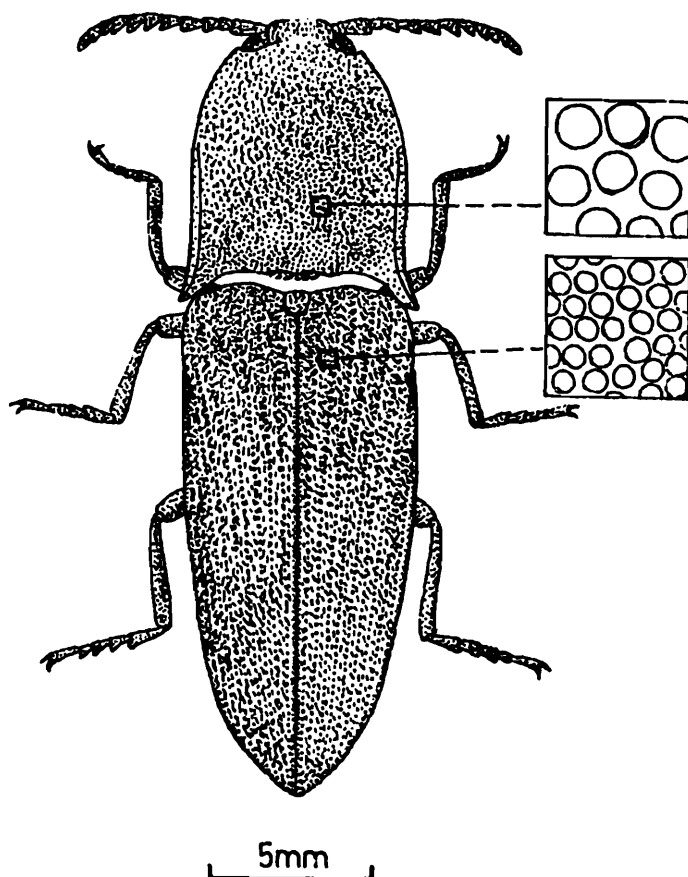


Fig. 26. *Lanelater rufipes* (Candeze) : Dorsal view.

Pronotum longer than width (length 7.5 mm, breadth 6.5 mm), slightly sinuate before the hind angles, lateral margins entire, narrow towards end; sides subparallel. Vestiture fine, moderately dense. Pronotal disc convex, densely punctate, punctation simple, punctures separated by 1-2 times their own diameter, integument between punctures not granulate. Posterior angles pointed, carinate; carina reaching beyond the middle of prothorax.

Prosternum densely punctate, punctures separated by less than their own diameter near the prosternopleural suture while punctures towards the lateral side are separated by 1-2 times their own diameter; integument between punctures not granulate. Prosternal spine short, not entering the mesosternal groove. Prosternopleural suture deeply grooved upto the anterior margin of procoxae to receive the antennae, no tarsal groove at the prosternum. Margin of mesosternal cavity declined.

Scutellum quadrate, the four corners are slightly emerginate, uniformly black; moderately densely punctate. Vestiture fine moderately dense. Integument between punctures not granulate.

Elytra 2.3 times longer than broad (length 16 mm, breadth 7 mm), convex, sides gradually widening on basal half, then weakly rounded and gradually tapering towards rounded apex; apices rounded and weakly spinose along middorsal suture; lateral margin entire. Striae punctate, punctures bigger and distinct while interstriae flat with coarsely distributed smaller punctures. Vestiture moderately dense. Legs slender, claws simple with setae.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, Ind. Mus. collection in 1907 (det. Fleutiaux).

Distribution : India : West Bengal (Kolkata), Pondicherry.

Remarks : This species is recorded for the first time from West Bengal.

V. Genus *Meristhus* Candeze, 1857

1857. *Meristhus* Candeze, *Mon. Elat.* 1 : 162; 1921, Hyslop, *Proc.U. S. Natn. Mus.*, LVIII : 656.
1973. von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.) suppl.*, 20 : 231.
1952. *Rhaciaspis* Arnett, *Wasmann J. Biol.* 10 : 121 Subgenus *Sulcimerus* 1947, Fleutiaux, *Notes Ent. Chin.*, 11 : 225.

Type : *Meristhus scrobinula* Candeze (as designated by Hyslop, 1921).

Diagnostic characters : The species has been described in details by von Hayek (1973).

Distribution : India.

Elsewhere : Africa, Indonesia, Madagascar, Southern U.S.A.

Biology and Habits : The larvae of *Meristhus (Sulcimerus) niponensis* Lewis live in the ground (Ohira, 1962). One *Meristhus* sp. near *M. lepidotus* Palisot de Beauvois commonly occurs on the fore dunes of the eastern South African seaboard. The adults have been found burrowing in the sand, usually in the neighbourhood of the dune plants, on which the larvae (which are unknown) probably feed (Callan, 1964). The adults have been collected under sand in river bed during this study.

Remarks : The genus was established by Candeze for those species in which the scutellum is longitudinally carinated. Schenkling catalogue (1925 : 35) lists a total of 22 species from the world. Later, 2 species was described by Ohira, 1973. But von Hayek (1973) has recorded only 8 species under this genus from the world, of which one (*M. quadripunctatus*) was from India (Indian border) and none was from West Bengal. Here 3 species have been recorded for the first time from the state of West Bengal. However, out of these 3 species *M. lotharensis* was recorded by Ohira (1973) from Nepal and the other *M. crenulatus* by Mukhopadhyay & Chakraborty from Sikkim (2003).

Key to the species

- 1. Posterior angles of pronotum with a carina*quadripunctatus*
 - Posterior angles of pronotum without carina 2
- 2. Posterior angle of pronotum parallel *lotharensis*
 - Posterior angle of pronotum divergent *crenulatus*

Meristhus (Sulcimerus) crenulatus Mukhopadhyay & Chakraborty, 2003
(Fig. 27)

2003. *Meristhus crenulatus* Mukhopadhyay & Chakraborty, *Fauna of Sikkim, State Fauna Series*, 9 (Part 3) : 217-236.

Description : Length 2.33 mm, width 1 mm. Body moderately elongate and more or less convex above; surface little shining, blackish brown except around margins of pronotum, basal area of elytra and undersides of most parts of prothorax more or less reddish brown. Abdominal tergites brownish. Antennae and legs are yellowish brown. Elytra with a pair of poorly defined, pale yellow spots at the posterior third, these spots variable. Vestiture of two types, one of thick, erect, scales sparsely spaced on head and pronotum and arranged in a row on elytral intervals; the other type consisting of smaller, decumbent, setae on head and pronotum and semi-erect, setae in a row on elytral intervals.

Head small, shallowly impressed at middle; surface coarsely and deeply punctate, punctures separated by less than their own diameter; clypeal margin prominent over antennal insertions. Frontal region coarsely punctate, frontal carina absent. Antenna short,

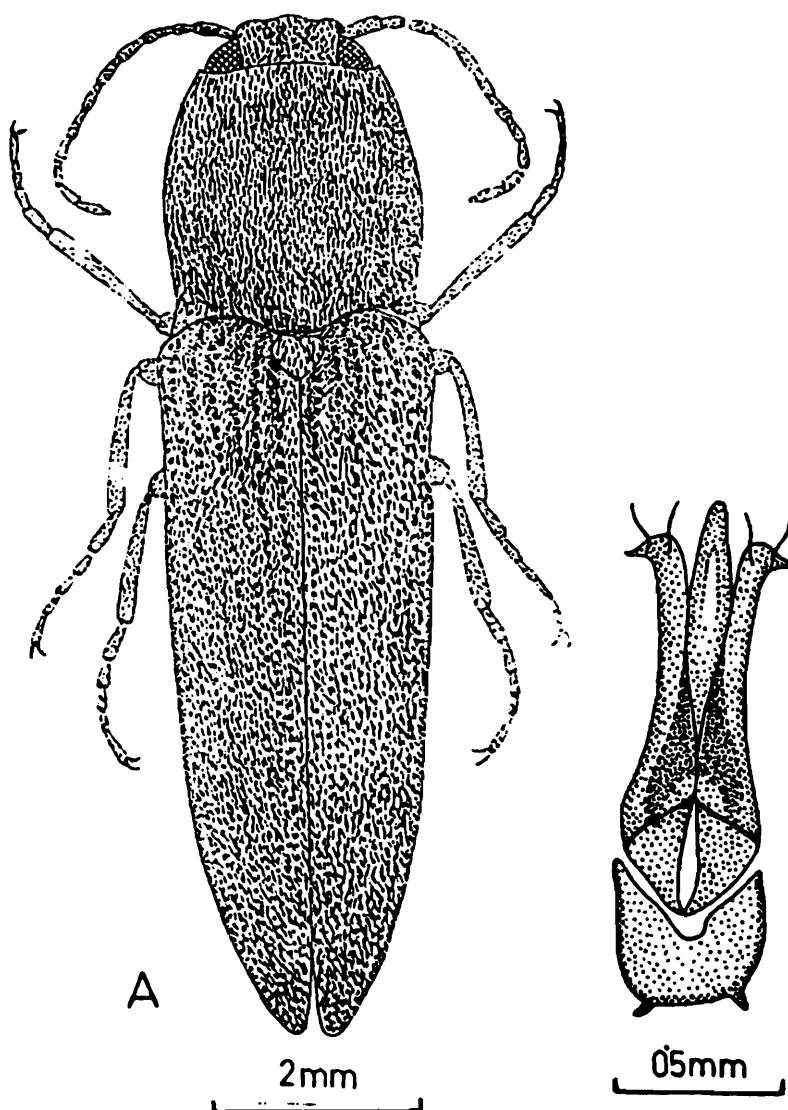


Fig. 27. *Meristhus crenulatus* Mukhopadhyay & Chakraborty : A. Dorsal view; B. Dorsal view of male genitalia.

ending before the anterior margin of procoxa, basal segment robust and subcylindrical; second segment small, subcylindrical, and clearly longer than wide; third segment shortest, subclavate and clearly shorter than fourth one; fourth to tenth segments distinctly serrate at first then changing to moniliform, each segment slightly wider than long; last segment oblong, ovate and weakly pointed apically.

Pronotum slightly wider than long (length 0.8 mm, breadth 1 mm), narrowest at anterior angles, widest near middle; sides crenulate and clearly sinuate just before posterior angles, weakly rounded at middle. Pronotal disc gently convex, with a very shallow, median, longitudinal groove at base in front of scutellum; sparsely punctate, punctures unevenly spaced, rather sparse on disc than base and lateral sides. Posterior angles very short divergent and truncated, without any carina.

Prosternum moderately densely punctate medially, punctures separated by 1-2 times their own diameters. Integument between punctures not granulate. Prosternal suture deeply grooved on anterior half, tarsal groove on proepisternum rather deep, well defined on posterior edge, tarsal groove on metasternum shallow, not clearly defined. Anterior margin of metasternum emarginate between mesocoxae.

Scutellum subquadrate, slightly longer than wide, with a longitudinal carina; moderately densely punctate. Vestiture fine, moderately dense.

Elytra about 1.5 times longer than width (length 1.5 mm, breadth 1 mm); sides gradually widening to near middle than rounded and gradually narrowing towards acute apex. Striae unimpressed with scales punctures mainly small and scattered; few are large and deep. Interstriae flattened and with small punctures, punctures are separated more than their own diameter.

Male Genitalia : Phallobase rounded with two small apical processes at two sides; parameres with subapical process, median lobe longer than parameres, tubular, apex pointed, furcae reaching the anterior margin of paramere.

Female : Cannot be distinguished externally from male.

Material examined : 5 exs., INDIA : West Bengal : Darjeeling : Kalimpong, 15.V.1996, P. Chakraborty coll., collected under store.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Remarks : The species *M. crenulatus* appears closer to *M. longicollis* Candeze from Bengal and *M. nepalensis* Ohira & Becker from Nepal, but can easily be separated from the former by pronotum wider than long, the posterior angles of the pronotum truncated without carina, elytra with sides gradually narrowing towards acute apex and presence of very poorly defined pale yellow spots on elytra at posterior third; and from the later by the absence of erect scales on alternate elytral intervals, scutellum without longitudinal carina and posterior angles of pronotum with carina.

This species was originally described from Sikkim (Mukhopadhyay & Chakraborty; 2003) and is recorded here from West Bengal for the first time.

***Meristhus (Sulcimerus) lotharensis* Ohira & Becker, 1973**

1973. *Meristhus lotharensis* Ohira & Becker, *Orient. Insects*, 7(4) : 464.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Sukna, date & collector not recorded.

Remarks : The species has been described by Ohira & Becker (1973) from Nepal and is recorded here for the first time from India as well as from West Bengal.

***Meristhus (Sulcimerus) quadripunctatus* Candeze, 1857
(Fig. 28)**

1857. *Meristhus quadripunctatus* Candeze, *Mem. Soc. r. Sci. Liege*, 12 : 163; 1874, Candeze, *Revis. Mon. Elat* : 103; 1888, Candeze, *Ann. Mus. Cir. St. Nat Genova*, 2, 6(26) : 671; 1972, Ohira & Becker, *Orient. Insects*, 7(4) : 462.

1947. *Meristhus (Sulcimerus) quadripunctatus*, Fleutiaux, *Notes d'Ent. Chinoise*, 11(8) : 256; 1973. von Hayek, *Bull. Br. Mus. Natn. Hist. (Ent.) suppl.*, 20 : 234.

Redescription : Length 5.7 mm, breadth 1.8 mm. Body small, moderately elongate and more or less depressed above, surface little shining, dark brown in colour. Abdominal segments brownish. Antennae and legs pale brown. Elytra with two whitish, round spots towards the basal half; vestiture of two types, one of thick, erect, scales sparsely spaced on pronotum and elytral intervals; the other type smaller, decumbent, setae on head, pronotum and elytra intermixed with the previous type.

Head small, shallowly and longitudinally impressed at middle. Frontal region deeply, coarsely and closely punctate; frontal carina absent. Clypeal margin prominent throughout. Eyes invisible. Antennae invisible in the material.

Pronotum slightly wider than long (length 1.8 mm, breadth 2 mm); sides subparallel, crenulate, vestiture fine, moderately dense. Pronotal disc convex, darker in colour but whitish along two lateral sides of the pronotum, moderately densely punctate medially, punctures deep and separated by 1-3 times their own diameter, integument between punctures granulate. Posterior angles slightly divergent and each with a carina, the carina extending upto 1/5th the length of pronotum.

Scutellum subquadrate, with a long well defined, longitudinal carina, surface convex; finely, moderately densely punctate. Vestiture fine, moderately dense. Integument between punctures not granulate.

Elytra about 1.8 times longer than basal width (length 3.5 mm, breadth 1.8 mm), sides gradually widening on basal third, then weakly rounded and gradually tapering towards

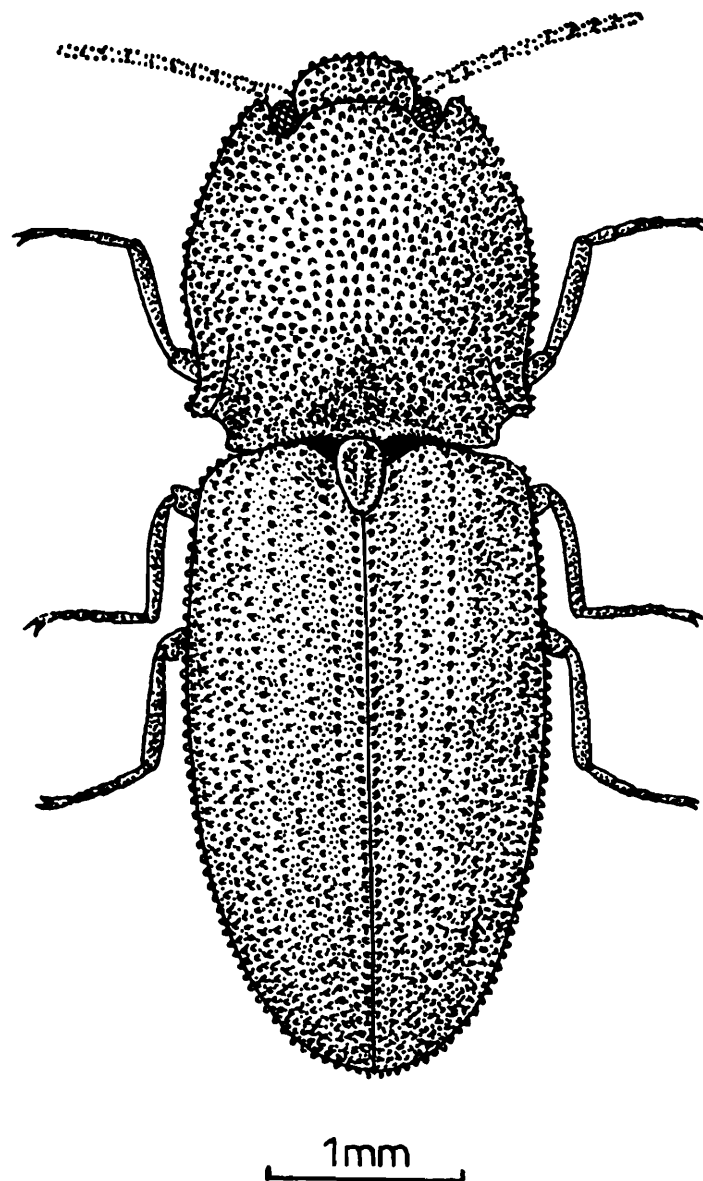


Fig. 28. *Meristhus quadripunctatus* (Candeze) : Dorsal view.

rounded apex; apices rounded and weakly spinose along middorsal suture. Striae consisting of rows of punctures joined by moderately impressed lines; punctures deep and coarse. Interstriae slightly convex to flat. Vestiture moderately dense. First and second abdominal segments each with a shallow, oval, median depression and very vague tarsal depression. Legs and claws simple.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling, date not recorded, Ind. Mus. collection (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling), Assam.

Elsewhere : Bangladesh; Indo-China; Myanmar; Nepal.

Remarks : This species is recorded from West Bengal for the first time. The material is pinned dorsally on a board, hence the ventral side could not be studied.

B. Subfamily CARDIOPHORINAE

Diagnostic Characters : Head capsule usually oval, deflexed, but may be somewhat depressed, mouth parts inferior, frons ridged between and above antennae; prosternum variable usually straight on sides, sometimes broad, usually prominent, sometimes emerginate in front, exposing mouth parts, prosternal process short, truncate; mesepimeron and mesepisternum cut off from mesocoxal cavity by meso- and metasternum, mesepimeron reduced in size; meso- and metasternum distinct, joined by a definite suture; scutellum usually cordate; often oblong or shield-shaped; tarsi various, simple, or 4th or 3rd and 4th lobed or 4th cordate, claws variable, simple bicuspidate, dented or pectinate.

Remarks : Candeze (1891) described the group under the tribe Cardiophorites with 7 genera. Schwarz (1906) also treated it as a tribe, while Fleutiaux (1941) raised it to the subfamily level. Stibick (1979) and Vats & Chauhan (1991) have also treated it as a subfamily. However, Stibick (1979) has recognised two tribes, Cardiophorini and Nyctorini, as done by Gurjeva (1974). The tribe Nyctorini contains single genus *Nyctor* with single species. Dolin (1975) did not recognise the tribe and preferred it to be synonymy under Cardiophorinae. Here also it has been treated as a subfamily. This group Cardiophorinae is little known and needs a revision of it.

This is quite a large subfamily with some 35 genera and perhaps 1000 species from the world. The single genus *Cardiophorus* Eschscholtz is well distributed in India. About 54 species from India and 6 species from West Bengal under this genus have been recorded of which 2 are recorded for the first time from this state in this present work and 1 species is described as new to science.

VI. Genus *Cardiophorus* Eschscholtz, 1829

- 1829. *Cardiophorus* Eschscholtz, In *Thon. Arch.* Vol., 2 : 34, pt. 1.
- 1891. Candeze, *Catalog. Method des Elat.*, : 125.
- 1906. Schwarz, In Wytsmann *Genera Insect.*, 46B : 162.
- 1921. Hyslop, *Proc. U. S. Natn. Mus.* Vol. LVIII : 633; 1991, Vats and Chauhan, *Res. Bull. Punj. Univ.*, 42(I-IV) : 11.
- 1830. *Caloderus* Stephens, *Illustr. Brit. Ent.* Vol., 3 : 269.
- 1840. Castelnau, *Hist. Nat. Anim. Art.* Vol., I : 249.
- 1832. *Dicronychus* Brulle, *Exped. Sc. Moree, Ent.*, : 138.
- 1835. *Drasterius* and *Dolopius*, Falderman, *Nouv. Mem. Soc. Nat. Moscou.* Vol., 4 : 172 and 177.
- 1858. *Platynychus* Motschulsky, *Etudes Ent.* Vol., 7 : 59.
- 1859. *Gauroderus* Thomson, *Skand. Col.* Vol., I : 104.

Type : 1746, *Elater ruficollis* Linnaeus, *Faun. Seuc.* : 724 (Designation by Thomson, 1859, *Skand. Col.* Vol., 1 : 104).

Note : 1801, *Elater ruficollis* Fabricius, *Syst. Eleuth.* Vol., 2 : 227, was originally included not, as Linnean species, but Fabricius (same reference) referred the species to Linnaeus. (Hyslop, 1921).

Diagnostic Characters : Frons more or less slanted and bulged, usually rounded and the clypeus is prominent and head is always more wide than long. Mandibles short and bicuspid. Last joint of the mandibular pulp is of triangular form or of the form of an half-moon.

Antennae are of different length and thin in nature; as the male is concerned, antennae are often longer than head and are together with thorax. The first joint is big and ovoid, the second one is always small, the third one is so long or smaller than the forth one and the last one is round and elongated, 4th-10th elongated, triangular.

Prothorax is more or less curved, rounded on the sides, the front part always narrower than in the middle portion and not edged on the sides; hind angles of pronotum short. Lower portion is edged from outside and the hind angles usually with a fine longitudinal carina.

Scutellum cordiform or heart shaped. Elytra rounded on the apex. Prosternum forntally rounded, parallel posteriorly, on the sides often with a raised longitudinal carina. Mesosternal cavity aligned vertically downwards.

Legs are moderately long; femur linings are extended and unusually, strongly rounded; 1st-4th joints of the tarsi gradually shorten in length and become plain; claws simple or often indented.

Distribution : India.

Elsewhere : Africa, Australia, China, Japan, Malayan Archipelago, Mexico, New Guinea, North America, Siberia.

Biology and Habits : Very little is known about the biology of the members of this genus. During the present study it was observed that these insects feeds only on leaves of trees.

Remarks : The genus was established by Eschscholtz, 1829 and 13 species were included in this genus. Schwarz (1906) has listed 50 species from India of which 13 were originally from undivided Bengal. Candeze (1860; 1893) in his monograph included 146 species, while Schenkling in 1925, listed 472 species under this genus from the world. Since then Fleutiaux (1947), Lanchester (1971), and Leseigneur (1972) described several new species. Vats & Chauhan (1991) has added 14 new species from northwest India in the list. Here, 6 species of this genus from West Bengal have been recorded of which materials of 4 species were available for study.

Key to the species

1. Claws bifid, antennae extended beyond the hind angle of pronotum *moni* n. sp.
- Claws simple, antennae extended only upto or just beyond the middle of the pronotum 2
2. Body oblong, elytra with four prominent yellowish round spots *moorei*
- Body elongated, elytra without any spots
3. Posterior angle of pronotum rounded *gangeticus*
- Posterior angle of pronotum pointed *serratus*

34. *Cardiophorus bombycinus* Candeze, 1892

1892. *Cardiophorus bombycinus* Candeze, *Elat. Nouv. Fasc.*, 5 : 46; 1906, Schwarz, In : Wytsmann *Genera Insect.*, 46B : 167.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

35. *Cardiophorus ferrugatipes* Candeze, 1892

1892. *Cardiophorus ferrugatipes* Candeze, *Elat. Nouv. Fasc.*, 5 : 45; 1906, Schwarz, In : Wytsmann *Genera Insect.*, 46B : 167.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

36. *Cardiophorus gangeticus* Candeze, 1860 (Fig. 29)

1860. *Cardiophorus gangeticus* Candeze, *Mon. Elat. Vol.*, 3 : 212; 1891, Candeze, *Catalog. Method des Elat.* : 127;
1906. Schwarz, In Wytsmann *Genera Insect.*, 46B : 167.

Redescription : Length 9.1 mm, breadth 2.5 mm. Body elongated, reddish brown in colour. Abdominal tergites blackish brown. Antennae deep brown, legs brownish. Vestiture fine, sparse, whitish in colour.

Head blackish brown, slightly broader than long, surface moderately convex. Frons convex with anterior margin arcuate. Frontal carinae complete across the frons. Frontal region densely punctate, punctation simple. Antennae moderately long, extended beyond the middle of pronotum, basal segment robust, 2nd segment smallest and subglobose, 3rd longer than the 2nd, from 3rd segment onwards all are serrate. Mandibles simple.

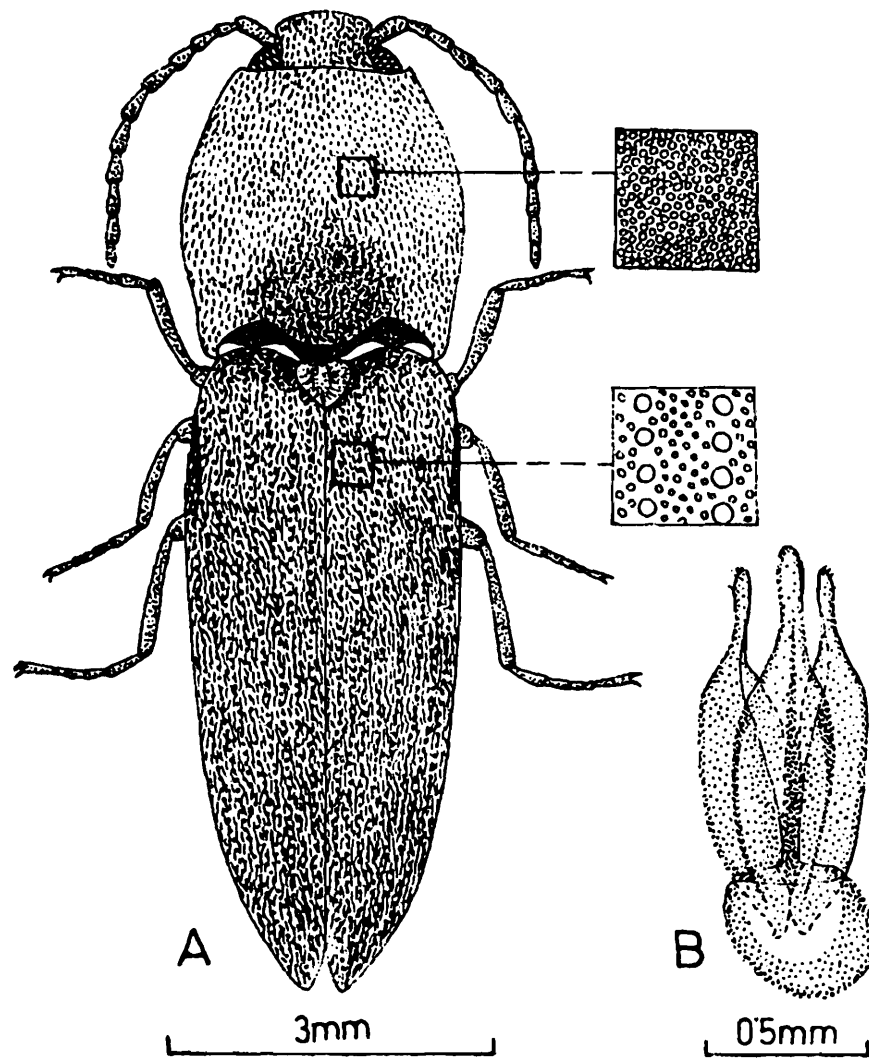


Fig. 29. *Cardiophorus gangeticus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Pronotum reddish brown with blackish tinct on anterior and posterior side; longer than broad (length 2.9 mm, breadth 2.6 mm), widest at middle, strongly convex, submarginal line extending beyond the middle of the prothorax; pronotal disc convex, shallowly punctured; punctation simple, dense, shallow; punctures small, separated by 1-2 times their own diameter, integument between the punctures not granulate. Vestiture fine, whitish and dense. Posterior angles of pronotum rounded, acarinate, with lateral furrows and indents.

Prosternum blackish brown, punctation dense, pubescence dense and fine. Prosternal spine not margined in front of coxae, moderately punctate. Metasternum slightly emerginate between mesocoxae. Metacoxal plates with posterior margin transverse.

Scutellum blackish brown, cordate, broader than long; vestiture fine, moderately dense; moderately densely punctate; punctures and separated by 1-2 times their own diameter; integument between punctures not granulate.

Elytra about 2.4 time longer than width (length 6 mm, breadth 2.5 mm), more than 2 times the length of prothorax. Sides sub-parallel along basal half, then narrowed; rounded at distal extremities. Striae with longitudinal rows of single punctures, the punctures are

slightly longer than normal. Interstriae slightly convex, more convex anteriorly with granulate margin. Claws simple. Last sternite of abdomen small and flat.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, 6.IX.1907, Ind. Mus. collection.

Distribution : India : West Bengal (Calcutta, Darjeeling).

Remarks : This species was previously recorded from the hilly tracts of Darjeeling but in the present work it has also been recorded from the plains of Kolkata for the first time.

37. *Cardiophorus moni* n. sp.

(Fig. 30)

Description : Length 10.5 mm, breadth 3.8 mm. Body oblong, blackish brown in colour, surface shining. Abdominal tergites blackish brown. Antennae and legs brown. Vestiture fine, moderately dense, small, whitish coloured.

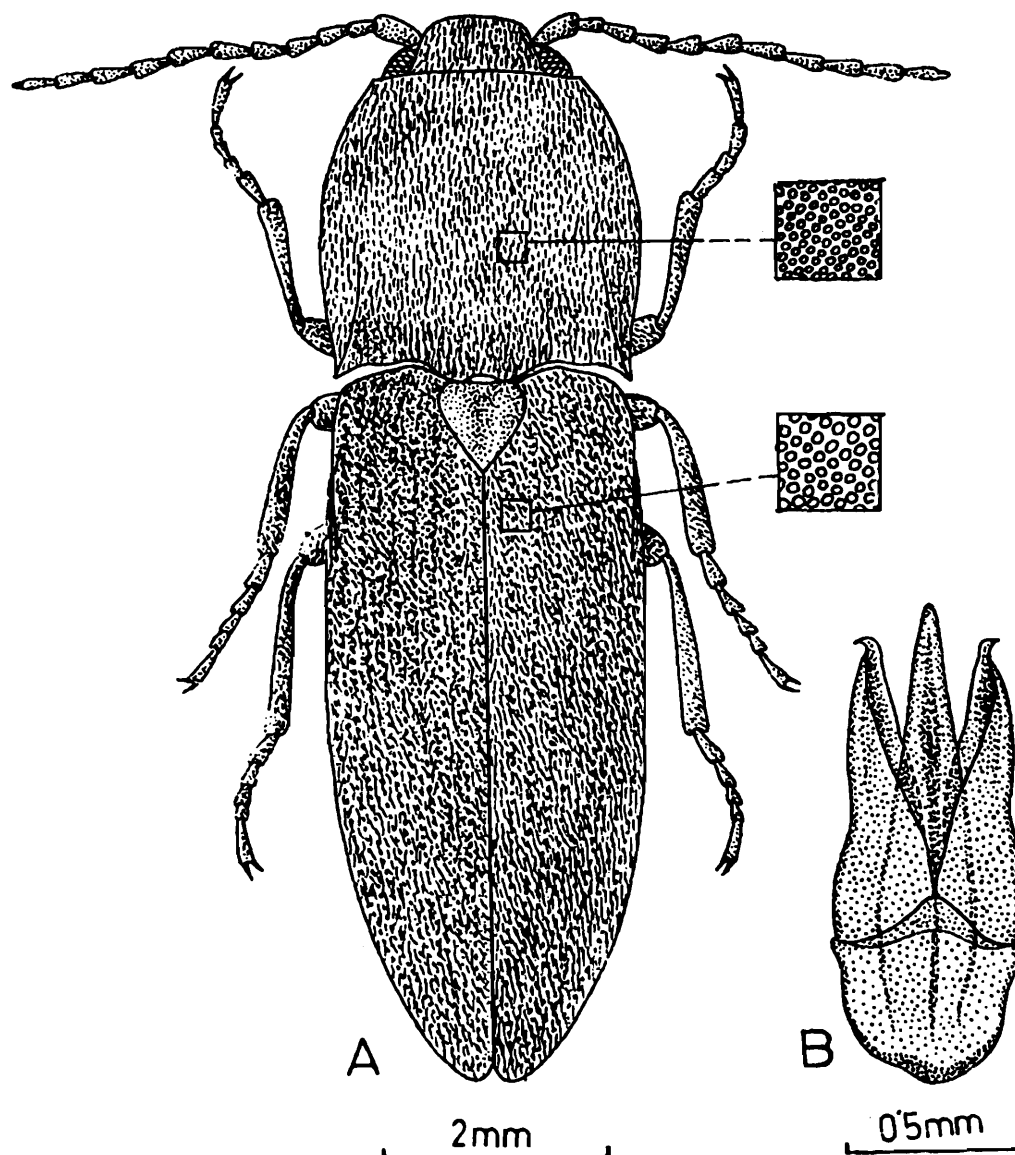


Fig. 30. *Cardiophorus moni* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

Head small, broader than long, almost flattened, slightly depressed in middle, surface flat. Frons weakly concave medially. Frontal region densely punctate, punctation simple; frontal carina complete across the frons. Eyes small, visible. Antennae long, extended beyond the hind angle of pronotum, basal segment robust, 2nd segment elongated, subglobular and smallest, 3rd and 4th segments almost subequal, the segments from 3rd onwards are all serrate, last segment slightly constricted near apex.

Pronotum almost subquadrate (length 2.8 mm, breadth 2.8 mm), widest between middle; convex, sides sub-parallel, lateral margin not prominent, sinuate before hind angles. Vestiture fine, dense, small. Pronotal disc evenly, strongly convex; evenly densely punctate, punctation simple, punctures separated by 1-2 times their own diameter. Integuments between punctures not granulate. Posterior angles of pronotum pointed, acarinate.

Prosternum densely punctate, punctures are separated by less than their own diameter; integuments between punctures not granulate. Prosternal spine elongated, without any carina, moderately densely punctate, apex of prosternal spine pointed. Margins of mesosternal cavity slightly inclined.

Scutellum heart shaped, slightly broader than long, widest medially; surface little depressed; vestiture fine, dense; surface finely and densely punctate; integument between punctures not granulate.

Elytra about 2.2 times longer than width (length 6.2 mm, breadth 2.8 mm), convex, sides almost subparallel along basal half then narrowed caudad. Apices rounded at distal extremities and strongly spinose along mid-dorsal suture. Striae consisting of linear rows of single punctures jointed by moderately impressed line, punctures shallow, separated by 1-2 times their own diameter; interstriae weakly convex to flat; finely and densely punctate, punctures shallow and scattered, not granulate. Vestiture moderately dense. Claws simple. Last sternite of abdomen flat. Legs slender with simple tarsi and bifid claws.

Male Genitalia : Phallobase with almost rounded anterior margin, parameres leaf shaped, with very sharply pointed anterior tip and very small subapical process; median lobe slender, tubular, longer than parameres, gradually narrows posteriorly to a pointed tip; furcae not reaching the anterior margin of parameres.

Female : Cannot be distinguished externally from male.

Type Material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & pty. coll., collected at light..

Paratypes : 1 ex., INDIA : West Bengal : Jalpaiguri : Gorumara, 10.VI.1996, S. Pratihari coll., collected at light; 1 ex., Darjeeling : Kalimpong, alt. 3000 ft., 3.V.1997, D. B. Khawas coll., collected from soil surface of cultivated mulberry field; 1 ex., Midnapore : Jhargram, 21.IV.1985, S. Biswas coll.

Distribution : INDIA : West Bengal (Darjeeling, Jalpaiguri, Midnapore).

Remarks : The species comes closer to *C. aequabilis* Candeze and *C. limbatus* Candeze but differs from the former by having simple punctation on pronotum and frons with anterior margin pointed (punctation double in pronotum and frons with anterior margin straight in *C. aequabilis*) and from the latter by having prothorax almost subquadrate and absence of submarginal line (prothorax longer than broad and submarginal line present in *C. limbatus*).

The species is named after Dr. Pradip Kumar Chakraborty whom the first author calls 'moni'

38. *Cardiophorus moorei* Candeze, 1860 (Fig. 31)

1860. *Cardiophorus moorei* Candeze, *Mon. Elat.* Vol., 3 : 206, p. 3. f. 20; 1891, Candeze, *Catalogue. Method des Elat.* : 127; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46B : 167.

Redescription : Length 9.7 mm, breadth 3.8 mm. Body oblong, flattened, blackish brown in colour with four yellowish, almost round shaped spots on the elytra, surface shining. Abdominal tergites brownish. Antennae and legs yellowish brown. Vestiture fine, whitish, moderately dense.

Head blackish brown, broader than long, almost flat. Frons weakly concave medially. Frontal region evenly densely punctate, punctation simple; frontal carina complete across the frons. Eyes small. Antennae damaged.

Pronotum wider than long (length 2.5 mm, breadth 3.5 mm), widest between middle; almost subquadrate, convex, sides' straight, sub-parallel, lateral margin slightly sinuate before hind angles. Vestiture fine, dense. Pronotal disc evenly, strongly convex; evenly densely punctate medially, punctures separated by 1-2 times their own diameter. Integuments between punctures not granulate. Posterior angles of pronotum slightly divergent, subpointed, acarinate.

Prosternum moderately densely punctate, punctures are separated by a narrow distance. Integument between punctures not granulate. Prosternal spine densely punctate, apex of prosternal spine blunt. Margins of mesosternal cavity slightly inclined.

Scutellum heart shaped, as long as broad, widest medially. Vestiture fine, moderately dense; surface finely and moderately punctate; integument between punctures not granulate.

Elytra about 1.8 times longer than width (length 7.0 mm, breadth 3.8 mm), sides' subparallel along basal third, then rounded at distal extremities. Striae consisting of rows of single punctures jointed by moderately impressed line, punctures shallow; interstriae weakly convex to flat, finely, moderately densely punctate, not granulate. Vestiture moderately dense. Claws simple. Last sternite of abdomen flat.

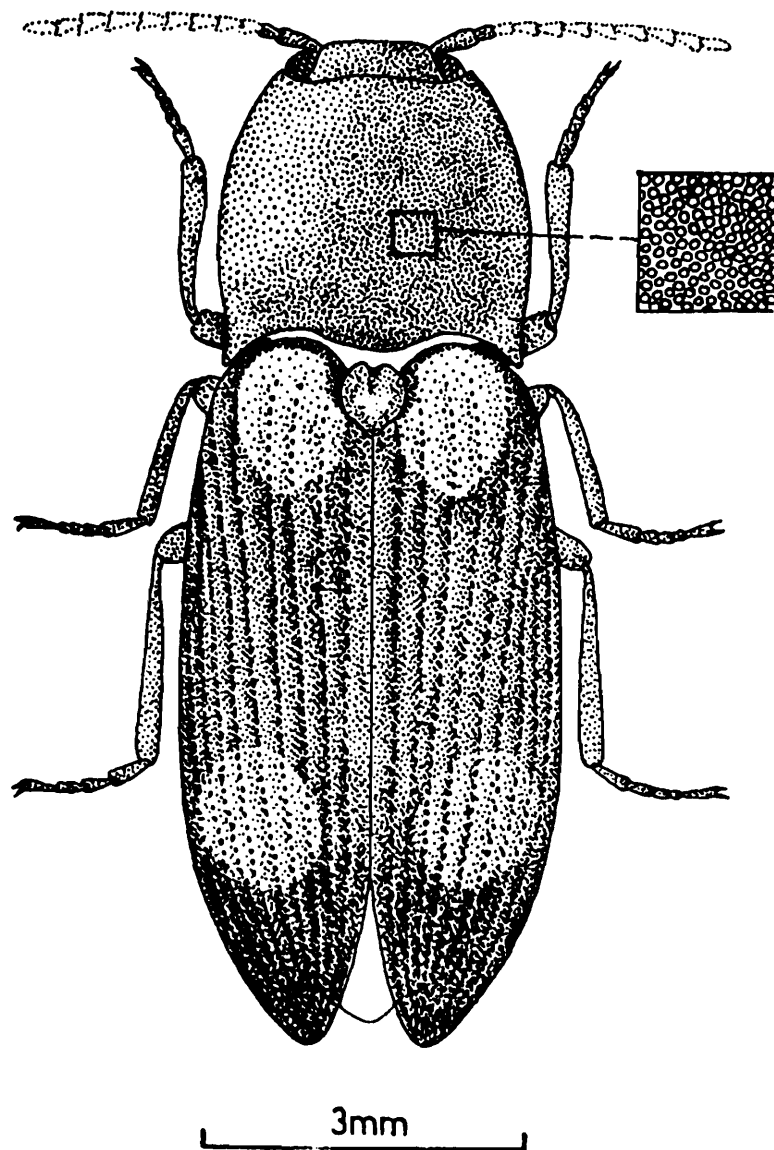


Fig. 31. *Cardiophorus moorei* Candeze : Dorsal view.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Mungphu, alt. 5000 ft., no other data available.

Distribution : India : West Bengal (Darjeeling), Tamil Nadu.

Remarks : The species can be easily recognized by the four roundish spots on the elytra, two on each side. The species was recorded earlier from South India and here for the first time from West Bengal.

39. *Cardiophorus serratus* Mukhopadhyay and Chakraborty, 2001
(Fig. 32)

2003. *Cardiophorus serratus* Mukhopadhyay and Chakraborty, Zool. Surv. India, Fauna of Sikkim, State Fauna Series, 9(Part-3) : 217-236.

Redescription : Length 9.2 mm, breadth 2.8 mm. Body elongated and more or less convex above; surface little shining; blackish brown except the sides of the elytra which

is reddish brown; antennae and legs are brown, vestiture fine, whitish, evenly distributed all over the body.

Head small, slightly broader than long, surface depressed anteriorly. Frons with anterior margin almost straight, pubescence whitish, punctation simple, dense and small. Antennae brown, short, extended upto the anterior margin of procoxae; basal segment robust, second segment distinctly shorter than the third; fourth to tenth segments distinctly serrate, last segment ovate, constricted near apex.

Pronotum almost as long as broad (length 2.7 mm, breadth 2.7 mm), narrowest at the anterior angles; sides almost straight and slightly sinuate just before the posterior angles; pronotal disc convex; sub-marginal line extending much beyond the middle of the prothorax; vestiture whitish, punctures unevenly spaced, simple, dense and small; posterior angles pointed, without any carina. Lateral margin of pronotum almost straight.

Prosternum reddish brown, densely punctate, punctation simple, Prosternal spine margined in front of coxae. Metasternum slightly emerginate between mesocoxae.

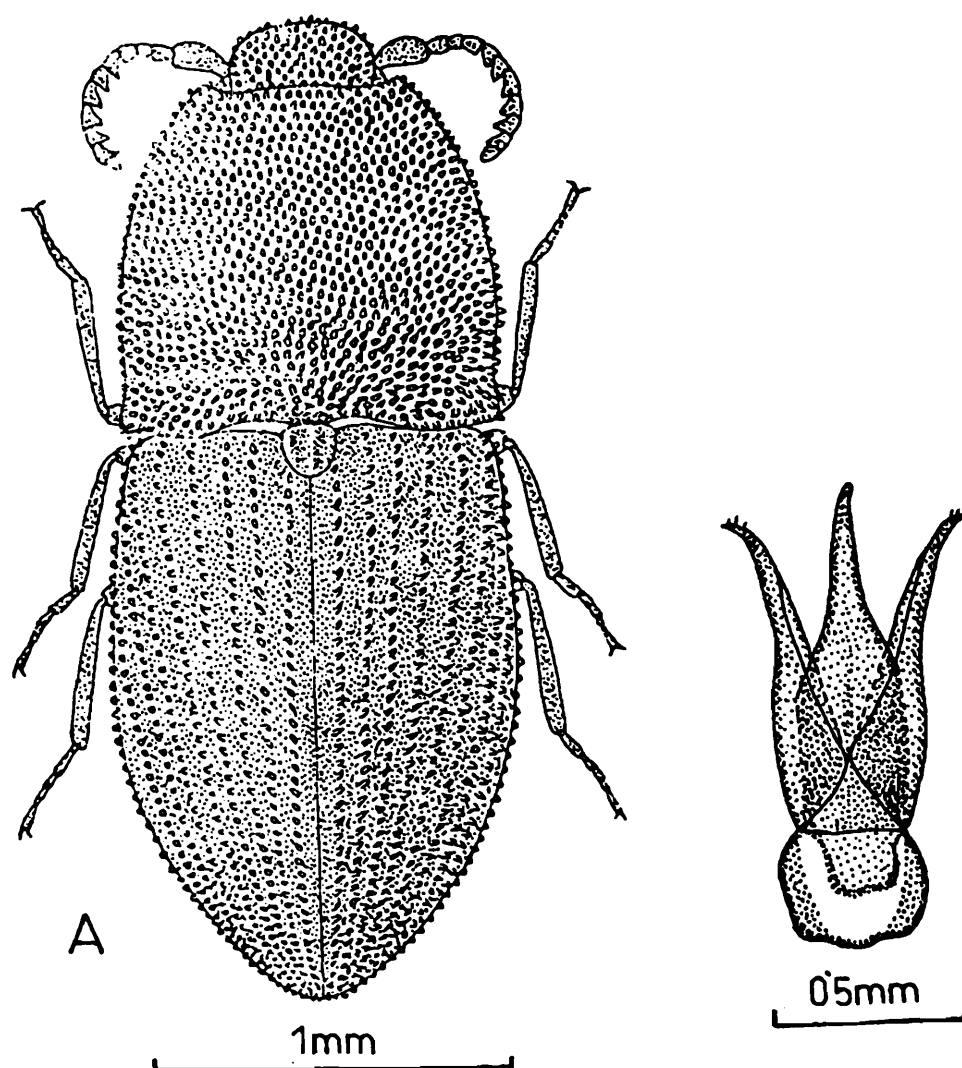


Fig. 32. *Cardiophorus serratus* Mukhopadhyay & Chakraborty : A. Dorsal view; B. Dorsal view of male genitalia.

Elytra about 2.2 times longer than width (length 6.2 mm, breadth 2.8 mm); sides gradually widening to near middle then rounded and gradually narrowing towards acute apex; vestiture whitish, dense. Striae with small punctures. Interstriae slightly convex, more convex towards anterior, sides subparallel. Legs slender, tarsi and claws simple.

Male Genitalia : Phallobase with round anterior margin, parameres divergent, gently curved outwards, distal part with a very small subapical process; median lobe longer than parameres, slender, gradually narrows posteriorly, apex pointed.

Material examined : 6 exs., INDIA : West Bengal : Darjeeling : Tista Bazar, 3.IV.1997, P. Chakraborty coll.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Remarks : The species *C. serratus* appears closer to *C. doggeri* Vats & Chauhan described from Himachal Pradesh, but can be easily separated by frons with anterior margin almost straight, punctation simple, prosternal spine margined in front of coxae and the anterior margin of scutellum is not indented.

This species was originally described from Sikkim (Mukhopadhyay and Chakraborty, 2003) and it is recorded here from West Bengal for the first time.

C. Subfamily HEMIOPSINAE

Diagnostic characters : Body normally shell-shaped, head capsule oval, deflexed, mouthparts inferior, frons without ridge between and above antennae; antennae of normal length i.e. reaching beyond elytral bases; thorax normally arcuate on sides and convex or globular dorsally to elongate, narrow and subcylindrical; prosternum truncate, exposing labium, prosternal sutures concave and double or secondarily closed (excavated line present) and straight; scutellum shield-shaped, never cordate; mesocoxae open to both mesepimeron and mesepisternum, mesosternal coxae more or less approximated, metasternum more or less pointed; meso- and metasternum distinct, joined by a definite suture; tarsi simple or with lobe on 1 or more segments; claws simple.

Remarks : Both the two genera, *Plectrosternus* Lacordaire and *Hemiops* Castelnau were kept under the tribe Campylides (Candeze, 1863). Schenkling (1927) raised the tribe to the status of subfamily with the change of its name to Denticollinae on the basis of oldest genus *Denticollis* Pillern and Mitterpacher, 1783. But Fleutiaux (1941) kept it under subfamily Hemiopsinae. Stibick (1979) has placed Hemiopsinae as a subjective junior synonym of the tribe Oestodini Hyslop under subfamily Oestodinae Hyslop. Vats & Kashyap (1992) has treated both the genera under subfamily Denticollinae. However, here we have followed Fleutiaux (1941) and the subfamily is named as Hemiopsinae.

A total of 30 species under 9 genera were recorded from different parts of the world including 9 species under 3 genera from India. In the present study 3 species under 2

genera have been recorded from West Bengal. All the 3 species are new record from the state and one is new record from India.

Key to the genera

1. Antennae fine, weakly serriform, not passing completely beyond the half of the head length in ♂; shorter among the ♀, eyes oval mandibles dented **Hemiops**
- Antennae strong, pectinate, attaining half of the head length among the ♂; not passing hardly the base of pronotum among the ♀ and more weakly pectinate; eyes rounded, mandibles simple **Plectrosternus**

VII. Genus *Hemiops* Castelnau, 1833

1833. *Hemiops* Castelnau, *Dejean Cat. Ed.*, 3 : 95; 1836, Silberman, *Rev. Ent.*, Vol., 4 : 15; 1906. Schwarz In Wytsmann *Genera Insect*, 46C : 304.

1921. Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 648; 1992, Vats and Kashyap, *J. Ent. Res.*, 16(4) : 247.

Type : *Hemiops flava* Castelnau (as designated by Hyslop, 1921).

Diagnostic characters : Frons perpendicularly directed downwards, flat and more or less rounded and narrowed; raised over the antennal base, short and do not reach the anterior margin of the frons. Labrum grooved longitudinally in middle. Mandibles narrowed and prominent, inclined downwards vertically anterior margin emerginate. Last segment of maxillary palpi hatched shaped. Eyes very small and only feebly bulged.

Antennae moderately long and from 4th segment serrate; 1st segment moderately long, not compressed, 2nd segment very small; 3rd segment longer than other segment, last segment truncated at apex.

Prothorax small and strongly convex and emerginate laterally, lateral margin fine and bent downwards, sometimes indistinct in front and reaching below the eyes. Scutellum sometimes emerginate in front. Prosternum short and broad flatly rounded in front and not prominent. Prosternal process bent inward. Prosternal suture almost straight and bent inwards. Mesosternal plates triangular and inclined inwards.

Legs moderately long; femur abruptly broaden inwards; 1–4th tarsal segments gradually decreasing in length, the fifth one is as long as the three previous segments together.

Distribution : India.

Elsewhere : Burma, China, Formosa, Indo-China, Indonesia, Malay Peninsula, Nepal, Thailand, Tonkin.

Biology and Habit : Unknown.

Remarks : In Genera Insectorum (1906) all together 13 species were recorded of which 4 were from India and none from West Bengal. Here, two species of the genus *Hemiops* has been recorded of which *H. crassa* is new record from India and both are new records from West Bengal.

Key to the species

1. Pronotum as long as broad, without any depression..... *crassa*
- Pronotum slightly broader than long, with a slight depression on the mid dorsal portion *flava*

40. *Hemiops crassa* (Gyllenhal), 1817 (Fig. 33)

1817. *Elater crassus* Gyllenhal, in *Schönh. Syn. Ins.*, 3, Append : 135.

1902. *Hemiops crassa* ; Fleutiaux, *Annl. Soc. Ent. Fr.*, 71 : 580; 1906, Schwarz, In : Wytsmann *Genera Insect.*, 46C : 304; 1973, Ohira, *Pac. Insects*, 15(1) : 137.

1863. *Hemiops nigricollis* Candeze, *Mon. Elat.*, 4 : 496; 1878, Candeze, *Ann. Mus. Civ. St. Nat. Genova*, 12 : 140.

Redescription : Length 17 mm, breadth 5 mm. Body elongated, yellowish brown in colour with shining appearance. Abdominal tergites little deep yellowish brown. Antennae brown and legs yellowish brown. Vestiture fine long, yellowish coloured, dense in head and pronotum, sparse in elytra.

Head orangish yellow, almost flat, slightly raised in middle. Frons acuminate in front, frontal carina not prominent, punctation simple and dense. Antennae long, extending beyond the hind angles of pronotum, 1st antennal segment yellowish, robust, 2nd segment smallest and subglobose, 3rd longest, 4th to 10th serrate, compressed laterally, last segment elongate. Mandibles dented.

Pronotum almost as long as broad somewhat squarish (length and breadth 5mm) strongly convex, sides subparallel, pronotal disc convex and moderately punctate. Vestiture sparse and fine. Punctation double, some punctures are larger and scattered, some are small and distributed between the larger ones. Posterior angles of pronotum subpointed, acarinate with two longitudinal depression at the base of the pronotum one on each side, which are parallel to the lateral margin of pronotum. Lateral margin of pronotum almost straight.

Prosternum moderately punctate, broad; punctation scattered. Prosternopleural sutures double, arcuate. Prosternal spine moderately punctate, punctures shallow, the spine is acutely projected apically. Margins of mesosternal cavity declined from middle onwards.

Scutellum elongated, yellowish occur in colour with brownish margin, parallel laterally, the anterior margin is notched, scatterdly punctate, surface smooth.

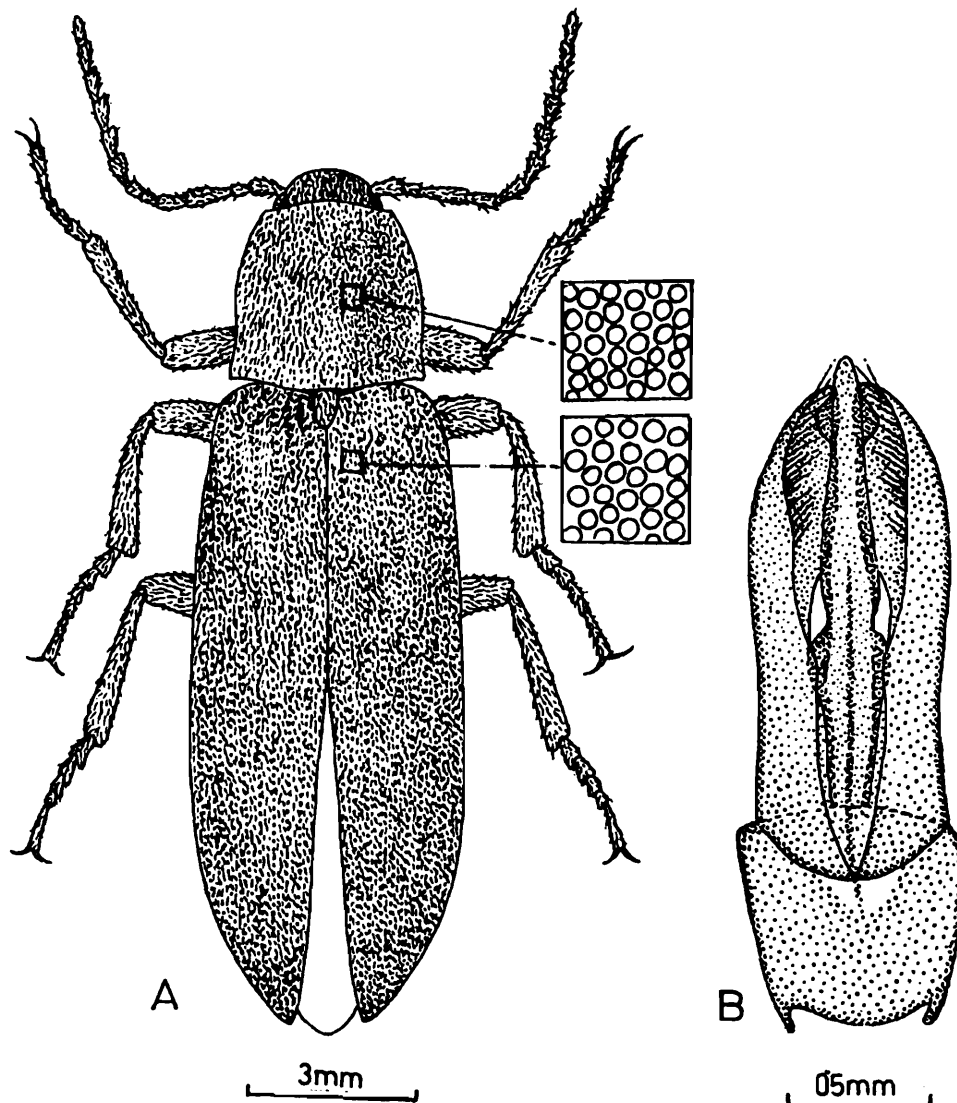


Fig. 33. *Hemiops crassa* Gyllenhal : A. Dorsal view : B. Dorsal view of male genitalia.

Elytra about 2.1 time longer than width (length 10.2 mm, breadth 5 mm). Sides almost subparallel rounded at distal extremities, almost flat. Striae with longitudinal rows of black bordered punctures hence, the striae appear blackish. Interstriae convex with small, scattered punctures. Vestiture moderately dense. Tarsi deep brown with numerous long, spine like hairs; claws simple without any setae at base. Last sternite of the abdomen flat.

Male Genitalia : Phallobase with two antero-lateral processes; parameres elongated, broad, posterior end of each parameres without subapical process; median lobe slightly longer than parameres, broadly conical posteriorly; furcae not reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Mungphu, date and collector not recorded (det. Fleutiaux); 5 exs., Jalpaiguri : Buxa, date and collector not recorded.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri).

Elsewhere : Borneo, Malay Penn., Sumatra.

Remarks : The species is very close to *H flava* Castelnau, but differs in having no depressions on the pronotum. This species is recorded from West Bengal and also from India for the first time.

41. *Hemiops flava* Castelnau, 1836
(Fig. 34)

1836. *Hemiops flava* Castelnau, In Silberman Rev. Ent., IV : 15; 1863, Candeze, Mon. Elat., IV : 494, t. 6, f. 7; 1918, Fleutiaux, Anns Soc. Ent. Fr., LXXXVII : 275; 1934, Miwa, Fauna Elat. Japan : 241; 1936, van Zwaluwenburg, Philipp. Journ. Sci., 59(3) : 431; 1940, Fleutiaux, Anns Soc. Ent. Fr., 109 : 32; 1966, Ohira, Kontyu, 34(3) : 217; 1970, Ohira., Anns Hist. Natur. Mus. Natn. Hung. Tomus 62 : 212, 220; 1971, Ohira, Anns Hist. Nat. Mus. natn. Hung. Tomus, 63 : 209; 1972, Ohira & Becker, Orient Insects, 6(2) : 139; 1992, Vats and Kashyap, J. Ent. Res., 16(4) : 249.

Material examined : 2 exs., INDIA : West Bengal : Jalpaiguri : Buxa, date and collector not recorded.

Distribution : India : West Bengal (Jalpaiguri), Assam, Haryana, Sikkim, Uttar Pradesh and south India.

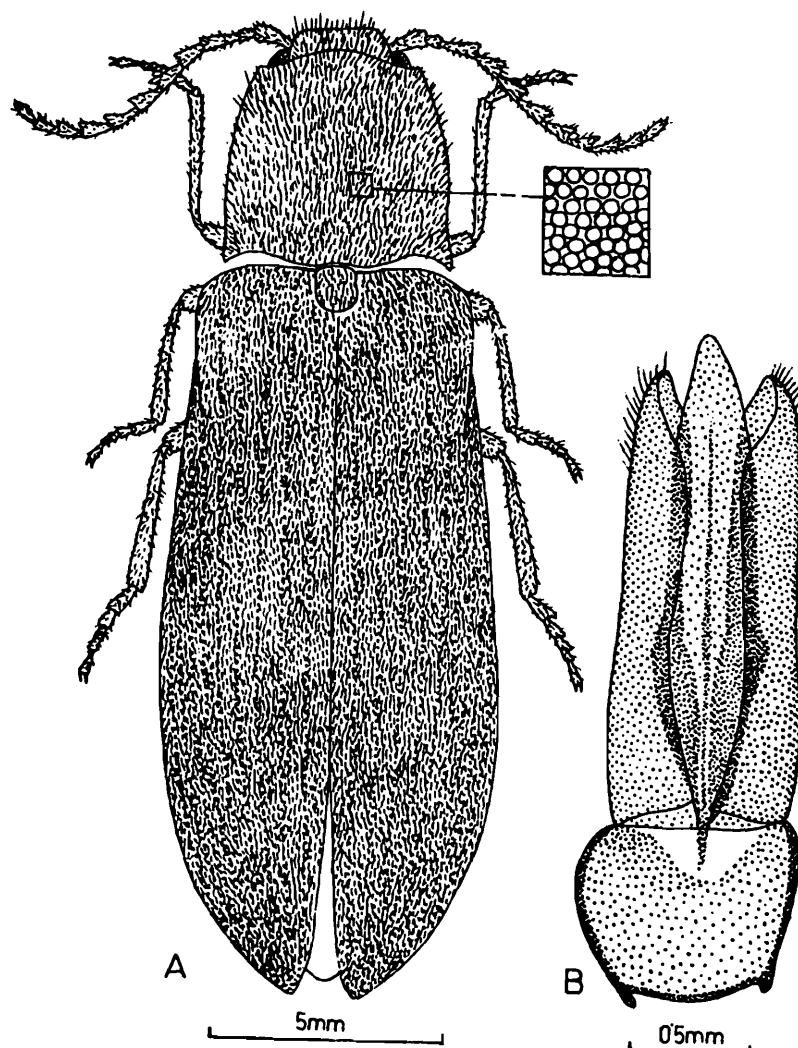


Fig. 34. *Hemiops flava* Castelnau : A. Dorsal view; B. Dorsal view of male genitalia.

Elsewhere : Borneo; Burma; China; Formosa; Indo-China; Java; Laos; Malay Peninsula; Nepal; Philippines; Siam; Sumatra; Thailand; Tonkin.

Remarks : Vats and Kashyap (1992) have redescribed the species. This species is recorded for the first time from West Bengal.

VIII. Genus *Plectrosternus* Lacordaire, 1857

1857. *Plectrosternus* Lacordaire, *Gen. Col.*, Vol., 4 : 227; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 304; 1921, Hyslop, *Proc. U.S. Natn. Mus.*, LVIII : 665; 1922, Vats and Kashyap, *J. Ent. Res.*, 16(4) : 247.

1834. *Oxysternus* Latreille, *Annls Soc. Ent. Fr.* Vol., 3 : 164.

Type : *Plectrosternus rufus* Lacordaire (Monobasic and by original designation).

Note : Hyslop in 1921 suggested as new name for *Oxysternus*, but, as he fixes type, they are not isogenotypic.

Diagnostic characters : Frons perpendicularly bent downwards, triangularly thickened and flatly rounded in the middle; strongly raised edge across the antennal base is short and does not reach the anterior margin of frons. Labrum transverse and longitudinally grooved in the middle, almost bilobed. Mandibles strong, well developed, inclined vertically downwards and divided or clefted an anterior edge. Last segment of maxillary palpi hatched shaped.

Antennae of male long, from 4th segment onwards pectinate and densely covered with short hairs; in female antennae short and strongly serrate, 1st segment thick, moderately short and feebly bent, 2nd and 3rd segment very small, 3rd rather larger than 2nd, last segment in both sex is deeply and apically incised and visibly bilobed.

Prothorax short, narrowed anteriorly, sides feebly emerginated in the middle, base with two long groove or furrow on each side, lateral margin straight and reaching upto the middle of the eye, hind angle short and acarinate. Elytra broad and moderately long, somewhat broadened posteriorly, striae covered with double rows of punctures. Prosternum short and broad, flatly rounded in front, posternal process short, horizontally inclined backwards and extended upto the end; if seen from the sides outwardly edged; joints are doubled and slightly inclined inwards; their interspace is smooth and not deep. Mesosternal cavity is small, triangular, horizontal, inclined vertically inwards in front.

Legs thick and moderately long; femur generally moderately strongly broadened in inner-side; tarsi strong, thickly covered beneath with hairs like brush, 1-4 segments gradually decreasing in length.

Distribution : India.

Elsewhere : Bangladesh, Burma, Cochin China, Formosa, Laos, Tonkin.

Biology and Habits : Nothing is known on the biology or habits of *Plectrosternus* species.

Remarks : Till 1992, *Plectrosternus rufus* was the only species so far recorded from India. Vats and Kashyap in 1992 described a new species *P. convexus* from Uttar Pradesh. Only one species viz. *P. rufus* is recorded here from West Bengal for the first time during the present study.

42. *Plectrosternus rufus* Lacordaire, 1857

(Fig. 35)

1857. *Plectrosternus rufus* Lacordaire, *Gen. Col. IV* : 228; 1863, Candeze, *Mon. Elat., IV* : 493.

1891. Candeze, *Catalog. Methods des Elat.*, : 214; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 304; 1933, Fleutiaux, *Ind. For. Rec.*, 18 : 16; 1934, Miwa, *Fauna Elat. Japan*, : 241; 1940, Fleutiaux, *Annls Soc. Ent. France*, 109 : 32; 1971, Ohira, *Annls Hist. Natur. Mus. natn. Hung. Tomus*, 63 : 209.

Redescription : Length 32 mm, breadth 10 mm. Body elongated, reddish brown in colour, surface shining. Abdominal tergites reddish brown. Antennae and legs dark brown.

Head dark brown, slightly lighter in colour than the body, depressed longitudinally in middle, on both sides before the eyes two carinae present. Frontal region moderately densely punctate, punctation simple and scattered. Frontal carina not strong. Vestiture moderately long, dense. Antennae long, extended upto the hind angles of pronotum, 2nd antennal segment shorter than the 3rd and are subglobose, 4th antennal segment longer than the 3rd, 4th to 10th segment laterally compressed and pectinate.

Pronotum reddish brown, trapezoid, wider than long (length 9mm, breadth 10mm), widest behind middle, strongly convex, sides subparallel, pronotal disc convex. Punctation simple, scattered; punctures small, separated by quite a long distance. Integuments between punctures not granulate. Posterior angles of pronotum subpointed, acarinate, divergent; anterior angles not covering the eyes. Lateral margin entire and almost straight.

Prosternum densely punctate, punctures separated by less than their own diameters. Integuments between punctures not granulate. Prosternal spine moderately densely punctate, blunt apically. Margin of mesosternal cavity declined.

Scutellum reddish brown, with black margin, oblong, surface depressed, moderately densely punctate all along, punctures small, vestiture fine and sparse.

Elytra about 2.2 times longer than width (length 22 mm, breadth 10 mm). Sides subparallel along basal half, then narrowed; rounded at distal extremities, lateral margin slightly raised. Striae blackish consisting of several punctures in each striae, punctures moderately deep, separated by their own diameters to less than their own diameters. Interstriae slightly convex with irregularly placed smaller punctures. Vestiture moderately dense. Claws simple. Last sternite of abdomen flat.

Male Genitalia : Phallobase with anterior margin rounded; parameres long, broad, gradually narrowed anteriorly, without any subapical process. Median lobe gradually

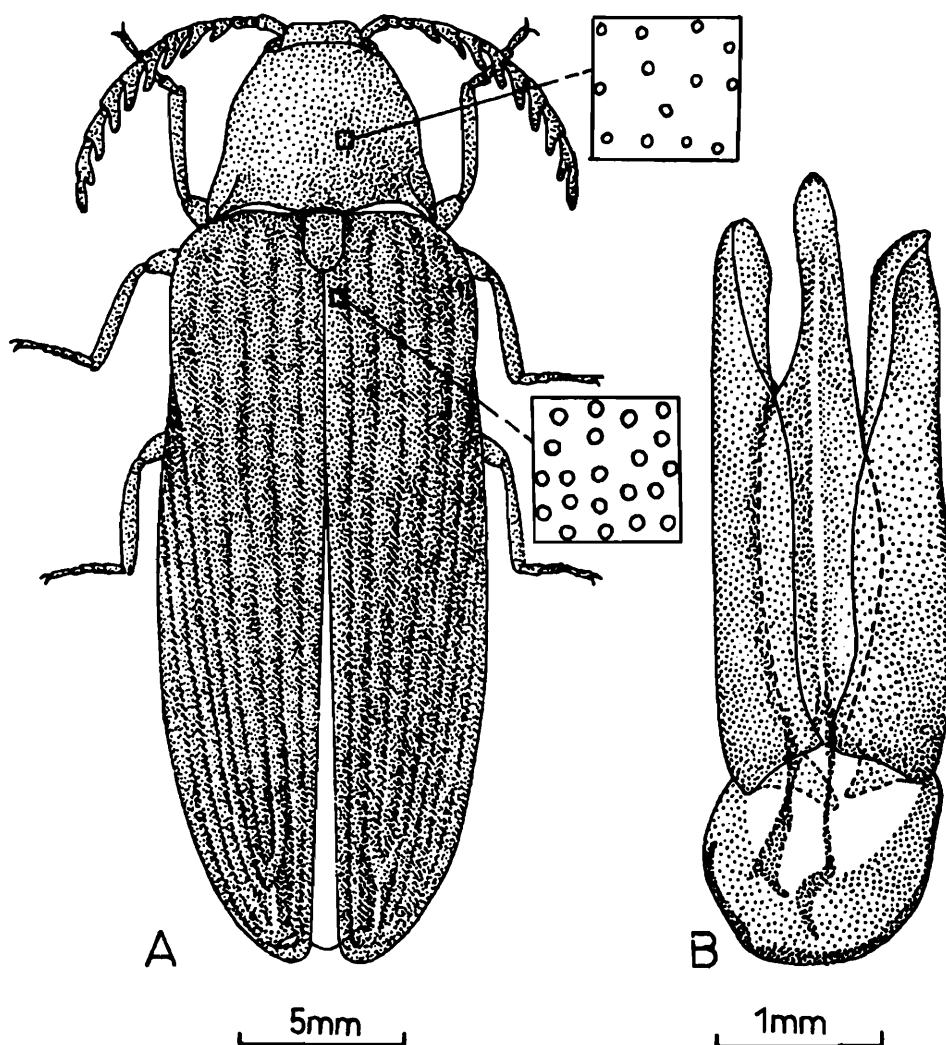


Fig. 35. *Plectrosternus. rufus* Lacordaire : A. Dorsal view; B. Dorsal view of male genitalia.

narrowed apically, distinctly longer than parameres, broadly conical posteriorly, apex rounded. Furcae not reaches the anterior margin of parameres.

Material examined : 3 exs., INDIA : West Bengal : Darjeeling; Pearson coll., date not recorded; 1 ex., E. Himalaya : Sukna, 500 ft. alt., 2.VII.1908, N. Annandale coll.; 1 ex., Jalpaiguri : Buxa, date and collector not recorded.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri), Assam, Bihar, Kerala.

Elsewhere : Bangladesh; Burma; Cochin China; Formosa.

Remarks : This species was previously recorded from 'Indes Orientales' but the actual locality is not given (Candeze 1891). This species is recorded from West Bengal for the first time.

D. Subfamily MELANOTINAE

Diagnostic characters : Head capsule oval, deflexed, mouthparts inferior, frons ridged above and between antennae (may be obsolete in middle); prosternum normally arcuate anteriorly; scutellum various, never cordate, may be slightly excavate anteriorly; mesocoxae

open to mesepimeron but closed to mesepisternum; meso and metasternum distinct, joined by a definite suture; tarsi simple, without pads, but rarely 3rd segment broadened to receive 4th; claws prominently pectinate and without basal setae.

Remarks : The name of this group was proposed by Candeze in 1859 as a tribe which was followed by Schwarz (1906). Jacobson (1913) raised it to the subfamily level. Since then, all the chief authors have unanimously followed Jacobson (*op. cit.*). Accounts of North American species have been provided by Quate & Thompson (1967). Very recently the *Melanotus* group of genera has been reclassified by von Hayek (1990).

This is a small rather homogenous subfamily consisting of 8 genera and about 300 species from the world, mostly under the genus *Melanotus* Eschscholtz. Only 5 genera have been recorded from India and 4 from West Bengal under this subfamily. In the present work, materials of 7 species under 3 genera were available for study from West Bengal, of which 3 species have been described here as new to science.

Key to the genera

1. Pronotum with lateral basal groove, posterior coxae non-angular *Melanotus*
- Pronotum without any basal groove, posterior coxae angular at middle 2
2. In ventral view, posterior angle of prothorax truncated at apex; ventral surface of last visible abdominal segment with two or more large punctures *Szombatya*
- In ventral view, posterior angle of prothorax terminate to a point; ventral surface of last visible abdominal segment without large punctures near apex *Priopus*

IX. Genus *Melanotus* Eschscholtz, 1829

1829. *Melanotus* Eschscholtz, In Thon. Ent. Archiv., 2 : 32; 1832, Brullé, *Expedition Seientifique de Moree Section des Science Physiques*, 3(1) : 136; 1967, Quate & Thompson, *Proc. U. S. Nat. Mus.*, 121 (3568) : 1-83; 1990, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 59(1) : 55; 1991, Vats & Chauhan, *J. Ent. Res.*, 15(3) : 187.
1829. *Perimecus* Dillwyn, *Memoranda relating to Coleopterous insects found in the neighbourhood of Swansea* : 32.
1833. *Cranotychus* Dejean, *Cat. des Col.*, Coll. de M.le Comte Dejean : 87.
1889. *Dodecactenus* Candeze, *Annl's Soc. Ent. Belg.*, 33 : 102(36).
1892. *Sphenicosomus* Schwarz, *Wiener Entomologische Zeitung*, 11 : 132.
1894. *Sphenicosomus* du Buysson, *Faune Gallo-Rhenane, Elaterides. Melanotus* : 129 [Probably an inadvertent error]
1894. *Melanotopsis* Lewis, *Annl's and Mag. of Nat. Hist.*, 13(6) : 192.
1902. *Cremnostethus* Schwarz, *Deutsche Entom. Zeit.*, 1901(2) : 197.
1933. *Tenalomus* Fleutiaux, *Annl's Soc. Ent. Fr.*, 101 : 234.

1965. *Kensaculus* Chujo & Ohira, *Memoires Fac. Lib. Art. & Edu. Kagawa Univ.*, 2(132) : 24.

1979. *Natomelus* Dolin, *Trudy Vsesoyuznogo Entomologicheskogo Obshchestva*, 61 : 71.

Type : *Elater fulvipes* Herbst, by subsequent designation (Westwood, 1838).

Diagnostic character : The genus has been described in details by von Hayek (1990).

Distribution : Widely distributed all over the world.

Biology and Habits : Little is known on the habits of the adults. Some species feed on nectar and in doing so may cause damage to the flowers of fruit trees (Horion, 1949). Some species live in rotten or decaying wood and are predacious though they may also obtain some nutrient from the wood (Horion, *op. cit.*). Others live on the ground and are known to occur on the roots of cereal, forage and other crop in the Palaearctic, Indomalayan and Nearctic regions. (von Hayek, 1990).

Remarks : The genus has been described in details by Quate & Thompson (1967) and also von Hayek (1990). Candeze (1891) has recorded a total of 149 species under this genus from the world including 10 from India and 3 from Bengal (probably undivided Bengal). Here, 6 species of this genus from West Bengal have been recorded and this includes 3 new to science and 1 new record from West Bengal.

Key to the species

1. The carina on the hind angle of pronotum extended upto the middle of pronotum 2
- The carina on the hind angle of pronotum does not extend upto the middle of pronotum 3
2. Pronotal disc densely and closely punctate, punctures separated by less than their own diameter *fuscus*
- Pronotal disc moderately densely punctate, punctures separated by 1-2 times their own diameter *kolkatai*. n. sp.
3. Antennae extended only beyond the middle of the pronotum ... *himalayanus*, n. sp.
- Antennae extended upto or beyond the hind angle of pronotum 4
4. Pronotum longer than broad, pronotal disc moderately convex *ongicornis*
- Pronotum almost as long as broad, pronotal disc strongly convex 5
5. At least four segments of antennae extended beyond the posterior angle of pronotum; pronotal disc sparsely punctate *telum*
- Only one or two segments of antennae extended beyond the posterior angle of pronotum; pronotal disc densely punctate *bengalicus*. n. sp.

43. *Melanotus bengalicus* n. sp.

(Fig. 36)

Description : Length 14.5 mm, breadth 4 mm. Body elongated, blackish brown in colour; surface shining. Abdominal tergites brownish. Antennae and legs brownish. Vestiture fine, moderately dense, moderately long, whitish brown coloured.

Head small, longer than broad, surface flat. Frontal region moderately densely punctate, punctation simple; frontal carina subconical across the frons. Eyes large, prominent. Antennae long, extended by one and a half segment beyond the posterior angle of pronotum, basal segment robust, 2nd segment smallest and globular; 3rd segment small and also globular; these two segments clearly shorter than the 4th; the rest segments serrate.

Pronotum as long as broad (length 3.5 mm, breadth 3.5mm); widest behind middle; sides abruptly narrow anteriorly; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc strongly convex, densely punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles pointed, carinate. Carina extended upto the 1/4th of the pronotum parallelly to the lateral margin.

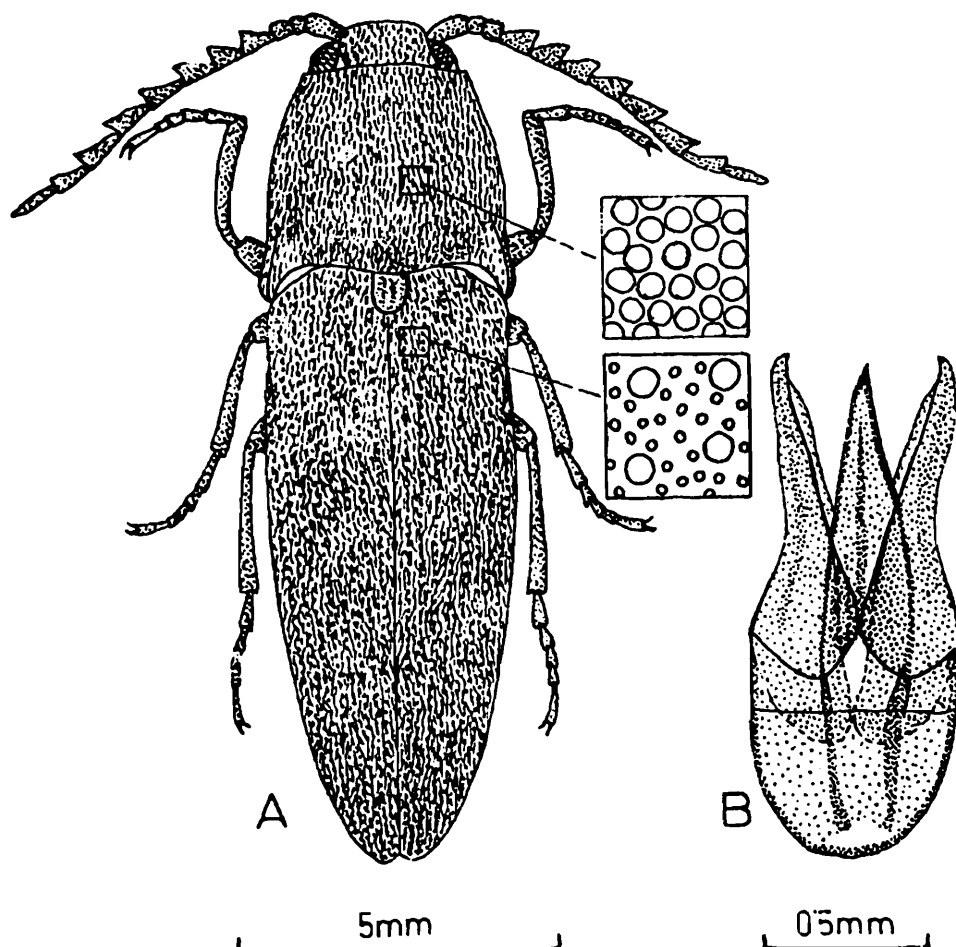


Fig. 36. *Melanotus bengalicus* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

Pronotum densely punctate; punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine abruptly becomes narrow after the procoxal area, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity inclined. Prosternal process strongly and obliquely inflexed just behind procoxae.

Scutellum subquadrate, slightly longer than broad, surface depressed; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.6 times longer than broad (length 10.5 mm, breadth 4 mm), convex, sides subparallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along middorsal suture. Striae consisting of linear rows of single punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat with smaller punctures, punctures round. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with broad and rounded anterior margin; parameres sinuate, broad and with a pointed tip, parameres without subapical process; median lobe as long as parameres, gradually tapering to a pointed apex; furcae extended far beyond the anterior margin of parameres.

Female : Cannot be distinguished externally from male.

Type Material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Jalpaiguri : Jaldapara; 4.V.1983; B. N. Das & pty. coll.

Paratypes : 2 exs., collection data as in the holotype.

Distribution : India : West Bengal.

Remarks : This new species is very close to *M. fuscus* but differs in the following way – firstly antennae in this new species is much longer than that of *M. fuscus*. In *fuscus* antennae extend only beyond the middle of the pronotum, but in this new species it extends by one and a half segment from the hind angle of pronotum. Secondly, the aedeagus in both the species is totally different.

Itymology : It is named after the place from where it was collected for the first time.

44. *Melanotus fuscus* (Fabricius) 1801 (Fig. 37)

1801. *Elater fuscus* Fabricius, *Syst. Eleuth*, II : 228.

1860. *Melanotus fuscus* Candeze, *Mon. Elat.*, III : 335; 1933, Fleutiaux, *Annls Soc. Ent. Fr.*, CII : 225; 1970, Ohira, *Annls Hist. Nat. Mus. Natn. Hung.*, 62 : 220; 2000, Biswas & Chakraborty, *Zool. Surv. India., Fauna of Tripura, State Fauna Series*, 7(Part 3) : 99-108.

1806. *Elater hirticornis* Herbst, *Ins. Kaf.*, X : 47, t. 162, f.4.

1841. *Cratonychus fuscus* Erichson, *Zeitschr. Ent.*, III : 106.

Redescription : Length 15.2 mm, breadth 4.1 mm (range varies from 13-15.5 mm and 4-4.5 mm). Body elongated, surface shining, blackish brown in colour. Abdominal tergites blackish brown. Antennae and legs brownish. Vestiture fine, dense, moderately long, yellowish brown in colour.

Head small, depressed in middle, slightly broader than long (length 2 mm, breadth 1.7 mm), surface flat. Frontal region moderately densely punctate, punctation simple; frontal carina subconical across the frons. Clypeal margin depressed and rounded at middle. Eyes large, prominent. Antennae moderately long, extended beyond the middle of prothorax, basal segment robust, second segment smallest and globose, 2nd and 3rd segments together clearly shorter than 4th, the segments are feebly serrate.

Pronotum subquadrate, slightly broader than long (length 4.0 mm, breadth 4.1 mm); widest behind middle; sides abruptly narrow anteriorly; lateral margin entire. Vestiture fine, dense, moderately long. Pronotal disc moderately convex, closely and densely punctate, punctation simple, punctures separated by less than their own diameter,

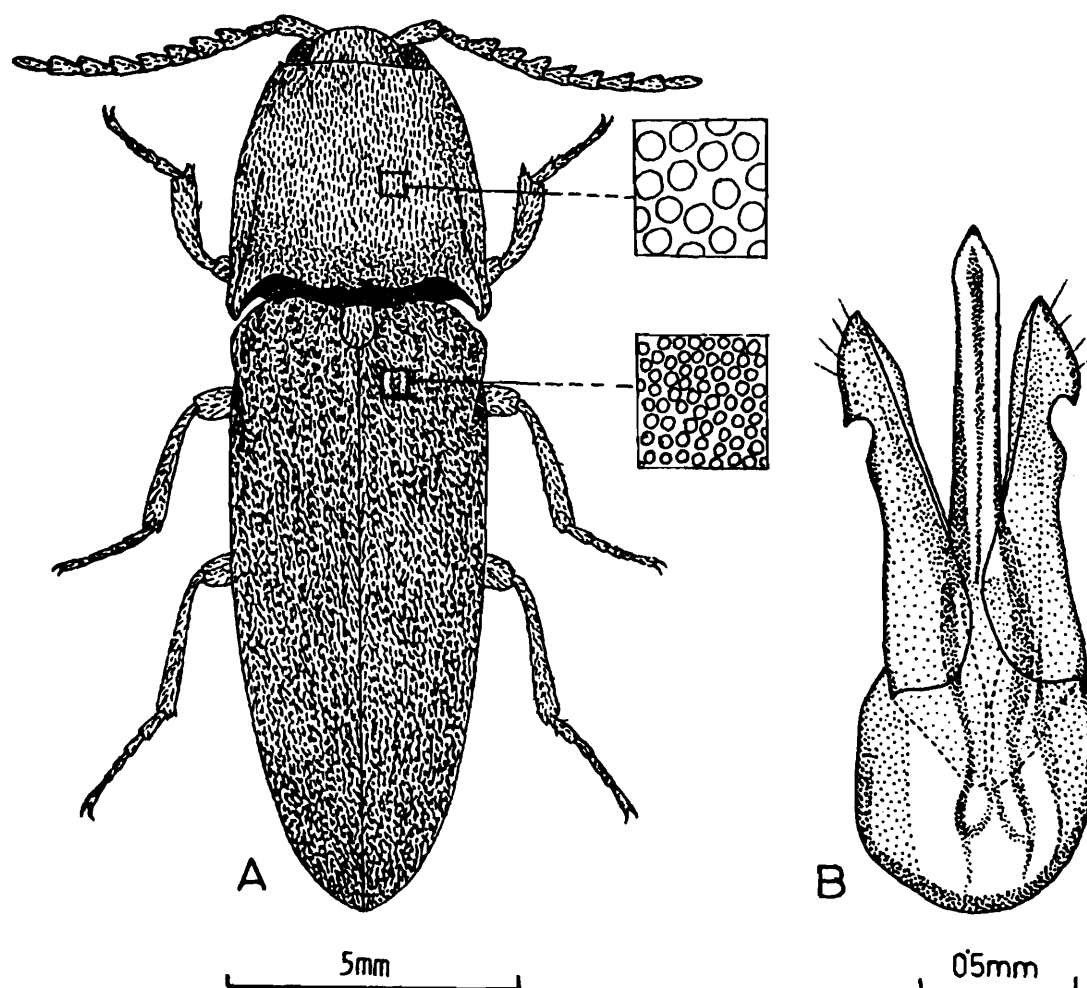


Fig. 37. *Melanotus fuscus* (Fabricius) : A. Dorsal view; B. Dorsal view of male genitalia.

integument between punctures not granulate. Hind angles pointed, not divergent, unicarinate, carina long, distinct, reaching the middle of the prothorax, parallelly with the lateral margin.

Prosternum strongly concave, densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine densely punctate, apex of prosternal spine acutely rounded, moderately densely punctate. Prosternal process strongly and obliquely inflexed just behind procoxae. Margins of mesosternal cavity declined.

Scutellum longer than wide, more or less subquadrate, surface depressed; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.6 times longer than broad (length 10.8 mm, breadth 4.1 mm), convex, sides' straight, subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae rather shallow and weakly defined, consisting of bigger and rounded punctures, punctures separated by less than their own diameter; interstriae slightly elevated, punctate, punctures small and scattered. Last sternite of abdomen flat. Vestiture moderately dense. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with rounded anterior margin, parameres with elongated subapical processes and deep concavities in front; median lobe distinctly longer than parameres, slender, conical posteriorly; furcae extended beyond the anterior margin of parameres.

Material examined : 2 exs., INDIA : West Bengal : Murshidabad, date and collector not recorded (det. Fleutiaux); Murshidabad : Moregram : Phulbari, 9.II.1980, I. J. Gupta & pty. coll.; 5 exs., Calcutta, date and collector not recorded; 1 ex., Calcutta : New Alipore, 10.III.1999, P. Chakraborty coll.; 1 ex., DumDum, 5.V.1998, S. S. Saha coll.; 2 exs., Jalpaiguri : Madarihat, 2.V.1983, B. N. Das & Pty. coll.; 1 ex., Darjeeling : Kalimpong, 24.IV-10.V.1915, F. H. Gravely coll.; 1 ex., Kalimpong, 3000 ft. alt. 3.V.1997, D. B. Khawas coll., collected from soil surface of cultivated mulberry field; 1 ex., Teesta Bazar, 214 m. alt., 18.IV.1976, A. R. Bhowmick, collected on bush; 1 ex., Darjeeling, 450 m. alt., 19.IV.1976, C. R. Basu coll., collected at light; 1 ex., Darjeeling, 500 m alt. 5.IV.1973, H. S. Sharma & pty coll.; 1 ex., Darjeeling : Reung, 2.IV.1973, H. S. Sharma & pty. coll.; 1 ex., Darjeeling : Reyans, 29.II.1973, H. S. Sharma & pty. coll.; 1 ex., Singla, 19.IV.1973, H. S. Sharma & pty. coll.

Distribution : India : W.B. (Kolkata, Darjeeling, Jalpaiguri, Murshidabad), Sikkim, Tripura.

Elsewhere : Ambonia; India-China; Mayanmar; Sri Lanka; Yunnan.

Remarks : The species is widely distributed in the South East Asian countries including India. From the collection data it is evident that the species is widely distributed in many districts of West Bengal.

45. *Melanotus himalayanus* n. sp.

(Fig. 38)

Redescription : Length 14 mm, breadth 4 mm. Body elongated, surface shining, blackish brown in colour. Abdominal tergites reddish brown. Antennae and legs reddish brown. Vestiture fine, moderately dense, long, whitish coloured.

Head small, depressed in middle, and slightly broader than long (length 1 mm, breadth 1.5 mm); surface flat. Frontal region scatterdly punctate, punctation simple; frontal carina complete across the frons. Clypeal margin depressed. Eyes large, visible. Antennae moderately long, extended beyond the middle of pronotum, basal segment robust, 2nd segment smallest and globose, 3rd is shorter than the 4th, 2nd and 3rd segments together subequal to the 4th, 4th segment onwards the segments are serrate.

Pronotum broader than long (length 3 mm, breadth 3.8 mm); widest behind middle;

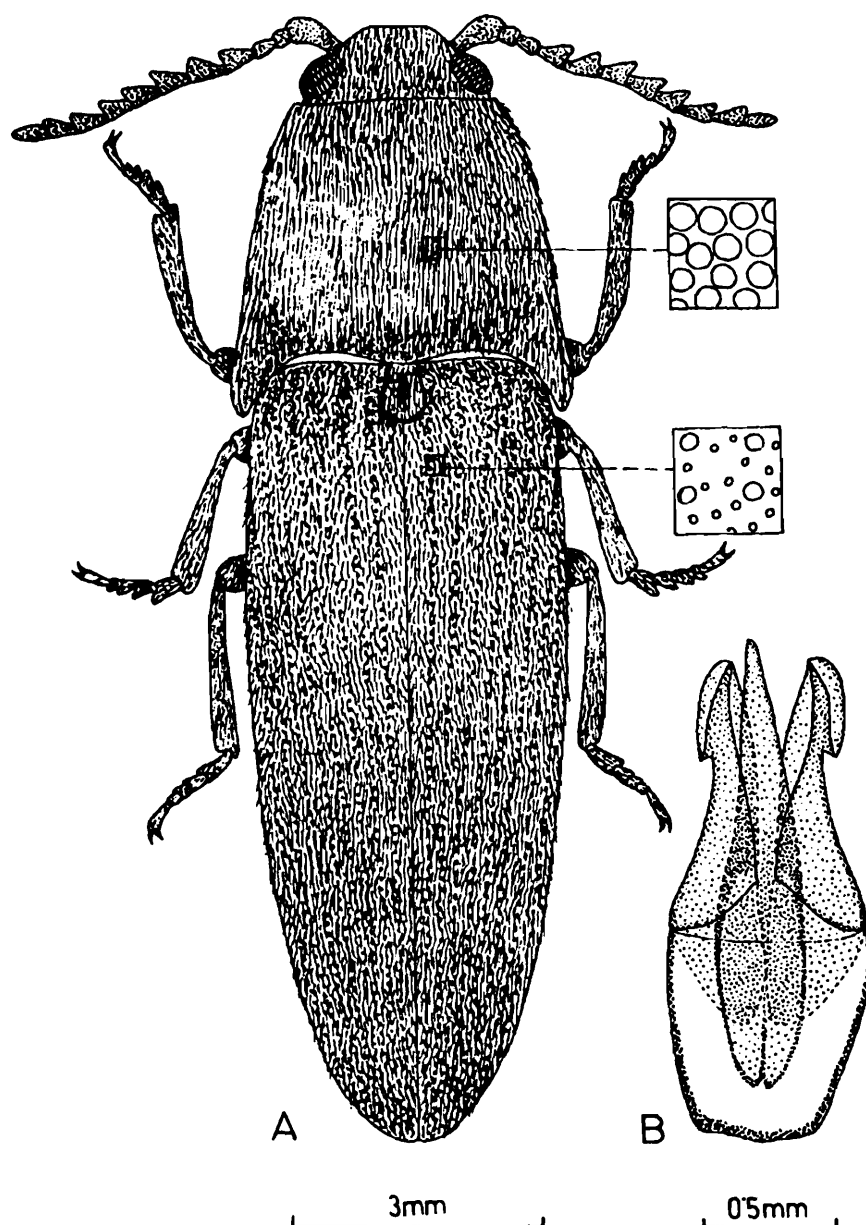


Fig. 38. *Melanotus himalayanus* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

sides' abruptly narrow anteriorly; lateral margin entire. Vestiture fine, moderately dense. Long. Pronotal disc moderately convex, moderately densely punctate, punctation double bigger, punctures separated by 1-2 times their own diameter, while the smaller punctures are scatterdly distributed in between the bigger punctures, integument between punctures not granulate. Hind angles pointed, carinate, carina extended roughly upto 1/3rd of the pronotum.

Prosternum moderately densely punctate, punctures separated by 1-2 times their own diameter, punctures are elongated in shape; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine sharply pointed, moderately densely punctate. Margins of mesosternal cavity inclined. Prosternal process strongly and obliquely inflexed just behind procoxae.

Scutellum subpentagonal, surface depressed, slightly longer than wide, moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.5 times longer than broad (length 10mm, breadth 4 mm), convex, sides' straight, subparallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along suture. Striae consisting of linear rows of single punctures, punctures separated by 1-2 times their own diameter; punctures are slightly elongated; interstriae flat, with smaller, rounded punctures scattered all along. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with broadly flat anterior margin, parameres broad at base, with subapical process, broader towards the base; median lobe longer than parameres, narrow in middle, conical posteriorly; furcae extended beyond the anterior margin of parameres.

Female : Cannot be distinguished externally from male.

Type Material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Darjeeling : Reyang, 31.III.1973, H. S. Sharma & pty. coll.

Paratype : 2exs., collection data as in the holotype.

Distribution : India : West Bengal.

Remarks : This new species is very close to *M. longicornis* Candeze described from West Bengal, but differs in the following way. Antennae do not extend to the end of the pronotum like that of *M. longicornis* Candeze, 2nd and 3rd segments of antennae jointly are not clearly shorter than the fourth; frons does not possess the subtriangular structure and interstriae is punctate (smooth in the other species). Finally the aedeagus is totally different in these two species.

Itymology : It is named after the place from where it was collected for the first time.

46. *Melanotus kolkatai* n. sp.

(Fig. 39)

Description : Length 12 mm, breadth 4 mm. Body elongated, blackish brown in colour; surface shining. Abdominal tergites brownish. Antennae and legs brownish. Vestiture fine, dense, long, whitish coloured.

Head small, longer than broad, surface flat. Frontal region densely punctate, punctation simple; frontal carina complete across the frons. Eyes large, prominent. Antennae moderately long, extended beyond the middle of the prothorax; basal segment robust, 2nd segment smallest and globose, 3rd segment small and globose, these two segments together are shorter than the 4th; the rest segments serrate.

Pronotum slightly broader than long (length 3 mm, breadth 3.5 mm); widest behind middle; sides abruptly narrow anteriorly; lateral margin entire. Vestiture fine, dense, long. Pronotal disc moderately convex, moderately densely punctate, punctures round; punctation simple, punctures separated by 1-2 times their own diameter; integument

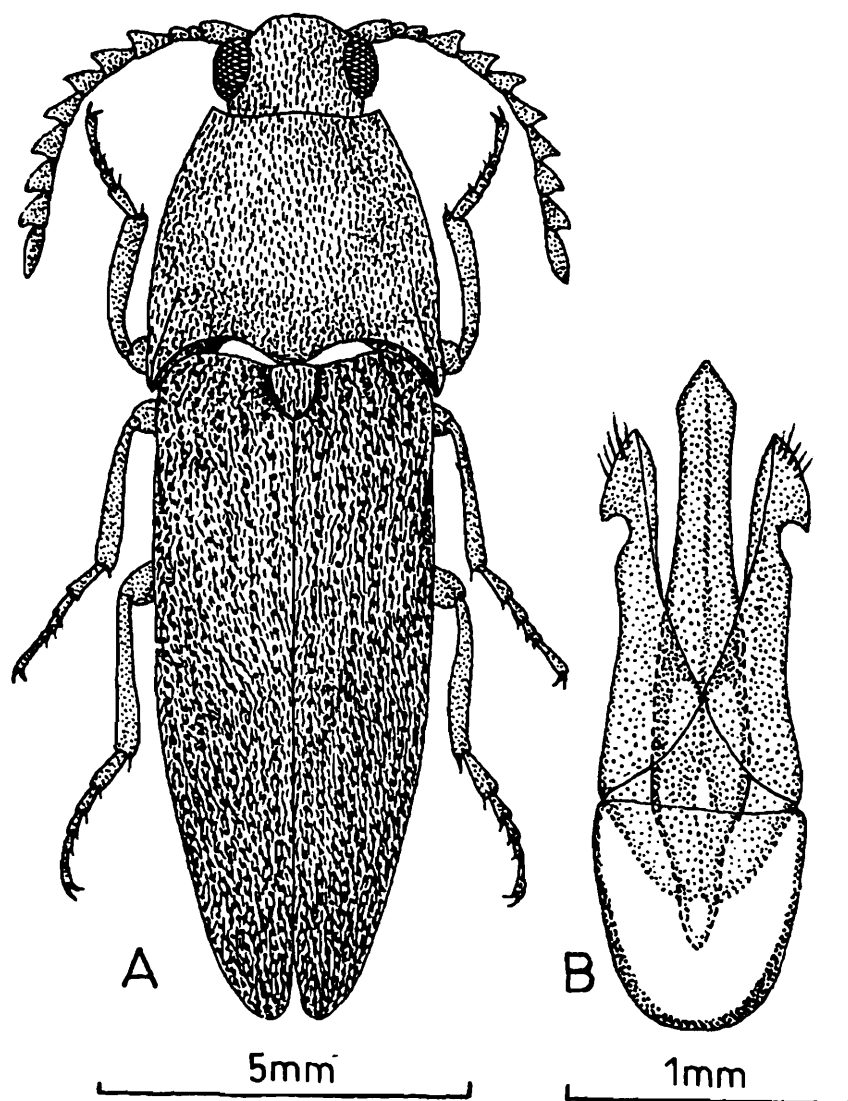


Fig. 39. *Melanotus kolkatai* n. sp. : A. Dorsal view : B. Dorsal view of male genitalia.

between punctures not granulate. Hind angles pointed, carinate, carina extended upto the middle of the prothorax parallel with the lateral line.

Prosternum moderately densely punctate; punctures separated by 1-2 times their own diameter, punctures elongated; integument between punctures not granulate. Prosternal spine without groove, apex of prosternal spine broadly rounded, moderately densely punctate. Margins of mesosternal cavity inclined. Prosternal process strongly and obliquely inflexed just behind procoxae.

Scutellum subpentagonal, surface depressed, as long as broad; moderately densely punctate; vestiture fine, dense; integument between punctures nor granulate.

Elytra 2 times longer than broad (length 8 mm, breadth 4 mm), convex, sides almost straight, subparallel along basal half, then narrowed caudad. Apices rounded and weakly spinose along middorsal suture. Striae consisting of linear rows of single punctures, joined by moderately impressed lines; punctures separated by less than their own diameter; interstriae slightly convex to flat, with smaller punctures. Vestiture moderately dense. Last sternite of abdomen slightly convex. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with almost flat anterior margin, parameres leaf shaped, with subapical process; deep concavities in front; median lobe clearly longer than parameter, tubular, with conically pointed anterior tip; furcae reaching the anterior margin of paramere.

Female : Cannot be distinguished externally from male.

Type Material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Calcutta : Naktala, 9.III.1994, S. K. Chakraborty coll.;

Paratype : 1ex., collection data as in the holotype.

Distribution : India : West Bengal.

Remarks : The species is close in appearance with *M. fuscus* (Fabricius) but differs in the following ways: the punctures on the pronotum and prosternum are moderately dense in this species whereas these are coarse and dense in *fuscus*; the genitalia of both the species also differs markedly viz., phallobase rounded in *M. fuscus* and almost flat in this species and the parameres are leaf shaped in this species, which is not in the *M. fuscus*.

Itymology : It is named after the place from where it was collected for the first time.

47. *Melanotus longicornis* Candeze, 1860 (Fig. 40)

1860. *Melanotus longicornis* Candeze, *Mon. Elat.* III : 332; 1971, Ohira, *Annls Hist. Nat. Mus. natn. Hung.*, 63 : 211; 1990, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 59(1) : 55.

Redescription : Length 18 mm, breadth 4.0 mm. Body elongated, surface shining, blackish brown in colour. Abdominal tergites reddish brown. Antennae and legs brownish. Vestiture fine moderately dense, moderately long, whitish coloured.

Head small, slightly broader than long (length 2 mm, breadth 2.5 mm), surface flat. Frontal region moderately densely punctate, punctation simple; frontal carina complete across the frons; frons with a slight depression. Clypeal margin depressed. Eyes small, prominent. Antennae long, extended to the hind angle of pronotum, basal segment robust, second segment smallest and globose, 2nd and 3rd segments together clearly shorter than the 4th; the segments are feebly serrate.

Pronotum longer than broad (length 5.0 mm, breadth 4.0 mm), widest behind middle; sides abruptly narrow anteriorly; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex, moderately densely punctate,

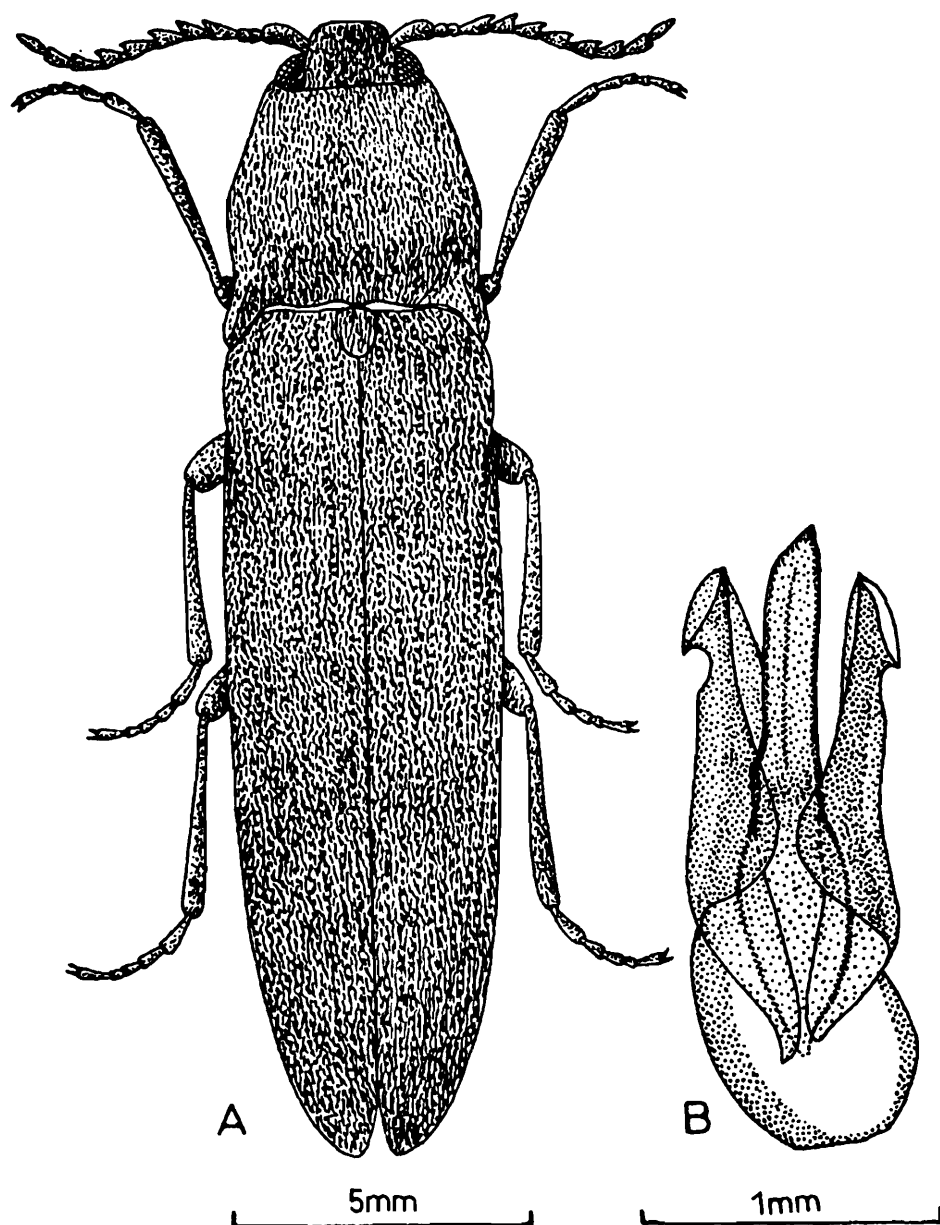


Fig. 40. *Melanotus longicornis* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

punctuation simple, punctures separated by 1-2 times their own diameter; integuments between punctures not granulate. Hind angles flatly pointed, with prominent carina, extending upto the 1/4th length of the pronotum.

Prosternum moderately densely punctate, punctures elongated and separated by less than their own diameter; integument between punctures not granulate. Prosternal spine very short, apex of prosternal spine blunt, moderately densely punctate. Prosternal process strongly and obliquely inflexed just behind procoxae. Margins of mesosternal cavity declined.

Scutellum subpentagonal, slightly longer than wide; surface depressed; sparsely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.8 times longer than broad (length 11mm, breadth 4.0 mm), convex, sides straight, subparallel along basal third, then narrowed caudad. Apices rounded and spinose along suture. Striae consisting of linear rows of punctures, punctures separated by less than their own diameter; interstriae flat, smooth, not punctate. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with rounded anterior margin; parameres with broad subapical process and deep concavities in front; median lobe slightly longer than parameres, gradually tapering to a conical process; furcae extended beyond the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling, no other date available; 1 ex., Calcutta, no other data was available (det. Candeze).

Distribution : India : West Bengal, (Kolkata, Darjeeling), Assam, Sikkim.

Elsewhere : China; Sri Lanka.

Remarks : The species comes closer to *M. telum* but differs in having pronotum longer than broad, antennae extended upto the hind angle of pronotum, whereas pronotum is trapezoidal and antennae are extended by four segments beyond the posterior angle of pronotum in *telum*. This species is recorded for the first time from West Bengal.

48. *Melanotus telum* Candeze, 1893

1893. *Melanotus telum* Candeze, Mem. Soc. R. Sci. Liege (2nd Ser.) 18 : 49; 1974, Ohira & Becker, Orient. Insects, 8(4) : 559.

1901. *Cremnostethus telum*; Schwarz, Deut. Ent. Z., 1901, 197; 1927, Schenkling, in Junk's Col. Cat., 83 (Elateridae II) : 289.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling, date & coll. not recorded.

Distribution : India : West Bengal (Darjeeling); Nepal.

Remarks : The material has been re-described by Ohira & Becker (1974).

X. Genus *Metriaulacus* Schwarz, 1902

1902. *Metriaulacus* Schwarz, *Deut. Ent. Zeit.* : 198; 1906, Schwarz, In Wytsmann *Genera Insect*, 46B : 191; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol., LVIII : 657; 1990, von Hayek, *Bull. Bri. Mus. (Nat. Hist.) (Ent.)*, 59(1) : 75; 1995, Platia and Schimmel, *Annls Soc. Ent. Fr. (N. S.)*, 31(1) : 39.

Type : *Metriaulacus nigrolaterus* Schwarz (Monobasic).

Diagnostic characters : Very recently, the genus has been well described by von Hayek (1990).

Distribution : India.

Elsewhere : Bhutan, Indonesia, Nepal, Philippines, Peninsular Malaysia, Taiwan, Thailand, Vietnam.

Biology and Habits : Unknown.

Remark : Platia & Schimmel (1995) provided an account of 8 species of this genus. This includes 2 species from India and one species [*gobius* (Candeze)] from West Bengal. This is the only species recorded so far from the large area of North India to Indonesia, Malaysia and Philippines.

49. *Metriaulacus gobius* (Candeze) 1860

1860. *Melanotus gobius* Candeze, *Monogr. Elat.*, III : 329; 1888, Candeze *Annali del Museo Civico di Storia Naturale Giacoma Doria* [Genova], 6 : 684; 1891, Candeze, *Catalog. Method des Elat.*, : 143.
1900. *Spheniscosomus gobis*, Candeze, *Elat. Nouv.*, VII : 94; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46B : 185; 1927, Schenkling, In Junk's *Col. Cat.*, 88; *Elat.*, II : 270.
1900. *Spheniscosomus perimacer* Candeze, *Annls Soc. Ent. Belg.*, 4 : 94.
1933. *Metriaulacus gobius*; Fleutiaux *Annls Soc. Ent. Fr.*, 101 : 214; 1965, Van Zwaluwenburg, *Pac. Insects*, 1 : 400; 1973, Ohira, *Pac. Insects*, 15 : 119; 1974, Ohira, *Steenstrupia*, 2 : 178; 1990, von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 59 : 77; 1995, Platia & Schimmel, *Annls Soc. Ent. Fr. (N. S.)*, 31(1) : 46.
1991. *Melanotus angustiformis* Vats & Chauhan, *J. Ent. Res.*, New Delhi, 15 : 191.

Material examined : None was available for study.

Distribution : India : West Bengal, Tamil Nadu, U.P.

Elsewhere : Borneo; Java; Laos; Nepal; Philippines; Sulawesi; Sumatra; Thailand; Vietnam.

Genus *Priopus* Castelnau, 1840

1840. *Priopus* Castelnau, *Hist. Nat. Anim. Art.*, Vol., 1 : 251; Candeze, 1860, *Mem. Soc. r. des Sci. Liege*, 15 : 512; Candeze, 1891, *Catalog. Method. des. Elat.*, Connus en 1890 : 141; von Hayek, 1990, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 59(1) : 77; Platia & Schimmel, 1995, *Lavor-Soc. Ven. Sc.*

Nat., vol. 20 : 53; Platia & Schimmel; 1995, *Entomologie*, 65; 135; Platia & Schimmel, 1996, *Estratto dagli Annali del. Mus. Civ. Sto. Nat.*, vol., XCI-10 : 179.

1860. *Diploconus* Candeze, *Mem. Soc. Roy. Des. Sci. Liege*, 15 : 290.

1921. *Neodiploconus* Hyslop, *Proc. U. S. Nat. Mus.*, 58 : 658.

1902. *Thaumastiellus* Schwarz, *Stettiner Entomologische Zeitschrift*, 1901(2) : 336.

1933. *Pulchronotus* Fleutiaux, *Annls Soc. Ent. Fr.*, 101 : 206.

1933. *Placonides* Fleutiaux, *Annls Soc. Ent. Fr.*, 101 : 208.

Type : *Priopus frontalis* Castelnau (by subsequent designation) (von Hayek, 1990).

Diagnostic character : The genus has been described in details by von Hayek (1990).

Distribution : Occurs in the eastern Indomalayan and the Oceanic realms and Japan.

Biology and Habits : Nothing is known of the biology or habits of *Priopus* species.

Remarks : In her recent paper on the reclassification of the *Melanotus* group of genera, von Hayek (1990) fixed the priority of the generic name *Priopus* Castelnau, 1840 (type species : *P. frontalis* Castelnau) for the species until then treated for genus *Diploconus* Candeze, 1860, then to *Neodiploconus* Hyslop, 1921. In this work, the conclusions of von Hayek (*op. cit.*) about the generic diagnosis of *Priopus* Castelnau, has been followed. This genus is endemic to the Indo-malayan region with few species in India, but many in Malaysia, Indonesia and the Philippines.

From India, 7 species of *Priopus* have been recorded by Platia & Schimmel (1995) of which 3 were new to science. All these species are endemic of the region except one (*vafer* Erichson) which is also known from Sumatra.

From West Bengal, 5 species of *Priopus* have been recorded of which one species (*ornatus* Candeze) is recorded from West Bengal for the first time.

50. *Priopus miniaticollis* (Hope) 1831

1831. *Elater miniaticollis* Hope, In J. E. Grey, *Zool. Misc.*, London, 1(1) : 25.

1860. *Melanotus nitidus* Candeze, *Mem. Soc. r. Sci. Liege*, 15 : 334.

1990. *Priopus nitidus* von Hayek, *Bull. Br. Mus. Nat. Hist. (Ent.)*, 59(1) : 83.

1990. *Priopus miniaticollis*; von Hayek, *Bull. Br. Mus. Nat. Hist.(Ent.)* 59(1) : 82; 1995, Platia and Schimmel, *Lavori – Soc. Ven. Sc. Nat.*, 20 : 59.

Material examined : None was available.

Distribution : India : West Bengal, Assam, Meghalaya, Sikkim, U.P.

Elsewhere : Bhutan.

Remarks : The species has been described by Platia & Schimmel (1995).

51. *Priopus miniatus* (Hope) 1831

1831. *Elater miniatus* Hope, J. E. Grey, Zool. Misc., London, 1(1) : 25.

1990. *Priopus miniatus*; von Hayek, Bull. Br. Mus. Nat. Hist. (Ent.), 59(1) : 82; 1995, Platia & Schimmel, Lavori-Soc. Ven. Sc. Nat., 20 : 61.

Material examined : None was available.

Distribution : India : West Bengal; Nepal. Bhutan.

Remarks : The species has been redescribed by Platia & Schimmel (1995).

**52. *Priopus ornatus* (Candeze) 1891
(Fig. 41)**

1891. *Diploconus ornatus* Candeze, Annls Mus. Stor. Nat. Genova : 782.

1921. *Neodiploconus ornatus*; Hyslop, Proc. U. S. Nat. Mus., LVIII : 658.

1990. *Priopus ornatus*; von Hayek, Bull. Br. Mus. Natn. Hist. (Ent.), 59(1) : 83.

Redescription : Length 9 mm, breadth 2.2 mm. Body small, moderately elongated, smooth, reddish brown in colour, surface shining. Abdominal tergites yellowish brown. Antennae and legs brownish. Vestiture fine, sparse, more or less long, whitish brown coloured.

Head elongated, slightly broader than long, surface flat. Frontal region moderately densely punctate, punctation simple; frontal carina rounded across the frons. Eyes prominent, extended upto the half portion of head. Antennae long, extended [beyond the hind angle of the pronotum]; basal segment robust, 2nd segment smallest and globose; 3rd segment small and also globose, segments wider than long, the rest segments serrate. Mandibles simple.

Pronotum distinctly longer than broad (length 2.5 mm, breadth 2.0 mm); widest behind middle; surface smooth, very few punctures present; lateral margin entire. Vestiture fine, sparse, more or less long. Pronotal disc strongly convex, very sparsely punctate; punctation simple, punctures separated by 3-5 times their own diameter; integument between punctures not granulate. Hind angles pointed, non-carinate. Pronotum with a longitudinal linear black line dorsally extended upto the middle.

Prosternum very sparsely punctate; punctures separated by 2-3 times their own diameter; integuments between punctures not granulate. Prosternal spine without any groove, apex of prosternal spine bluntly pointed, moderately densely punctate. Margins of mesosternal cavity inclined. Prosternal process strongly and obliquely inflexed just behind procoxae.

Scutellum subquadrate, and slightly elevated, brownish with black margin, surface emerginate; sparsely punctate; vestiture not visible, integument between punctures, punctures not granulate.

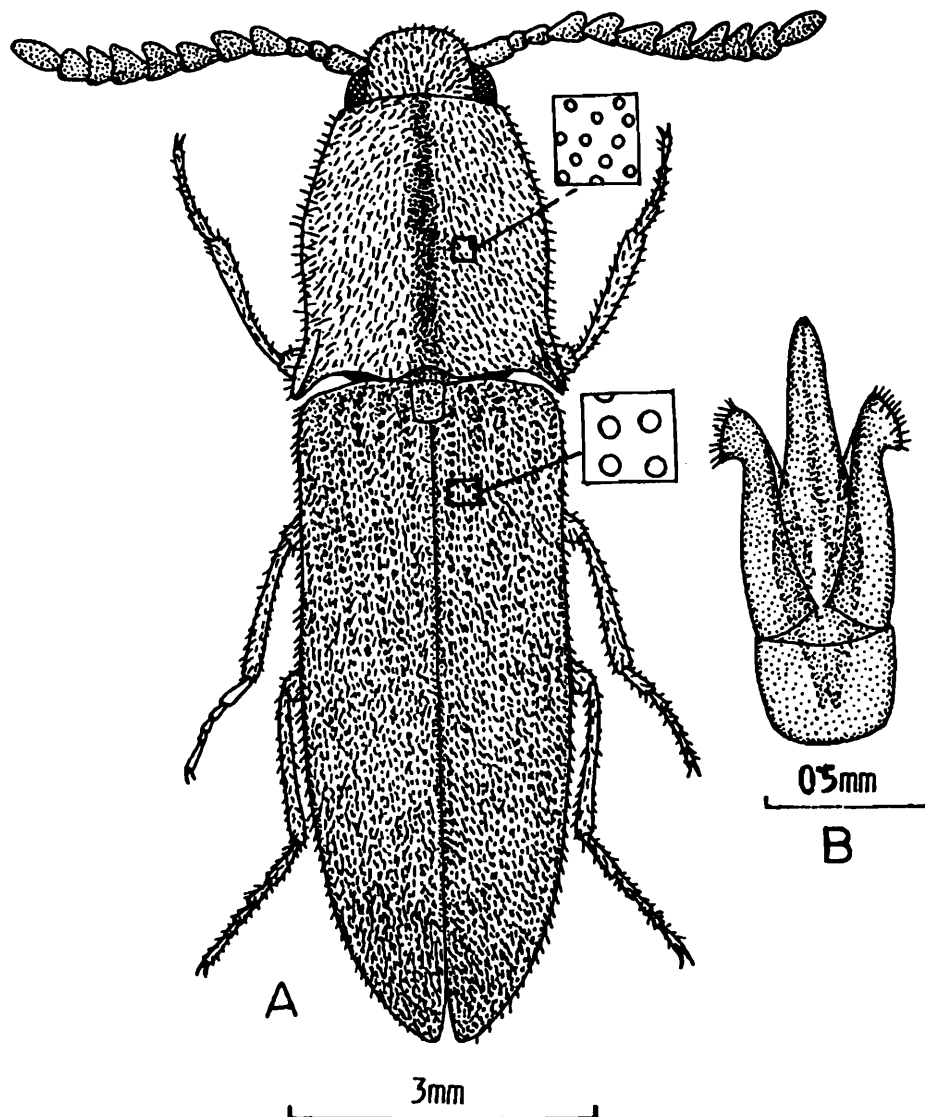


Fig. 41. *Priopus. oranatus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Elytra 2.5 times longer than broad (length 5.5 mm, breadth 2.2 mm), convex, subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along blackish middorsal suture. Striae consisting of linear rows of blackish coloured joined by moderately impressed lines, punctures, punctures separated by 1-2 times their own diameter; interstriae slightly convex to flat, sparsely punctate, punctures scattered. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and pectinate claws.

Male Genitalia : Phallobase with rounded anterior margin; parameres leaf shaped, broad but narrows at the apex, with subapical process, and deep concavities in front; median lobe clearly longer than parameres; with a pointed tip; furcae not reaching the anterior margin of parameres.

Material examined : 2 exs., INDIA : West Bengal : Darjeeling : Kalimpong, 3000 ft. alt., 5.V.1997, D. B. Khawas coll.; 1 ex., E. Himalaya : Darjeeling, May, 1913, 1500 ft. alt., Lord Carmichael coll. (det. Fleutiaux).

Distribution : India : West Bengal, Sikkim.

Remarks : This species is recorded for the first time from West Bengal. The species was recorded from India for the first time earlier from Sikkim (Mukhopadhyay & Chakraborty, 2003).

53. *Priopus trimaculatus* (Hope) 1831

1831. *Elater trimaculatus* Hope, In J. E. Grey, Zool. Misc., London, 1(1) : 25.

1990. *Priopus trimaculatus*; von Hayek, Bull. Br. Mus. nat. Hist., 59(1) : 84; 1995, Platia & Schimmel, Lavori-Soc. Ven. Sc. Nat., 20 : 63.

Material examined : None.

Distribution : India : West Bengal, Sikkim.

Elsewhere : Bhutan; Nepal.

Remarks : The species was redescribed by Platia & Schimmel (1995).

54. *Priopus vafer* Erichson, 1841

1841. *Priopus vafer* Erichson, Zeit. Ent., 3 : 108; 1995, Platia & Schimmel, Lavori - Soc. Ven. Sc. Nat., 20 : 64.

1860. *Melanotus vafer*; Candeze, Mem. Soc. r. Sci. Liege 15 : 337; 1891, Candeze., Catalog. Method. des. Elat. : 143; 1906, Schwarz, In Wytsmann Genera Insect. 46B : 188; 1927, Schenkling, In : Junk's Col. Cat., 88, Elat., II : 282; 1990, von Hayek, Bull. Br. Mus. Nat. Hist (Ent.), 59(1) : 74.

1860. *Diploconus coracinus* Candeze, Mem. Soc. r. Sci. Liege, 15 : 494.

1933. *Neodiploconus (Ploconides) coracinus* Fleutiaux, Annls Soc. Ent. Fr., 101 : 211.

1990. *Priopus coracinus* von Hayek, Bull Br. Mus. Nat. Hist., 59(1) : 81.

Material examined : None was available for study.

Distribution : India : West Bengal, Bihar, Orissa.

Elsewhere : Burma; Laos; Malay. Pen.; South China; Sri Lanka; Sumatra; Thailand; Vietnam.

Remarks : The species has been redescribed by Platia & Schimmel (1995).

XII. Genus *Szombatya* Platia, 1986.

1986. *Szombatya* Platia, Acta Coleopt., 2(1) : 1; 1990, von Hayek, Bull. Br. Mus. Nat. Hist. (Ent.), 59(1) : 85; 1995, Platia and Schimmel, Acta Zool. Hung., 41(2) : 93.

Type : *Psellis formosana* Szombathy (by monotypy.) (von Hayek; 1990).

Diagnostic characters : The genus was described recently by Platia in 1986 with single species. von Hayek (1990) has also given the generic diagnosis of this genus.

Distribution : India.

Elsewhere : Indonesia; Malaysia; Taiwan; Tonkin; Vietnam.

Biology and Habits : Unknown.

Remarks : This genus can be separated from *Melanotus* by the pronotum lacking latero-basal incision and from *Priopus* by the truncate apex of the posterior angle of pronotum. The genus has two or more large punctures on the ventral surface of the last visible abdominal segments.

This genus is rather rare in collection compared to the other genera of Melanotinae till now. Only 7 species of this genus is recorded from the world of which 1 was from hilly tracts of Assam in India. Here the single species *S. hodgarti* Platia and Schimmel is recorded from West Bengal for the first time.

55. *Szombatya hodgarti* Platia and Schimmel, 1995

1995. *Szombatya hodgarti* Platia and Schimmel, *Acta Zool. Hung.*, 41(2) : 98.

Material examined : 1ex., INDIA : West Bengal : Calcutta, no other data available.

Distribution : India : West Bengal (Calcutta), Assam.

Remarks : The species was recorded from 'Rangamati : Chittagong hill tracts' (Platia and Schimmel, 1995). They have mentioned the place under India : Bengal. But, Chittagong is now situated in Bangladesh. In addition, they have also recorded this species from Assam, India. In this present study, the species is recorded from the state of West Bengal for the first time.

E. Subfamily CONODERINAE

Diagnostic characters : Frons more or less inflexed or flat, curved downwards, mouthparts inferior, frontal carina well developed above and between antennae, more or less straight and well separated from labrum; antennae and tarsi not received in deep grooves; prosternal suture closed, prosternal lobe normally arcuate; meso- and metasternum with distinct suture; scutellum shield-shaped, never cordate; tarsi with 4th segment broadened or lobed beneath; claws simple, setae present at base.

Remarks : Candeze (1891) and Schwarz (1906) has treated this group of species under a tribe Monocrepidites. They included 9 genera under this tribe. Fleutiaux (1919) has raised the group to the subfamily Conoderinae. However, recently Stibick (1979) preferred to include these genera under the tribe Conoderini of the subfamily Pyrophorinae. Here, the name proposed by Fleutiaux (*op. cit.*) has been followed.

This subfamily contains 14 genera with nearly 800 species from the world mainly under the genera *Aeoloderma* Fleutiaux, *Heteroderes* Latreille and *Conoderus* Eschscholtz

including 20 species and 5 genera (viz., *Aeoloderma* Fleutiaux, *Heteroderes* Latreille, *Monocrepidius* Eschscholtz, *Conoderus* Eschscholtz and *Pachyderes* Latreille) are from India. From West Bengal 11 species under 4 genera are recorded of which materials of 8 species under 3 genera were available for study. Two species have been recorded for the first time from India and 3 species from West Bengal.

Key to the genera

1. Head distinctly smaller in comparison to pronotum, pronotum much dilated, much more wider than that of elytra, frons very little inclined and always more or less thickened *Pachyderes*
- Head normal size, pronotum normal in comparison to elytra, frons narrowly convex rounded in front 2
2. Prothorax covered with double punctures, 4th segment of tarsi lamellate, antennae generally reach only to the base of prothorax and feebly serrate from fourth segment onward *Heteroderes*
- Prothorax covered with simple or dissimilar punctures 4th segment of tarsi broadened and more or less cordiform, non lamellate, antennae variable in length usually feebly serrate and compact at sides, sometimes feebly keeled lengthwise *Aeoloderma*

Genus *Aeoloderma* Fleutiaux, 1928

1928. *Aeoloderma* Fleutiaux, *Encyclopedie Entomologique* Ser. B, pt. 1, vol., 3 : 135; 1955, Arnett, *Proc. U. S. Natn. Mus.* vol., 103 (3336) : 602; 1973, Ohira, *Folia Entomol. Hung. Suppl.*, XXVI : 320.
1829. *Æolus* Eschscholtz, In : *Thon. Arch.* Vol. 2, pt. 1 : 33; 1906, Schwarz, In : *Wytsmann Genera Insect*, 46A : 101; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 624.

Type : *Elater crucifer* Rossi, 1790, *Fauna Etrusca*, vol. 1 : 183 (Original designation). (Hyslop, 1921)

Morphological characters : Frons convex, rarely flat, rounded anteriorly, rarely truncated, base usually with fine longitudinally raised carina; nasal surface always much broader than high. Labrum broader than long and rounded in front. Mandibles short, bent and not visible at repose; last segment of maxillary palpi triangularly elongated.

Antennae variable in length usually feebly serrate and compact at sides, sometimes feebly keeled lengthwise; first segment sometimes rather long and somewhat curved, 2nd segment small, 3rd as long as or longer than 2nd segment, but always shorter than 4th; last segment more or less oval and depressed apically.

Prothorax generally longer than broad, hind angle with single or double carina. Elytra usually rounded at apex rarely emarginate or truncated. Prosternal suture straight and continuous. Mesosternal shield bent inward with raised margin.

Legs moderately long; femur strongly extended inwardly; tarsi simple, only 4th segment expanded; upper surface more or less extended over fifth segment and more or less strongly lobed and extended beneath.

Distribution : India, Australia, South America.

Biology and Habits : Unknown.

Remarks : Ohira (1967, 1970, 1973) transferred two species (viz. *brachmana* Candeze and *sinensis* Candeze), originally described under the genus *Aeolus* Eschscholtz, to this genus. Both these species are recorded here for the first time from West Bengal. Another species (*chrysites* Candeze) which was originally under the genus *Aeolus* has also been transferred to this genus, in this present work.

Key to the species

1. Body brownish in colour, pronotum as long as broad *brachmana*
- Body yellowish brown in colour, pronotum broader than long 2
2. Pronotal disc moderately convex, scatterdly punctate *chrysites*
- Pronotal disc gently convex, moderately densely punctate *sinensis*

56. *Aeoloderma brachmana* (Candeze, 1859)

(Fig. 42)

1859. *Aeolus brachmana* Candeze, *Mon. Elat.*, II : 283, 345; Fleutiaux, 1918, *Bull. Mus. Hist. Nat., Paris* : 216; Fleutiaux, 1918, *Annls Soc. Ent. Fr.*, 87 : 208.
1929. *Aeoloderma brachmana*; Fleutiaux, *Ency. Ent.*, Coleoptera : 34; Ohira 1970, *Annls Hist. nat Mus. natn. Hung*, Tomus 62 : 211, pl. II, fig. E.; Ohira 1973, *Folia Entomol. Hung. Suppl.* XXVI : 320.

Redescription : Length 4.6 mm, breadth 1.5 mm. Body small, elongated, brownish in colour, surface shining. Abdominal tergites yellowish brown. Antennae and legs brownish. Vestiture fine, moderately dense, small, whitish coloured.

Head small, broader than long, surface convex. Frons with anterior margin arcuate, frontal region densely punctate, punctation simple; frontal carina complete across the frons. Eyes large and prominent. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd segment smaller, 2nd slightly shorter than the 3rd, 3rd is shorter than the fourth; the rest segments serrate. Mandibles invisible at rest.

Pronotum subquadrate, as long as broad (length 1.2 mm, breadth 1.2 mm); widest at middle, sides almost parallel, lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc gently convex, densely punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles bluntly pointed, acarinate.

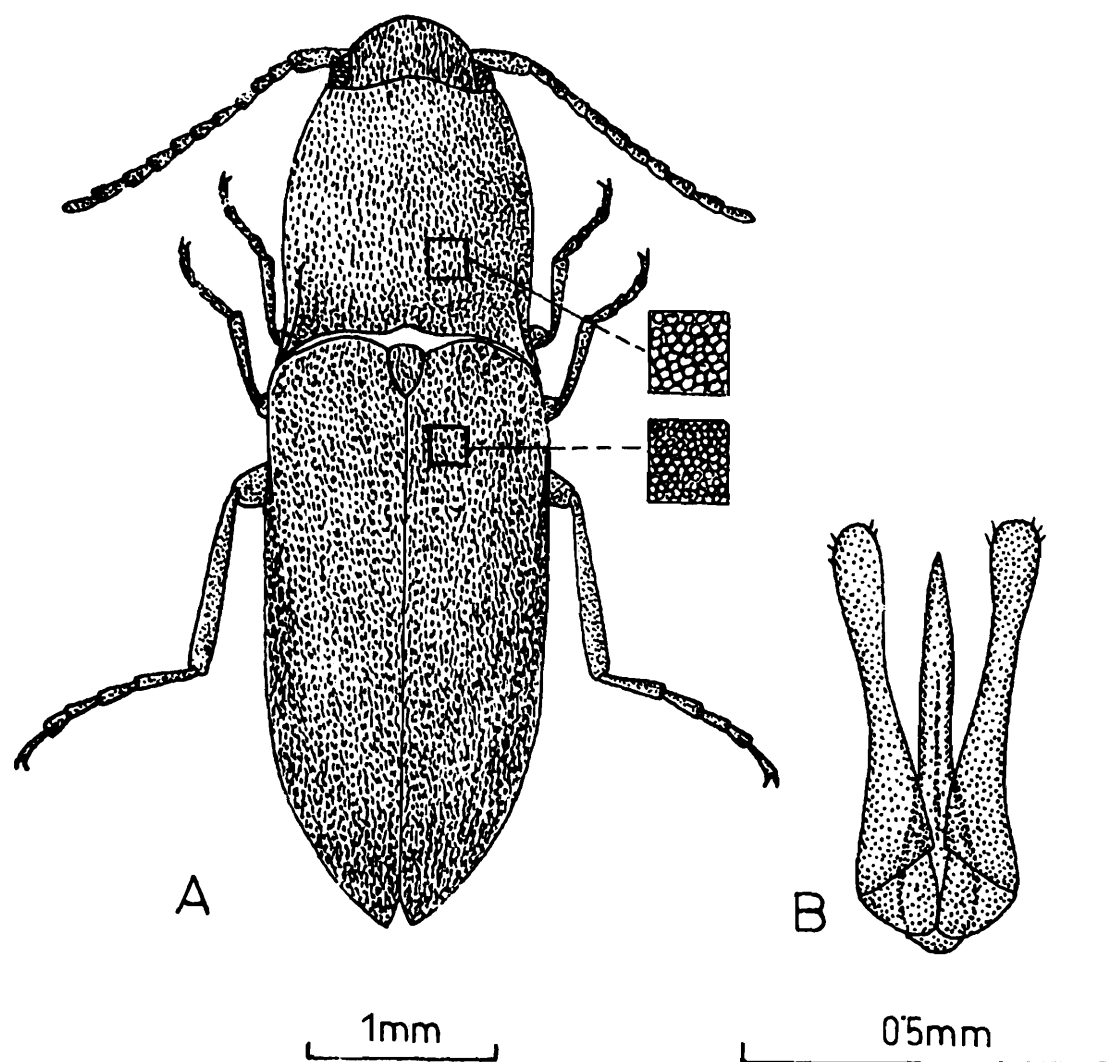


Fig. 42. *Aeoloderma brachmana* Candeze : A. Dorsal view : B. Dorsal view of male genitalia.

Prosternum densely punctate; punctures separated by less than their own diameter, integument between punctures not granulate. Prosternal spine short, apex of prosternal spine blunt, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum brownish with black anterior border, subpentagonal, surface slightly convex; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2 times longer than broad (length 3 mm, breadth 1.5 mm), convex, sides' subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along middorsal suture. Striae flat, consisting of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae convex, with rough surface. Vestiture moderately dense. Last sternite of abdomen convex. Legs slender with 4th tarsal segment lamellated below, claws simple.

Male Genitalia : Phallobase with straight anterior margin; parameres almost straight, with posterior end slightly bulging and rounded, without subapical process; median lobe shorter than parameres, slender, apex subconical; furcae reaching beyond the anterior margin of parameres.

Material examined : 3 exs., INDIA : West Bengal : Calcutta, no other data available (det. Fleutiaux); 4 exs., 24 Parganas (N) : Sukantanagar, 23.V.99, S. K. Ghosh coll., collected at light.

Distribution : India : West Bengal (Calcutta, North 24 Parganas).

Elsewhere : Annam; Burma; Formosa; Java; Vietnam; Philippines; Sumatra.

Remarks : The species was originally reported from 'Hindustan' (Candeze 1859). The species comes closer to *chrysites* (Candeze) but differs in body colour, pronotum being as long as broad and pronotal disc gently convex. This species is recorded here for the first time from West Bengal.

57. *Aeoloderma chrysites* (Candeze, 1859) comb. n.
(Fig. 43)

1859. *Aeolus chrysites* Candeze, *Mon. Elat.*, II : 346

Redescription : Length 5 mm, breadth 1.5 mm. Body small, elongated, yellowish brown in colour, surface shining. Abdominal tergites yellowish brown. Antennae and legs brownish. Vestiture fine, moderately dense, small, whitish coloured.

Head small, as long as broad, surface convex. Frons with anterior margin arcuate; frontal region moderately densely punctate, punctation simple; frontal carina complete across the frons. Eyes small and visible. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd and 3rd segments are smallest and subequal, 4th is distinctly shorter than the 5th; the rest segments serrate.

Pronotum broader than long (length 1.5 mm, breadth 1.6 mm); widest at middle; sides almost parallel; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc convex, scatterdly punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles pointed, without carina.

Prosternum densely punctate; punctures separated by less than their own diameter; integuments between punctures not granulate. Prosternal spine small, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum brownish with blackish border, subpentagonal, surface slightly convex; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2 times longer than broad (length 3 mm, breadth 1.5 mm), convex, sides subparallel along basal third, than narrowed caudad. Apices rounded and very weakly spinose along middorsal suture. Striae flat, consisting of irregular punctures joined by moderately impressed lines punctures separated by less than their own diameter; interstriae convex, flat with rough surface. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with 4th tarsal segment lamellated below and claws simple.

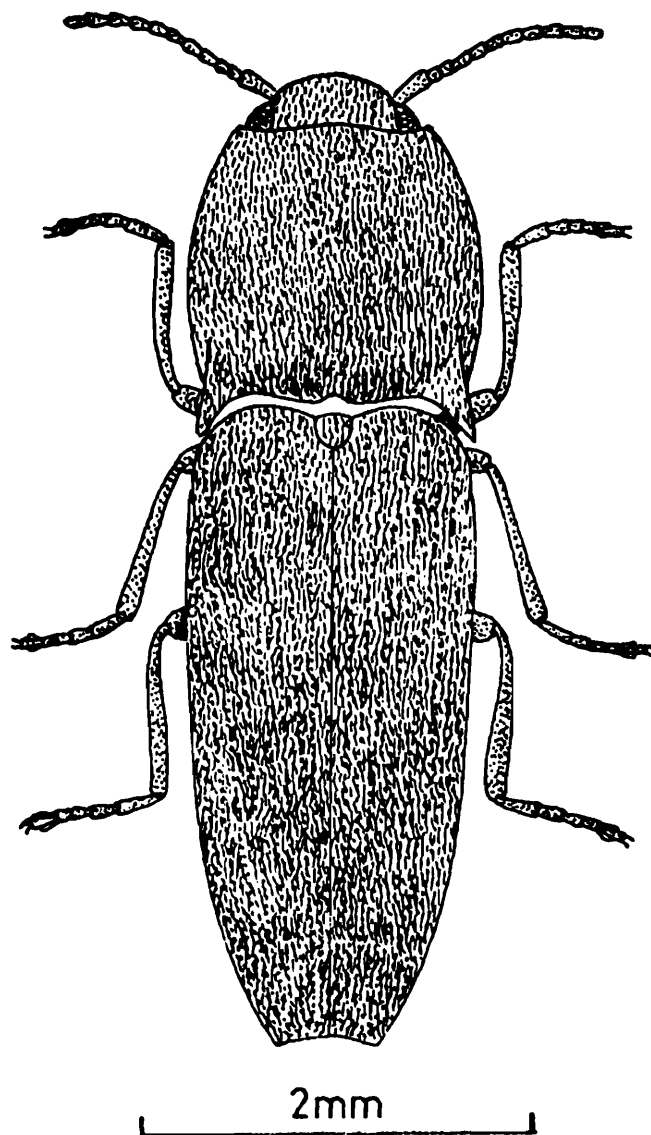


Fig. 43. *Aeoloderma chrysites* Candeze : Dorsal view.

Material Examined : 1 ex., INDIA : West Bengal : Calcutta, V 1914, F. H. Gravelly coll., collected at light.

Distribution : India : West Bengal (Calcutta); previously reported from 'Indes : Orientales'

Remarks : The species is close to *A. brachmana* (Candeze) but differs from the latter by body colour, pronotum being broader than long and pronotal disc moderately convex. This species is recorded for the first time from India.

58. *Aeoloderma sinensis* (Candeze, 1859)
(Fig. 44)

1859. *Aeolus sinensis* Candeze, *Mon. Elat.*, II : 346.

Aeoloderma sinensis; Fleutiaux, 1929, *Ency. Ent. Col.* : 34; Ohira, 1970, *Annls Hist. Nat. Mus. natn. Hung.* Tomus, 62 : 211; Ohira 1973, *Folia Entomol. Hung. Suppl.*, XXVI : 320.

Redescription : Length 5.2 mm, breadth 1.3 mm. Body small, moderately elongated, more or less depressed above; surface shining, yellowish brown except head, median longitudinal area of pronotum, around scutellum, basal areas of sutural and 2nd intervals and a part of apical third (transverse zigzag band) on elytra usually dark brown. Abdominal tergites brownish. Antennae brown, legs pale yellowish brown. Vestiture fine, moderately dense all over the body, short, pale yellowish.

Head small, broader than long, surface flat. Frontal region scatterdly punctate, punctation simple, frontal carina arcuate across the frons. Eyes large, prominent. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd and 3rd segment smaller and subequal; 2nd is very slightly shorter than the 3rd, 3rd shorter than the fourth; the rest segments serrate. Mandibles invisible.

Pronotum broader than long (length 1.3 mm, breadth 1.5 mm); widest at middle; sides convex, sides almost parallel; lateral margin entire, sinuate before the hind angles. Vestiture fine, moderately dense, short. Pronotal disc gently convex, moderately densely punctate,

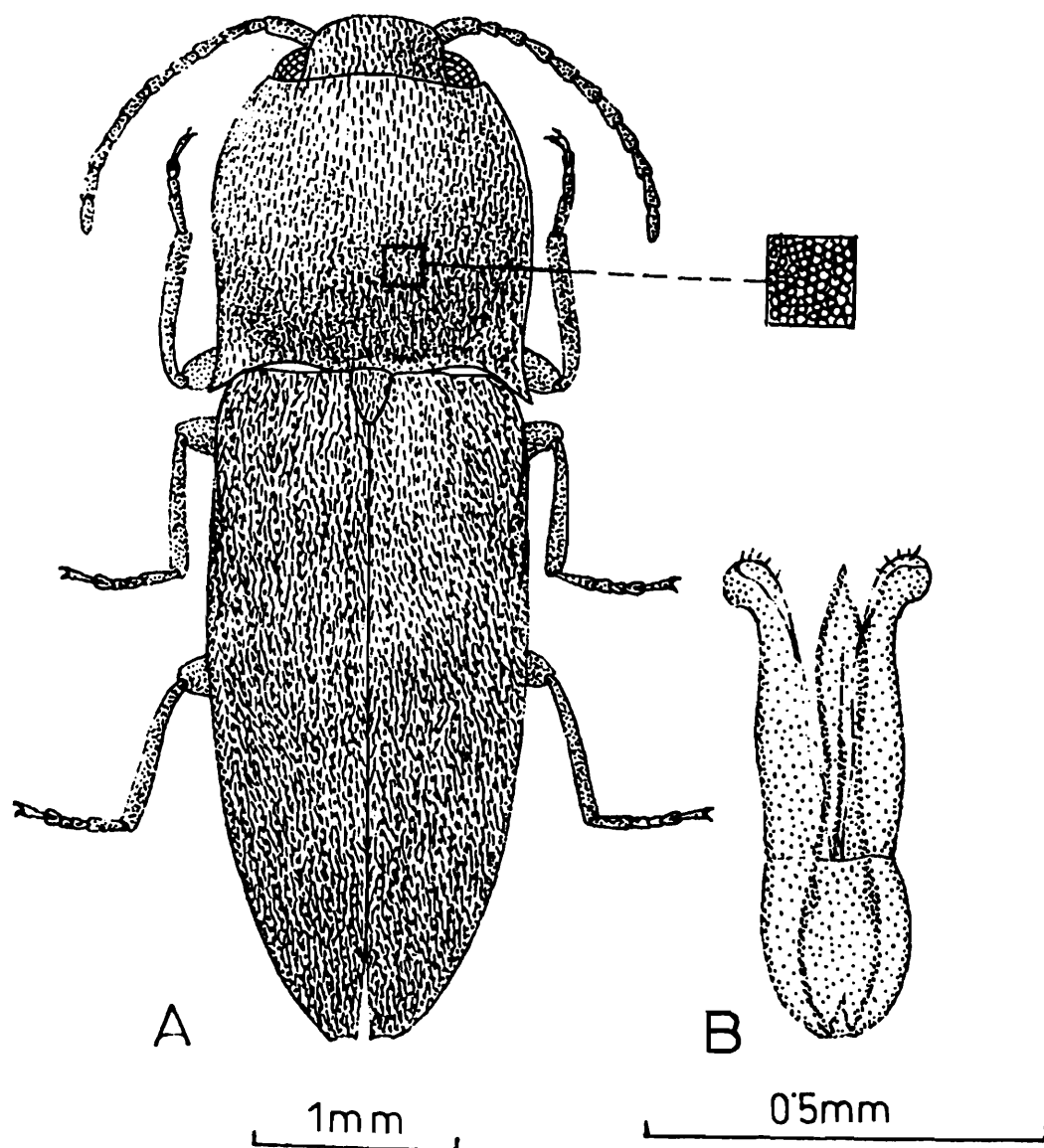


Fig. 44. *Aeoloderma sinensus* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

punctuation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles of pronotum pointed sharply without any carina.

Prosternum densely punctate; punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine short, apex of prosternal spine blunt, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum subpentagonal, longer than broad, surface slightly convex; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.7 times longer than broad (length 3.5 mm, breadth 1.3 mm), convex, sides' subparallel along basal third, then narrowed caudad. Apices weakly truncated and very weakly spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines; punctures separated by less than their own diameter, interstriae convex, with rough surface. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with 4th tarsal segment lamellated below and claws simple.

Male Genitalia : Phallobase with almost straight anterior margin; parameres straight posteriorly, without subapical process; median lobe as long as parameres, broader in middle, apex rounded; furcae reaching the anterior margin of parameres.

Material examined : 3 exs., INDIA : West Bengal : Calcutta : Eden Gardens, 16.X.1911, F. H. Gravely coll. collected at light. (2 exs. det. Fleutiaux); 2 exs. Midnapur : Kharagpur, 17 - 30.VI.1911, R. Hodgard coll.; 2 exs. Burdwan : Kulti, 31.III.1986, S. K. Saha & pty. coll., collected on grass, 1 ex., Hoogly : Konnagar, 29.IX.1999, P. Chakraborty coll., collected at light; 3 exs., 24 Pgs (S) : Sundarban : Jharkhali, 26. VI.1986, B. P. Haldar coll.

Distribution : India : West Bengal (Kolkata, Midnapore, Burdwan, Hooghly, South 24 Parganas).

Elsewhere : Cambodge; Cochin China; Formosa; Hong Kong; Laos; South Asia; Tonkin.

Remarks : The species very closely allied to *Aeloderma agnata* (Candeze, 1873) which is known from Japan. However, it can be differentiated from the latter by having two types of punctures (smaller ones scattered among the bigger ones) on the pronotal disc. This species is recorded for the first time from India.

Genus *Heteroderes* Latreille, 1834

1834. *Heteroderes* Latreille, *Annls Soc. Ent. Fr.* Vol., 3 : 155; Schwarz, 1906, In : Wytsmann *Genera Insect*, 46A : 105; Hyslop, 1921, *Proc. U. S. Natn. Mus.*, LVIII : 649.

1858. *Monocrepidius* Germar, *Zeitschr. F. Ent.* Vol., I : 231; Dejean, 1837, *Cat. Col.*, Ed., 3 : 98.

1858. *Cryptohypnus* (pars) Germar, *Zeitschr. F. Ent.* Vol., I : 148.

Drasterius (pars) Dejean, 1837, *Cat. Col.*, Ed., 3 : 105.

Aeolus Candeze, 1859, *Mon. Elat.* Vol. 2 : 283, Dejean 1837, *Cat. Col.*, Ed., 3 : 103.

Type : *Heteroderes fuscus* Latreille (Monobasic) (Hyslop, 1921).

Morphological characters : Frons generally convex and rounded in front; nasal surface much broader. Mandibles bifurcate, last segment of maxillary palpi triangular.

Antennae generally reach only to the base of prothorax and feebly serrate from fourth segment onwards; 2nd segment small, 3rd usually longer than 2nd, however always shorter than 4th.

Prothorax longitudinally covered with two different types of punctures and two different types of pubescence, short and long; hind angle with single or double carina or even without carina, lateral margin entire. Elytra proportionately short, rounded at distal extremities and acuminate. Prosternum rounded in front, prosternal process somewhat long and slender and more or less sloping inside and bent inwards. Metasternal shield with flat and with posterior to anterior parallel margin.

Distribution : Virtually cosmopolitan.

Biology and Habits : Little is known as to the habits of the adults. The larvae of some species are found on soil and are found to eat other soil dwelling insects like Scarabaeid larvae.

Remarks : Although 106 species under this genus are known from the world, but only 10 are from India and 4 from West Bengal (Schenkling, 1927). Later, Vats and Chauhan (1993) recorded additional 7 species from Northwest India of which 3 were new species.

In the present study 4 species of this genus have been studied which includes two species that are newly recorded from West Bengal.

Key to the species

1. Pronotum as long as broad, frontal region scatterdly punctate *macroderes*
- Pronotum longer than broad, frontal region densely or moderately densely punctate 2
2. Body yellowish brown, frons with anterior margin almost flattened *pinosus*
- Body blackish brown or reddish brown frons with anterior margin arcuate 3
3. Body blackish brown, carina on the hind angle of pronotum extended upto 1/3rd the length of pronotum *lenis*
- Body reddish brown, carina on the hind angle of pronotum extended upto 1/4th the length of pronotum *spinicollis*

59. *Heteroderes lenis* Candeze, 1859

(Fig. 45)

1859. *Heteroderes lenis*, Candeze, *Mon. Elat.* Vol., 2 : 357; Candeze 1891, *Catalog. Method des Elat.* : 83; Schwarz, 1906, In : Wytsmann *Genera Insect*, 46A : 105.

Redescription : Length 12 mm, breadth 3.5 mm. Body moderately elongated, blackish brown in colour; surface not shining. Abdominal tergites blackish brown. Antennae and legs yellowish brown. Vestiture fine, dense, small, grayish coloured.

Head small, as long as broad, surface flat. Frontal region densely punctate, punctation double—bigger punctures scatterdly distributed while smaller ones are dense, frontal carina complete across the frons, with arcuate anterior margin. Eyes large and prominent. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd segment smallest, 3rd segment shorter than the fourth; the rest segments serrate.

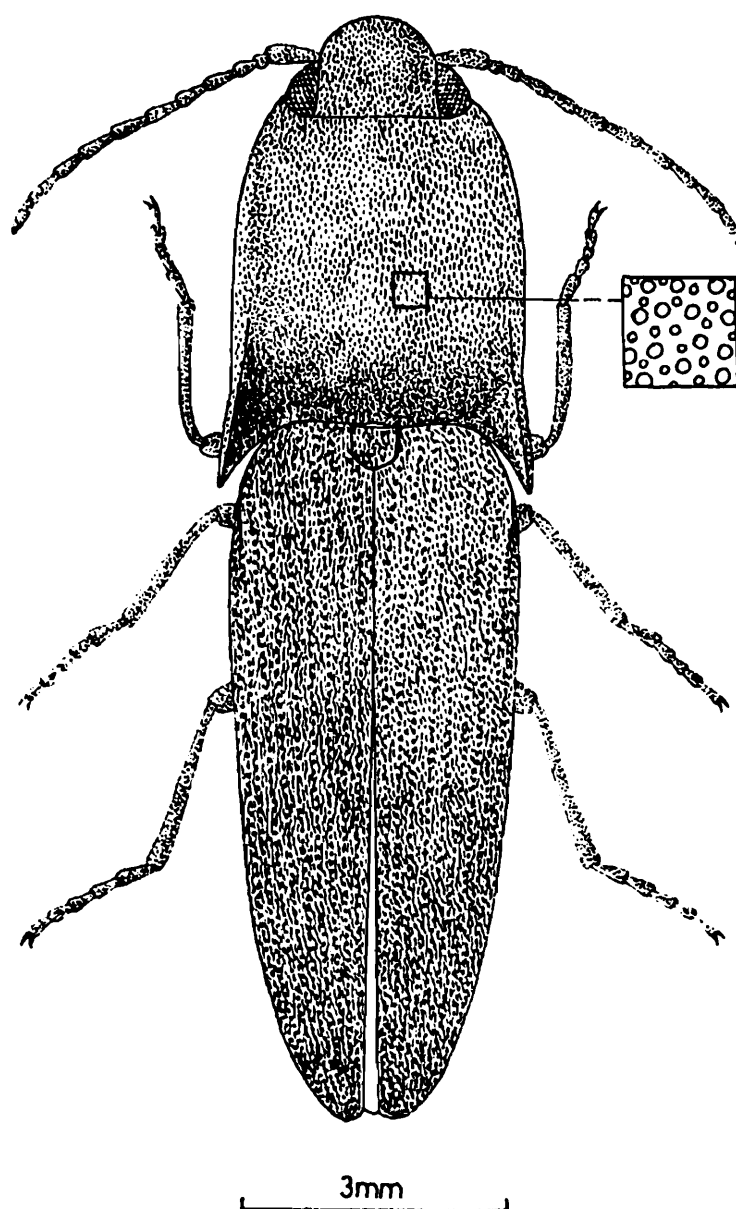


Fig. 45. *Heteroderes lenis* Candeze : Dorsal view.

Pronotum longer than broad (length 4 mm, breadth 3.2 mm); widest at middle; sides almost parallel but slightly narrows towards the anterior side; lateral margin entire. Vestiture fine, dense, short. Pronotal disc gently convex, densely punctate, punctation double, bigger punctures scatterdly placed while the interspaces are finely and densely punctate, punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Hind angles divergent, bicarinate, one carina extended upto 1/3rd portion of the pronotum parallel to the lateral margin, the other carina is short and is parallel to the interior side of the posterior angle of pronotum.

Prosternum densely punctate; punctures separated by less than their own diameter; integuments between punctures not granulate. Prosternal spine short, blunt, apex of prosternal spine roundly pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subquadrate, surface flat densely punctate; vestiture fine, dense; integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 7.5 mm, breadth 3.5 mm), convex, sides' subparallel along basal half, then narrowed caudad. Apices rounded and spinose along middorsal suture then slightly incurved after the spine. Striae consisting of linear rows of elongated punctures joined by moderately impressed lines, punctures separated by less than their own diameter, interstriae slightly convex to flat, finely and coarsely punctate on the surface superficially giving a rough look. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with fourth tarsal segment lamellated below, lamellae broad, easily visible dorsally, claws simple.

Genitalia : Out of the four examples studied here none was male.

Material examined : 2 exs., INDIA : West Bengal : Darjeeling : Kalimpong, 15.IV-3.V.1997, D. B. Khawas coll.; 1 ex., Nakshalbari, 16.VI.1979, P. Haldar & pty. coll.; 1 ex., Jalpaiguri : Jaldapara, 4.V.1983, S. K. Chatterjee coll.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri), Himachal Pradesh, U.P. and Tripura.

Remarks : The species is very close to *H. sericeus* Candeze but differs from the latter by having black body colour and flat scutellar surface, whereas, the body colour is reddish brown and surface of scutellum is convex in *sericeus* Candeze.

60. *Heteroderes macroderes* Candeze, 1859

(Fig. 46)

1859. *Heteroderes macroderes* Candeze, *Mon. Elat.*, II : 358; Fleutiaux, 1927, *Encycl. Ent.*, Col. : 25; Ohira, 1970, *Annls Hist. Natur. Mus. Nat. Hung.* 62 : 219.

Redescription : Length 10.5 mm, breadth 3.2 mm. Body moderately elongated, blackish brown in colour; surface shining. Abdominal tergites blackish. Antennae and legs yellowish brown. Vestiture fine, dense, small, whitish yellowish coloured.

Head small, longer than broad, surface flat, slightly depressed in middle. Frontal region scatterdly punctate, punctation double; frontal carina complete across the frons, with anterior margin arcuate. Eyes large and prominent. Antennae moderately long, extended beyond the middle of the pronotum, basal segment elongated and robust, 2nd segment smallest and subglobose, 2nd is distinctly shorter than the 3rd, 3rd is shorter than the 4th; the rest segments serrate.

Pronotum as long as broad (length 3 mm, breadth 3 mm); widest behind middle; sides almost parallel; lateral margin entire. Vestiture fine, not very dense, moderately long. Pronotal disc gently convex, scatterdly punctate; punctation double, bigger punctures sparsely distributed while the interspaces finely punctate; smaller punctures separated by 1-3 times their own diameter; integument between punctures not granulate. Hind angles pointed, with two carinae, one carina extended upto 1/3rd of the pronotum, parallel to the lateral margin, other carina very short and parallel to the interior margin of the pronotum.

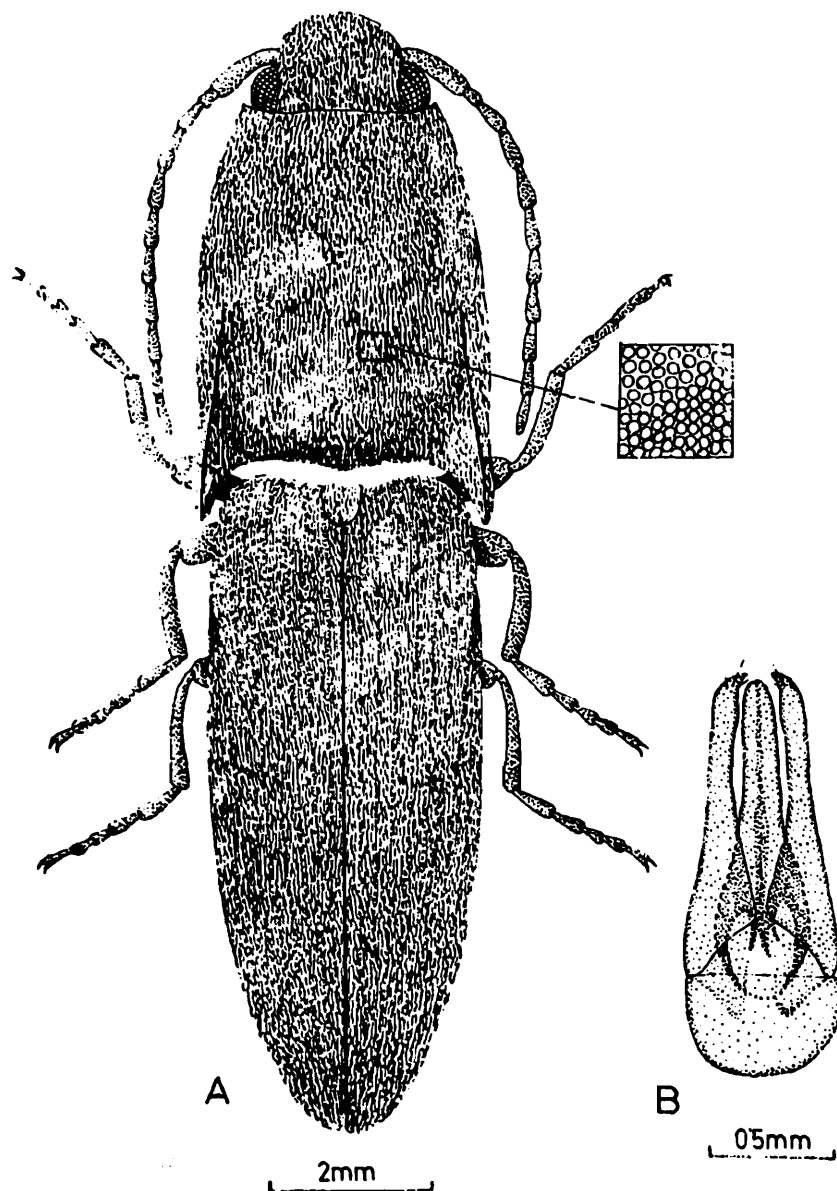


Fig. 46. *Heteroderes macroderes* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

Prosternum moderately densely punctate; punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Prosternal spine moderately long, apex of prosternal spine roundly pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subquadrate, brownish with black margin, surface almost flat and slightly convex in middle; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra about 2.2 times longer than broad (length 7 mm, breadth 3.2 mm), convex, sides almost subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along middorsal suture. Striae consisting of linear rows of elongated punctures, joined by moderately impressed lines, punctures separated by 1-2 times their own diameter, punctures are distinct at the basal half; interstriae flat, scatterdly and finely punctate. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with 4th tarsal segment lamellated below, lamellae narrow, concealed below fifth tarsomere, not visible dorsally; claws simple.

Male Genitalia : Phallobase with the anterior margin damaged in the male specimen; parameres with posterior end slightly curved inwards, and without subapical process; median lobe longer than parameres, uniformly tubular but stouter, apex rounded; furcae reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : E. Himalaya : Darjeeling : Sukna, 23 - 30. VIII.1928, T. M. Puri coll. (det. Fleutiaux); 2 exs., Siliguri, 18-20.VII.1907, Ind. Mus. coll.; 1 ex., Murshidabad : Berhampur, date not recorded, Z.S.I. coll.; 1 ex., Calcutta, date not recorded, Z.S.I. coll.; 1 ex., Bardhaman : Ranigunj, date not recorded, A. Martin coll.

Distribution : India : West Bengal (Darjeeling, Murshidabad, Kolkata, Bardhaman), Assam.

Elsewhere : Burma; China; Laos; Tonkin; Yunnan.

Remarks : The species is close to *H. lenis* Candeze but differs in having almost subquadrarte pronotum, frontal region with more scatterdly punctured and elytral sides being subparallel along basal third. This species is recorded here for the first time from West Bengal.

61. *Heteroderes spinicollis* Candeze, 1859 (Fig. 47)

1859. *Heteroderes spinicollis* Candeze, *Mon. Elat.*, II : 360; Candeze, 1891, *Catalog. Method des. Elat.* : 83; Fleutiaux, 1893, *Annls Soc. ent. Fr.*, : 271; Schwarz, 1901, *Deutsche ent. Z. Heft.*, I : 17; Fleutiaux, 1905, *Annls Soc. Ent. Fr.*, 4 : 322; Schwarz, 1906, In Wytsmann *Genera insect*, 46A : 105; Ohira, 1973, *Ent. Scand. suppl.*, 4 : 30, fig. 4, I; Biswas & Chakraborty, 2000, *Zool. Surv. India, Fauna of Tripura, State Fauna Series*, 7(Part 3) : 99-108

Redescription : Length 9 mm, breadth 2.2 mm. Body moderately elongated, reddish brown except the middle of the pronotum which is blackish in colour; surface shining. Abdominal tergites brown. Antennae and legs brown. Vestiture fine, dense, small, grayish and orangish coloured.

Head small, broader than long, surface flat, slightly depressed in middle. Frontal region moderately densely punctate, punctation double; frontal carinae complete across the frons, frons flat with anterior margin arcuate. Eyes large and prominent. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd segment sub-globose and shorter than the 3rd, 3rd segment shorter than the 4th, 4th segment longest, the rest segments serrate.

Pronotum longer than broad (length 3 mm, breadth 2.5 mm); widest behind middle; sides gradually narrows anteriorly; lateral margin entire. Vestiture fine, dense, short. Pronotal disc blackish in colour, gently convex, densely punctate; punctation double, bigger punctures are scatterdly distributed while the smaller ones are present in the interspaces between the bigger punctures, bigger punctures separated by less than their

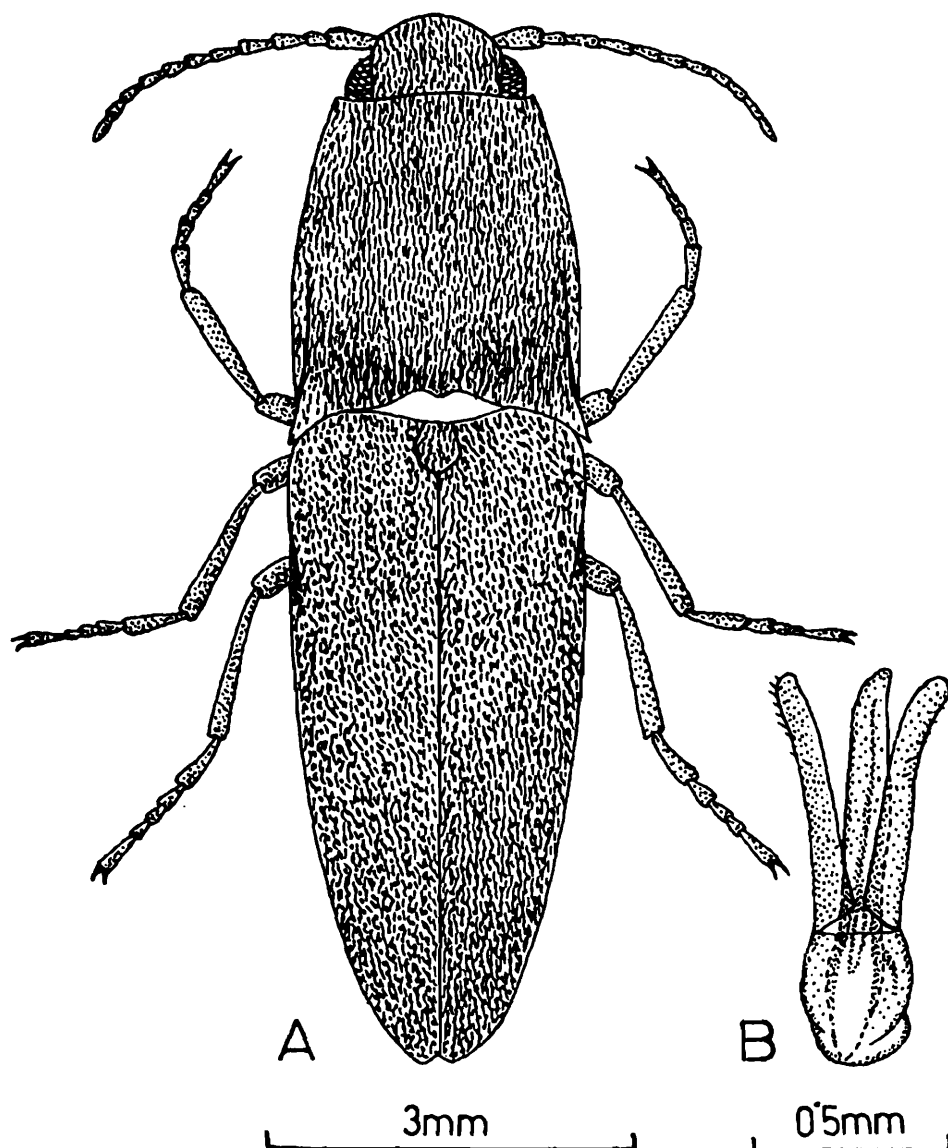


Fig. 47. *Heteroderes spinicollis* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

own diameter; integument between punctures not granulate. Hind angles pointed, with carina, carina extended upto the 1/4th portion of the pronotum; a small median acuminate projection with laterally compressed base in the posterior half of pronotum before the scutellum, the projection is striated.

Prosternum moderately densely punctate; punctures separated by less than their own diameter; integuments between punctures not granulate. Prosternal spine small, apex of prosternal spine bluntly pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subquadrate, slightly longer than broad, surface flat, anterior margin straight, moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.5 times longer than broad (length 5.5 mm, breadth 2.2 mm), dorsal surface convex, sides subparallel along basal third, then narrowed caudad. Apices rounded and weakly spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat with double punctation. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with fourth tarsal segment lamellated, the lamellae visible dorsally; claws simple.

Male Genitalia : Phallobase with rounded anterior margin; parameres with posterior ends slightly curved outwards, rounded and without subapical process; median lobe as long as parameres, uniformly tubular, apex subconical; furcae reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling, date not recorded, Z.S.I. coll. (det Fleutiaux).

Distribution : India : West Bengal (Darjeeling), Tripura.

Elsewhere : Sri Lanka.

Remarks : This species is recorded here for the first time from West Bengal. The species is similar in comparison to *H. flavonotatus* Bohemann. However, it differs from the latter in having flat head surface, scutellum being subquadrate, and also different genitalial structure.

62. *Heteroderes spinosus* Candeze, 1890 (Fig. 48)

1890. *Heteroderes spinosus* Candeze, *Bull. Soc. Ent. Belg.*, : 161; Candeze, 1891, *Catalog. Method des Elat.*, : 83; Schwarz, 1906, In : *Wytsmann Genera. Insect*, 46A : 105.

Redescription : Length 6 mm, breadth 1.8 mm. Body small, elongated, yellowish brown in colour; surface shining. Abdominal tergites reddish brown. Antennae and legs light brown. Vestiture fine, moderately dense, small, yellowish coloured.

Head small, as long as broad, surface flat. Frontal region densely punctate, punctation double; frontal carina complete across the frons, frons flat with anterior margin flattened. Eyes small & prominent. Antennae moderately long, extended beyond the middle of the pronotum, basal segment robust, 2nd segment smallest and subglobose, 3rd longer than the 2nd but smaller than the fourth; the rest segments serrate. Pronotum longer than broad (length 1.9 mm, breadth 1.5 mm); widest at middle; sides almost straight, lateral margin entire. Vestiture fine, moderately dense, small. Pronotal disc gently convex, densely punctate; punctation double, bigger punctures are scattered while smaller ones are present in between the interspaces, bigger punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Hind angles divergent, unicarinate, carina extended upto the 1/4th of the length of pronotum, a small median acuminate projection with laterally compressed base in the posterior half of the pronotum.

Prosternum moderately densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine small, apex of

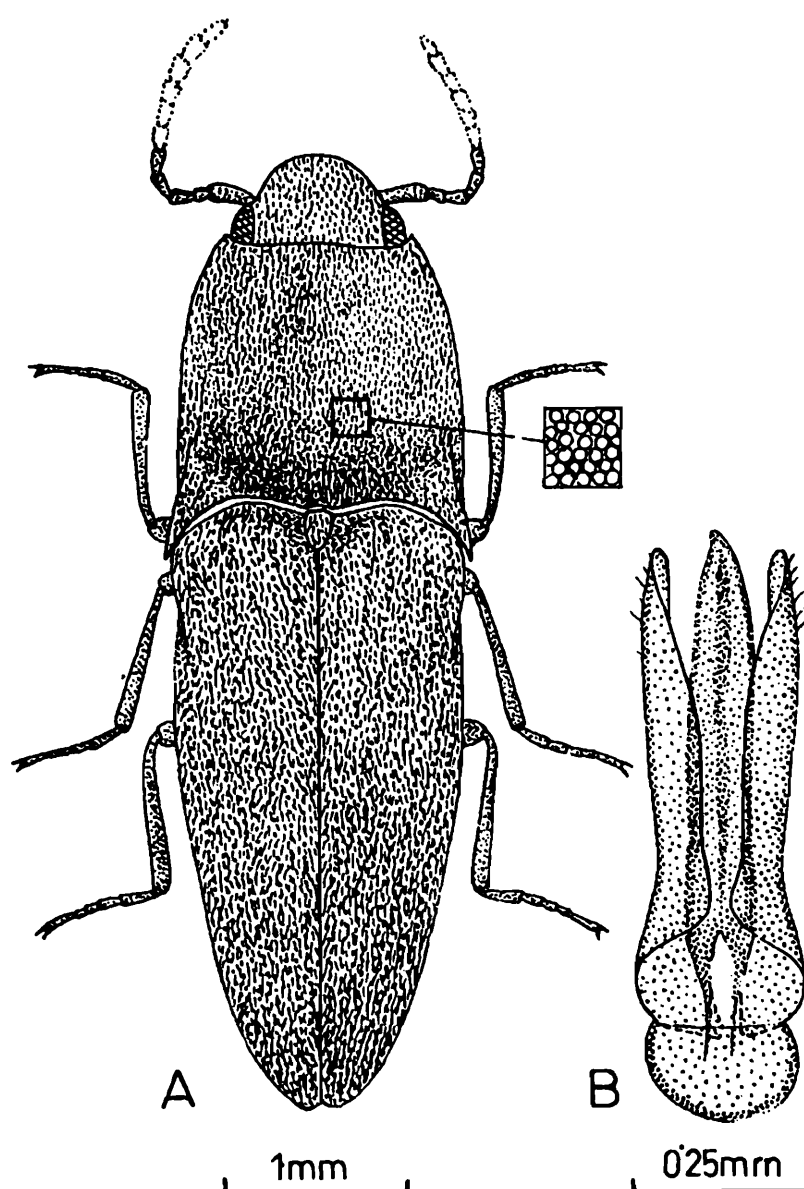


Fig. 48. *Heteroderes spinosus* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

prosternal spine bluntly pointed, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum subpentagonal, reddish brown with black margin, surface convex, anterior margin flat; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 1.9 times longer than broad (length 3.5 mm, breadth 1.8 mm), dorsal surface convex, sides subparallel along basal third, then narrowed caudad. Apices semicircularly truncated and not spinose along middorsal suture. Striae consisting of linear rows of punctures, joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat, with double punctation. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with fourth tarsal segment lamellate below, lamellae narrow, concealed below fifth, not visible dorsally, claws simple.

Male Genitalia : Phallobase with rounded anterior margin; parameres with posterior ends slightly curved inwards, without subapical process; median lobe as long as parameres, uniformly tubular, stouter than parameres, with subconical apex; furcae reaching the anterior margin of parameres.

Material examined : 1 ex., INDIA : West Bengal : E. Himalaya : Darjeeling : Sukna, 23-30.VIII.1928, Z.S.I. coll. (det Fleutiaux); 1 ex., Murshidabad : Berhampur, Z.S.I. coll., date not recorded.

Distribution : India : West Bengal (Darjeeling, Murshidabad), originally reported from Bengal.

Remarks : This species is similar to *H. amaculatus* Vats and Chauhan (1993) but differs in having head as long as broad, pronotum longer than broad besides the body colour. Since Vats & Chauhan (*op. cit.*) has not provided the figure of the male genitalia of the latter species the genitalial variations between these two species could not be compared.

Genus *Pachyderes* Guerin-Meneville, 1829

1829. *Pachyderes* Guerin - Meneville, *Icon. Regne Anim.* Vol., 3, fasc. 4 : 41, pl. 12, fig. 5; Candeze, 1891, *Catalog. Method. des Elat.*, : 66; Schwarz, 1906, In : Wytsmann *Genera. Insect*, 46A : 88; Hyslop, 1921, *Proc. U. S. Natn. Mus.* LVIII : 661.

Type : *Pachyderes ruficollis* Guerin-Meneville, 1829 (Hyslop, 1921).

Note : Most authors credit the genus to Latreille, *Ann. Soc. Ent. Fr.*, 1834 : 149. However, Hyslop (1921) has stated that Latreille (1834) described the genus from the figure as the plates were evidently distributed before the text was published.

Morphological characters : Head is distinctly small in compare to prothorax, frons very little inclined and always more or less thickened, nasal space hardly broader than high. Mandibles bidented, and last segment of maxillary palpi elongatedly triangular.

Antennae moderately long and in male usually pectinate; 2nd segment extremely small, last segment rather elongated and truncated at apex.

Prothorax always much broader than elytra, hind angle very strongly developed.

Elytra plain and narrowed behind. Prosternum short, prosternal process moderately long and horizontal and directed posteriorly, sometimes both sides between front coxae raised and emerginate. Mesosternal shield almost horizontal and with parallel and raised margin.

Legs slender; femur feebly enlarged innerside; tarsi rather shorter than tibiae; 1st segment of hind tarsi is almost as long as following three segments taken together, 2nd and 3rd segment triangularly enlarged, 4th broadly heart shaped; 5th somewhat shorter than the first, claws small and simple.

Distribution : India.

Elsewhere : Java, Laos, Malacca, Malayan Archipelago, Nepal, Tonkin.

Biology and Habits : Unknown.

Remarks : Altogether 7 species under this genus were recorded of which 2 species were from India. *P. bengalensis* Candeze was originally reported from 'Bengal' while the other species *P. niger* Candeze was from Hindustan, Birmanie and Malaysia (Candeze 1891). Later on, Ohira (1970) recorded the latter species from West Bengal.

63. *Pachyderes bengalensis* Candeze, 1889

(Fig. 49)

1889. *Pachyderes bengalensis* Candeze, *Elat. Nouv. Fasc.*, 4 : 24; Candeze, 1891, *Catalog. Method des Elat.*, : 66; Schwarz, 1906, In : Wyttsmann *Genera Insect*, 46A : 87.

Redescription : Length 13 mm, breadth 5 mm. Body elongated, blackish brown in colour; surface shining. Abdominal tergites reddish brown. Antennae and legs brownish. Vestiture fine, moderately dense, moderately long, yellowish white coloured.

Head small, slightly depressed in middle, surface flat. Frontal region evenly densely punctate, punctation simple; frontal carina thick, complete across the frons. Eyes small but prominent. Antennae small, long, extended upto the middle of the pronotum; basal segment robust, 2nd segment smaller, 3rd segment distinctly longer than the 2nd, 4th segment subequal to the 3rd; the rest segments serrate.

Pronotum distinctly broader than long (length 3.5 mm, breadth 5 mm); widest at middle; sides almost parallel; lateral margin entire. Vestiture fine, dense, moderately long. Pronotal disc gently convex, densely punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles pointed, carinate, carina extended upto 1/3rd the length of the pronotum.

Prosternum densely punctate; punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine small, apex of prosternal spine bluntly pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subpentagonal, sides slightly emerginate, surface convex; densely punctate; vestiture fine, dense; integument between punctures not granulate.

Elytra 2.0 times longer than broad (length 10 mm, breadth 5 mm), convex, sides' subparallel along basal half, then narrowed caudad. Apices rounded and not spinose along middorsal suture. Striae consisting of linear rows of elongated punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae slightly convex to flat, finely punctate, punctures scattered. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with tarsi having lobe on the 4th segment and simple claws.

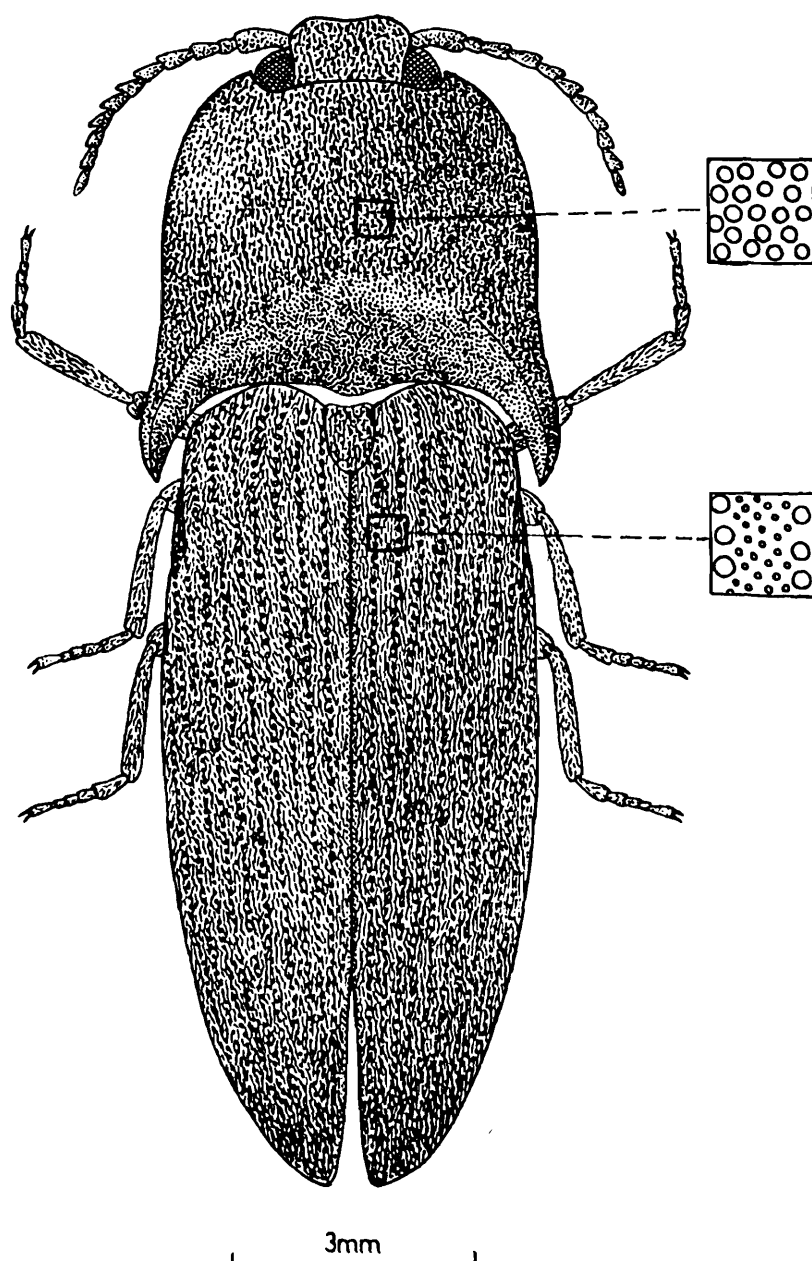


Fig. 49. *Pachyderes bengalensis* Candeze : Dorsal view.

Material examined : 2 exs., INDIA : West Bengal : Darjeeling : Naxalbari, 16.VI.1979, P. Haldar & pty. coll., collected at light.

Distribution : India : West Bengal (Darjeeling), Tripura.

Remarks : The species was originally recorded from 'Bengal' but the actual locality of the species was not mentioned.

64. *Pachyderes niger* Candeze, 1878

1878. *Pachyderes niger* Candeze, *Elat. Nouv.*, II : 14; Candeze 1888, *Annls Mus. Civ. St. Nat. Genova*, II, VI : 673; Candeze, 1890, *Annls Mus. Civ. St. Nat. Genova*, II, X : 776; Schwarz, 1906, In *Wytsmann Genera Insect*, 46A : 88, Fleutiaux, 1918, *Annls Soc Ent. France*, LXXXVII : 205; Fleutiaux, 1929, *Ency. Ent.*, Col. : 23; Ohira, 1970, *Annls Hist. Natur. Mus. Nat. Hung. Tomus*, 62 : 224.

Material examined : None was available for study.

Distribution : India : West Bengal.; Burma; Thailand; Vietnam; Yunnan.

Remarks : The species was recorded from West Bengal by Ohira (1970) but due to nonavailability of any material the species could not be studied.

Genus *Monocrepidius* Eschscholtz, 1829

1829. *Monocrepidius* Eschscholtz, In : *Thon. Archiv.*, vol. 2, pt. I : 31; Schwarz, 1906, In : *Wytsmann Genera Insect*, 46A : 93; Hyslop, 1921, *Proc. U. S. Natn. Mus.*, LVIII : 657. *Conoderes* Eschscholtz, 1829, In : *Thon. Archiv. Ent.*, Vol. 2 : 31; Dejean, 1837, *Cat. Col.*, Ed. 3 : 97. *Cardiophorus* (pars.) Solier in Grey, 1850, *Hist. Chile., Zool.*, Vol. 5 : 16. *Oophorus* (pars) Melsheimer, *Proc. Acad. Nat. Sc. Philad.*, Vol. 2 : 214; Dejean, 1837, *Cat., Col.*, Ed. 3 : 103. *Cryptohypnus* (pars) Germar, 1829, *Zeitschr. F. Ent.*, Vol. 5 : 145.

Type : *Monocrepidius pallipes* Eschscholtz (as designated by Hyslop, 1921).

Biology and Habits : Unknown.

Distribution : America, Australia, Asia, Polynesia.

Remarks : In *Genera Insectorum* (1906) 6 species have been recorded from India of which 2 were from Bengal (actual locality not known) and 1 from Kolkata.

65. *Monocrepidius longicollis* Candeze, 1878

1878. *Monocrepidius longicollis* Candeze, *Elat. Nouv. Fasc.*, 2 : 7; Schwarz, 1906, In *Wytsmann Genera Insect*, 46A : 93.

Material examined : None was available for study.

Distribution : India; originally reported from Kolkata of West Bengal.

F. Subfamily PHYSORRHININAE

Diagnostic characters : Head capsule oval, deflexed, mouthparts inferior, frontal carina complete, usually projecting, antennae 11-segmented, serrate; prosternum normally arcuate anteriorly, prosternal suture excavated in front, double; scutellum shield shaped, never cordate; mesocoxae open to both mesepimeron and mesepisternum; meso- and metasternum distinct, joined by a definite suture; tarsi with 3rd segment only lobed, 4th very small; claws simple, without basal setae.

Remarks : Candeze (1891) and Schwarz (1906) both have treated it as a tribe while Fleutiaux (1919) gave it a status of subfamily, which was followed by Ohira & Becker (1973) and Vats & Chauhan (1992). But Stibick (1979) treated it under the tribe Physorrhini Candeze of subfamily Elaterinae Leach. Here, we have followed Fleutiaux and treated it as a subfamily.

The subfamily contains 9 genera with fewer than 200 species from the world, more than half of which are in the genus *Anchastus* Le Conte. From India 38 species under 2 genera were recorded. Later, Vats & Chauhan (1992) have recorded one species from India (Haryana). From West Bengal 2 species under the single genus *Anchastus* has been recorded both of which are new record from India and the State of West Bengal.

Genus *Anchastus* Le Conte, 1853

1853. *Anchastus*, Le Conte, *Trans. Amer. Philos. Soc.*, vol. 10 (n. ser) : 459; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46B : 133; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 627; 1992, Vats & Chauhan, *J. Ent. Res.*, 16(3) : 185.

1853. *Brachycrepis*, Le Conte, *Trans. Amer. Philos. Soc.*, vol. 10 : 460.

1829. *Ampedus* Germar, *Zeitschr. f. Ent.*, vol. 5 : 190.

1829. *Monocrepidius* Eschscholtz, In : Thon. *Ent. Arch.*, 2 : 31

? *Cardiophorus* Mannerheim, *Bull. Soc. Nat. Mosc.* : 239

Type : *Anchastus digitatus* Le Conte (as designated by Hyslop, 1921).

Morphological characters : Frons convex, strongly inclined and plainly rounded; nasal space much broader than high and entire breadth equally high. Mandible acuminate, short, compressed at base. Last segment of palpi triangular.

Antennae usually longer than head and thorax taken together; 2nd segment very small, not longer than broad, 3rd longer than 2nd, sometimes as long as 4th.

Prothorax usually from the middle roundedly narrowed, base of pronotum plain or from the middle roundedly narrowed in front, hind angle plain or with double keeled and in such case inside keel obliquely directed inside. Prosternum rounded in front and only little prominent, prosternal process more or less inclined inwards, suture moderately open in front to antennal groove. Mesosternal cavity inclined inwards, margin flat.

Legs moderately short and robust. Femur abruptly strong, angularly produced, angle usually rounded, rarely oblique, sometimes compressed; 1st segment of hind tarsi longer than following three segments together, 4th segment very small and hardly visible, followed by 5th segment; claws normally simple.

Distribution : India.

Elsewhere : Burma, Indonesia, Laos, Malay, Siam, Tonkin.

Biology and Habits : Unknown.

Remarks : Schenkling (1925) has listed 132 species from the world, while Schwarz (1906) has listed 24 species from Asia, out of which one was from India (Bihar).

Key to the species

1. Body bicoloured, pronotum longer than broad, pronotal disc densely punctate *falsus*
2. Body unicoloured, pronotum as long as broad, pronotal disc moderately densely punctate *imitans*

66. *Anchastus falsus* Candeze, 1895 (Fig. 50)

1895. *Anchastus falsus* Candeze, *Elat. Nouv. Fasc.*, 6 : 47; 1906, Schwarz, *In Wytsmann Genera Insect.* 46B : 134.

Redescription : Length 7.5mm, breadth 2.5 mm. Body moderately elongated, bicoloured, head and pronotum reddish brown, elytra blackish brown. Abdominal segments reddish brown. Antennae and legs brownish. Vestiture fine, dense, moderately long, whitish yellow coloured.

Head small, broader than long, depressed. Frontal region densely punctate, concave medially. Frontal carina complete across the frons. Antennae long, extended about to the posterior end of pronotum; 1st segment of antennae robust, 2nd segment smallest and globular, 3rd segment smaller than the 4th, 3rd to 10th segments serrate, last segment dorsoventrally flattened.

Pronotum slightly broader than long (length 2.4 mm, breadth 2.5 mm), widest behind middle, sides subparallel. Vestiture fine, dense, whitish yellow coloured. Pronotal disc convex; evenly and densely punctate, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles of pronotum pointed, carinate, carina short, extended only upto 1/4th of the pronotum.

Prosternum moderately punctate medially, punctures separated by more than their own diameter; integuments between punctures not granulate. Prosternal spine moderately long, moderately densely punctate. Margins of mesosternal cavity declined.

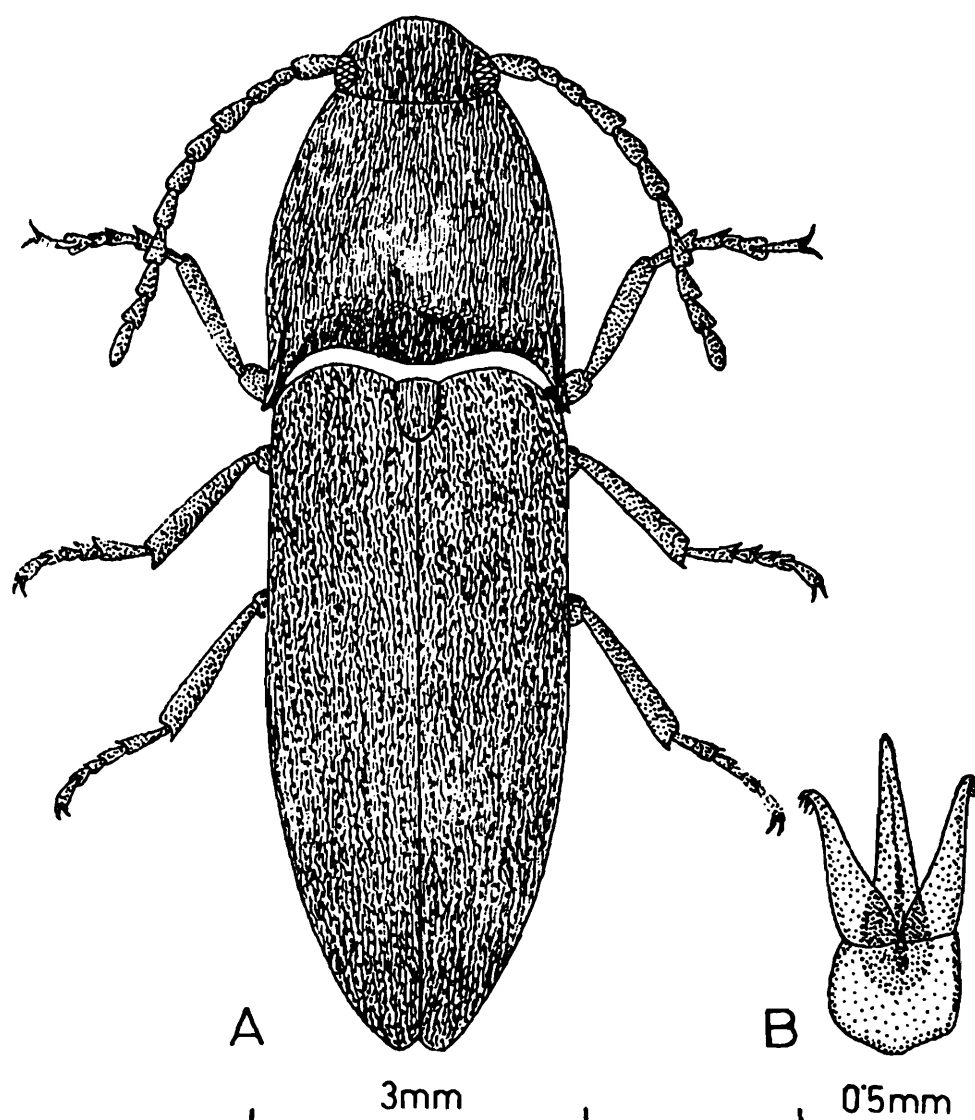


Fig. 50. *Anchastus falsus* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

Scutellum subquadrate, longer than wide, reddish brown in colour. Vestiture moderately dense, surface punctate, punctures separated by 1-2 times their own diameter.

Elytra blackish brown, 1.8 times longer than broad (length 4.6 mm, breadth 2.5 mm), rounded at distal extremities, convex, sides straight, subparallel along with basal half. Apices spinose along middorsal suture. Striae punctate, consisting of rows of single punctures joined by moderately impressed lines. Punctures shallow, becoming indistinct towards the base; interstriae moderately convex to flat; densely granulate. Last sternite of abdomen flat and truncated.

Male Genitalia : Phallobase with anterior margin flat, parameres triangular shaped with posterior angles slightly curved outwards, without subapical process, median lobe as long as parameres, triangular; apex pointed.

Material examined : 10 exs., INDIA : West Bengal : Darjeeling : Singla, alt.1500 ft., V.1913, Lord Carmichaels coll.; 2 exs., Pashok, alt. 2500 ft., 26.V.- 14.VI.1916, F. H. Gravely coll. (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Sumatra.

Remarks : This species is recorded from India as well as from West Bengal for the first time.

67. *Anchastus imitans* Candeze, 1895
(Fig. 51)

1895. *Anchastus imitans* Candeze, *Elat. Nouv. Fasc.*, 6 : 47; 1906, Schwarz, In : *Wytsmann Genera Insect*, 46B : 34.

Redescription : Length 8.0 mm, breadth 2.5 mm. Body moderately elongated, unicoloured, reddish brown. Abdominal tergites yellowish brown. Antennae reddish brown, legs yellowish brown. Vestiture fine, moderately dense, moderately long, whitish yellow coloured.

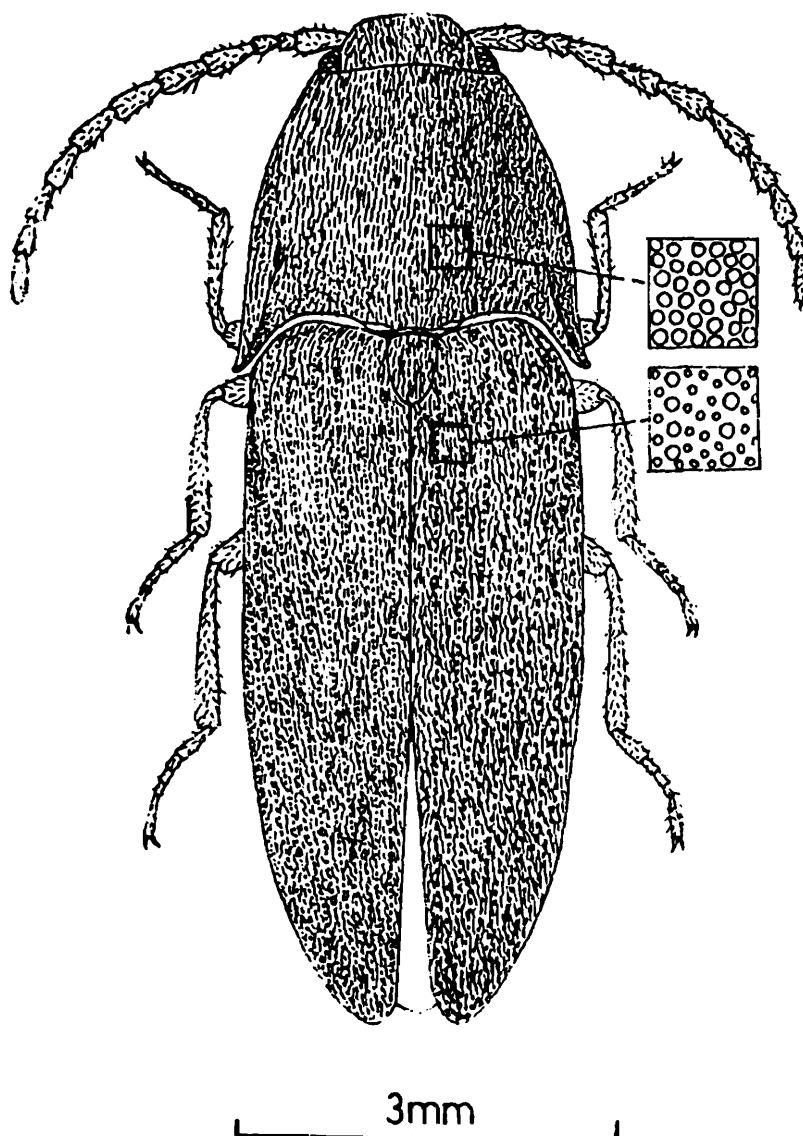


Fig. 51. *Anchastus imitans* Candeze : Dorsal view.

Head convex, frontal region moderately punctate; frontal carina complete across the frons. Antennae long, extended beyond the middle coxae; 1st segment robust, 2nd and 3rd segments small subequal and globular, 3rd segment smaller than the 4th, last segment dorsoventrally flattened, all other segments are serrate.

Pronotum as long as broad (length and breadth 2.5 mm), widest at middle, sides subparallel. Vestiture fine, moderately dense, whitish yellow. Pronotal disc convex, evenly and moderately punctate; punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Hind angles of pronotum subpointed, without any carina.

Prosternum moderately punctate, punctures separated by a distance more than their own diameter, integument between punctures not granulate. Prosternal spine moderately long, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum elongated, subquadrate, distinctly longer than wide, reddish brown in colour. Vestiture dense, surface punctate, punctures separated by 1-2 times their own diameter.

Elytra 1.9 times longer than broad (length 4.8 mm, breadth 2.5 mm), rounded at distal extremities, convex, sides straight, subparallel along basal half. Apices spinose along middorsal suture. Striae punctate, consisting of rows of single punctures joined by moderately impressed lines, punctures shallow, becoming indistinct towards the base; interstriae moderately convex to flat, granulate. Last sternite of abdomen flat.

Material examined : 1 ex., INDIA : West Bengal : E. Himalaya : Darjeeling : Singla, 1500 ft. alt., VI. 1913, Lord Carmichaels coll.(det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling).

Remarks : This species is recorded from India as well as from West Bengal for the first time.

G. Subfamily DICREPIDINAE

Diagnostic characters : Head capsule oval, deflexed, mouth parts inferior, frontal carina complete, usually projecting, antenna 11-segmented, serrate or occasionally flabellate in ♂ ; prosternum normally arcuate anteriorly, prosternal sutures double, often excavated at apices; scutellum shield-shaped, not cordate; mesocoxae open to both mesepimeron and mesepisternum; meso- and metasternum distinct, joined by a definite suture; tarsi with segments 1 to 3 or 2 and 3 or rarely 1 to 4 lobed beneath (*Blauta* Leconte); claws simple or dentate, without any basal setae.

Remarks : This subfamily contains about 40 genera from the world. From India 37 species under 7 genera were recorded of which one species under the genus *Singhalenus* Candeze is recorded from this state. This species has been recorded from India as well as from West Bengal for the first time.

XVIII. Genus *Singhalenus* Candeze, 1859

1859. *Singhalenus* Candeze, *Mon. Elat.*, 2: 43; 1906, Schwarz, In Wytsmann *Genera Insect.*, 46A : 72; 1921, Hyslop, *Proc. U. S Natn. Mus.*, LVIII : 668.

Type : *Singhalenus taprobanicus* Candeze (as designated by Hyslop, 1921).

Morphological characters : Frons convex and more or less strongly inclined in front, evenly truncated with a raised middle line; nasal space as high as broad or not so high. Mandibles cleft at apex; last segment of palpi triangular.

Antennae moderately long and somewhat slender, 2nd segment very small, 3rd as long as the 4th, last segment elongated and simple. Prothorax and elytra almost cylindrical. Prosternal suture open in front to antennal groove. Prosternal process and mesosternal cavity more or less sloping innerside. Legs moderately short, femur directed inside and feebly toothed, tarsi rather shorter than tibiae, 1st tarsal segment hardly lobed, 2nd and 3rd segment strongly lobed.

Distribution : India.

Elsewhere : Sri Lanka.

Biology and Habits : Unknown.

Remarks : Both Candeze (1891) and Schwarz (1906) have treated the genus under the tribe Dicrepidini. But according to Fleutiaux (1940, 1941) has treated the genus under subfamily Dicrepidinae that has been followed here. Four species of this genus were previously recorded from India and Sri Lanka of which 1 was from Bengal (undivided) but without actual locality. Here one species of this genus has been recorded from West Bengal. The species is a new record from India as well as from West Bengal.

68. *Singhalenus candezei* Schwarz, 1896

(Fig. 52)

1896. *Singhalenus candezei* Schwarz, *Deut. Ent. Zeit.* : 97; 1906, Schwarz., In : Wytsmann *Genera Insect.*, 46A : 72.

Redescription : Length 10 mm, breadth 2.4 mm. Body elongated, unicoloured, reddish brown. Abdominal segments brownish. Antennae and legs brownish. Vestiture fine, long, dense, whitish.

Head elongated, flat, extended towards the front; vestiture long, frontal region densely punctate; frontal carina complete across the frons. Antennae long, extended up to the middle coxae; 1st segment robust, 2nd segment smallest and globular, 3rd and 4th segments are subequal, rest antennal segments are serrate, last one is dorsoventrally flattened.

Pronotum distinctly longer than broad (length 2.5 mm, breadth 2.0 mm), widest behind middle, sides almost parallel. Vestiture fine, long and whitish, moderately dense. Pronotal

disc moderately convex. Pronotum evenly and densely punctate, puncture separated by less than their own diameter. The integument between punctures slightly ridged. Hind angles of pronotum strongly curved outwards but truncated.

Prosternum finely punctate, punctures separated by less than their own diameter. Integument between punctures not granulated. Margins of mesosternal cavity declined.

Scutellum subquadrate, longer than wide, reddish brown with black margin in four sides. Vestiture absent in the specimen, surface punctate.

Elytra blackish brown, 2.7 times longer than broad (length 6.5 mm, breadth 2.4 mm) rounded at distal extremities, convex, sides' straight, subparallel along the basal half then narrowed gradually. Striae punctate, consisting of rows of single punctures, joined by moderately impressed lines. Punctures shallow, becoming indistinct towards the apex, interstriae moderately convex to flat. Last sternite of abdomen flat. Tibia with 2nd and 3rd articles lamellated; claws simple.

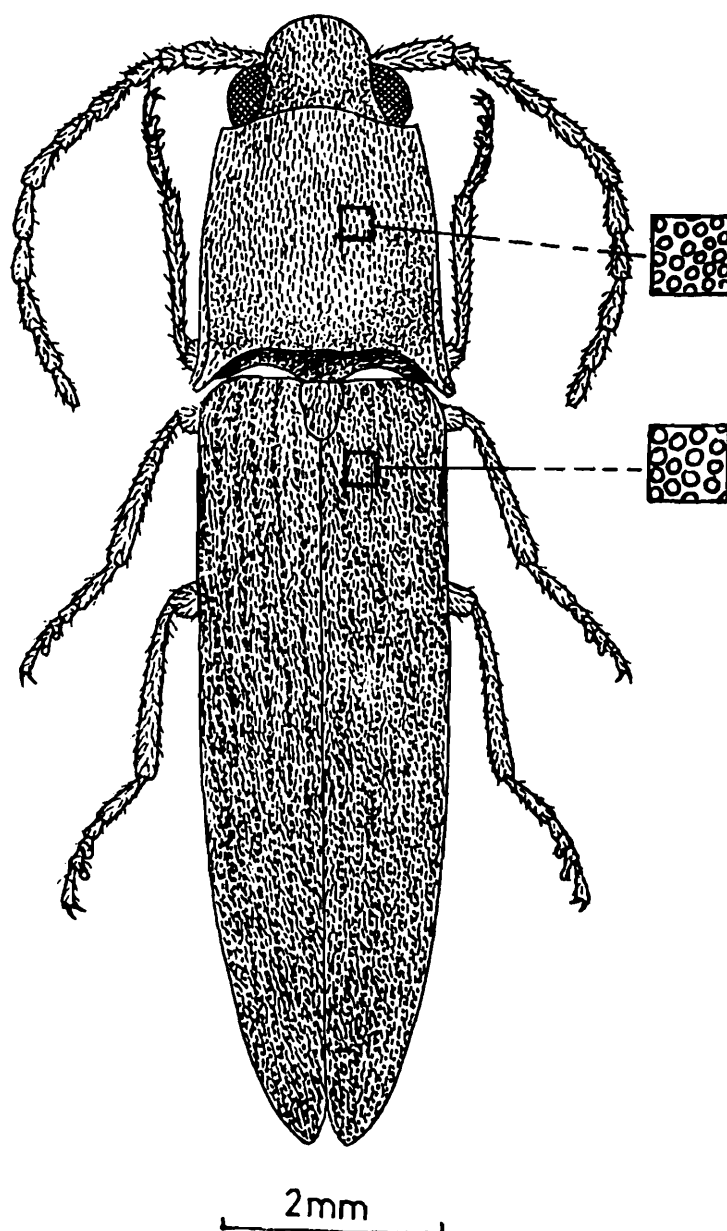


Fig. 52. *Singhalenus candezei* Schwarz : Dorsal view.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Kurseong, 5000 ft. alt., 7.III.1928, Gopi Ram coll.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Sri Lanka.

Remarks : This material is recorded from India as well as from West Bengal for the first time.

H. Subfamily HEMIRRHIPINAE

Diagnostic characters : Frons more or less inflexed or flat, curved downwards, mouthparts inferior, frontal carina absent to prominent, antennae and tarsi not received in deep grooves; antennae not reaching the hind angles of pronotum, usually laminate or flabellate, rarely serrate, 2nd and 3rd segments usually subequal and moniliform, 3rd often with small tooth, rarely larger than 2nd, pronotum without luminous spots, prosternal suture closed, excavate or pseudoexcavate anteriorly, prosternal lobe normally arcuate to sometimes straight anteriorly; meso- and metasternum with distinct suture, colourful species with horizontal mesosternal cavity and thick sides, unicoloured species with sloping mesosternal cavity and inconspicuous sides; scutellum shield-shaped, never cordate; tarsi simple; claws simple, setae present at base.

Remarks : Casari-Chen (1994) has reported 26 genera and 339 species of this subfamily, the largest genus being *Hemirhipus* Berthold. From India 4 genera and 12 species and from West Bengal 2 genera and 3 species under this subfamily have been recorded. But materials of 3 species under both the genera were available for study. Two species have been recorded from West Bengal for the first time.

Key to the genera

1. Body unicoloured (light reddish brown), scutellum shield shaped (pentagonal), almost as long as wide *Anthracalaus*
- Body bicoloured (blackish with yellowish decorative look), scutellum subpenta- gonal, wider than long *Calais*

XVIX. Genus *Anthracalaus* Fairmaire, 1888

1888. *Anthracalaus* Fairmaire, *Annl's Soc. ent. Fr.*, 8(6) : 349; 1891, Candeze, *Catalog Method des Elat.*, : 30; 1906, Schwarz, In Wytsmann *Genera Insect*, 46A : 32, 34; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, 58 : 628; 1925, Schenkling, In Junk's *Coleopt. Cat.*, 80, Elat. I : 42; 1940, Fleutiaux, *Bull. Annls Soc. ent. Belg.*, 80 : 91, 92; 1959, Van Zwaluwenburg *Pac. Insects*, 1 : 355; 1990, Calder, *Invertebrate Taxonomy*, 3 : 556; 1992, Calder and von Hayek, *Ent. Scand.*, 23 : 11-62.

1927. *Anthracralaus* Fleutiaux, *Fauna des Colonies Francaise*, 1 : 101.

1961. *Pseudomelanactes* Mathieu, *The American Midland Naturalist*, **65** : 474; 1967, Arnett, *Entomological News*, **78** : 111.

Type : *Alaus westermanni* Candeze (by subsequent designation of Hyslop, 1921).

Diagnostic characters : Details descriptions have been provided by von Hayek & Calder (1992).

Distribution : Throughout the South East Asian region ranging from India and southern China through Indo-China and the Indo-Malayan archipelago to New Guinea, the Solomon Islands and Australia. Also, a single endemic species is also known from southern Arizona.

Biology and Habits : Nothing has been published or is apparently known about the life history or larval stages of *Anthracalaus* species.

Remarks : Calder and von Hayek (1992) have recorded 17 species of this genus from the world of which 2 are recorded from India. *A. moricii* Fairmaire was reported from Assam and *A. bengalensis* (Candeze) from West Bengal, Orissa, Maharashtra, Tamil Nadu and Pondicherry.

69. *Anthracalaus bengalensis* (Candeze) 1889

1889. *Corymbites bengalensis* Candeze, *Elat. Nouv.*, **4** : 114,

1890. *Pristilophus bengalensis*; Candeze, *Annls Soc. Ent. Belg.*, **34** : CLV; 1891, Candeze, *Catalog Method. des Elat.* : 175; 1918, Fleutiaux, *Bull. Mus. Natn. Hist. Natur.*, **24** : 226; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, **87** : 251; 1924, Fleutiaux, *Opuscles de l'Institut Scientifique de L'Indochine*, **2** : 137.

1936. *Neopristilophus bengalensis*; Fleutiaux, *Annls Soc. Ent. Fr.*, **105** : 284.

1905. *Homotechnes brunneus* Fleutiaux, *Annls Soc. Ent. Fr.*, **74** : 325.

1992. *Anthracalaus bengalensis*; Calder & von Hayek, *Ent. Scand.*, **23** : 32.

Material examined : 4 exs.; INDIA : West Bengal : Maldah , no other data was available.

Distribution : India : West Bengal (Maldah), Maharashtra, Orissa, Pondicherry, Tamil Nadu; Cambodia.

Genus *Calais* (Castelnau) 1836

1829. *Alaus* (pars) Eschscholtz, *Ent. Arch. in Thon.*, **2** : 33; 1874, Candeze, *Mem. Soc. R. Sci. Liege*, **4** (ser. 2) : 117; 1891, Candeze, *Catalog. Method des Elat. connus en 1890* : 30; 1906, Schwarz, In : Wytsmann *Genera Insect*, **46A** : 35.

1836. *Calais* Castelnau, *Revue Ent.*, **4** : 9; 1857, Candeze, *Mem. Soc. r. Sci. Liege*, **12** : 239; 1869. Gemminger & Harold, *Monachii, Sumptu E. H. Gummi*, Vol. **5** : 1501 (Cat.); 1942, Fleutiaux, *Annls Soc. Ent. Belg.*, **80** : 91; 1967, Neboiss, *Proc. R. Soc. Vict.*, **80**(2) : 260; 1994, Sonia A. Casari-Chen., *Revta bras. Ent.*, **38**(1) : 206-219.

Type : *Elater excavatus* Fabricius, 1801 (as designated by Hyslop, 1921).

Diagnostic characters : The genus has been described in details by Casari-Chen (1994).

Distribution : Africa, America, Asia, Australia, Europe.

Remarks : Casari-Chen (1994) has fixed the priority of the generic name *Calais* Castelnau (1834) for the species which were described under *Alaus* Eschscholtz till then. This genus contains about 173 species from the world including 73 from Afrotropical region and 100 from Palearctic, Oriental and Australian region.

In the present work, 2 species of this genus have been studied from West Bengal. These 2 species are recorded for the first time from this state.

Key to the species

1. Head and pronotum coarsely and sparsely punctured, pronotum broader than long *sculptus*
- Head and pronotum finely and densely punctured, pronotum longer than broad *sordidus*

70. *Calais sculptus* (Westwood) 1848 (Fig. 53)

1848. *Alaus sculptus* Westwood, *Cab. Orient. Ent.*, London : 72, tab. 35, fig. 8; 1857, Candeze, *Mon. Elat.*, I : 213 et. 219; 1906, Schwarz, In : *Wytsmann Genera. Insect*, 46A : 37.

1994. *Calais sculptus*; Casari-Chen, *Revta. bras. Ent.*, 38(1) : 214.

Redescription : Length 29 mm, breadth 10 mm (vary from 26-32 mm & 9-11 mm). Body elongated, blackish with yellowish decorative look, surface shining. Abdominal tergites blackish with yellowish scales giving the decorative look. Antennae blackish with brownish tinge, legs blackish with yellowish scales. Vestiture two types, one of thick, erect, small black scales sparsely spaced on head and pronotum, and arranged scatterdly on the elytral intervals; the other type consisting of small, thin, yellowish patches of scales giving the whole body decorative look.

Head almost flat, slightly depressed in middle, frons acuminate in front, frontal region coarsely and sparsely punctate, punctation simple; frontal carina absent across the frons. Eyes large, prominent. Antennae moderately long, extended upto the procoxae, basal segment robust, 2nd segment shortest and subglobose, 3rd segment slightly shorter than the 4th; 3rd–10th segments clearly serrate, longer than wide.

Pronotum broader than long (length 9 mm, breadth 10 mm); widest before middle; sides almost straight; lateral margin sinuate before the hind angles. Vestiture fine, of two types, as written previously. Pronotal disc evenly convex, sculptured longitudinally, sculptures comprising of blunt, irregular ridges, the ridges are very finely punctate and

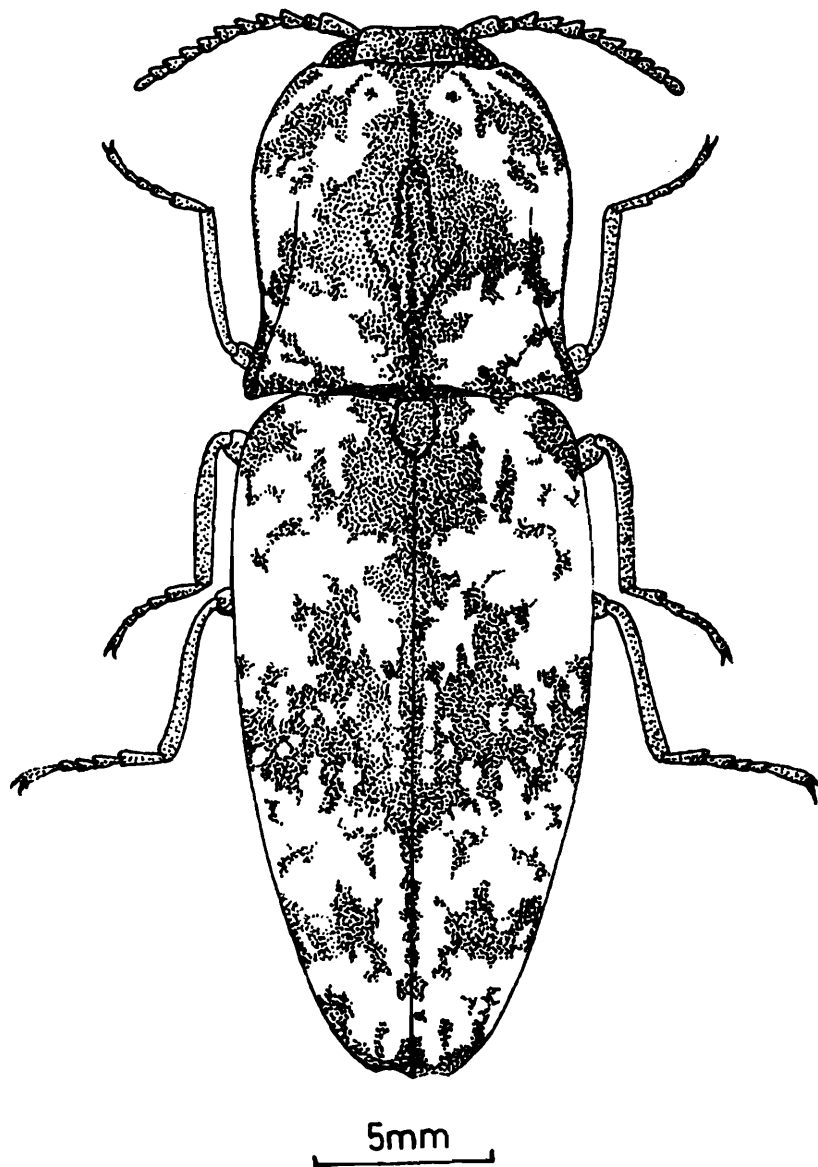


Fig. 53. *Calais sculptus* (Westwood) : Dorsal view.

the punctation in the interspaces between the ridges are moderate in size; integument between punctures not granulate. Base of pronotum with two prominent, well-developed tubercles in a longitudinal row in front of the scutellum. Pronotum sparsely and coarsely punctate. Hind angles slightly divergent, with two sublateral carinae extending upto the $\frac{1}{4}$ th length of pronotum.

Prosternum moderately densely punctate; punctures somewhere separated by 1-2 times their own diameter, somewhere as same as their own diameter; integument between punctures not granulate. Prosternal spine with a small longitudinal groove, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity strongly inclined.

Scutellum subpentagonal, wider than long, widest at middle, sides straight to weakly concave medially; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 1.9 times longer than broad (length 19 mm, breadth 10 mm), convex, sides' straight, subparallel along basal half, then narrowed caudad. Apices rounded and strongly spinose along middorsal suture. Striae prominent consisting of rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae slightly convex to flat, finely punctate. Vestiture moderately dense. Last sternite of abdomen flat. Leg slender with simple tarsi and claws.

Genitalia : No male material was available for study.

Material examined : 4 exs.; 2 exs., INDIA : West Bengal : Darjeeling : Pashok, 26.V–14.VI. 1916, F. H. Gravely coll. (det. Fleutiaux); 1 ex., Jalpaiguri : Buxa, no other data available.

Distribution : India : West Bengal (Darjeeling, Jalpaiguri), Sikkim.

Elsewhere : Siam; Tonkin.

Remarks : The species was originally reported from 'Hindustan border' (Candeze, 1891) and recorded here for the first time from West Bengal. Earlier the author also recorded this species for the first time from Sikkim (*Rec. Zool. Surv. India, State Fauna Series : Fauna of Sikkim*, Mukhopadhyay & Chakraborty, 2003). The species may be separated from the closely related species viz., *C. sordidus* (Westwood) by its punctation on the head and pronotum and colour pattern of pronotum and elytra. In West Bengal this species is represented only in the Northern Himalayan region.

71. *Calais sordidus* (Westwood) 1848

(Fig. 54)

1848. *Alaus sordidus* Westwood, *Cab. Orient. Entomol.*, London, 72, t. 35, f. 9; 1857, Candeze, *Mon. Elat.*, I : 231; 1906, Schwarz, In : *Wytsmann Genera Insect*, 46A : 37; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 196, 1947, Fleutiaux, *Notes d'Ent. Chinoise*, 11(8) : 298; 1973, Ohira and Becker, *Orient. Insect*, 7(4) : 461.

1994. *Calais sordidus*; Casari-Chen, *Revta. bras. Ent.*, 38(1) : 214.

Redescription : Length 32 mm, breadth 10 mm (vary from 29–34 mm & 9–11 mm). Body elongated, blackish with yellowish decorative look; surface dull. Abdominal tergites mainly yellowish with few black patches. Antennae and legs blackish. Vestiture fine, moderately dense, moderately long, whitish yellow coloured, spreaded all over the body giving the body a decorative look.

Head small, depressed in middle, two sides convex. Frontal region finely and densely punctate, punctation simple; frontal carina absent. Eyes large, prominent. Antennae moderately long, extended beyond the middle of pronotum upto procoxae, basal segment robust, 2nd segment smallest and subrounded, 2nd segment slightly shorter than the 3rd, 2nd & 3rd jointly slightly shorter than the 4th, the rest segments serrate. Mandibles dented.

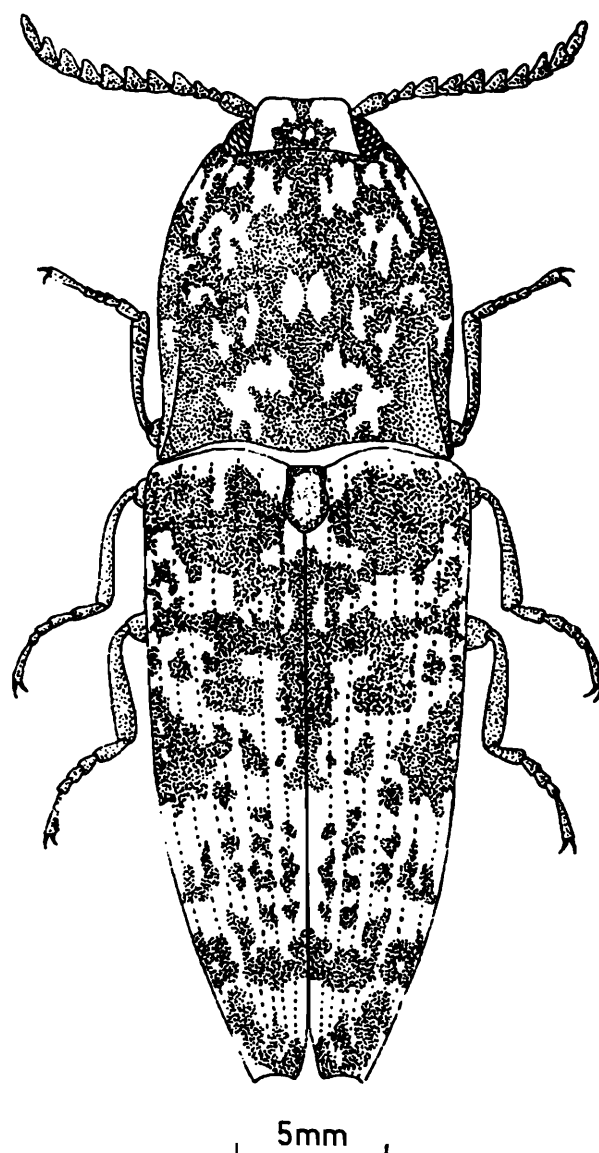


Fig. 54. *Calais sordidus* Westwood : Dorsal view

Pronotum longer than broad (length 11 mm, breadth 9 mm); widest behind middle; sides subparallel; lateral margin entire, sinuate before hind angles. Vestiture fine, moderately dense, moderately long. Pronotal disc strongly convex, densely and finely punctate, punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles pointed, divergent, carinate, carina extended upto 1/5th of the pronotum.

Prosternum densely punctate; punctures separated by less than their own diameter; integument between punctures not granulate. Prosternal spine with small, longitudinal groove, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum subpentagonal, longer than wide, surface flat; densely punctate; vestiture fine, dense; integument between punctures not granulate.

Elytra 2.1 times longer than broad (length 21 mm, breadth 10 mm), convex, sides almost straight, subparallel along basal half, then narrowed caudad. Distal extremities of elytra truncated and inwardly convex and apices weakly spinose along middorsal suture. Striae consisting of linear rows of punctures, joined by moderately impressed lines, punctures separated by less than their own diameter, interstriae slightly convex to flat, densely punctate, punctures shallow. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and claws.

Genitalia : No male material was available for study.

Material Examined : 2 exs., INDIA : West Bengal : Darjeeling : Kalimpong, alt. 2000 app. ft, Ind. Mus. coll. (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling), Sikkim, Nilgiri Hills.

Elsewhere : Burma (Myanmar); China (Yunnan); Laos; Nepal; Sri Lanka; Vietnam.

Remarks : This species is recorded here for the first time from West Bengal. This species may be separated from *C. sculptus* (Westwood) which occurs in this area by its colour pattern, fine and dense punctures on head and pronotum and also shape of the pronotum.

I. Subfamily OXYNOPTERINAE

Diagnostic characters : Head more or less oval, deflexed, mouthparts inferior; antennae of ♂ long, pectinate or laminate to rarely compressed and dented or subserrate, serrate, frons deeply foveate medially; pronotum explanately broadened and flattened, prosternum normally arcuate anteriorly, prosternal spine normally arcuate anteriorly, prosternal spine normally elongate, mesosternum and metasternum distinct or connate, suture indistinct or absent or may be; mesocoxae open to mesepimeron and mesepisternum; scutellum shield-shaped, never cordate, elytra acuminate to apex, striate, spinose and usually mucronate at apex; claws simple, without setae; tarsi simple or lobed.

Remarks : The subfamily Oxynopterinae contains 3 tribes, viz., Oxynopterini with 4 genera and 12 species, Campsosternini with 5 genera and nearly 200 species and Pectocerini with 3 genera and 13 species, all recorded from the world. In the present study materials of two tribes viz. Oxynopterini and Campsosternini were available for study.

The tribes Campsosternini Fleutiaux and Pectocerini Gurjeva have almost common characters like head capsule oval, deflexed like head capsule oval, deflexed, mouth-parts inferior, prosternum normally arcuate anteriorly, mesocoxae open to mesepimeron and mesepisternum scutellum shield shaped, claws simple without setae but these two tribes differ in one character, the tribe Campsosternini have mesosternum and metasternum connate while that is distinct in the other tribes and both meso – and metasternum joined by a definite suture. So, concerning these characters both the genera *Campsosternus* and *Pectocera* have been treated under the subfamily Oxynopterinae as mentioned by Schenkling (1925) and followed by Ohira (1971, 1973), but under separate tribes namely Campsosternini

and Pectocerini. Though Stibick (1979) has preferred to treat the genera *Campsosternus* and *Pectocera* under two separate subfamilies, the genus *Campsosternus* Latreille under tribe Campsosternini of subfamily Oxynopterinae and *Pectocera* Hope under tribe Pectocerini of subfamily Pityobinae.

From India, 11 species and 2 genera of Campsosternini and 1 species under a single genus of Pectocerini are recorded, and from West Bengal 1 genus and 3 species of the former tribe and 1 genus and 1 species of the later tribe are recorded. Materials of 2 species of Campsosternini (both new records from West Bengal) and 1 species of Pectocerini (new record from West Bengal) were available for study.

Key to the tribes

1. Mesosternum and metasternum connate and both meso – and metasternum not joined by a definite suture **Campsosternini**
2. Mesosternum and metasternum distinct and both meso – and metasternum joined by a definite suture **Pectocerini**

Tribe Campsosternini

XXI. Genus *Campsosternus* Latreille, 1834

1834. *Campsosternus* Latreille, *Annl's Soc. Ent. Fr.*, Vol. 3 : 141; 1840, Castelnau, *Hist. Nat. Col.*, Vol. I : 238; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46A : 50; 1921, Hyslop, *Proc. Soc. U. S. Natn. Mus.*, LVIII : 632.

1829. *Ludius*, Eschsholtz, In Thon. *Ent. Archiv.*, 2 : 34 ; 1829, Dejean, *Cat. éd.*, 3 : 107.

Type : 1775, *Elater fulgens* Fabricius, *Ent. Syst.*, Vol. 2 : 20 (Mono-basic).

Note : Geminger and Harold (Cat. 1869) reduced the type of Synonymy under *Campsosternus auratus* Drury. Schwarz follows Gemminger and Harold, but credits *auratus* to Westwood (Hyslop, 1921).

Diagnostic characters : Frons inclined and not emarginate in front, more or less compact and truncated, without nasal space. With labrum rounded and plainly placed; raised margin across the antennal base oblique and directed forward and reaching to the front of the frons.

Mandible strong, bent and simple. Maxilla rather long, last segment gradually broadened apically and more or less obliquely truncated. Antennae moderately long, laterally compact together, and from 3rd segment more or less strongly serrate; 2nd segment very small, last segment elongated and strongly truncated at apex.

Prothorax more or less always as broad as long and base more or less gradually narrowed or sinuous, evenly little convex or plainly depressed, lateral margin more or less swollen. Scutellum more or less rounded, usually broader than long and more strongly

round behind than front, sometimes almost truncated or feebly emerginate in front. Elytra not broader than base of prothorax, convex, and usually from the middle narrowed behind, apex sharp and sometimes ended in a tooth.

Prosternum particularly behind between the front coxae rather strongly convex, prosternal process at first horizontal and feebly bent beneath apically. Metasternum between mesocoxae transversely moderately strongly convex, mesosternal shield moderately long, very feebly inclined inside, mesosternal suture divergent in front.

Legs moderately long, femur grooved beneath, tarsi simple, and femur usually narrow, feebly rounded, moderately strongly enlarged inside.

Distribution : Asia and Malayische zone.

Remarks : The genus was treated under the tribe Chalcolepidiini by Candeze (1891) and Schwarz (1906). However, Fleutiaux 1941 treated it under the subfamily Campsosterinae. While, Stibick (1979) has treated it under the tribe Campsosternini of subfamily Oxynopterinae. While, Schenkling (1927) has preferred to treat the genus under the subfamily Oxynopterinae that was followed by Ohira (1971) and also in this present work. From India, 10 species of this genus have been recorded of which 3 are from West Bengal. Here, only materials of two species were available for study.

Key to the species

1. Size small (vary from 16–22 mm), head flat, pronotum finely and densely punctured *dohrni*
- Size big (vary from 35–37 mm), head depressed, pronotum finely but sparsely punctured *stephensi*

72. *Campsosternus brunneicornis* Candeze, 1889

1889. *Campsosternus brunneicornis* Candeze, *Elat. Nouv.*, 4 : 16; Candeze, 1891, *Catalog. Method des Elat.*, : 45; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 A : 51.

Material examined : None was available for study.

Distribution : India; previously reported from Darjeeling district of West Bengal.

73. *Campsosternus dohrni* Westwood, 1848

(Fig. 55)

1848. *Campsosternus dohrni* Westwood, *Cab. Orient. Ent.*, : 71, t. 35, f. 2; 1891, Candeze, *Catalog. Method des Elat.*, : 44; 1906, Schwarz, In Wytsmann *Genera Insect*, 46A : 50; 1927, Fleutiaux, *Faune Colonies France* : 113; 1947, Fleutiaux, *Notes d'Ent. Chinoise*, XI (8) : 317; 1973, Ohira, *Annls Hist. Nat. Mus. Hung.*, 62 : 219, fig.2, A, plate III, Fig. G.

Redescription : Length 22 mm, breadth 6 mm. Body elongated, bicoloured, reddish brown and greenish black, with metallic reflection and shining appearance on all over the body. Abdominal segments dark brownish with metallic reflection. Antennae and legs blackish brown. Surface smooth.

Head flat, the middorsal line is slightly elevated, frontal region moderately punctate, frontal carina weak. Antennae damaged.

Pronotum reddish brown with a broad longitudinal band on the middle which is greenish black in colour. Pronotum broader than long (length 5 mm, breadth 6 mm), widest at middle, sides almost subparallel, surface plain. Pronotal disc moderately convex, finely and densely punctate; punctures separated by more than their own diameter; integument between punctures smooth. Hind angles of pronotum pointed, acarinate.

Prosternum scatterdly punctate, punctures distributed apart, integument between punctures smooth. Prosternal spine slightly curved, scatterdly punctate; Margins of mesosternal cavity inclined.

Scutellum subtriangular, wider than long, greenish black, surface plain and punctate.

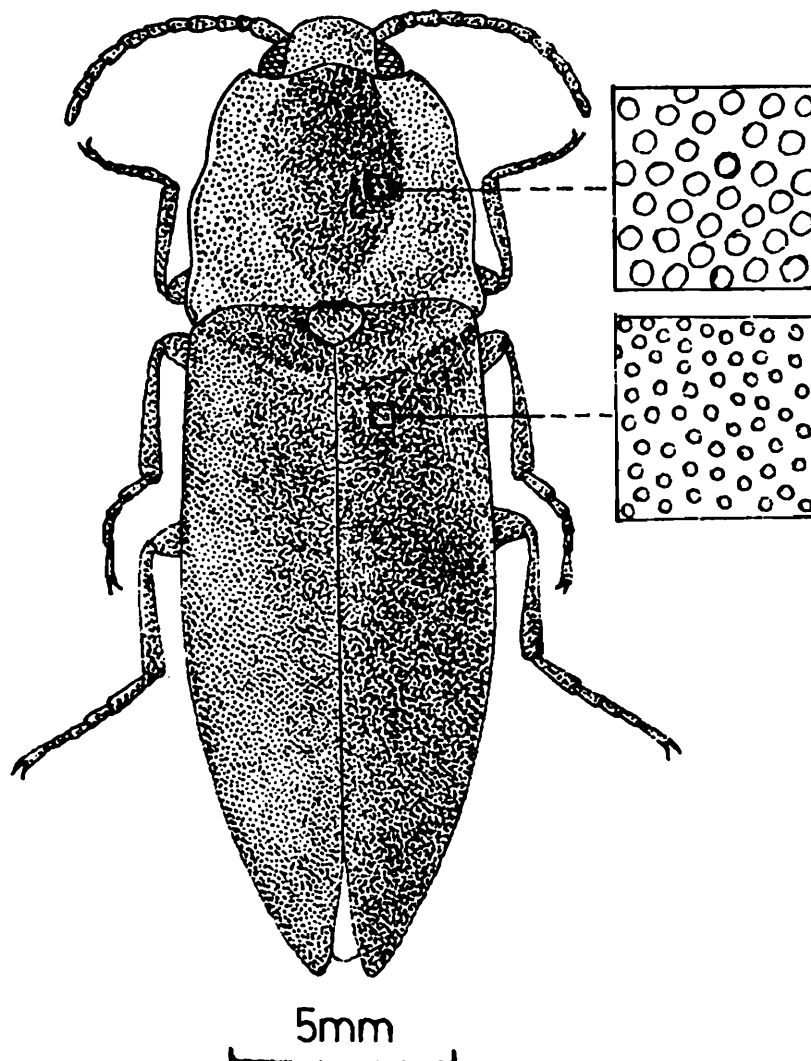


Fig. 55. *Campsosternus dohrni* Westwood : Dorsal view.

Elytra greenish black, 2.5 times longer than broad (length 15 mm, breadth 6 mm) sharply pointed at distal extremities, convex, sides almost straight, subparallel along the basal half; elytral surface smooth with rough punctures. Striae and interstriae indistinct. Last sternite of abdomen flat. Tibia and claws simple.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling; no other data available (det. Fleutiaux).

Distribution : India : W.B. (Darjeeling), Assam.

Elsewhere : Annam; Burma; Laos; Tonkin; Yunnan (China).

Remarks : The species comes close to *C. stephensi* Herbst but differs in size, shape and also in colouration. This species is not so colourful and shiny like the later one though the colour pattern on the pronotum and the combination of colour is very similar. However, the elytral colour varies a lot. The later species is much longer (about two times) and also wider (about 1-1/2 times) than this species.

Ohira (1973) recorded the species from Yunnan (China). Fleutiaux (1927), reported this species from Assam. Here it is reported for the first time from West Bengal.

74. *Campsosternus stephensi* Hope, 1831

(Fig. 56)

1831. *Campsosternus stephensi* Hope, *Zool. Miscell.* : 25; 1848, Westwood, *Cab. Orient. Ent.*, : 71, pl. 35, F.3; 1891, Candeze, *Catalog. Method des Elat.*, : 44; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46A : 50.

Redescription : Length 37 mm, breadth 11 mm. Body elongated, broad, bicoloured, greenish black and reddish brown with metallic reflection and shining appearance. Abdominal segments blackish and shining. Antennae and legs blackish. Surface plane.

Head depressed, concave at the middle, both the lateral surface convex, surface plane. Frontal carina weak, frontal region scatterdly punctate. Antennae blackish with bluish reflection, extended just beyond the middle of the pronotum, first segment globular, third segment smallest and slightly smaller than the second, the rest segments are clearly serrate.

Pronotum reddish brown, with a broad longitudinal band of greenish black colour on the middle. Pronotum distinctly broader than long (length 8 mm, breadth 10 mm), widest at middle. Sides almost parallel. Surface smooth. Pronotal disc moderately convex and finely but scatterdly and sparsely punctate; punctures on the pronotum separated by 1-3 times their own diameter, integument between punctures smooth. Lateral margin of the pronotum is thick all along and is slightly sinuate before the hind angles. Hind angles of the pronotum pointed, acarinate.

Prosternum reddish brown but the prosternal spine blackish. Prosternum smooth without any puncture. Prosternal spine inserted into the mesosternal cavity, sparsely punctate. Margins of mesosternal cavity inclined.

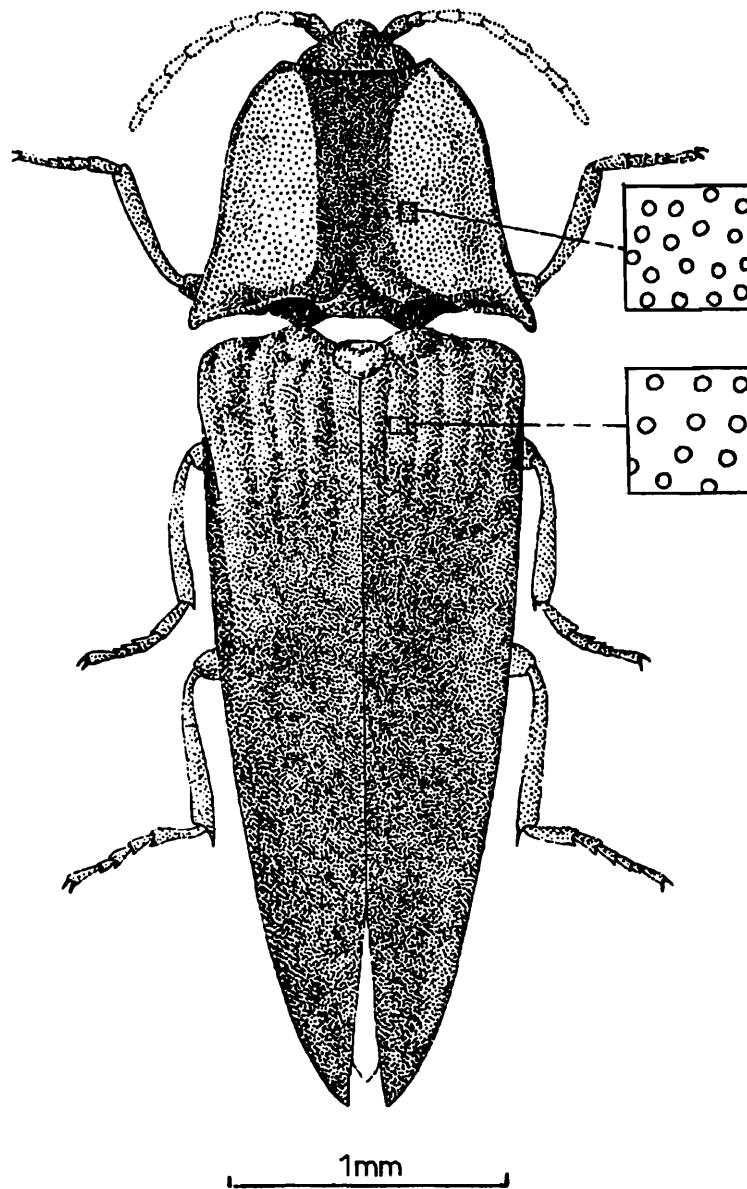


Fig. 56. *Campsosternus stephensi* Hope : Dorsal view.

Scutellum subtriangular, slightly depressed at middle, few punctures are present, surface smooth, colour as of the elytra.

Elytra blackish with greenish metallic reflection, 2.4 times longer than broad (length 24 mm, breadth 10 mm), strongly pointed at distal extremities, convex, sides straight, subparallel along the basal half. Striae and interstriae indistinct. Elytra moderately densely punctate all along, punctures scattered, separated by a distance more than their own diameter. Last sternite of abdomen elongated and flat. Tibia and claws simple.

Material Examined : 1 ex.; INDIA : West Bengal : Darjeeling, V, 1914, collector not recorded (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling), originally reported from 'Bengal Sept.' (Candeze, 1891)

Remarks : The species is a rare one. Since its original record in 1831 from the borders of undivided Bengal, it has been reported here for the first time from the Darjeeling district of West Bengal.

Tribe Pectocerini

Genus *Pectocera* Hope, 1842

1842. *Pectocera* Hope, *Proc. Zool. Soc. London*, : 79; 1891, Candeze, *Catalog. Method des Elat.*, : 47; 1906, Schwarz, In : *Wytsmann Genera Insect*, 46A : 56; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 663; 1973, Ohira & Becker, *Orient. Insects*, 7(4) : 466.

Type : *Pectocera cantori* Hope (as designated by Hyslop, 1921).

Diagnostic characters : Frons only little inclined, strongly compressed along the length and not emerginate in front; margin across the antennal base strongly raised, without nasal space.

Antennae of male are very long, from 3rd segment pectinate, last segment very long and 1/5 at apex and underside feebly truncated.

Prothorax small and narrowed anteriorly. Elytra long and broad and behind middle narrowly rounded sutural margin thorn like acuminate. Prosternum not prominent in front, prosternal process feebly inclined inward. Mesosternal shield bent innerside, margin (suture) plain and divergent anteriorly. Legs moderately long, femur moderately strong, tarsi simple.

Distribution : Asia, Malay Archipelago.

Remarks : Candeze (1891) and Schwarz (1906) treated the genus under tribe Oxynopterini. Schenkling (1925) raised it to the status of subfamily and treated the genus under tribe Pectocerini Gurjeva, 1973, which has been followed by Ohira (1971) and Ohira & Becker (1973). Stibick has followed Gurjeva (1974) but placed the tribe under subfamily Pityobinae Hyslop. Here, following Schenkling (*op. cit.*) the genus has been treated under tribe Pectocerini of subfamily Oxynopterinae. However, Fleutiaux (1940-'41) has placed the genus probably under subfamily Campsosterninae.

This genus is represented by 4 species from the world of which a single species viz. *P. cantori* from India which is known from Himachal Pradesh (Shimla) and West Bengal. The species is recorded from West Bengal for the first time in this present work.

75. *Pectocera cantori* Hope, 1842

(Fig. 57)

1842. *Pectocera cantori* Hope, *Proc. Zool. Soc. London* : 79; 1848, Westwood, *Cab. Orient. Ent.*, : 72, t. 35. f. 6.; 1857, Candeze, *Mon. Elat.*, I : 361; 1874, Candeze, *Id. Revis. Mon. Elat.*, : 207; 1891, Candeze, *Catalog. Method des Elat.*, : 47; 1906, Schwarz, In : *Wytsmann Genera Insect*, 46A : 50; 1914, Stebbing, *Indian Forest Insects of Economic Importance*, Coleoptera : 227, f. 150; 1918, Fleutiaux, *Annls Soc. Ent. Fr.* 87 : 201 : 1973, Ohira & Becker, *Orient. Insects*, 7(4) : 466.

1842. *Pectocera mellii* Hope, *Proc. Zool. Soc.*, London : 79.

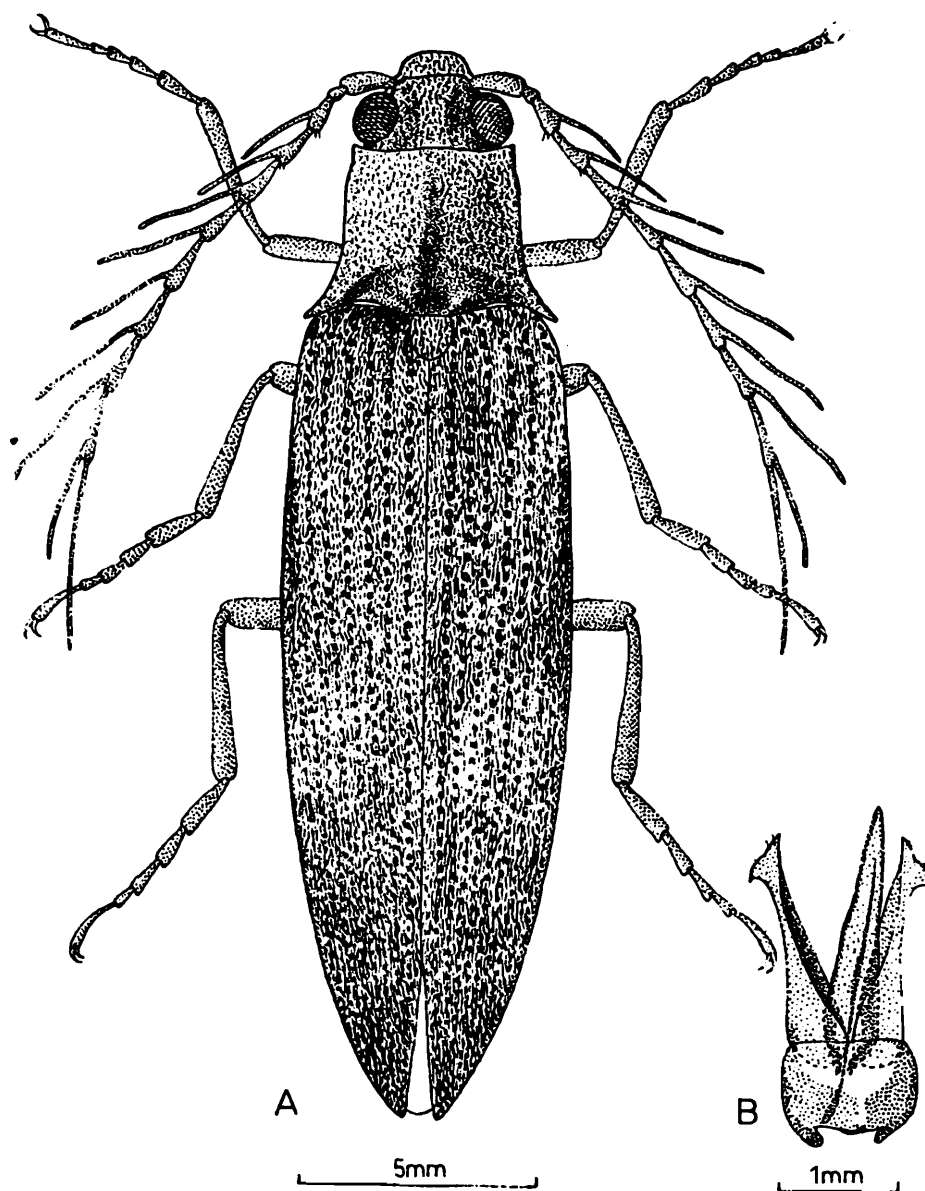


Fig. 57. *Pectocera cantori* Hope : A. Dorsal view; B. Dorsal view of male genitalia.

Material examined : 2 ex., INDIA : West Bengal : Darjeeling : Kurseong , 5000 ft alt., N. B. Jahans coll., date not recorded; 2 exs., Kurseong, alt. 5000 ft; Lynch, C. coll., date not recorded.

Distribution : India : West Bengal, Assam.

Elsewhere : Nepal; Tibet.

Remarks : This species is for the first time recorded from West Bengal. The material has been redescibed by Ohira & Becker (1973).

J. Subfamily ADRASTINAE

Diagnostic characters : Head capsule oval, deflexed , mouthparts inferior, frontal carina complete or incomplete, but characteristically as an elevated rim over the antennal bases which may or may not meet in the middle in front of the labrum to which it may or may

not be connected by a ridge, antennae 11 segmented, serrate; prosternum normally arcuate anteriorly, prosternal sutures double, excavated in front; scutellum shield shaped, never cordate; mesocoxae open to both mesepimeron and mesepisternum; meso – and metasternum distinct, joined by a definite suture; tarsi simple or 3rd and 4th segment lobed; claws strongly serrate, without basal setae.

Remarks : Candeze (1863) introduced the tribe Adrastites with about 5 genera from the world. Fleutiaux (1940) raised the tribe to the level of subfamily. Stibick (1979) reported 8 genera under this subfamily accommodating more than 150 species from the world of which almost 50% are under the genus *Glyphonyx* Candeze. Little else is known about these insects. Two genera (namely *Adrastus* Eschscholtz and *Silesis* Candeze) and about 53 species (2 species of *Adrastus* and 51 species of *Silesis*) under this subfamily are recorded from India. From West Bengal 37 species under the single genus *Silesis* has been recorded, but materials of only 5 species viz. *S. bengalensis* Candeze, *S. candezei* Schimmel & Platia, *S. nigriceps* Candeze, *S. rugosus* Schimmel & Platia and *S. wittmeri* Schimmel & Platia were available for present study.

XXIII. Genus *Silesis* Candeze, 1863

1863. *Silesis* Candeze, *Monogr. Elat.*, Vol. 4 : 458 ; 1906, Schwarz, *Genera Insect*, 46C: 293;

1921. Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 669; 1991, Platia & Schimmel, *Fragm. Entomol.*, Roma 23(1) : 110 *Adrastus* (pars.) Erichson, *Zeitschr. f. Ent.*, Vol. 3 : 121.

1856. *Cratonychus* Reiche, *Annls Soc. Ent. Fr.*, : 416.

Type : *Silesis hilaris* Candeze (as designated by Hyslop, 1921).

Candeze established the genus *Silesis* in 1863 with seven species. The type species was later designated as *Silesis hilaris* Candeze by Hyslop, 1921.

Diagnostic characters : Frons convex, perpendicularly inclined anteriorly and transversely truncated in the middle. Frontal carina raised over the antennal base and reaches frontally to the anterior margin of the frons. Labrum is little broader than long; obliquely directed posteriorly and rounded anteriorly and separated from the front by an extremely lowered nasal area. Mandibles bidentate, last segment hatchet like.

Antennae of male moderately long and from the fourth joint onwards the segments are feebly serrate, first segment rather elongated and slightly inclined, 2nd and 3rd segments short and similar to each other, last segment short and acuminate.

Prothorax is more or less quadrangular, round and narrowed in front, the lateral carina is frontally inclined downwards, hind angles on both the sides with a fine, rather long carina.

Elytra variable in form. Prosternum rounded in front, prosternal process is horizontally inclined or slightly inclined inwards. Mesosternal cavity horizontal at base, inclined inwards in front.

Legs rather short; femur gradually and feebly extended inwardly; first segment of tarsi rather elongated, 4th and sometimes the 3rd segment with short lobe, claws pectinate.

Distribution : India.

Elsewhere : Bhutan, China, Europe, Myanmar, Nepal & North Africa, Tonkin.

Remarks : Candeze (1891) and Schwarz (1906) both have treated the genus under the tribe Adrastini. Fleutiaux (1941) considered the genus under the subfamily Adrastinae that has been followed by Ohira & Becker (1971) and Vats & Chauhan (1993).

Schwarz (1906) in '*Genera Insectorum*' has listed 39 species from the world (Europe, Asia & North Africa) of which 12 species are from India and 5 species from Bengal. Schenkling (1927) has listed 41 species of *Silesis* in '*Coleopterum Catalogus*', most of these are from Oriental region. Subsequently, Fleutiaux (1940, 1947), Ohira (1969), Ohira & Becker (1971) and Vats & Chauhan (1993) added few species. Recently Platia & Schimmel (1991, 1993) have given an account of this genus and have included 51 species from India and 36 species from West Bengal of which 23 are new to science. During the tenure of this present work, materials of only 5 species were available for study.

Key to the species

1. Lateral sides of propleurae without any vestige of alutaceous area, lateral carina of pronotum absent or obsolete posteriorly *bengalensis*
- Lateral sides of propleurae with alutaceous area more or less apparent, lateral carina complete or obsolete posteriorly 2
2. 2nd antennal joint clearly more robust and longer than 3rd 3
- 2nd antennal joint not or slightly more robust, just longer, equal in length or shorter than 3rd 4
3. Lateral carina of pronotum complete *rugosus*
- Lateral carina of pronotum obsolete posteriorly *wittmeri*
4. Pronotum transverse at least 1.25 times wider than long, carina of hind angles of pronotum shorter extending upto middle to the distance to anterior margin.....
..... *candezei*
- Pronotum slightly wider than long (less 1.2 times) or as long as wide, carina of hind angles of pronotum longer extending 3/4th to more the distance to anterior margin
..... *nigriceps*

76. *Silesis beckeri* Platia & Schimmel, 1993

1993. *Silesis beckeri* Platia & Schimmel, *Fragm. Entomol., Roma*, 25(1) : 117.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

77. *Silesis bengalensis* Candeze, 1889

1889. *Silesis bengalensis* Candeze, *Elat. Nouv.*, 4 : 122; 1891, Candeze, *Catalog. Method. Des Elat. connus en*, 1890 : 209; 1905, Fleutiaux, *Annls Soc. Ent. Fr.*, 74 : 330; 1906, Schwarz, *Genera Insect*, 46C : 294; 1927, Schenkling, *Junk's Col. Cat. Pars*, 88, Elateridae, 2 : 489; 1991, Platia and Schimmel, *Fragm. Entomol. Roma.*, 23(1) : 110

1902. *Silesis luteipennis* Schwarz, *Deut. Ent. Zeit.*, 44(2) : 348.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Rangpoo, 450 m. alt., 21.IV.1976, C. R. Basu coll., collected under bark.

Distribution : India : West Bengal (Darjeeling), Tamil Nadu.

Remarks : Platia and Schimmel (1991) have redescribed the species.

78. *Silesis bhaktai* Platia & Schimmel, 1991

1991. *Silesis bhaktai* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 110.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

79. *Silesis brancuccii* Platia & Schimmel, 1991

1991. *Silesis brancuccii* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 113.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

80. *Silesis brignolii* Platia & Schimmel, 1991

1991. *Silesis brignolii* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 115.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

81. *Silesis canaliculatus* Platia & Schimmel, 1991

1991. *Silesis canaliculatus* Platia & Schimmel, *Fragm Entomol. Roma*, 23(1) : 115.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

82. *Silesis candezei* Platia & Schimmel, 1991

1991. *Silesis candezei* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 116.

Material examined : 10 exs., INDIA : West Bengal : Calcutta : Pallisree (Behala), 12.IX.1986, S. Biswas coll.; 1 ex., Nadia : Kalyani, 25.II.1996, P. Chakraborty coll., collected at light; 1 ex., Bankura : Bishnupur, 29.X.1985, M. Datta & party coll.; 1 ex., Purulia : Pancha, 24.XI.1986, T. R. Mitra & party coll.; 1 ex., Darjeeling: Ranigram, 2000m alt., 26.V.1974, J. K. Jonathan coll..

Distribution : India : West Bengal (Bankura, Calcutta, Darjeeling, Nadia, Purulia).

Elsewhere : Nepal.

Remarks : This species has been described in details by Platia & Schimmel (1991).

83. *Silesis catei* Platia & Schimmel, 1991

1991. *Silesis catei* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 118.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling); Nepal.

84. *Silesis convexcicollis* Platia & Schimmel, 1991

1991. *Silesis convexcicollis* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 120.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

85. *Silesis convexus* Platia & Schimmel, 1991

1991. *Silesis convexus* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 121.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

86. *Silesis cylindriformis* Ohira & Becker, 1971

1971. *Silesis cylindriformis* Ohira & Becker, *Orient. Insects*, 5(4) : 580; 1991, Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 122.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

87. *Silesis dilatatus* Platia & Schimmel, 1993

1993. *Silesis dilatatus* Platia & Schimmel, *Fragm. Entomol. Roma*, 25(1) : 117.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

88. *Silesis excavatus* Platia & Schimmel, 1991

1991. *Silesis excavatus* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 123

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

89. *Silesis fruhstorferi* Platia & Schimmel, 1991

1991. *Silesis fruhstorferi* Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 126

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

90. *Silesis granarius* Candeze, 1893

1893. *Silesis granarius* Candeze, *Elat. Nouv.* 6 : 68; 1905, Fleutiaux, *Annls Soc. Ent. Fr.*, 74 : 330.

1906. Schwarz, In Wytsmann. *Genera Insect.* 46C : 294; 1927, Schenkling, *Junk's Col. Cat. Pars*, 88, *Elat.*, 2 : 489; 1991, Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 130.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

91. *Silesis grisescens* Candeze, 1893

1893. *Silesis grisescens* Candeze, *Elat. Nouv.* 6 : 68; 1906, Schwarz, In Wytsmann *Genera Insect*, 46C : 294; 1927, Schenkling *Junk's Col. Cat. Pars*, 88, *Elat.* 2 : 489; 1991, Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 130.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

92. *Silesis humilis* Platia & Schimmel, 1991

1991. *Silesis humilis* Platia & Schimmel, *Fragm. Entomol. Roma*, **23**(1) : 133

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

93. *Silesis inficetus* Candeze, 1892

1892. *Silesis inficetus* Candeze, *Annls Soc. Ent. Belg.*, **36** : 494; 1906, Schwarz, In : Wytsmann *Genera Insect*, **46C** : 294; 1927, Schenkling, In : Junk's *Col. Cat. Pars* **88**, Elat. **2** : 489; 1974, Ohira & Becker, *Orient. Insects*, **8**(4) : 561; 1991, Platia & Schimmel, *Fragm. Entomol., Roma*, **23**(1) : 135.

Material examined : None was available for study.

Distribution : India : West Bengal, Bihar, N. India.

Elsewhere : Nepal.

94. *Silesis lateralis* Candeze, 1897

1897. *Silesis lateralis* Candeze, *Elat. Nouv.*, **6** : 79; 1905, Fleutiaux, *Annls Soc. Ent. Fr.*, **74** : 330.

1906. Schwarz, In : Wytsmann *Genera Insect*, **46C** : 294; 1927, Schenkling, In Junk's *Col. Cat.*, *Pars*, **88**, Elat. **2** : 489; 1991, Platia & Schimmel, *Fragm. Entomol. Roma*, **23**(1) : 138.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Tamil Nadu.

95. *Silesis lebischi* Platia & Schimmel, 1991

1991. *Silesis lebischi* Platia & Schimmel, *Fragm. Entomol., Roma*, **23**(1) : 139.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Assam.

Elsewhere : Nepal.

96. *Silesis longipennis* Schwarz, 1902

1902. *Silesis longipennis* Schwarz, *Deut. Ent. Zeit.*, **44**(2) : 347; 1906, Schwarz, In : Wytsmann *Genera Insect*, **46C** : 294; 1927, Schenkling, In Junk's *Col. Cat. Pars*, **88** : Elat. **2** : 489; 1991. Platia & Schimmel, *Fragm. Entomol. Roma*, **23**(1) : 140.

1902. *Silesis cylindricus*, Schwarz, *Deut. Ent. Zeit.*, 44(2) : 348.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Bhutan, China, Nepal.

97. *Silesis nepalensis* Ohira & Becker, 1971

1971. *Silesis nepalensis* Ohira & Becker, *Orient. Insects*, 5(4) : 579; 1991, Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 144.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

98. *Silesis nigriceps* Candeze, 1892

1892. *Silesis nigriceps* Candeze, *Annls Soc. Ent. Belg.*, 36 : 495; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 294; 1927, Schenkling, In Junk's *Col. Cat. Pars* 88, *Elat.*, 2 : 490; 1991, Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 144.

1918. *Silesis duporti* Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 268; 1940, Fleutiaux, *Annls Soc. Ent. Fr.*, 109 : 22.

Material examined : 11 exs. INDIA : West Bengal : Darjeeling, V. 1913, Lord Carmichael coll.

Distribution : India : West Bengal (Darjeeling), Bihar.

Elsewhere : China; Tonkin.

Remarks : Platia & Schimmel (1991) have redescribed the species.

99. *Silesis numerosus* Platia & Schimmel, 1991

1991. *Silesis numerosus*. Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 145.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

100. *Silesis pasangi* Platia & Schimmel, 1991

1991. *Silesis pasangi*, Platia & Schimmel, *Fragm. Entomol. Roma*, 23(1) : 148.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

101. *Silesis raii* Platia & Schimmel, 1991

1991. *Silesis raii* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 153.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

102. *Silesis rugosus* Platia & Schimmel, 1991

1991. *Silesis rugosus* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 156.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Ranigram, 2000m. alt., 26.V.1974, J. K. Jonathan & party coll.; 1 ex., Bankura : Hatirampur, 10.IX.1986, D. N. Biswas coll.

Distribution : India : West Bengal (Bankura, Darjeeling), Sikkim.

Elsewhere : Nepal.

Remarks : The species has been described in details by Platia & Schimmel (1991).

103. *Silesis sabatinellii* Platia & Schimmel, 1991

1991. *Silesis sabatinellii* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 157.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

104. *Silesis schawalleri* Platia & Schimmel, 1991

1991. *Silesis schawalleri* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 160.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

105. *Silesis semirufus* Candeze, 1863

1863. *Silesis semirufus* Candeze, *Mem. Soc. r. Sci. Liege*, 17 : 462; 1891, Candeze., *Annls Mus. Civ. Stor. Nat. G Doria, Genova*, 10 : 789; 1891, Candeze, *Catalog. Method des Elat.*, : 209; Schwarz,

1906, In : Wytsmann *Genera Insect*, 46C : 294; Schenkling, 1927, In Junk's *Col. Cat.* 88, Elat., II : 490; 1991, Platia & Schimmel., *Fragm. Entomol.*, Roma, 23(1) : 162.

Material examined : None was available for study.

Distribution : India : West Bengal (Calcutta).

Elsewhere : Myanmar.

106. *Silesis sericeus* Candeze, 1878

1878. *Silesis sericeus* Candeze, *Elat. Nouv.*, 2 : 197; Candeze., 1891, *Catalog. Method des Elat.*, : 209; 1906, Schwarz, In : Wytsmann *Genera. Insect.*, 46C : 294; Schenkling, 1927, In : Junk's *Col. Cat.* 88, Elat., II : 490 ; 1991, Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 163.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

107. *Silesis sherpana* Ohira & Becker, 1971

1971. *Silesis sherpana* Ohira & Becker, *Orient. Insects*, 5(4) : 577; 1978, Ohira, *New Ent.*, 27(4) : 95.

1991. Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 163.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

108. *Silesis simulatus* Candeze, 1863

1863. *Silesis simulatus* Candeze, *Mem. Soc. r. Sci. Liege*, 17 : 462; 1891, Candeze., *Catalog. Method des Elat.*, : 209; 1906, Schwarz, In Wytsmann *Genera Insect.* 46C : 294; 1927, Schenkling, In : Junk's *Col. Cat.*, : 490, 1991, Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 164.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Tamil Nadu.

Elsewhere : Nepal.

109. *Silesis spiniformis* Platia & Schimmel, 1991

1991. *Silesis spiniformis* Platia & Schimmel, *Fragm. Entomol.*, Roma, 23(1) : 166.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

110. *Silesis vignai* Platia & Schimmel, 19911991. *Silesis vignai* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 168.*Material examined* : None was available for study.*Distribution* : India : West Bengal (Darjeeling).*Elsewhere* : Nepal.111. *Silesis wewalkai* Platia & Schimmel, 19911991. *Silesis wewalkai* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 169.*Material examined* : None was available for study.*Distribution* : India : West Bengal (Darjeeling, Jalpaiguri), Sikkim.*Elsewhere* : Nepal.112. *Silesis wittmeri* Platia & Schimmel, 19911991. *Silesis wittmeri* Platia & Schimmel, *Fragm. Entomol., Roma*, 23(1) : 170.*Material examined* : 1 ex., INDIA : West Bengal : Darjeeling : Kalimpong, 3000ft. alt., 3.V.1997; D. B. Khawas coll., collected from soil surface of cultivated mulberry field.*Distribution* : India : West Bengal (Darjeeling), Sikkim.*Remarks* : Platia & Schimmel (1991) have redescribed the species.

K. Subfamily SENODONIINAE

Diagnostic characters : Head capsule flattened, mouth-parts prognathous, frons either ridged and complete, often projecting or completely absent, prosternum either normally arcuate, sometimes short, rarely truncate, prosternal sutures double or single, may be excavate in front; scutellum various but never cordate; mesocoxae open to both mesepimeron and mesepisternum; meso and metasternum distinct, joined by a definite suture; tarsi simple or lobed, if lobed then segmented feebly, widened at most; claws simple, or rarely pectinate, without basal setae.

Remarks : Schenkling (1927) established this subfamily. Before that the genera included in this subfamily were treated under the tribe Allotriites Candeze, 1863 by Candeze (1891) and Schwarz (1906). But later Stibick (1979) has preferred to treat it as a subtribe Senodoniina under tribe Denticollini Reitter, 1905. But here the name proposed by Schenkling (1927) has been followed. Seven genera and more than 100 species were recorded from the world of which about 44 species and 7 genera (viz., *Brancuccia* Schimmel and Platia, *Dima* Charpentier, *Neocsikia* Ohira and Becker, *Paracsikia* Schimmel and Platia,

Parapenia Suzuki, *Penia* Castelnau and *Senodonia* Castelnau) are from India. From West Bengal 33 species have been recorded under 5 genera. But materials of only 5 species (*P. eschscholtzi* Hope, *P. holzschuhi* Schimmel & Platia, *P. longipes* Candeze, *P. opatroides* Candeze and *P. wittmeri* Dolin & Suzuki) under the single genus *Penia* Castelnau were available for study.

XXIV. Genus *Dima* Charpentier, 1825

1825. *Dima* Charpentier, *Hor.. Ent.*, : p. 191, pl. 6, fig. 8; 1906, Schwarz, In : Wytsmann. *Genera Insect*, 46C : 246; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 640.

Type : *Dima elateroides* Charpentier (Monobasic).

Diagnostic characters : The genus has been well described by Schimmel & Platia, 1991.

Biology and Habits : Unknown.

Distribution : India.

Elsewhere : Nepal, South West Europe.

Remarks : Schimmel & Platia (1991) have described 16 species under this genus of which 2 are from India: Bengal; rest were from Nepal. Candeze (1891) has treated it under the tribe Dimites. Schwarz (1906) has treated the genus under tribe Dimaini whereas, Schenkling (1927) has treated it under subfamily Senodoniinae which has been followed by Ohira & Becker (1972).

113. *Dima convexiculata* Schimmel & Platia, 1991

1991. *Dima convexiculata* Schimmel & Platia, *Entomol. Basil.*, 14 : 284.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

114. *Dima pseudoleistoides* Schimmel & Platia, 1991

1991. *Dima pseudoleistoides* Schimmel & Platia, *Entomol. Basil.*, 141 : 294.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling).

XXV. Genus *Neocsikia* Ohira & Becker, 1972

1972. *Neocsikia* Ohira & Becker, *Orient. Insects* 6(4): 535; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 299.

Type : *Neocsikia nepalensis* Ohira & Becker, 1972 (Original designation). (Hyslop, 1921).

Diagnostic characters : The genus has been described in details by Ohira & Becker, 1973.

Distribution : India.

Elsewhere : Nepal.

Biology and Habits : Unknown.

Remarks : The genus *Neocsikia* was established by Ohira & Becker in 1972. The type species was *Neocsikia nepalensis* Ohira & Becker, 1972, which was described by them from Nepal. Later Schimmel & Platia (1991) recorded 2 species of this genus *Neocsikia*, viz., *N. nepalensis* from Nepal and *N. krishna* Suzuki, 1982, from West Bengal (Darjeeling), India. In the present study no material of this genus was available for study

115. *Neocsikia krishna* Suzuki, 1982

1982. *Neocsikia krishna* Suzuki, *Trans. O. t. Shikoku Ent. Soc.*, 16(1-2) : 77; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 299.

Material examined : None was available for study.

Distribution : India : West Bengal : (Darjeeling).

Elsewhere : Nepal.

XXVI. Genus *Paracsikia* Schimmel & Platia, 1991

1991. *Paracsikia* Schimmel & Platia, *Entomol. Basil.*, 14 : 300.

Type : *Paracsikia nigerrima* Schimmel & Platia, 1991 (by original designation).

Diagnostic characters : The species has been described in details by Schimmel and Platia (1991).

Distribution : India.

Elsewhere : Nepal.

Biology and Habits : Unknown.

Remarks : Schimmel and Platia (1991) while erecting this genus described only 4 species under this genus of which *P. nigerrima* Schimmel & Platia, 1991 was from Nepal and the rest 3 species viz., *P. brunnea*, *P. indica* and *P. parvula* are from West Bengal, India.

116. *Paracsikia brunnea* Schimmel & Platia, 1991

1991. *Paracsikia brunnea* Schimmel & Platia, *Entomol. Basil.*, 14 : 302.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling, Himalaya).

117. *Paracsikia indica* (Fleutiaux) 1916

1916. *Dima indica* Fleutiaux, *Bull. Soc. Ent. Fr.*, : 256; 1972, Ohira & Becker, *Orient. Insects*, 6(4) : 532.

1991. *Paracsikia indica* Schimmel & Platia, *Entomol. Basil*, 14 : 303.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling).

118. *Paracsikia parvula* Schimmel & Platia, 1991

1991. *Paracsikia parvula* Schimmel & Platia, *Entomol. Basil*. 14 : 305.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling), Sikkim.

XXVII. Genus *Penia* Hope, 1831

1831. *Penia* Hope, *Synop. Ins. Nepaul*, *Gray's Zool. Misc.*, : 21; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 245; 1921, Hyslop, *Proc. U. S. Natn. Mus. Vol. LVIII* : 663; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 315.

Type : *Penia eschscholtzi* Hope (Monobasic) (Hyslop, 1921).

Diagnostic characters : The genus has been well described by Schimmel & Platia, 1991

Biology and Habits : No information about the biology and habits of the species of *Penia* has yet been published.

Distribution : India, Sikkim.

Elsewhere : Nepal, Malayan Archipelago.

Remarks : Candeze (1891) & Schwarz (1906) has treated the genus under tribe Allotriini whereas Schenkling (1927) has treated the genus under subfamily Senodoniinae, which has been followed by Ohira & Becker (1972). From India total 34 species of this genus is recorded of which 25 are from the state. But materials of only 5 species were available for study.

Key to the species

1. Hind angle of pronotum acute and spin like 2
- Hind angle of pronotum obtuse and not spine like 4
2. Body covered sparsely with hair *eschscholtzi*
- Body covered densely with hairs 3

3. Body covered densely with hairs intermingled with distantly placed long hairs but not with setaceous hairs *wittmeri*
- Body extremely densely covered with setaceous hairs not distantly placed *holzschuhi*
4. Body covered with soft accumbent hairs, reddish brown species *longipes*
- Body covered with accumbent setaceous hairs, blackish brown species *opatroides*

119. *Penia canaliculata* Candeze, 1863

1863. *Penia canaliculata* Candeze, *Mon. Elat.*, 4 : 235; 1891, Candeze, *Catalog. Method. des Elat.*, 184; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 315.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

120. *Penia eschscholtzi* (Hope) 1831

1831. *Elater eschscholtzi* Hope, In Gray, *Zool. Miscell.*, .. 26.

1863. *Penia eschscholtzi*, Candeze, *Mem. Soc. Roy. Sci. Liege*, 17 : 230 t. 7, f. 7; 1891, Candeze, *Catalog. Method. des Elat.*, : 184; 1927, Schenkling, In : Junk's *Col. Cat.*, 88, Elateridae II : 418; 1972, Ohira & Becker, *Orient. Insects*, 6(4) : 532; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 320.

Material examined : 7 exs., INDIA : West Bengal : Darjeeling : Pashok, 3500 ft. alt., 26.V.–14.VI. 1916, F. H. Gravely coll.; 2 exs., Singla, 3500 ft. alt., V 1913, Lord Carmichael's coll. (det. Candeze):

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

121. *Penia girardi* Schimmel & Platia, 1991

1991. *Penia girardi* Schimmel & Platia, *Entomol. Basil.*, 14 : 321.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling), Sikkim.

122. *Penia hayekae* Schimmel & Platia, 1991

1991. *Penia hayekae* Schimmel & Platia, *Entomol. Basil.*, 14 : 324.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling).

Elsewhere : Nepal.

123. *Penia hirtella* Candeze, 1863

1863. *Penia hirtella* Candeze, *Mon. Elat.*, 4 : 231; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 324.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), N. India.

Elsewhere : Nepal.

124. *Penia holzschuhi* Schimmel & Platia, 1991

1991. *Penia holzschuhi* Schimmel & Platia, *Entomol. Basil.*, 14 : 326.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Pashok, 3500 ft. alt., 26.V.1916, F. H. Gravely coll.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

125. *Penia horrida* Schimmel & Platia, 1992

1992. *Penia horrida* Schimmel & Platia, *Beitr. Ent.*, 42 (1992) 2 : 303.

Material examined : None was available for study.

Distribution : India: West Bengal.

126. *Penia jansoni* Schimmel & Platia, 1991

1991. *Penia jansoni* Schimmel & Platia, *Entomol. Basil.*, 14 : 328.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

127. *Penia kaszabi* Dolin & Suzuki, 1987

1987. *Penia kaszabi* Dolin & Suzuki, *Vestn. Zool.*, 1 : 29; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 329.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Himalaya, Sikkim.

128. *Penia lateralis* Schwarz., 1905

1905. *Penia lateralis* Schwarz., Dt. Ent. Zeitschr., : 261; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 330.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling), Himalaya.

Elsewhere : Nepal.

129. *Penia longipes* Candeze, 1863

1863. *Penia longipes* Candeze, *Mon. Elat.*, 4 : 232; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 332.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling: Singla, 3500 ft. alt., V. 1913, Lord Carmichael coll.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal..

130. *Penia longiuscula* Schimmel & Platia, 1991

1991. *Penia longiuscula* Schimmel & Platia, *Entomol. Basil.*, 14 : 333.

Material examined : None was available for study.

Distribution : India: West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

131. *Penia martensi* Schimmel & Platia, 1991

1991. *Penia martensi* Schimmel & Platia, *Entomol. Basil.*, 14 : 335.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

132. *Penia minima* Schimmel & Platia, 1991

1991. *Penia minima* Schimmel & Platia, *Entomol. Basil.*, 14 : 336.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

133. *Penia nebrioides* Candeze, 1863

1863. *Penia nebrioides* Candeze, *Mon. Elat.*, 4 : 232, t. 3, f. 8; 1891, Candeze, *Catalog. Method. des Elat.* : 184; 1927, Schenkling, In : *Junk's Col. Cat.*, 88 Elateridae II : 418; 1972, Ohira & Becker, *Orient. Insects*, 6(4) : 533; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 337.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Himalaya.

Elsewhere : Nepal.

134. *Penia nigra* Schwarz, 1905

1905. *Penia nigra* Schwarz, *Dt. Ent. Zeitschr.*, : 263; Schimmel & Platia, 1991, *Entomol. Basil.*, 14 : 338.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

135. *Penia ohirai* Suzuki & Dolin, 1987

1987. *Penia ohirai* Suzuki & Dolin, *Vestn. Zool.*, 1 : 29; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 339.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

136. *Penia opatroides* Candeze, 1893

1893. *Penia opatroides* Candeze, *Elat. Nouv. Fasc.*, 5 : 34; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 339.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Kalimpong, 3.V.1998, D.B. Khawas coll.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Bhutan.

137. *Penia plagiata* Candeze, 1891

1891. *Penia plagiata* Candeze, *Annls Mus. Stor. Nat. Gen.*, 786 ; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 340.

Material Examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

138. *Penia pseudolateralis* Schimmel & Platia, 1991

1991. *Penia pseudolateralis* Schimmel & Platia, *Entomol. Basil.*, 14 : 344.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

139. *Penia rustica* Schimmel & Platia, 1991

1991. *Penia rustica* Schimmel & Platia, *Entomol. Basil.*, 14 : 348.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

140. *Penia similis* Schimmel & Platia, 1991

1991. *Penia similis* Schimmel & Platia, *Entomol. Basil.*, 14 : 351.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

141. *Penia suzukii* Schimmel & Platia, 1991

1991. *Penia suzukii* Schimmel & Platia, *Entomol. Basil.*, 14 : 355.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling).

142. *Penia tomentosa* Candeze, 1863

1863. *Penia tomentosa* Candeze, *Mon. Elat.*, 4 : 232; 1891, Candeze, *Catalog. Method des Elat.*, : 184; 1927, Schenkling, In : Junk's *Col. Cat.*, 88, Elateridae II : 419; 1927, Ohira & Becker, *Orient. Insects*, 6(4) : 533; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 356.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), (Caneze, 1891).

Elsewhere : Nepal.

143. *Penia wittmeri* Suzuki & Dolin, 1984

1984. *Penia wittmeri* Suzuki & Dolin, *Entomol. Basil.*, 9 : 168; 1991, Schimmel & Platia, *Entomol. Basil.*, 14 : 356.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Kalimpong, 3.V.1998, D.B. Khawas coll.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

Remarks : The species is related to *Penia hirtella* Candeze, 1863, but differs from the later by dark coloration of body, smaller and finer punctuation in striae on elytra and by the form of male genitalia.

XXVIII. Genus *Senodonia* Castelnau, 1836

1836. *Senodonia* Castelnau, Silberman Rev. Ent. Col., Vol. 4 : 12; 1921, Hyslop, Proc. U. S. Natn. Mus., Vol. LVIII : 669.

Type : *Semiotus (Senodonia) quadricollis* Castelnau, (Monobasic).

Diagnostic characters : The genus has been well described by Schimmel & Platia, 1991.

Biology and Habits : No information available.

Distribution : India.

Elsewhere : Bhutan, Nepal.

Remarks : Candeze (1891) has treated the genus under tribe Allotriites. Schenkling (1927) has treated it under subfamily Sendoniinae that has been followed by Ohira (1971). From West Bengal 2 species of this genus were previously recorded, but materials of none of the species were available for study.

144. *Senodonia brancuccii* Schimmel & Platia, 1992

1992. *Senodonia brancuccii* Schimmel & Platia, Entomol. Basil., 15 : 240.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

145. *Senodonia emodi* Candeze, 1863

1863. *Hemilimerus emodi* Candeze, Mon. Elat., IV : 227, t. 3 & 5; 1891, Candeze Catalog. Method. des Elaterides, : 183

1971. *Senodonia emodi*, Ohira, Annls Hist. Nat. Mus. natn. Hung, Tomus, 63 : 210 pl. 1, fig. G, pl. III, figs. A. B.; 1992, Schimmel & Platia, Entomol. Basil., 15 : 243.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Bhutan; Nepal.

L. Subfamily ELATERINAE

Diagnostic characters : Head capsule oval, deflexed, mouthparts inferior, frontal carina arcuate, directed downward and projecting towards labrum, absent in middle, or as a large, thick pad between eyes, with trough, antennae 11-segmented, filiform to usually serrate; prosternum normally arcuate anteriorly, prosternal sutures entire or excavated in front, usually single, rarely double; scutellum shield-shaped, never cordate; mesocoxae open to both mesepimeron and mesepisternum; meso- and metasternum distinct, joined by a definite suture; tarsi simple; claws simple.

Remarks : This is the largest subfamily of the family Elateridae. Candeze (1891) treated the group as tribe Elaterites and included 18 genera under this tribe. Schwarz (1906) has also treated it as a tribe and has included 15 genera under it. However, Fleutiaux (1941) has treated it as subfamily Elaterinae. Stibick (1979) has reported 9 tribes under this subfamily, mostly of which are treated as subfamily by other authors. Stibick (1979) has considered a total of 180 genera and subgenera and almost 800 species under this subfamily Elaterinae, including 36 genera under tribe Elaterini. The largest genus under this subfamily is *Agonischius* Candeze with about 130 species from the world. From India, about 15 genera and 100 species are recorded under this subfamily. The genera included are *Anchastus* LeConte, *Agonischius* Candeze, *Ampedus* Dejean, *Aphanobius* Eschscholtz, *Drasterius* Eschscholtz, *Elater* Linnaeus, *Glyphonyx* Candeze, *Megapenthes* Kiesenwetter, *Melanoxanthus* Eschscholtz, *Ludigenus* Candeze, *Ludius* Latreille, *Parelater* Candeze, *Scelisus* Candeze, *Sericus* Eschscholtz and *Vuilletus* (author unknown). From West Bengal 17 species under 5 genera are recorded, of which materials of 11 species under 5 genera were available for study. Here, 2 species from India and 10 species from West Bengal have been recorded for the first time.

Key to the genera

1. Mandibles bidented, last segment of maxillary palpi oval or elongated *Melanoxanthus*
- Mandibles indented at apical margin, last segment of maxillary palpi triangular or flatly rounded 2
2. Antennae short, rather thick and ripped, 2nd segment very small compared to the 3rd, 3rd segment longer than the 4th, last segment curved at the top *Ludigenus*
- Antennae slender, serrate, 3rd segment as long as or longer than the 2nd, last segment dorsoventrally flattened or oval 3
3. Elytra truncated or crenated at distal extremities, posterior coxae broader exteriorly *Aphanobius*
- Elytra rounded at distal extremities, posterior coxae not broader exteriorly 4

4. Elytra without prominent striations, 1st segment of hind tarsi little expanded, 2-4 segments gradually decreasing in length *Agonischius*
- Elytra with prominent striations, hind tarsi simple without any expansion, 2-4 segments almost of equal size *Drasterius*

XXIX. Genus *Agonischius* Candeze, 1863

1863. *Agonischius* Candeze, *Mon. Elat.*, Vol. 4 : 407; 1891, Candeze., *Catalog. Method. des Elat.*, : 201; 1906, Schwarz, In Wytsmann *Genera Insect*, 46 C : 274; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 624.

Type : *Agonischius pectoralis* Candeze (designated by Hyslop, 1921).

Diagnostic characters : Frons convex and perpendicularly inclined in front; the feebly raised margin around the root of the antennae obliquely directed inwards. Labrum almost as long as broad, perpendicularly directed inwards, strongly rounded in front and it is separated from the frons by a very lowered nasal area. Mandibles triangularly extended at base, feebly acuminate in front and indented at apical margin. Maxillary palpi thin, last segment flatly rounded or almost triangular.

Antennae of variable length, in male from 4th segment more or less serrate, sometimes from 4th segment very broad, 2nd segment always small, 3rd as long as or longer than 2nd.

Prothorax convex, often longer than broad, lateral margin inclined below, hind angle with single or double carina, prosternal suture bent inward and not opens in front. Prosternum rounded in front and little extended in front, prosternal process horizontal, plain behind or more or less bent inward. Elytra of variable length. Mesosternal cavity triangular and highly inclined inwards.

Legs moderately long; femur narrow, parallel, or gradually broader inwards; tarsi thin and simple, 1st segment of the hind tarsi is little extended, 2-4 segments gradually decreasing in length.

Distribution : Asia, Australia.

Biology and Habits : Unknown.

Remarks : Schwarz (1906) has recorded 15 species from India of which 4 were from West Bengal. Out of these 4 species only one species has been studied and redescribed. The materials of the other species were not available.

146. *Agonischius altus* Candeze, 1889

(Fig. 58)

1889. *Agonischius altus* Candeze, *Elat. Nouv.*, IV : 120; 1891, Candeze., *Catalog. Method. des Elat* : 201; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 C : 274; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 259.

Redescription : Length 9.5 mm, breadth 2.4 mm. Body small, elongated, blackish coloured with reddish-green metallic reflection; surface shining. Abdominal tergites yellowish brown. Antennae blackish brown except the 1st two segments, which are yellowish brown, legs yellowish brown. Vestiture fine, sparse, moderately long grayish coloured.

Head small, slightly broader than long, surface flat. Frontal region moderately densely punctate, punctation simple; frontal carina absent. Eyes small but prominent. Antennae moderately long, extended beyond the middle of the prothorax; basal segment robust, 2nd segment smallest and globular, 3rd segment subglobose, shorter than the 4th, from 4th segment onwards the segments are serrate.

Pronotum longer than broad (length 2.5 mm, breadth 2.0 mm), widest before middle, sides subparallel, narrows anteriorly, lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex without any pubescence, moderately densely punctate; punctation sparse and scattered, punctures often separated by 2-3 times their own diameter; integument between punctures not granulate. Hind

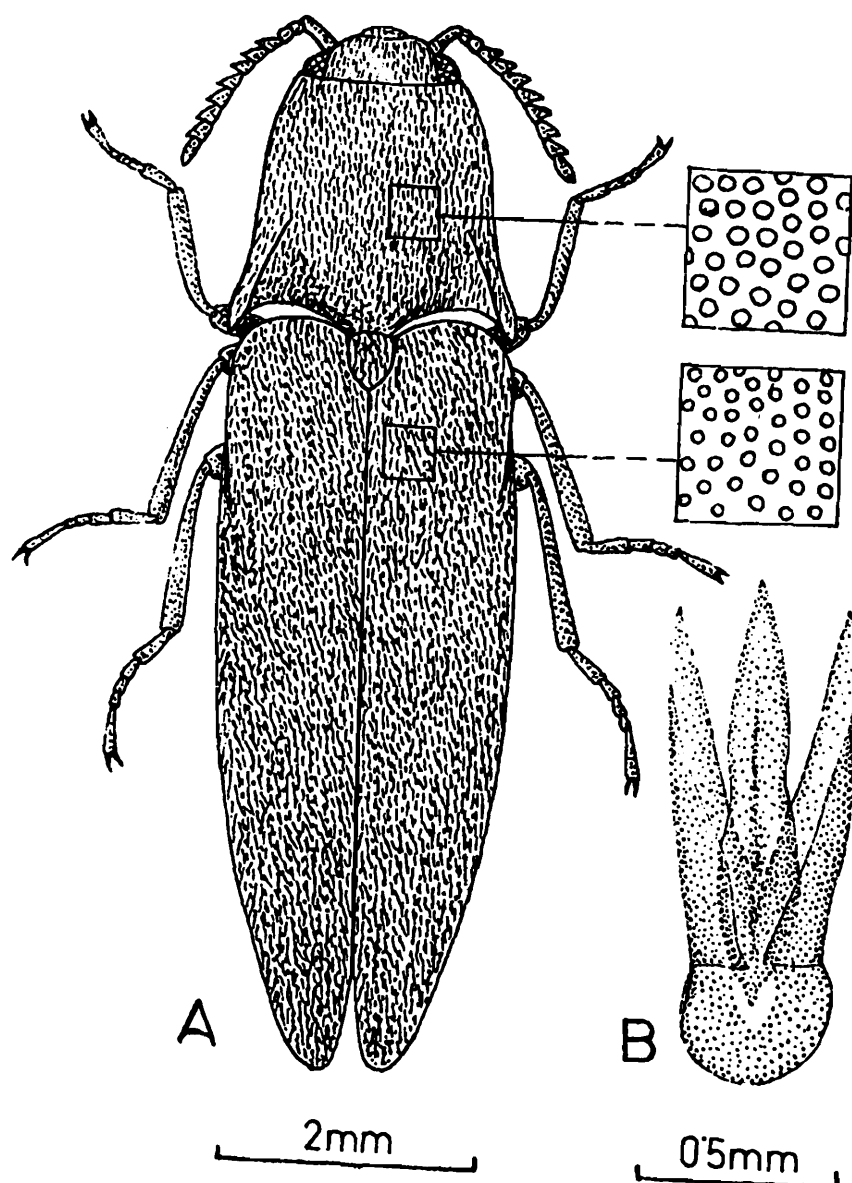


Fig. 58. *Agonischius altus* Candeze : A. Dorsal view; B. Dorsal view of male genitalia.

angles sharply pointed, elongated, directed backward, unicarinate; carina extended upto 1/4th the length of the pronotum.

Prosternum black with metallic reflection, moderately densely punctate; punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Prosternal spine small, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subtriangular, with a notch on the anterior side, elongated, surface convex; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.5 times longer than broad (length 6 mm, breadth 2.4 mm), dorsal surface convex, and sides subparallel along basal third, then narrowed caudad. Apices flatly rounded and very weakly spinose along middorsal suture. Striae indistinct. Elytra almost flat with sparsely and scatterdly distributed punctures. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with tarsi and claws simple.

Male Genitalia : Phallobase with rounded anterior margin; parameres slender with outer margin almost straight; posterior end pointed and without subapical process; median lobe longer than the parameres, gradually narrows to a very thin rounded tip furcae invisible.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Tindharia, alt. 856 m., date & collector not known, (det. Fleutiaux); 2 exs., Tindharia, 856 m. alt., 4.V.1976, A. R. Bhowmick coll.; 3 exs., Dowhill, 1880 m. alt., 30.IV.1976, C. R. Basu coll., collected on bush; 1 ex., Lopchu, 1607 m. alt., 1.V.1976, C. R. Basu coll., collected on bush; 1 ex., Ghoom, 2117 m. alt., 29.IV.1976, A. R. Bhowmick coll.

Distribution : India : West Bengal (Darjeeling).

Remarks : This species was originally recorded from Darjeeling district of West Bengal. In this present study also all the materials studied are reported from Darjeeling district.

147. *Agonischius cinctus* Candeze, 1878

1878. *Agonischius cinctus* Candeze, *Elat. Nouv., Fasc.*, 2 : 51; 1891, Candeze., *Catalog. Methods des Elat.*, : 202 ; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 274.

Material examined : None was available for study.

Distribution : India; originally reported from North Bengal.

148. *Agonischius metallicus* Candeze, 1892

1892. *Agonischius metallicus* Candeze, *Elat. Nouv. Fasc.*, 5 : 62; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 C : 274.

Material examined : None was available for study.

Distribution : India; originally reported from Darjeeling district of West Bengal.

149. *Agonischius simulator* Candeze, 1895

1895. *Agonischius simulator* Candeze, *Elat. Nouv. Fasc.*, 6 : 73; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46C : 274.

Material examined : None was available for study.

Distribution : India; originally reported from Darjeeling district of West Bengal.

XXX. Genus *Aphanobius* Eschscholtz, 1829

1829. *Aphanobius* Eschscholtz, In : Thon., *Ent. Arch.*, Vol. 2(1) : 33; 1891, Candeze, *Catalog. Method. des Elat.* : 191; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 C : 261; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 628.

1844. *Aphanobius* (pars.) Germar, *Zeitschr. F. Ent.*, Vol. 5 : 183.

Type : *Aphanobius longicollis* Eschscholtz (by designation of Candeze, 1863, *Monogr. Elat.*, Vol. 4 : 322) (Hyslop, 1921).

Note : *Aphanobius infuscatus* Germar, designated as genotype of Leconte, 1853, *Trans. Amer. Philos. Soc.*, Vol. 10: 453, was not originally included in the genus. (Hyslop, 1921).

Diagnostic characters : Frons quadrangular, convex and rounded anteriorly; frontal carina present in between the eyes; eyes large. Labrum longitudinally straight in front, broader than long, strongly rounded anteriorly. Mandibles strongly inclined, single or bicuspid, the last segment of mandibular palpi feebly hatchet shaped.

Antennae serrate from 4th joint onwards, 1st segment somewhat extended and robust, 3rd segment as long as or longer than the 2nd one, last segment dorsoventrally flattened.

Prothorax longer than broad, posterior angles of pronotum sharply pointed and carinate. Prosternum frontally flat and rounded and little prominent; prosternal spine narrow, horizontally aligned inwards, vertically weaned in front of mesocoxae; interspace between two mesocoxae narrow. Elytra long and narrow, often truncated or crenated at the apex. Mesosternal cavity triangular in length and inclined inwards.

Legs rather long posterior coxae broader exteriorly, tarsi with one segment dialated, pubescence present, tarsal segments gradually decreasing in length from 1st to 4th segment.

Distribution : India.

Elsewhere : Africa, Indo-China, Siam, Sumatra.

Biology and Habits : Unknown.

Remarks : From the world 21 species under this genus was recorded, out of which 2 species was from India. It includes one from Darjeeling district of West Bengal and the other was from H.P. Another species *A. longithorax* Wiedemann, was recorded from Bengal, but without indicating its actual locality. Out of the 2 species of West Bengal 1 species was studied during the present work.

150. *Aphanobius alaomorphus* Candeze, 1863

1863. *Aphanobius alaomorphus* Candeze, *Mon. Elat.*, Vol. 4 : 313, pl. 4, f. 11; 1891, Candeze., *Catalog. Method. des Elat.*, : 191; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 C : 261

Material examined : None was available for study.

Distribution : India, originally reported from Darjeeling district of W.B.

Elsewhere : Indo-China.

151. *Aphanobius touffus* Vats & Chauhan, 1992

1992. *Aphanobius touffus* Vats & Chauhan, *J. Ent. Res.*, 16(3) : 189–190.

Material examined : 1 ex., India : West Bengal : Nadia : Kalyani, 28.IV.1998, P. Chakraborty coll., collected at light.

Distribution : India: West Bengal (Nadia), H.P., U.P.

Remarks : The species has been well described by Vats & Chauhan (1992). In this present work this species is recorded from West Bengal for the first time.

XXXI. Genus *Drasterius* Eschscholtz, 1829

1829. *Drasterius* Eschscholtz, In : *Thon. Ent. Arch.*, Vol. 2(1) : 33; 1891, Candeze, *Catalog. Method. des Elat.*, : 86; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46A : 111; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 642; 1927, Schenkling, In : *Junk's Col. Cat.* 88; *Elat.*, 2 : 176.

1829. *Cryptohypnus* (pars.) Germar, *Zeif. F. Ent.*, vol. 5 : 148; 1857, Lacordaire, *Gen. Col.*, Vol. 4 : 190.

1853. *Monocrepidius* (pars) Le Conte, *Trans. Amer. Philos. Soc.*, Vol. 10(new ser.) : 484.

Type : *Elater bimaculatus* Fabricius, 1801, *Syst. Eleuth.* Vol. 2 : 245 (Designation of Westwood, 1840, *Mod. Class. Ins.*, Vol. 2, Gen. Syn., p. 25).

Diagnostic characters : Frons only little inclined, convex, rounded in front, and frontal space rather extending over. Mandible emerginate at apex, last segment of maxillary palpi triangularly elongated.

Antennae moderately slender, feebly serrate, 1st segment moderately large, 2nd and 3rd more or less similar and both of them together always longer than 4th, last segment elongated oval.

Prothorax proportionately large. Prosternal suture straight and almost always open in front. Elytra rounded at distal extremities. Mesosternal plate small and bent inward.

Legs slender; femur rather rounded by expanded inner-side; tarsi simple and hairy beneath.

Distribution : India.

Elsewhere : Bangladesh, Nepal, Pakistan, Sri Lanka.

Biology and Habits : Nothing is known about the biology and habits of *Drasterius* species.

Remarks : Candeze (1891) treated this genus under the tribe Elaterites which was also followed by Schwarz (1906). However, Fleutiaux (1941) placed the genus under the subfamily Elaterinae. From West Bengal 5 species of this genus were recorded of which materials of 3 were available for study.

Key to the species

(Following to Platia and Gudenzi, 1997)

1. Pronotum normally bicoloured, yellow or red–orange with dark spot more or less expanded, very rarely unicoloured yellow or entirely black; disc gradually sloping at base *collaris*
- Pronotum unicoloured, brown or blackish, often lighter only at apex of posterior angles and at base; disc abruptly sloping at base 2
2. Apex of posterior angles of pronotum more sharp and strongly divergent *brahminus*
- Apex of posterior angles of pronotum less sharp and not divergent *sulcatulus*

152. *Drasterius brahminus* Candeze, 1859

1859. *Drasterius brahminus* Candeze, *Mon. Elat.*, II : 426; 1891, Candeze, *Catalog. Method. des Elat.* : 86; 1906, Schwarz, In : Wyttsmann *Genera Insect.* 46B : 111; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 212; 1927, Schenkling, In : Junk' *Col. Cat.*, 88, Elat. II : 135; 1997, Platia & Gudenzi, *Lambillionea*, XCVII : 405–406.

Material examined : 2 exs., INDIA : West Bengal : Calcutta, 1930, collected at light.

Distribution : India : West Bengal (Calcutta), M.P., Maharashtra, U.P.

Elsewhere : Pakistan.

Remarks : Platia & Gudenzi (1997) have redescribed the species. The species is recorded for the first time from West Bengal.

153. *Drasterius collaris* Candeze, 1859

1859. *Drasterius collaris* Candeze, *Monogr. Elat.*, II : 427; 1891, Candeze, *Catalog. Method. des Elat.*, : 86; 1905, Fleutiaux, *Annls Soc. Ent. Fr.*, 74 : 323; 1906, Schwarz, In : Wytsmann *Genera Insect.* 46B : 111; 1925, Schenkling, In : Junk's *Col. Cat.*, 80, *Elat.* I : 135; 1997, Platia & Gudenzi, *Lambillionea*, XCVII : 407.

Material examined : 4 exs., INDIA : West Bengal : Calcutta, 5 : 6.X.1912, F. H. Gravelly coll., collected at light; 3 exs., Eden Garden, 14.X.1911, F. H. Gravelly coll.; 1 ex., Calcutta, X.1912, F. H. Gravelly coll.; 1 ex., Nadia : Mohanpur, 8.VIII. 1964, S. Chakraborty coll.; 1 ex., Midnapore : Kharagpur, 17-30.VI.1911, R. Hodgart coll.

Distribution : India : West Bengal (Calcutta, Nadia, Midnapore), Assam, M.P., Rajasthan, U.P.

Elsewhere : Nepal and Pakistan.

Remarks : Platia & Gudenzi (1997) have redescribed the species. The species is recorded for the first time from West Bengal.

154. *Drasterius confusus* Platia & Gudenzi, 1997

1997. *Drasterius confusus* Platia & Gudenzi, *Lambillionea*, XCVII : 407.

Material examined : None was available for study.

Distribution : India : Bengal, Bihar, Karnataka, Maharashtra, Pondicherry, Tamil Nadu.

Elsewhere : Sri Lanka.

155. *Drasterius discicollis* (Walker) 1859

1859. *Ampedus discicollis* Walker, *Annls and Mag. Nat. Hist.*, London, 3 : 258.
1927. *Melanoxanthus discicollis* Schenkling, In Junk's *Col. Cat.*, 88; *Elat.* 2 : 176.
1927. *Elater discicollis* Schenkling, In Junk's *Col. Cat.* 88; *Elat.*, 2 : 531.
1997. *Drasterius discicollis* Platia & Gudenzi, *Lambillionea*, XCVII : 409.

Material examined : None was available for study.

Distribution : India : Bengal, Bihar, Maharashtra, Orissa, Pondicherry, Tamil Nadu.

Elsewhere : Sri Lanka, Birmania.

156. *Drasterius sulcatulus* Candeze, 1859

1859. *Drasterius sulcatulus* Candeze, *Monogr. Elat.*, II : 427; 1891, Candeze, *Catalog. Method. des Elat.*, : 86; 1906, Schwarz, In Wytsmann *Genera Insect*, 46 B : 111 ; 1914, Fleutiaux, *Phillippine Jour. Of Sci.*, 9(5), Sec. D : 442; 1925, Schenkling, In : Junk's *Col. Cat.* Pars 80, *Elat.*, I : 136; 1997, Platia & Gudenzi, *Lambillionea*, XCVII : 411.

Material examined : 4 exs., INDIA : West Bengal : Calcutta, 18.V–17.VI.1909, Ind. Mus. coll.; 1 ex, Calcutta, 8.X.1912, F. H. Gravely coll., collected at light; 1ex., Bhowanipur, 28.VII.1925, H. S. Pruthi coll.; 1 ex, Calcutta, VI.1926, Z.S.I. coll., collected at light; 3 exs, Nadia : Mohanpur, 8.VIII.1964, S. Chakraborty coll.

Distribution : India : West Bengal (Calcutta, Nadia), Goa, Karnataka, Kerala, Maharashtra, M.P., Orissa, Pondicherry, Tamil Nadu, U.P.

Elsewhere : Bangladesh; Nepal; Sri Lanka.

Remarks : Platia & Gudenzi (1997) have redescribed the species. The species is recorded for the first time from West Bengal.

XXXII. Genus *Ludigenus* Candeze, 1863

1863. *Ludigenus* Candeze, *Mon. Elat.*, Vol. 4 : 325; 1906, Schwarz, In Wytsmann *Genera Insect*, 46 C : 262; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 653.

Type : *Ludigenus politus* Candeze, (as designated by Hyslop, 1921).

Diagnostic characters : Frons little inclined and feebly convex and inclined downwards in the middle. Labrum diagonal, mandibles aligned almost horizontally towards front, thick and bicuspid, the last joint short and triangular.

Antennae short, rather thick and ripped. First segment short and thick, 2nd segment very small, 3rd almost longer than the 4th, the last segment curved at the top.

Prothorax is rather short, hind angles of pronotum short and pointed. Prosternum rather strongly rounded frontally, prosternal spine inclined inwards. Elytra comparatively long and constringed, rounded at distal extremities. Mesosternal cavity triangular, horizontal with broad, flat edges.

Legs rather long, posterior coxa widest at the middle, and crenated at posterior edges. Tarsi simple, laterally compressed and thickly velvet hairy underneath, 1st tarsal segment almost as long as to the both of the following segments, 2nd segment is gradually decreasing in length.

Distribution : India.

Elsewhere : Indo-China, Malay Archipelago

Biology and Habits : No information is available about the biology and habits of *Ludigenus* species.

Remarks : 2 species under this genus was recorded from the world. From India, the only known species under this genus was *L. politus* Candeze which was recorded from 'Indo- China' but the actual locality of this species is not known. Later on in 1997, the author reported this species from the state of Tripura. In the present study a new species of this genus is recorded from West Bengal.

157. *Ludigenus kalpanas* n. sp.

(Fig. 59)

Description : Length 18.5 mm, breadth 4 mm. Body elongated, blackish brown in colour; surface smooth. Abdominal tergites blackish brown. Antennae and legs brownish. Vestiture fine, dense, moderately long, whitish yellow coloured.

Head flattened slightly elongated, surface smooth. Frontal region densely punctate, punctation simple; frontal carina present across the frons but foveate in middle. Eyes large, prominent. Antennae long, extended upto the hind angle of pronotum, basal segment robust, 2nd segment smallest and elongatedly subglobose; 3rd longer than 2nd but shorter than 4th, 4th segment longest; the segments from 3rd onwards serrate.

Pronotum elongated, longer than width (length 5 mm, breadth 4 mm); widest at middle; sides' subparallel; lateral margin entire. Vestiture fine, dense, moderately long. Pronotal disc moderately convex, densely punctate; punctation simple, punctures separated by less

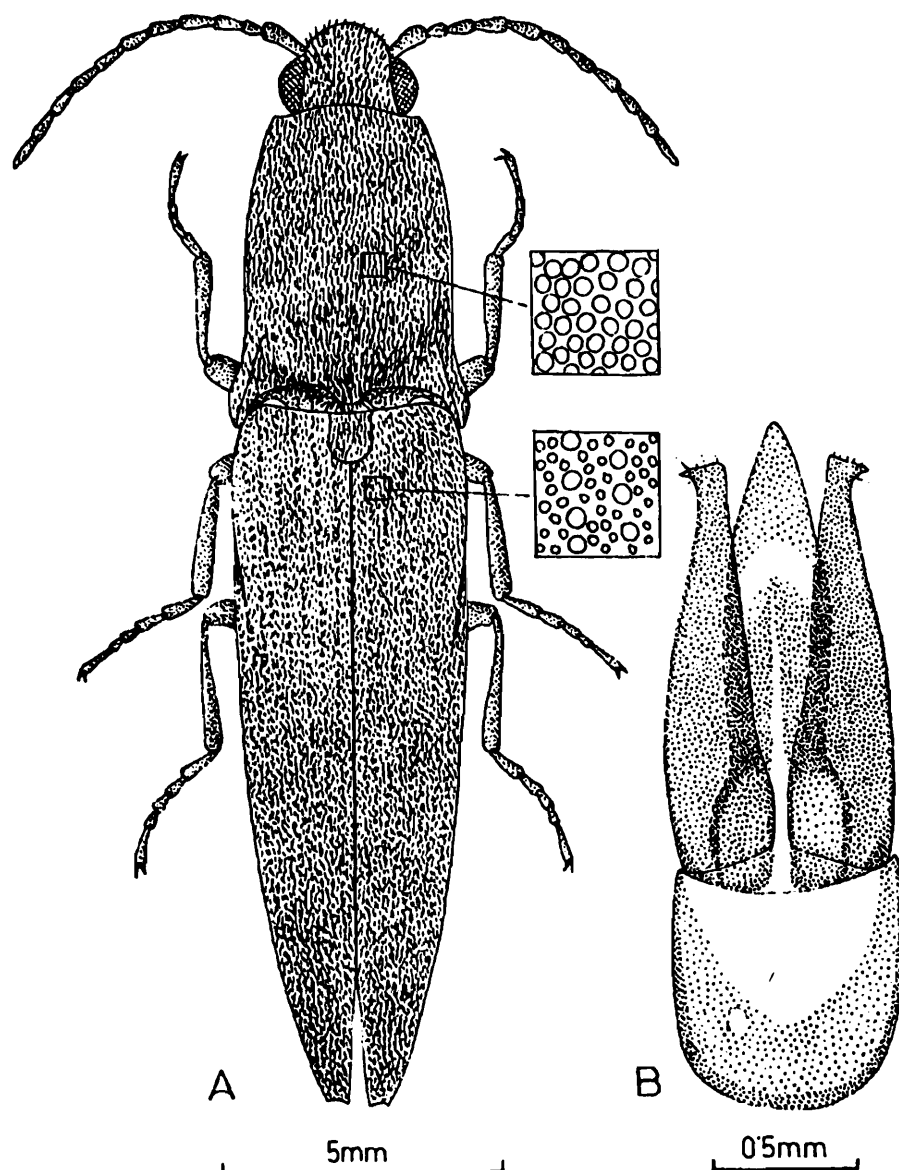


Fig. 59. *Ludigenus kalpanas* n. sp. : A. Dorsal view; B. Dorsal view of male genitalia.

than their own diameter; integument between punctures not granulate. Hind angles subpointed, notched on the lateral side, carina present, extended upto 1/5th of the lateral margin of pronotum.

Prosternum densely punctate; punctures separated by less than their own diameter, integuments between punctures not granulate. Prosternal spine elongated, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity inclined.

Scutellum subpentagonal, slightly depressed, surface smooth; densely punctate; vestiture fine, dense, integument between punctures not granulate.

Elytra about 3.0 times longer than broad (length 12.0 mm, breadth 4 mm), convex, sides' subparallel along basal third, then narrowed caudad. Apices truncated and spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by 1-2 times their own diameter; interstriae slightly convex to flat, moderately punctate, punctures small. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and simple claws.

Male Genitalia : Phallobase with anterior margin almost flat; parameres slender, slightly sinuate on the lateral side and with very small subapical process; median lobe slightly longer than the parameres, the anterior tip is pointed; furcae reaching the anterior margin of parameres.

Female : Very similar to male, can not be distinguished externally.

Type material : *Holotype* : 1 ex., ♂, INDIA : West Bengal : Darjeeling : Kalimpong, 3000 ft alt., 3.V.1997; D. B. Khawas coll., collected from soil surface of cultivated mulberry field.

Paratypes : 2 exs., same data as holotype.

Distribution : India : West Bengal (Darjeeling).

Remarks : The species is some what allied to *Ludigenus politus* Candeze from Indo-China but differs by the shape and size of antennae. The shape of 2nd antennal segment is subglobular as usual but longer in the new species and shorter in *L. politus* Candeze, the size and position of the lateral carina of hind angle of pronotum in both the species is different, the apical margin of the elytra is rounded in the latter species while that is truncated in this species.

Prior to the description of this species, the only known species under this genus from the Indo-Chinese zone was *Ludigenus politus* Candeze which was recorded by the author from India (Tripura) for the first time (Biswas & Chakraborty, 2000).

Itymology : The species has been named after the name of Mrs. Kalpana Chakraborty mother of the first author, without her support it was not possible for her to complete the present work.

XXXIII. Genus *Megapenthes* Kiesenwetter, 1863

1863. *Megapenthes* Kiesenwetter, *Naturg. Ins. Deutschl.*, Vol. 5 : 353; 1891, Candeze, *Catalog. Method. des Elat.* : 95; 1906, Schwarz, In Wytsmann. *Genera Insect*, 46B : 122; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, LVIII : 655.

Type : *Elater lugens* Redtenbacher, 1842, *Dissert. inang. vinb.* : 11 (as designated by Hyslop, 1921).

Distribution : Asia, Australia, Brazil, California, Europe, Mexico.

Remarks : From India 9 species of this genus were recorded of which only one species was from Darjeeling district of West Bengal. In the present work no materials of this genus was available for study.

158. *Megapenthes linearis* Candeze, 1857

1857. *Megapenthes linearis* Candeze, *Elat. Nouv. Fase.*, I : 30; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 B : 122.

Material examined : None was available for study.

Distribution : India; originally reported from Darjeeling district of West Bengal.

XXXIV Genus *Melanoxanthus* Eschscholtz, 1833

1833. *Melanoxanthus* Eschscholtz, In : Dejean *Cat. Ed.*, 3 : 91; 1836, Castelnau, In Silbermann's *Rev. Ent.*, Vol. 4 : 6; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46B : 126; 1921, Hyslop, *Proc. U. S. Natn. Hist.*, Vol. LVIII : 656.

1858. *Sericosomus* Boheman, *Eugen. Res. Ins.*, : 71.

Type : 1801, *Elater melanocephalus* Fabricius, *Sys. Eleuth.*, vol. 2 : 239 (Monobasic).

Note: Candeze (1859) reduces the type of synonymy under *E. melanocephalus* Thunberg (Hyslop, 1921).

Diagnostic characters : Frons uniformly convex, rounded in front or more or less angularly drawn in the middle. Mandible bidentate, last segment of maxillary palpi oval or elongated.

Antennae short, usually in male from 4th segment onwards strongly serrate, segments 4-10 each arranged in decreasing order.

Prothorax convex, as long as broad or longer than broad. Prosternum prominent and moderately strongly round in front, lateral suture straight, fine and continuous. Prosternal process inclined below. Scutellum triangular and strongly inclined. Elytra almost always emerginate apically. Mesosternal shield inclined inwards.

Legs short; femur more or less strongly enlarged inwards; tarsi simple, segments 1-4 gradually decreasing longitudinally.

Distribution : Asia, Africa, Australia.

Biology and Habits : Unknown.

Remarks : Candeze (1891) treated the genus under the tribe Elaterites and Schwarz (1906) has also followed him. However, Fleutiaux (1941) has preferred to treat the genus under the subfamily Elaterinae. Vats & Chauhan (1992) has treated the genus under subfamily Ampedinae. However, the status proposed by Fleutiaux (*op. cit.*) has been followed.

Out of the 7 species under this genus recorded from India 6 species are known from West Bengal. In the present study materials of 5 species were available for study.

Key to the species

- 1. Pronotum broader than long *dimidiatipennis*
- Pronotum as long as broad or longer than broad 2
- 2. Pronotal disc moderately convex 3
- Pronotal disc strongly convex 4
- 3. Antennae extended just beyond the middle of the pronotum *anticus*
- Antennae extended beyond the hind angle of the pronotum *bimaculatus*
- 4. Pronotum as long as broad; 2nd and 3rd segments of antennae subequal; elytra yellowish brown with posterior 1/3rd portion blackish *melanocephalus*
- Pronotum longer than broad; 2nd segment of antennae smallest; elytra yellowish brown with posterior 1/6th portion blackish *melanurus*

159. *Melanoxanthus anticus* Candeze, 1892
(Fig. 60)

1892. *Melanoxanthus anticus* Candeze, *Annls Soc. Ent. Belg.*, : 490; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 A : 127.

Redescription : Length 8.5 mm, breadth 2.0 mm. Body moderately elongated, dark brown and yellowish brown in colour; surface shining. Abdominal tergites brownish. Antennae blackish brown and legs light brown. Vestiture fine, moderately dense, moderately long, yellowish white coloured.

Head small, broader than long, surface convex. Frontal region densely punctate, punctation simple; frontal carina complete, across the frons, anterior margin almost rounded. Eyes small, visible. Antennae moderately long, extended just beyond the middle of pronotum; basal segment robust, 2nd segment smallest and subglobular, 3rd segment also subglobular and slightly longer than the 3rd, 4th segment is distinctly longer than the 5th, 4th segment onwards the segments are serrate.

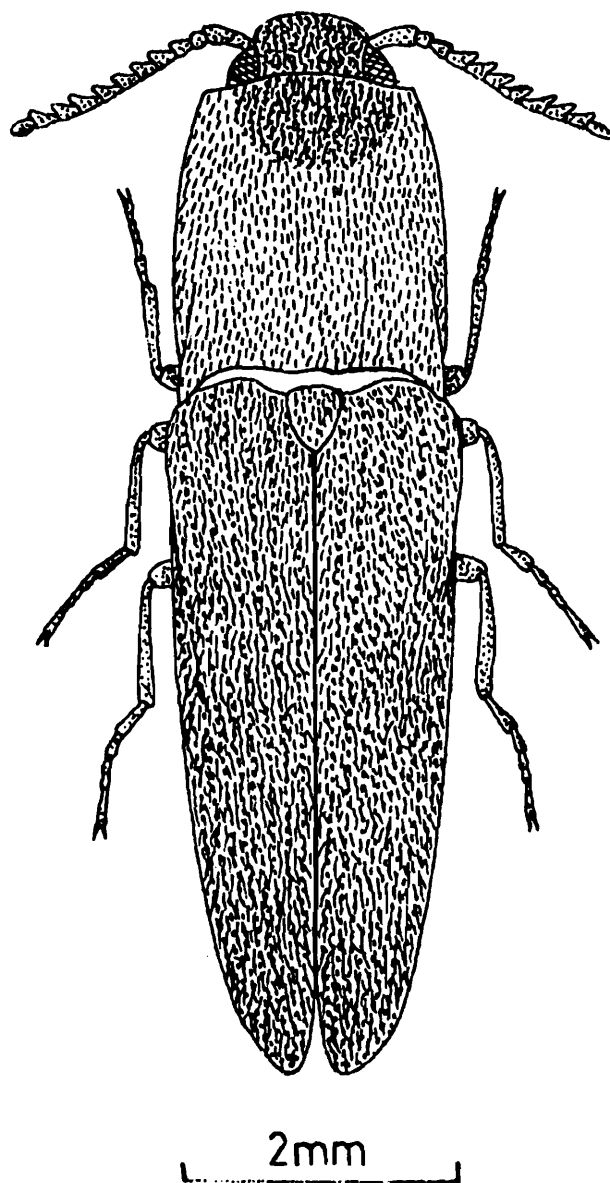


Fig. 60. *Melanoxanthus anticus* Candeze : Dorsal view.

Pronotum dark brownish with a blackish sub-rounded patch on the anterior side below the head, longer than broad (length 2.5 mm, breadth 2.2 mm); widest at middle; sides almost subparallel; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex, densely punctate; punctation simple, punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Hind angles short, slightly divergent, oblong, unicarinate, carina short, extended upto 1/4th of the pronotum.

Prosternum having anterior margin straight with a ridge; densely punctate, punctures separated by less than their own diameter, integument between punctures not granulate. Prosternal spine small, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subtriangular, elongated, longer than broad surface convex, distal part flat, anterior part straight; lateral margins emerginate; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra 2.5 times longer than broad (length 5.0 mm, breadth 2.0 mm), convex, sides' subparallel along basal third, then narrowed caudad. Apices truncated and finely spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae slightly convex to flat, granular. Vestiture moderately dense. Last sternite of abdomen almost flat. Legs slender with simple tarsi and simple claws.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Singla, 1500 ft. alt., VII, 1913, Lord Carmichael's coll. (det. Fleutiaux).

Distribution : India : West Bengal (Darjeeling); Maharashtra.

Remarks : The species was originally reported from 'Bengal' and Nagpore of Maharastra. But the actual locality of 'Bengal' is not known. Hence, the species is recorded for the first time from West Bengal.

160. *Melanoxanthus bimaculatus* Fleutiaux, 1918
(Fig. 61)

1918. *Melanoxanthus bimaculatus* Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 222.

Redescription : Length 8.0 mm, breadth 2 mm. Body moderately elongated, normally yellowish brown in colour and blackish in the posterior end of elytral quadrate; surface shining. Abdominal tergites blackish. Antennae blackish and legs deep brownish. Vestiture fine, moderately dense, moderately long, golden yellow coloured.

Head small, longer than broad, surface flat. Frontal region densely punctate, punctuation simple; frontal carina complete across the frons, with anterior margin arcuate. Eyes prominent and visible. Antennae long, extended beyond the hind angle of the pronotum; basal segment robust, 2nd and 3rd segment subequal and subglobose, 3rd is very slightly shorter than the 2nd, 4th segment slightly longer and stouter than the 5th; 4th segment onwards the segments are serrate.

Pronotum longer than broad (length 2.0 mm, breadth 1.7 mm); widest at middle; sides arcuate; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex, densely punctate; punctuation simple, punctures separate by less than their own diameter; integument between punctures not granulate. Hind angles long, sharply pointed, slightly divergent, unicarinate; carina short, extended upto the 1/4th part of the pronotum.

The ventral part is not visible as the material is pinned dorsally on a board.

Scutellum subrectangular, elongated, longer than broad, anterior margin almost rounded, surface convex; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

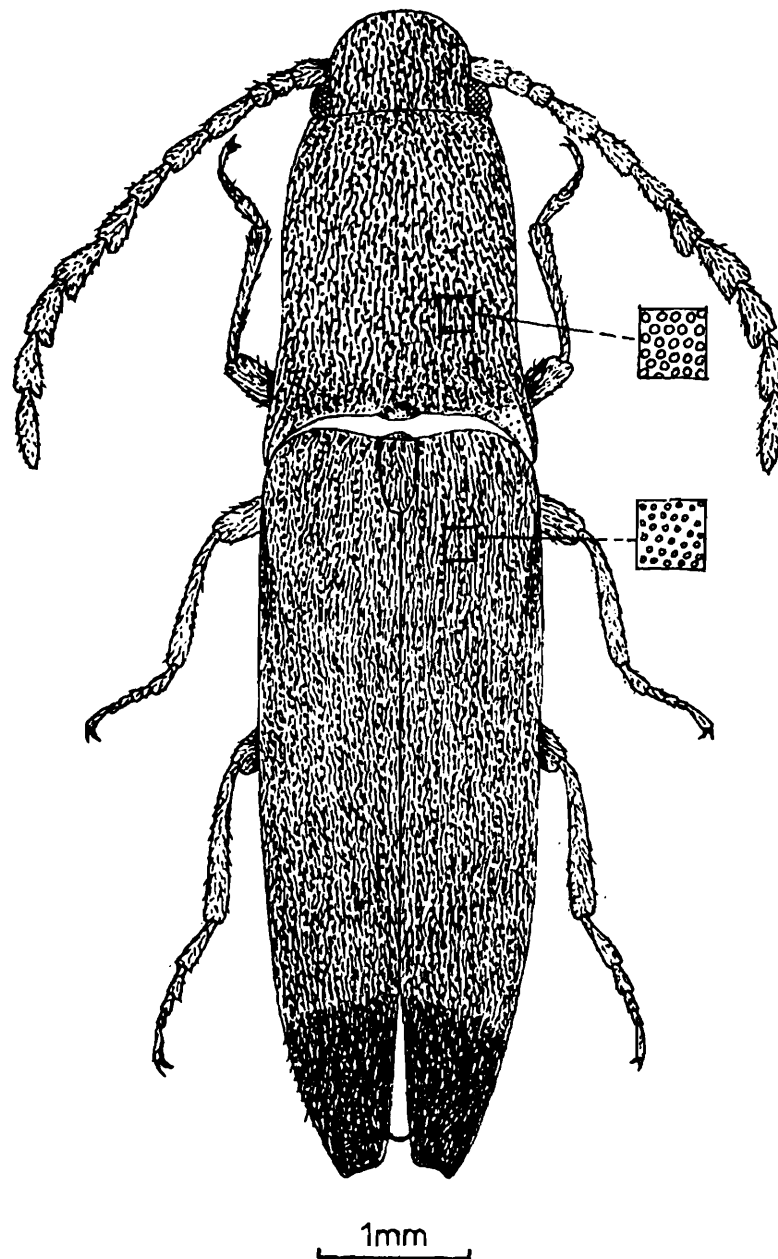


Fig. 61. *Melanoxanthus bimaculatus* Fleutiaux : Dorsal view

Elytra 2.5 times longer than broad (length 5.0 mm, breadth 2.0 mm), convex, sides' subparallel along basal half then narrowed caudad. Apices concave and truncated and finely spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat, non punctate, agranular. Vestiture moderately dense. Legs slender with simple tarsi and simple claws.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Pashok, alt. 2000 ft., V, 1916, L. C. Hartless coll. (det. K. V. L. Narayan).

Distribution : India: West Bengal (Darjeeling).

Elsewhere : Tonkin.

Remarks : This species is recorded for the first time from India as well as West Bengal.

161. *Melanoxanthus dimidiatipennis* Candeze, 1859
(Fig. 62)

1859. *Melanoxanthus dimidiatipennis* Candeze, *Monogr. Elat.*, II : 513; 1891, Candeze, *Catalog. Method. des Elat.*, : 99; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 A : 127.

Redescription : Length 9.0 mm, breadth 2.5 mm. Body moderately elongated, reddish brown and blackish in colour; surface shining. Abdominal tergites brownish. Antennae reddish brown upto 3rd segment, the rest segments are blackish. Legs brown. Vestiture fine, dense, moderately long, golden yellow coloured.

Head small, broader than long, surface flattened. Frontal region densely punctate, punctation simple; frontal carina complete across the frons, frons with anterior margin arcuate. Three carinae present on the head, one median, one longitudinal and a central carina and two smaller lateral carina near the eyes extended towards the posterior side of the head. Eyes small but visible. Antennae moderately long, extended beyond the

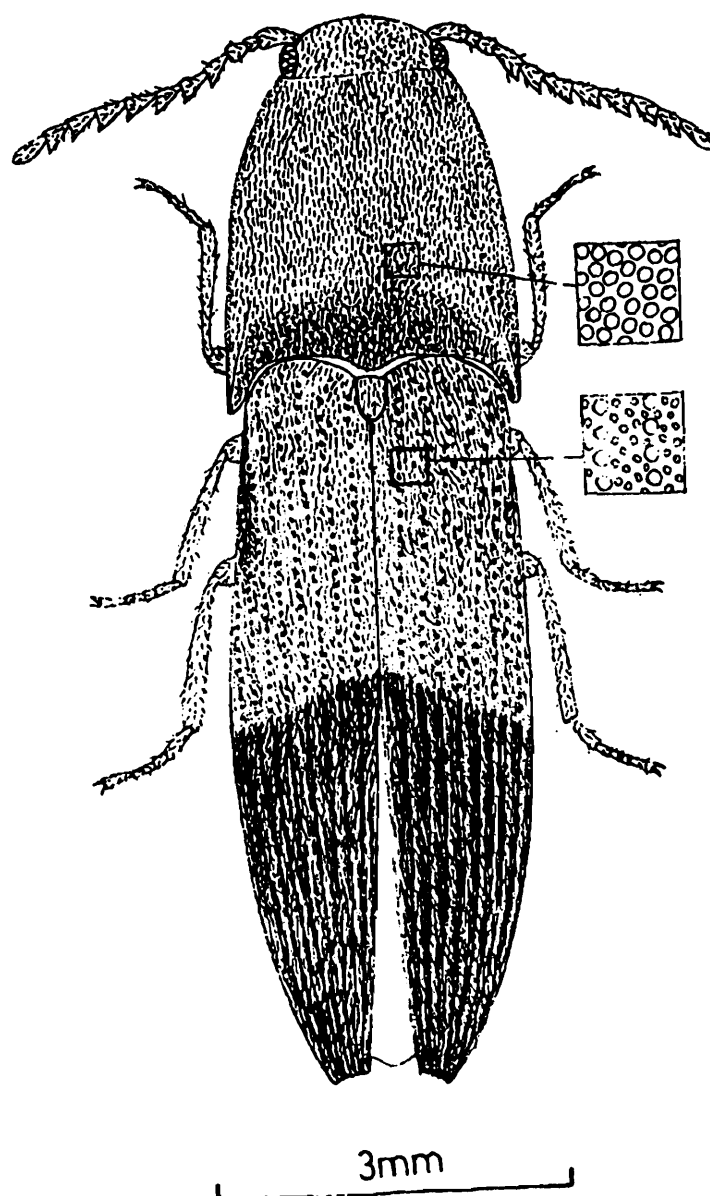


Fig. 62. *Melanoxanthus dimidiatipennis* Candeze : Dorsal view.

middle of the pronotum, basal segment robust, 2nd segment globular and smallest; 2nd slightly shorter than the 3rd, 3rd segment subserrate, 4th longer than the 5th, 4th segment onwards the segments are serrate.

Pronotum slightly broader than long (length 2.2 mm, breadth 2.7 mm); widest at middle; sides subparallel; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc moderately convex, finely and coarsely punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles short, slightly divergent, truncated, unicarinate; carinae extended only upto the 1/5th portion of pronotum.

Prosternum moderately densely punctate; punctures separated by 2-3 times their own diameter; integument between punctures not granulate. Prosternal spine slender, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum subrectangular, anterior margin almost straight, surface flat; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra yellowish brown except the posterior half, which is blackish; 2.4 times longer than broad (length 6 mm, breadth 2.5 mm); convex; sides subparallel along basal half, then narrowed caudad. Apices truncated and finely spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae convex with rough surface. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender and simple tarsi and simple claws.

Genitalia : Male were not available for study, both the materials are female.

Material examined : 2 exs., INDIA : West Bengal : Calcutta, 17.VIII.1932, S. Roy coll.

Distribution : India : West Bengal (Kolkata); originally reported from 'Bengal', but exact locality not known.

Remarks : This species is recorded for the first time from West Bengal.

162. *Melanoxanthus melanocephalus* (Fabricius) 1781
(Fig. 63)

1781. *Elater melanocephalus* Fabricius, *Sp. Ins.*, 1 : 272; 1784, Thunb., *Novae Ins. Sp.*, III : 63.
1787. Fabricius, *Mant. Ins.*, 1 : 174; 1792, Fabricius, *Ent. Syst.*, 1, 2 : 229, 1801, Fabricius, *Syst. El.*, I, II : 239; 1806, Herbst, *K^{of}.*, X : 111; 1844, Germar, *Zeitschr. Ent.*, V : 191.
1859. *Melanoxanthus melanocephalus* Candeze, *Mon. Elat.*, II : 512, tab. 7, fig. 12; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 221.

Redescription : Length 9 mm, breadth 2.3 mm. Body moderately elongated, yellowish brown in colour except the head and the elytral one third portion on the posterior side - which are blackish; a blackish spindle shaped portion present on the pronotum. Surface shining. Abdominal tergites yellowish brown except the last segment which is almost blackish and the 4th segment is blackish on the two lateral sides. Antennae blackish and legs brownish. Vestiture fine, moderately dense, moderately long, golden yellow coloured.

Head small, broader than long, surface flat, and convex. Frontal region densely and finely punctate, punctation simple; frontal carina complete across the frons, frons with anterior margin arcuate. Eyes small but visible. Antennae moderately long, extended slightly beyond the middle of the pronotum; basal segment robust, 2nd segment subglobose, 2nd and 3rd segments almost subequal, 3rd is subserrate, 4th segment long than the 5th; the segments are serrate from 4th onwards.

Pronotum mainly light brown but with an elongated longitudinal median 'U' shaped black marking extended upto the 3/4th of the pronotum; as long as broad (length 2.5 mm,

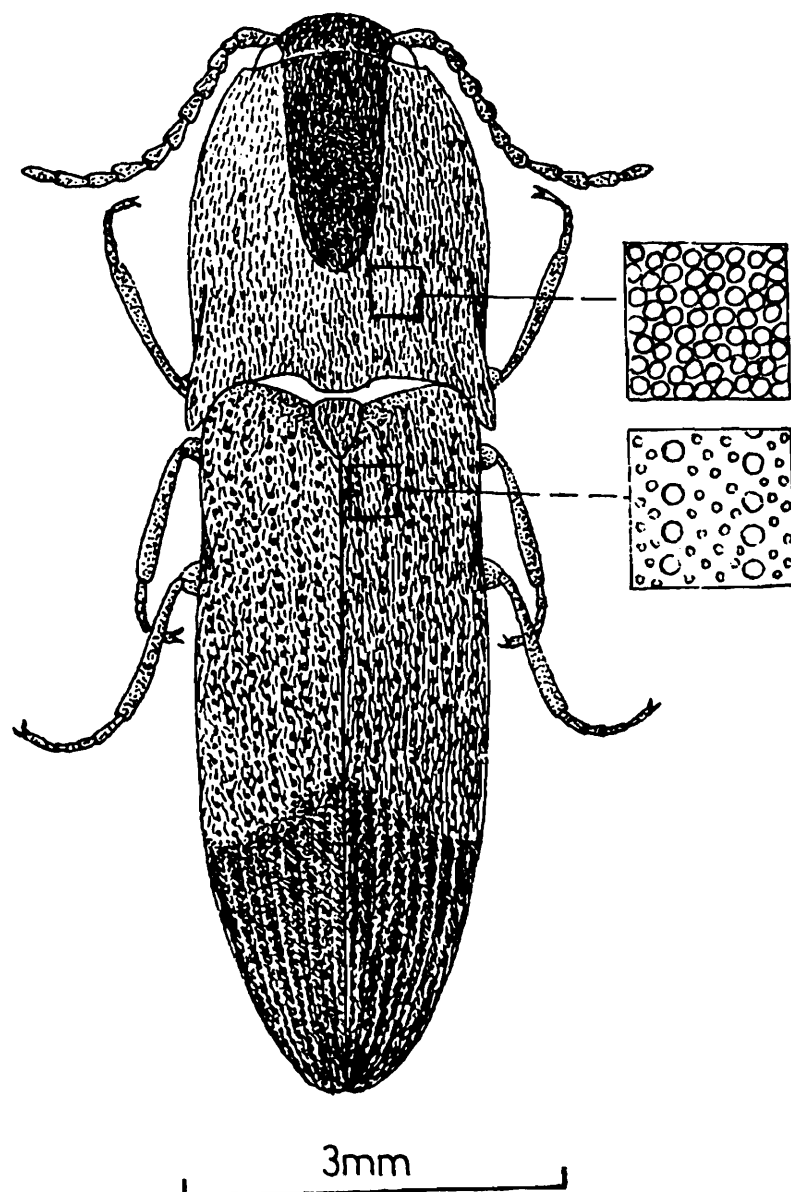


Fig. 63. *Melanoxanthus melanocephalus* Fabricius : Dorsal view.

breadth 2.5 mm); widest at middle; sides almost parallel; lateral margin entire. Vestiture fine, moderately dense, moderately long. Pronotal disc strongly convex, densely punctate; punctation simple, punctures separated by less than to 1-2 times their own diameter; integument between punctures not granulate. Hind angles short, slightly divergent, obtuse, unicarinate; carina short, extended upto the 1/4th of pronotum.

Prosternum moderately densely punctate; punctures separated by 1-2 times their own diameter; integuments between punctures not granulate. Prosternal spine short with longitudinal groove, apex of prosternal spine pointed, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum sub-triangular, brownish, anterior margin almost straight, posterior angles rounded, surface emerginate; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra normally yellowish brown but the posterior 1/3rd of the elytra is blackish; 2.5 times longer than broad (length 5.8 mm, breadth 2.3 mm), convex, sides subparallel along basal third, then narrowed caudad. Apices truncated and weakly spinose along middorsal suture. Striae consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat, granular with smaller punctures. Vestiture moderately dense. Last sternite of abdomen black and flat, the fourth segment is brownish but with two lateral sides blackish. Legs slender with tarsi and claws simple.

Male Genitalia : No male material was available for study.

Material examined : 1 ex., INDIA : West Bengal : Calcutta, 10.IX.1909, N. A. coll., collected at light (det Fleutiaux); 1 ex., Calcutta, VII-VIII 1976, A. K. Mukherjee coll., collected at day light; 1 ex., Calcutta Maidan, 21.IX.1911, F. H. Gravely coll.; 2 exs., Calcutta : Shyambazar, 25.VI.1996, S. S. Saha coll., collected at light; 1 ex., Calcutta, 1.VII.1907, Ind. Mus. coll., collected at light; 1 ex., Midnapore : Kharagpur, 17-30.VI.1911, R. Hodgart coll.;

Distribution : India : West Bengal (Kolkata, Midnapore), S. India (Coromondal; Andhra Pradesh).

Elsewhere : Borneo; China; Cochin China; Madagascar; Philippines; Sumatra; Tonkin.

Remarks : This species is recorded for the first time from West Bengal.

163. *Melanoxanthus melanurus* Candeze, 1865

(Fig. 64)

1865. *Melanoxanthus melanurus* Candeze, *Elat. Nouv.*, I : 27; 1878, Candeze, *C. R. Soc. Ent. Belg.*, XXI : 136; 1891, Candeze, *Catalog Method. des Elat.*, : 99; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46 A : 127; 1918, Fleutiaux, *Annls Soc. Ent. Fr.*, 87 : 222.

Redescription : Length 12 mm, breadth 3.7 mm. Body elongated, yellowish brown in colour except the head and posterior 1/3rd of the elytra which is blackish; surface shining. Abdominal tergites brownish. Antennae blackish and legs brownish. Vestiture fine, moderately dense, moderately long, golden yellowish coloured.

Head small, brownish, broader than long, surface convex. Frontal region densely punctate, punctation simple; frontal carina complete across the frons, frons with anterior margin subpointed. Eyes prominent. Antennae moderately long, extended beyond the middle of the pronotum; basal segment robust, 2nd segment smallest & subglobose, very slightly shorter than the 3rd, 4th segment longest; the segments are serrate. Mandibles invisible.

Pronotum has a transparent look, longer than broad (length 4.0 mm, breadth 3.5 mm); widest at middle; sides subparallel; lateral margin entire. Vestiture fine, moderately dense,

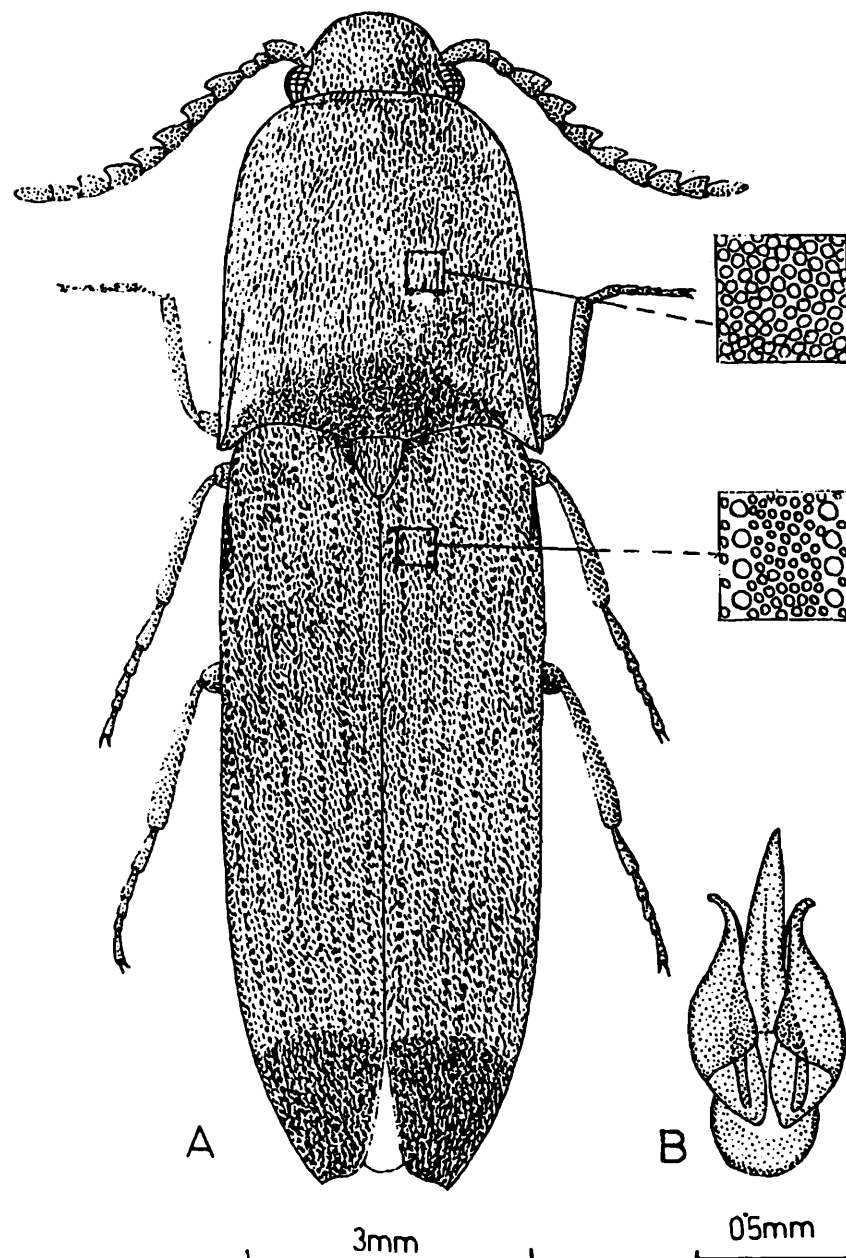


Fig. 64. *Melanoxanthus melanurus* (Candeze) : A. Dorsal view; B. Dorsal view of male genitalia.

moderately long. Pronotal disc strongly convex, densely punctate; punctation simple, punctures separated by less than their own diameter; integument between punctures not granulate. Hind angles short, slightly divergent, obtuse, unicarinate; carina short, extended beyond 1/4th of the pronotum.

Prosternum transparent, moderately densely punctate; punctures separated by 1-2 times their own diameter; integument between punctures not granulate. Prosternal spine elongated without groove, moderately densely punctate. Margins of mesosternal cavity declined.

Scutellum elongated, subtriangular, apex, flat, surface emerginate; moderately densely punctate; vestiture fine, moderately dense; integument between punctures not granulate.

Elytra yellowish brown but the posterior 1/6th portion of the elytra is blackish, 1.9 times longer than broad (length 7.3 mm, breadth 3.7 mm), convex, sides subparallel along basal third, then narrowed caudad. Apices truncated and very weakly spinose along middorsal suture. Striae indistinct, consisting of linear rows of punctures joined by moderately impressed lines, punctures separated by less than their own diameter; interstriae flat with smaller punctures, agranular. Vestiture moderately dense. Last sternite of abdomen flat. Legs slender with simple tarsi and simple claws.

Genitalia : All the materials studied were female, hence no male genitalia was studied.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Siglala, 1500 ft., V 1913, Lord Carmichael's coll. (det. Fleutiaux); 2 ex., Pashok, 3500 ft. alt., 26.V.-14.VI.1916, F. H. Gravely coll.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Cochin China, Siam.

Remarks : This species is recorded here for the first time from India.

164. *Melanoxanthus rubiginosus* Candeze, 1889

1889. *Melanoxanthus rubiginosus* Candeze, *Elat. Nouv.*, IV : 29; 1878, Candeze, *C. R. Soc. Ent. Belg.* XXI : cxxxviii; 1891, Candeze, *Catalog. Method des Elat.*, : 99; 1906, Schwarz, In : Wytsmann *Genera Insect*, 46A : 127.

Material examined : None was available for study.

Distribution : India; originally reported from Darjeeling district of West Bengal.

M. Subfamily HYPNOIDINAE

Diagnostic characters : Head capsule flattened, mouthparts prognathus, frons, ridged; prosternum normally arcuate anteriorly; scutellum various but never cordate; mesocoxae

open to mesepimeron but closed to mesepisternum; meso- and metasternum distinct, joined by a definite suture; tarsi simple, without pads; claws simple without setae.

Remarks : The Hypnoidinae are small, rather homogenous group best known through certain grain pests in the genus *Hypnoidus* Dillwyn. The subfamily contains about 10 genera and about 860 species, usually found in cold to temperate regions of North and South America, Europe & Asia. From India, 2 genera (viz. *Hypnoidus* Dillwyn and *Ligmargus* Stibick) and 14 species are recorded of which 13 are from the former genus and one from the latter genus. From West Bengal single species under the genus *Hypnoidus* is recorded.

The subfamily has been extensively monographed by Stibick [1976 (Part-I), 1978 (Part-II), 1979a (Part-III), 1980a (Part-IV) & 1980b (Part-V)].

XXXV. Genus *Hypnoidus* Dillwyn, 1829

1829. *Hypnoidus* Dillwyn, *Mem. Coleopt.*, : 32; 1978, Stibick, Part. II., *EOS.*, 52 : 342; 1980, Stibick, *EOS*, 54 : 250.

Type : *Elater riparius* Fabricius, 1775, *Ent. Syst.*, vol. 2, p. 232 (Designation of Westwood 1840, in *Int. Mod. Class. Ins.*, vol. 2, Gen. Syn., p. 25,) (Hyslop, 1921).

Diagnostic characters : The genus has been described in details by Stibick, (1978, 1980).

Distribution : Usually found in cold in temperate regions of North America, Europe and Asia.

Biology and Habits : Nothing is known of the biology and habits of *Hypnoidus* species.

Remarks : Stibick (1979b) recorded 58 species under 8 genera from the world. From the Himalayan zone of India 13 species have been recorded. From West Bengal single species *Hypnoidus beckeri* was described by Stibick in 1980. The species was originally reported from Darjeeling district of West Bengal. No material of this group was available for study.

165. *Hypnoidus beckeri* Stibick, 1980

1980. *Hypnoidus beckeri* Stibick, *EOS, Revista Espanola de Entomologia*, 54 : 254.

Material examined : None was available for Study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal; Tibet.

Remarks : The species was described by Stibick, 1980 in details. During this present study no material was available; hence the characters of this group can't be studied.

N. Subfamily NEGASTRINAE

Diagnostic characters : Pronotum oval, never cordate; claws simple and feebly toothed, or flanged, without basal setae; prosternal process elongate; mesepimeron and mesepisternum cut off from mesocoxae by meso- and metasternum; prosternum usually wider in middle and prosternal sutures normally arcuate.

Remarks : A large subfamily not yet studied well in the species level. Only European fauna is well studied (Stibick, 1979). Nakane and Kishii (1956) established the subfamily Negastrinae with 15 recognized genera. Stibick (1971) has given a good account on the genera of this subfamily and has included another five new genera. World wide about 400 species including about 65 sub-species and varieties have been recorded under 20 genera. From India Seven genera [viz., *Cryptohypnus* Eschscholtz (with two species), *Hemirrhaphes* Candeze (with one species), *Monadicus* Candeze (with two species), *Negastrius* Thompson (with three species), *Quasimus* Gozis (with eight species), *Yukoana* Kishii (with one species), *Zorochrus* Thompson (with one species)] and sixteen species have been recorded. From West Bengal two genera and eight species have been recorded in this present study.

Key to the Genera

1. Elytra without any striae *Quasimus*
- Elytra completely or partly striate *Zorochrus*

XXXVI. Genus *Quasimus* Gozis, 1886

1886. *Quasimus* Gozis, *Recher d. Species typ. d. quel ancien gen.*, : 22; 1921, Hyslop, *Proc. U. S. Natn. Mus.*, Vol. LVIII : 668; 1971, Stibick, *Pac. Insects*, 13(2) : 384.

Type : *Cryptohypnus minutissimus* Germar, 1817, *Fauna Ins. Eru.*, : 6, 8 (Monobasic) (Hyslop, 1921).

Morphological characters : Stibick (1971) has given the description of the genus in details.

Distribution : India.

Elsewhere : Indonesia; Japan; Europe; New guinea.

Biology and Habits : Unknown.

Remarks : Ohira (1973), Stibick (1971) and all other chief authors have treated the genus under subfamily Negastrinae.

This is one of the larger groups with one subgenus (*Miquasus*) Kishii, 1959. The nominate subgenus has a ring-like carination on the scutellum and comparatively heavy punctation, while (*Miquasus*) has only a flat scutellum and minute, sparse punctation. In this present study only 2 species under the nominate subgenus has been studied from West Bengal out of the 5 species recorded so far from this state.

Key to the species

1. 2nd and 4th segment of antennae almost subequal, scutellum broader than long ..
..... *meghalayanus*
- 2nd segment of antennae slightly shorter than the 4th, scutellum almost as long as
broad *obovatus*

166. *Quasimus (Quasimus) brancuccii* Dolin, 1993

1993. *Quasimus (Quasimus) brancuccii* Dolin, *Entomol. Basil.*, 16 : 191.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling, Sikkim).

167. *Quasimus (Quasimus) meghalayanus* Dolin, 1993

1993. *Quasimus (Quasimus) meghalayanus* Dolin, *Entomol. Basil.* 16 : 181-183.

Material Examined : 39 exs., INDIA : West Bengal : Darjeeling : Lava, 4.V.1974, J. K. Jonathan coll.

Distribution : India : West Bengal (Darjeeling), Meghalaya.

168. *Quasimus (Quasimus) obovatus* Dolin, 1993

1993. *Quasimus (Quasimus) obovatus* Dolin, *Entomol. Basil.*, 16 : 183.

Material examined : 4 exs., INDIA : West Bengal : Bankura : Hatirampur, 10.IX.1986, D. N. Biswas coll.; 2 exs., Nadia : Kalyani, 19.V.1995 & 31.III.1996, P. Chakraborty coll., collected at light.

Distribution : India : West Bengal (Bankura, Darjeeling & Nadia), U.P., Sikkim.

Elsewhere : Nepal.

Remarks : The species has been described in details by Dolin (1993). It was previously recorded from the hilly tracts of Darjeeling but in the present study the species has been recorded from the plains of West Bengal for the first time.

169. *Quasimus (Quasimus) persimilis* Dolin, 1993

1993. *Quasimus (Quasimus) persimilis* Dolin, *Entomol. Basil.*, 16 : 188.

Material examined : None was available for study.

Distribution : India : West Bengal (Darjeeling), Sikkim.

Elsewhere : Nepal.

170. *Quasimus (Quasimus) subovalis* Fleutiaux, 1930

1930. *Quasimus (Quasimus) subovalis* Fleutiaux, *Bull. Mus. Hist. Nat. Paris*, 11(2) : 643; 1970, Ohira, *Annls hist.-nat. Mus. Natn. hung*, Tomus, 62 : 238.

Material examined : None was available for study.

Distribution : India : West Bengal.

Elsewhere : Singapore; Sumatra; Tenasserim; Tonkin; Yunnan.

XXXVII. Genus *Zorochrus* Thompson, 1858

1858. *Zorochrus* Thompson, *Skand. Col.*, : 106; 1971, Stibick, *Pac. Insects*, 13(2) : 378-380.

Type : *Elater dermestoides* Herbst, 1806, *Kafer*, 10 : 85.

Morphological characters : The species has been described in details by Stibick (1971).

Distribution : India.

Elsewhere : Africa; Europe; Indonesia; Japan; South Africa; Central and North America; New Guinea.

Biology and Habits : Unknown. In the present study a single species (*Z. godavariensis* Ohira and Becker) was collected from cattle dung.

Remarks : The genus was established by Thompson, 1858 with *Elater dermestoides* Herbst, 1806, as its type species. Stibick (1971) has given the description of this genus in details. Prior to the present work, there was only two species *Z. tactus* (Candeze) and *Z. indicus* (Motschulsky) under this genus recorded from India. Here, two other species *Z. godavariensis* and *Z. birganjanius* have been recorded from India as well as from the state of West Bengal for the first time.

Key to the species

1. Antennae entirely reddish brown to yellowish brown; head flattened between eyes *birganjanius*
- Antennae pale yellow, head gently convex between eyes *godavariensis*

171. *Zorochrus birganjanius* Ohira & Becker, 1973

1973. *Zorochrus birganjanius* Ohira & Becker, *Orient. Insects*, 7(1) : 70.

Material examined : 23 exs., INDIA : West Bengal : Darjeeling : Rangpo, 450 m. alt., 15-19.IV.1976, C. R. Basu coll., collected at light.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

Remarks : This species is recorded here for the first time from West Bengal in India. Originally it was recorded from Nepal.

172. *Zorochrus godavariensis* Ohira & Becker, 1974

1974. *Zorochrus godavariensis* Ohira & Becker, *Orient. Insect*, 8(4) : 557.

Material examined : 1 ex., INDIA : West Bengal : Darjeeling : Melli, 23.XII.1980, S.K. Saha & party coll., collected under dung; 1 ex., Sukna, 10.VII.1995, P. Chakraborty coll.

Distribution : India : West Bengal (Darjeeling).

Elsewhere : Nepal.

Remarks : The species is recorded here for the first time from India.

173. *Zorochrus (Zorochrus) tactus* (Candeze, 1900)

1900. *Cryptohypnus tactus* Candeze, *Elat. Nouveaux*, 7 : 16

1905. *Hypnoidus monadicoides* Fleutiaux, *Annls Soc. Ent. Fr.*, 74 : 326.

1906. *Hypnoidus fleutiauxi* Schwarz, *Genera Insect*, 46B : 153 (nom. n. fiir *H. manadicoides* Fleutiaux, nec. 1903, Schwarz, : 369). *Zorochrus (Zorochrus) tactus*; Dolin & Cate, *Z. Arb. Gem. Ost. Ent.*, 50 : 40.

Material examined : None was available for study.

Distribution : India : West Bengal.

DISTRIBUTION AND ABUNDANCE OF ELATERID BEETLES

Distribution pattern of elaterid beetles recorded from West Bengal

Elaterid beetles although recorded as early as in 1831 from West Bengal, a systematic survey was lacking till the initiation of the present work. Although, many parts of West Bengal could not be surveyed, but so far as many as 172 species are known from this State. However, materials of 87 species of Elateridae were available for study. Here, an attempt has been made to analyse the available records of altitude and the prevalence of these species.

The northern West Bengal is the richest in flora-faunistic composition within the limits of its evergreen and youthful topography. This generalisation holds good for the elaterid fauna also, as has been proved in the present study.

The maximum concentration of 53 species (Table 1) is found in the area from the plainland to the lower Hill forest (upto 450 m), with Mangrove forest in the coastal area, deciduous and scrub vegetation covering the greater parts of the western region of the lower gangetic plains and the tropical moist deciduous forest of the lower hilly land of

Darjeeling district.

The second highest concentration of 42 species (Table 1) occurs in the Middle Hill Forest zone (450 m–1500 m) with a canopy of tropical rain forest and evergreen or deciduous forest dominated by *Shorea robusta*, species of *Adinia*, *Terminalia*, *Bauhania* etc.

In the Upper Hill Forest Zone (1500 m–2150 m) with mixed broad leaved forest, only 8 species (vide Table 1) have been recorded. In fact, all these species occur between 1500 m–2000 m, except a single species *Quasimus (Quasimus) obovatus* Dolin from Lava of Darjeeling district having a highest altitude of 2150 m. In most upper altitude beyond Ranigrom (2000 m), the occurrence of a single species is certainly due to lack of proper survey and collection in that area.

Apart from these species being restricted in the different altitudinal zones, there is one species (*Calais sculptus* Westwood) which seems to be versatile in exploiting varied ecological niches from the plains upto the altitude of 1525 m.

A histogram has been provided to analyse the data on distribution of this beetles in West Bengal (Fig. 65).

Table 1. Distribution of Elaterid species according to the Altitudinal zones in West Bengal.

Name of the species	Plains to Lower Hill (upto 450 m)	Middle Hill (450 m-1500 m)	Upper Hill (1500 m-2150 m)
A. Subfamily AGRYPNINAE			
1. <i>Adelocera pentagonalus</i> Vats & Kashyap	+		
2. <i>A. prabiri</i> n. sp.	+		
3. <i>A. triptii</i> n. sp.	+		
4. <i>Adelocera</i> sp.	+		
5. <i>Agrypnus afflictus</i> (Candeze)	+		
6. <i>A. bipapulatus</i> (Candeze)			+
7. <i>A. coenosus</i> (Hope)		+	
8. <i>A. colonicus</i> (Candeze)	+	+	
9. <i>A. costicollis</i> (Candeze)	+	+	
10. <i>A. darjeelingensis</i> n. sp.			+
11. <i>A. haedulus</i> (Candeze)	+		
12. <i>A. jurulosus</i> (Candeze)	+		
13. <i>A. lapideus</i> (Candeze)		+	
14. <i>A. maisus</i> Vats & Kashyap	+		
15. <i>A. melancholicus</i> (Candeze)	+		

Name of the species	Plains to Lower Hill (upto 450 m)	Middle Hill (450 m-1500 m)	Upper Hill (1500 m-2150 m)
16. <i>A. mustellinus</i> (Germar)		+	
17. <i>A. piger</i> (Candeze)		+	
18. <i>A. serrula</i> (Candeze)	+	+	
19. <i>A. shyamrupi</i> n. sp.	+		
20. <i>A. sinensis</i> (Candeze)	+	+	
21. <i>A. tostus</i> (Candeze)		+	
22. <i>Agrypnus</i> sp.		+	
23. <i>Lanelater attonitus</i> (Candeze)	+		
24. <i>L. cinereus</i> (Candeze)	+	+	
25. <i>L. fuscipes</i> (Fabricius)	+		
26. <i>L. kalimpongensis</i> n. sp.		+	
27. <i>L. luridus</i> (Fabricius)	+	+	
28. <i>L. rufipes</i> (Candeze)	+		
29. <i>Meristhus (Sulcimerus) crenulatus</i> Mukhopadhyay & Chakraborty		+	
30. <i>M. (Sulcimerus) lotharensis</i> Ohira & Becker	+		
31. <i>M. (Sulcimerus) quadripunctatus</i> Candeze	+	+	
B. Subfamily CARDIOPHORINAE			
32. <i>Cardiophorus gangeticus</i> Candeze	+		
33. <i>C. moni</i> n. sp.	+	+	
34. <i>C. moorei</i> Candeze			+
35. <i>C. serratus</i> Mukhopadhyay & Chakraborty	+		
C. Subfamily HEMIOPSINAE			
36. <i>Hemiops crassa</i> (Gyllenhal)		+	
37. <i>H. flava</i> Castelnau	+		
38. <i>Plectrosternus rufus</i> Lacordaire	+	+	

Name of the species	Plains to Lower Hill (upto 450 m)	Middle Hill (450 m-1500 m)	Upper Hill (1500 m-2150 m)
D. Subfamily MELANOTINAE			
39. <i>Melanotus bengalicus</i> n. sp.	+		
40. <i>M. fuscus</i> (Fabricius)	+	+	
41. <i>M. himalayanus</i> n. sp.	+		
42. <i>M. kolkatai</i> n. sp.	+		
43. <i>M. longicornis</i> Candeze	+	+	
44. <i>Priopus ornatus</i> (Candeze)		+	
45. <i>Szombatya hodgarti</i> Platia & Schimmel	+		
E. Subfamily CONODERINAE			
46. <i>Aeoloderma brachmana</i> (Candeze)	+		
47. <i>A. chrysites</i> (Candeze)	+		
48. <i>A. sinensis</i> (Candeze)	+		
49. <i>Heteroderes lenis</i> Candeze	+	+	
50. <i>H. macroderes</i> (Candeze)	+		
51. <i>H. spinicollis</i> Candeze		+	
52. <i>H. spinosus</i> Candeze	+		
53. <i>Pachyderes bengalensis</i> Candeze	+		
F. Subfamily PHYSORRHININAE			
54. <i>Anchastus falsus</i> Candeze		+	
55. <i>A. imitans</i> Candeze		+	
G. Subfamily DICREPIDINAE			
56. <i>Singhalenus candezei</i> Schwarz			+
H. Subfamily HEMIRRHIPINAE			
57. <i>Anthracalaus bengalensis</i> (Candeze)	+		
58. <i>Calais sculptus</i> (Westwood)	+	+	+
59. <i>C. sordidus</i> (Westwood)		+	
I. Subfamily OXYNOPTERINAE			
60. <i>Campsosternus dohrni</i> Westwood		+	
61. <i>C. stephensi</i> Hope		+	

Name of the species	Plains to Lower Hill (upto 450 m)	Middle Hill (450 m-1500 m)	Upper Hill (1500 m-2150 m)
62. <i>Pectocera cantori</i> Hope			+
J. Subfamily ADRASTINAE			
63. <i>Silesis bengalensis</i> Candeze	+		
64. <i>S. candezei</i> Schimmel & Platia	+		+
65. <i>S. nigriceps</i> Candeze		+	
66. <i>S. rugosus</i> Schimmel & Platia	+		+
67. <i>S. wittmeri</i> Schimmel & Platia		+	
K. Subfamily SENODONINAE			
68. <i>Penia eschscholtzi</i> (Hope)			+
69. <i>P. holzschuhi</i> Schimmel & Platia		+	
70. <i>P. longipes</i> Candeze		+	
71. <i>P. opatroides</i> Candeze		+	
72. <i>P. wittmeri</i> Dolin & Suzuki		+	
L. Subfamily ELATERINAE			
73. <i>Agonischius altus</i> Candeze		+	
74. <i>Aphanobius touffus</i> Vats & Chauhan	+		
75. <i>Drasterius brahminus</i> Candeze	+		
76. <i>D. collaris</i> Candeze	+		
77. <i>D. sulcatulus</i> Candeze	+		
78. <i>Ludigenus kalpanas</i> n. sp.		+	
79. <i>Melanoxanthus anticus</i> Candeze		+	
80. <i>M. bimaculatus</i> Fleutiaux		+	
81. <i>M. dimidiatipennis</i> Candeze	+		
82. <i>M. melanocephalus</i> (Fabricius)	+		
83. <i>M. melanurus</i> Candeze		+	
M. Subfamily NEGASTRINAE			
84. <i>Quasimus meghalayanus</i> Dolin			+
85. <i>Q. obovatus</i> Dolin	+		
86. <i>Zorochrus birganjianus</i> Ohira & Becker	+		
87. <i>Z. godavariensis</i> Ohira & Becker	+		

ABUNDANCE OF ELATERID BEETLES

Elaterid beetles are predominantly found during the month of April to September. When it rains early, these beetles are available also in March. Some populations may also be observed in October or even upto middle of November. During the winter months from end of November to February, these insects become very rare. It is observed from available data on collection that these beetles are available during the month of May in maximum number (38 species under 18 genera) and minimum in number during the month of December (single species). In the other months the availability of species are as follows – in January two species under one genus, in February 5 species under 4 genera, in March 9 species under 5 genera, in April 17 species under 11 genera, in June 22 species under 11 genera in July 15 species under 10 genera, in August 13 species under 8 genera in September 10 species under 8 genera in October 6 species under 4 genera and in November 3 species under 2 genera. A histogram (Fig. 66) has been provided to analyse these data on monthwise collection of these beetles. However, some specimens of few species may be available throughout the year, especially in the plain area of the state. Here, an attempt has been made to analyse the available records on abundance of elaterid beetles from the state of West Bengal with temperature. Since records on other abiotic factor like rainfall, relative humidity, day length etc. are not available, these factors could not be correlated with the abundance of these species.

Regarding abundance of the individuals of different species a great variation may be noted. Some species such as *Adelocera prabiri*, *Agrypnus serrula*, *Aeoloderma sinensis*, *Lanelater fuscipes*, *Melanotus fuscus*, *Heteroderes lenis*, *Silesis candezei* and *Agonischius altus* appear to be very common and any collection trip to suitable localities would yield specimens of most or all the species mentioned above. Some species, viz., *Lanelater attonitus*, *Agrypnus bipapulatus*, *A. haedulus*, *A. melancholicus*, *Cardiophorus gangeticus*, *Aeoloderma chrysites*, *Singhalenus candezei*, *Aphanobius touffus* and *Melanoxanthus anticus* are rarely found and it is difficult of get specimens of these species. It may be mentioned here that only a single specimen of some species of the following genera like *Penia*, *Campsosternus*, *Anchastus* and *Meristhus* has been collected during this study, but those species were reported in quite in a large number by many earlier workers from the state.

Table 2. Month wise occurrence of the species recorded from West Bengal

Name of the species	Month of collection
A. Subfamily AGRYPNINAE	
1. <i>Adelocera pentagonalus</i> Vats & Kashyap	May
2. <i>A. prabiri</i> n. sp.	May
3. <i>A. triptii</i> n. sp.	February
4. <i>Adelocera</i> sp.	April
5. <i>Agrypnus afflictus</i> (Candeze)	September

Name of the species	Month of collection
6. <i>A. bipapulatus</i> (Candeze)	Rains
7. <i>A. coenosus</i> (Hope)	April–July
8. <i>A. colonicus</i> (Candeze)	April
9. <i>A. costicollis</i> (Candeze)	March–August
10. <i>A. darjeelingensis</i> n. sp.	–
11. <i>A. haedulus</i> (Candeze)	Not recorded
12. <i>A. jurulosus</i> (Candeze)	April–May
13. <i>A. lapideus</i> (Candeze)	July
14. <i>A. maisus</i> Vats & Kashyap	June
15. <i>A. melancholicus</i> (Candeze)	June
16. <i>A. mustellinus</i> (Germar)	June
17. <i>A. piger</i> (Candeze)	April–May
18. <i>A. serrula</i> (Candeze)	January–April
19. <i>A. shyamrupi</i> n. sp.	January–May
20. <i>A. sinensis</i> (Candeze)	May
21. <i>A. tostus</i> (Candeze)	June
22. <i>Agrypnus</i> sp.	May
23. <i>Lanelater attonitus</i> (Candeze)	Not recorded
24. <i>L. cinereus</i> (Candeze)	June–August
25. <i>L. fuscipes</i> (Fabricius)	June–November
26. <i>L. kalimpongensis</i> n. sp.	May
27. <i>L. luridus</i> (Fabricius)	March–November
28. <i>L. rufipes</i> (Candeze)	Not recorded
29. <i>Meristhus (Sulcimerus) crenulatus</i> Mukhopadhyay & Chakraborty	May
30. <i>M. (Sulcimerus) lotharensis</i> Ohira & Becker	August
31. <i>M. (Sulcimerus) quadripunctatus</i> Candeze	May–July
B. Subfamily CARDIOPHORINAE	
32. <i>Cardiophorus gangeticus</i> Candeze	September
33. <i>C. moni</i> n. sp.	April–June
34. <i>C. moorei</i> Candeze	Not recorded
35. <i>C. serratus</i> Mukhopadhyay & Chakraborty	June

Name of the species	Month of collection
C. Subfamily HEMIOPSINAE	
36. <i>Hemiops crassa</i> Gyllenhal	Not recorded
37. <i>H. flava</i> Castelnau	Not recorded
38. <i>Plectrosternus rufus</i> Lacordaire	July
D. Subfamily MELANOTINAE	
39. <i>Melanotus bengalicus</i> n. sp.	May
40. <i>M. fuscus</i> Fabricius	February–May
41. <i>M. himalayanus</i> n. sp.	March
42. <i>M. kolkatai</i> n. sp.	March
43. <i>M. longicornis</i> Candeze	Not recorded
44. <i>Priopus ornatus</i> (Candeze)	May
45. <i>Szombatya hodgarti</i> Platia & Schimmel	April
E. Subfamily CONODERINAE	
46. <i>Aeoloderma brachmana</i> Candeze	May–June
47. <i>A. chrysites</i> Candeze	May
48. <i>A. sinensis</i> Candeze	June–October
49. <i>Heteroderes lenis</i> Candeze	April
50. <i>H. macroderes</i> (Candeze)	July–August
51. <i>H. spinicollis</i> Candeze	Not recorded
52. <i>H. spinosus</i> Candeze	August
53. <i>Pachyderes bengalensis</i> Candeze	June
F. Subfamily PHYSORRHININAE	
54. <i>Anchastus falsus</i> Candeze	May–June
55. <i>A. imitans</i> Candeze	June
G. Subfamily DICREPIDINAE	
56. <i>Singhalenus candezei</i> Schwarz	March
H. Subfamily HEMIRRHIPINAE	
57. <i>Anthracalaus bengalensis</i> (Candeze)	Not recorded
58. <i>Calais sculptus</i> Westwood	May–June
60. <i>C. sordidus</i> Westwood	Not recorded
L. Subfamily OXYNOPTERINAE	
60. <i>Campsosternus dohrni</i> Westwood	Not recorded

Name of the species	Month of collection
61. <i>C. stephensi</i> Hope	May
62. <i>Pectocera cantori</i> Hope	Not recorded
M. Subfamily ADRASTINAE	
63. <i>Silesis bengalensis</i> Candeze	April
64. <i>S. candezei</i> Schimmel & Platia	February, May–November
65. <i>S. nigriceps</i> Candeze	May
66. <i>S. rugosus</i> Schimmel & Platia	May, September
67. <i>S. wittmeri</i> Schimmel & Platia	May
K. Subfamily SENODONINAE	
68. <i>Penia eschscholtzi</i> Hope	May
69. <i>P. holzschuhi</i> Schimmel & Platia	May
70. <i>P. longipes</i> Candeze	May
71. <i>P. opatroides</i> Candeze	May
72. <i>P. wittmeri</i> Dolin & Suzuki	May
L. Subfamily ELATERINAE	
73. <i>Agonischius altus</i> Candeze	May
74. <i>Aphanobius touffus</i> Vats & Chauhan	April
75. <i>Drasterius brahminus</i> Candeze	Not recorded
76. <i>D. collaris</i> Candeze	June–October
77. <i>D. sulcatulus</i> Candeze	May–October
78. <i>Ludigenus kalpanas</i> n. sp.	May
79. <i>Melanoxanthus anticus</i> Candeze	June
80. <i>M. bimaculatus</i> Fleutiaux	May
81. <i>M. dimidiatipennis</i> Candeze	August
82. <i>M. melanocephalus</i> Fabricius	June–September
83. <i>M. melanurus</i> Candeze	May–June
M. Subfamily NEGASTRINAE	
84. <i>Quasimus meghalayanus</i> Dolin	May
85. <i>Q. obovatus</i> Dolin	March–May
86. <i>Zorochrus birganjianus</i> Ohira & Becker	April
87. <i>Z. godavariensis</i> Ohira & Becker	July, December

**SYSTEMATIC LIST OF SPECIES RECORDED FROM BENGAL
BUT WITHOUT THEIR EXACT LOCALITIES**

A. Subfamily AGRYPNINAE

I. Genus *Agrypnus* Eschscholtz, 1829

1. *A. furunculosus* Candeze 1857
2. *A. pardalinus* Candeze 1882

Genus *Lanelater* Arnett, 1952

3. *L. renardi* Candeze 1880

Genus *Rismethus* Fleutiaux, 1947

4. *R. pistrinarius* Candeze 1857

B. Subfamily CARDIOPHORINAE

II. Genus *Cardiophorus* Eschscholtz, 1829

5. *C. anceps* Candeze 1890
6. *C. bengalensis* Candeze 1878
7. *C. contemptus* Candeze 1860
8. *C. madidus* Candeze 1890
9. *C. rubicundus* Candeze 1890
10. *C. servilis* Candeze 1860
11. *C. tetricus* Candeze 1860
12. *C. umbraculatus* Candeze 1890

C. Subfamily MELANOTINAE

III. Genus *Melanotus* Eschscholtz, 1829

13. *M. sulcatus* Candeze 1890

D. Subfamily MONOCREPIDINAE

IV. Genus *Heteroderes* Latreille, 1834

14. *H. luteipes* Candeze 1859.

V. Genus *Monocrepidius* Eschscholtz, 1829

15. *M. oranatus* Candeze 1889.

E. Subfamily DICREPIDINAE

VI. Genus *Singhalenus* Candeze, 1859

16. *S. horsfieldi* Candeze 1868.

F. Subfamily HEMIRRHIPINAE

VII. Genus *Calais* Castelnau, 1836

17. *C. cardoni* Candeze 1890

VIII. Genus *Tetrigus* Candeze 1857

18. *T. parallelus* Candeze 1857

G. Subfamily OXYNOPTERINAE

Tribe Campsosternini

IX. Genus *Campsosternus* Latreille, 1834

19. *C. violatus* Germar, 1843

H. Subfamily ELATERINAE

X. Genus *Agonischius* Candeze 1863

20. *A. cardoni* Candeze 1890

21. *A. finitimus* Candeze 1890

22. *A. tenuivittus* Candeze 1892

I. Subfamily NEGASTRINAE

XI. Genus *Hemirrhaphes* Candeze, 1878

23. *H. notabilis* Candeze 1878

XII. Genus *Negestrius* Thompson, 1859

24. *N. indicus* (Motschulsky 1858)

Remarks : The beetles included in this list are recorded by different workers from 'Bengal' But the area under 'Bengal' has been changed from time to time before independence. In earlier days, during East India Company's rule 'Bengal' included vast areas which are under Bihar, Jharkhand, Orissa, and even Bangladesh now. This may be one of the reasons why all these 24 species were not available in the present truncated areas under West Bengal.

SUMMARY

The present work incorporates, for the first time a comprehensive account of 'Click-beetles' of West Bengal. The systematic account based mainly on the National Collection present in Zoological Survey of India, Calcutta and the collections made from time to time through different explorations in all the districts of West Bengal by the Zoological Survey of India.

This work deals with the detailed taxonomical studies of 'click-beetles' of West Bengal with biological information of some species have also been given. Prior to study, Elateridae

of West Bengal was represented by 104 species under 25 genera and this has been increased to 173 species under 37 genera after the completion of this work. However, representatives of 85 species under 23 genera were not available for study. The present taxonomic study of Elateridae of West Bengal is based on a total number of 415 examples of beetles and embodies 87 species under 28 genera which were actually available for study, among which 10 are new to science. The new species described here are *Adelocera prabiri*, *A. triptii*, *Agrypnus darjeelingensis*, *A. shyamrupi*, *Lanelater kalimpongensis*, *Cardiophorus moni*, *Melanotus bengalicus*, *M. himalayanus*, *M. kolkatai* and *Ludigenus kalpanas*. Sixteen species (marked ++ in the checklist) under 8 genera have been recorded for the first time from India as also from West Bengal and 40 species (marked + in the check list) under 17 genera from West Bengal. Moreover, the present chapter also focuses on the characteristic features of the respective subfamilies, genera and species and affinities of the allied species. Dichotomus keys to the subfamilies, genera and species dealt with have been provided along with the distributional records of each species from published record, as well as from actual study of the specimen. Relevant comments or remarks on biology, habit and life cycle have been added wherever available. The detailed synonymies which were available from references to the genera and species with restricted distribution have been provided. One new combination for *Aeoloderma chrysites* has been proposed. The study of genitalia of the species also provided with figures. The illustrations of aedeagus are given to those male specimens which has been studied by the authors. Camera lucida drawings of 64 species including 10 new species and 54 species whose drawings are not available have been provided. Those figures which are present in the recent publications were not provided.

Available information on the distribution of the species with regard to the altitude and the different months of the year have been analysed. It was observed that maximum concentration of 53 species is found in the area from plainland to the lower Hill forest (up to 450 m). The second highest concentration of 42 species is found in the Middle Hill forest zone (450m – 1500m) and lastly only 8 species are recorded in the Upper Hill forest zone (1500m – 3636m). From the study on abundance of these beetles from the State it was observed that these beetles are predominant during monsoon and are rare during winter. A great variation on abundance was observed among these beetles. From this study it was observed that 8 species of click beetles are very common and 9 species are very rare in distribution in this state.

It is hoped that this comprehensive work will enrich our present day knowledge on the taxonomy of this group of insects of West Bengal.

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REFERENCES

- ARNETT, R.H. 1952. A review of the nearctic Adelocerina (Coleoptera, Elateridae, Pyrophorinae, Pyrophorini) *Wasmann J. Biol.*, 10(1) : 103–126.
- 1955. Supplement and corrections to, J.A. Hyslop's Genotypes of Elaterid beetles of the world. *Proc. U. S. natn. Mus.*, 103 : 599–619.
- 1962. *The Beetles of the United States* (A manual for identification). Fascicle, 46 : 497–412. Washington, D.C.
- [The work was first issued as a series of fascicles with separate pagination and later (1968) reprinted with the above pagination. A new edition appeared in 1973.]
- BAGCHI, K. & MUKHERJEE, K. N. 1979. Diagnostic Survey of Deltic West Bengal. Geography Department. Calcutta University : 1-46 + maps & table.
- BECKER, E.C. 1956. Revision of Nearctic species of *Agriotes* (Coleoptera : Elateridae). *Can. Entomol.*, 88, suppl. 1 : 101 pp, 74 figs.
- BEESEON, C.F.C. 1941. The ecology and control of forest insects of India and the neighboring countries. India : Vasant Press, Dehra Dun, II + 1007 pp.
- BISWAS, S., MUKHOPADHYAY, P., SAHA, S.K., BASU, C.R., CHATTERJEE, S.K., CHAKRABORTY, S.K., BISWAS, D.N., HALDER, S.K., GHOSH, S.K. AND CHAKRABORTY, P. 1996. "Coleoptera (Part-Elateridae)", *Fauna of Delhi, State Fauna Series*, 6 : 352–353. *Zool. Surv. India*.
- BISWAS, S. & CHAKRABORTY, P. 2000. "Coleoptera : Elateridae" *Fauna of Tripura, State Fauna Series*, 7(Part 3) : 99-108, *Zool. Surv. India*.

- CALDER, A.A. 1986. Classification relationships and distribution of Crepidomeninae (Coleoptera : Elateridae). *Australian J. Zool.*, Supplementary series No. 122 : 200 pp., 276 figs.
- CALDER, A.A. & HAYEK, C.M.F. VON. 1992. A reappraisal and revision of the genus *Anthracalaus* Fairmaire (Coleoptera : Elateridae). *Ent. Scand.*, 23 : 11-62. Copenhagen, Denmark.
- CALLAN, E. MCC. 1964. Ecology of sand dunes with special reference to the insect communities. In *Monographiae Biologicae*, 14 : 174-183. Ecological studies in Southern Africa. Ed. D.H.S. Davis and others. The Hague.
- CANDEZE, E. 1857. Monographic des Elaterides I. *Mem. Soc.r. Sci. Liege*, 12 : viii + 400 pp., 7 pls.
- 1859. Monographie des Elaterides II. *Mem. Soc. r. Sci. Liege*, 14 : 453 pp.
- 1860. Monographie des Elaterides III. *Mem. Soc. r. Sci. Liege*, 15 : 512 pp.
- 1863. Monographie des Elaterides IV. *Mem. Soc. r. Sci. Liege*, 17 : 534 pp., 6 pls.
- 1865. Elaterides nouveaux 1. *Mem. Cour. Acad. R. Sci. Belg.*, (in 8°), 17 no. 1 : 1-63.
- 1874. Revision de la Monographie des Elaterides. *Mem. Soc. r. Sci. Liege*, 2nd Ser., 4(1) : viii+218 pp.
- 1878. Elaterides nouveaux (deuxieme fascicle). *Annls Soc. ent. Belg.*, (C.r. Seane) 21 : clxxxix- cxcix.
- 1882. Elaterides nouveaux 3. *Mem. Soc. r. Sci. Liege*, (2)9 : 1-117.
- 1889. Elaterides nouveaux 4. *Annls Soc. ent. Belg.*, 33 : 67-123.
- 1890. Note sur les Elaterides du Chota - Nagpore. *Annls Soc. ent. Belg.*, (Bull) 34 : cxlvi-clvii.
- 1891. *Catalogue methodique des Elaterides connus en 1890*. xii + 246 pp. (Liege).
- 1892. Deuxieme note sur les Elaterides due Chota-Nagpore. *Annls Soc. ent. Belg.*, 36 : 480-495.
- 1893a. Addition aux Elaterides des Indes Orientales. *Annls Soc. ent. Belg.*, 37 : 168-179.
- 1893b. Elaterides Nouveaux 5. *Mem. Soc. r. Sci. Liege*, 18 : 1-76.
- 1895. Mission Scientifique de M. Ch. Alluaud dans le Territoire de Diego Suarez (Avril-Aout 1893), Les Elaterides de Madagascar. *Annls Soc. ent. Belg.*, 39 : 50-69.
- 1897. Elaterides Nouveaux 6. *Mem. Soc. r. Sci. Liege*, 19(2) : 1-88.
- 1900. [posthumous]. Elaterides Nouveaux 7. *Annls. Soc. ent. Belg.*, 44 : 77-101.

- CASARI – CHEN, S.A. 1993. Systematics and evolution of Hemirhipini from old world and Australia I. Genera removed from tribe (Coleoptera, Elateridae, Pyrophorinae). *Revta bras. Ent.*, **37**(2) : 223–262.
- 1994. Systematics and evolution of Hemirhipini from old world and Australia II. Phylog of the tribe including the American Genera (Coleoptera, Elateridae). *Revta bras. Ent.*, **38**(1) : 161–252.
- CASTELNAU, F.L. 1836. De Laporte, Conte De' Etudes entomologiques. *Rev. Ent. (Silbermann)*, **4** : 6–60, table.
- 1840. *Histoire naturelle des insectes, Coleopteres*, 1 : cxxv + 324 pp., 19 pls. Paris.
- CHAKRABORTY, & P. CHAKRABARTI, S. 2000. Agrypninae (Coleoptera : Elateridae) of India : A Taxonomic Review and Check List. *Rec. zool. Surv. India*, **98**(Part-3) : 71–83.
- CHATTERJEE, A.M., MUKHOPADHYAY, P.K. & GUPTA, A. 1970. "West Bengal." Firma K. L. Mukhopadhyay : 1–213.
- CROWSON, R.A. 1955. The Natural Classification of the families of Coleoptera. Nathaniel Lloyd & Co. Ltd., London, : 1–187.
- 1961. On some new characters of classificatory importance in adults of Elateridae (Coleoptera). *Entomologist's mon. Mag.*, **96** : 158–161, 7 figs.
- 1967. The natural classification of the families of Coleoptera. E.W.Cassey Ltd., Middlesex, England, : 1–187 pp.
- DEJEAN, P.F.M.A. 1933[-36]. *Catalogue des Coleopteres de la collection de M. le Comte Dejean.*, [Ed. 2] : 443 pp. Paris.
- 1836[-37]. *Catálogo des Coleopteres de la collection de M. le Comte Dejean.*, (Troisieme Edition xiv + 508 pp. Paris.
- DOLIN, V.G. 1975. Wing venation of click-beetles (Coleoptera : Elateridae) and itsimportance for taxonomy of the family. *Zool. Zh.*, **54** : 1618–1633, 38 figs.
- DOLIN, V.G. & SUZUKI, W. 1987. Species of the *Penia opatroides* group (Coleoptera, Elateridae) of the Himalaya region. *Vestn. Zool.*, **1** : 29–39.
- DOLIN, W.G. 1993. Neue *Quasimus* –Arten (Coleoptera, Elateridae, Negastrinae) aus der Himalaya-region. *Entomol. Basil.*, **16** : 181–201.
- EMDEN, F.I. VAN. 1945. Larvae of British beetles. 5. Elateridae. *Entomologists's mon. Mag.*, **81** : 13–37.
- ESCHSCHOLTZ, J.S.F. 1829. Elaterites, Eintheilung derselben in Gattungen Jena. In : Thon, *Entomol. Archiv.*, **2**(1) : 31–35.

—1838. Table entitles 'Classification des Elaterides de M. Eschscholtz, In Castelnau, F.L.de Laporte, Comte de 1838, , In Silbermann, *Rev. Ent.*, 4 : 6–60.

FABRICIUS, J.F.C. 1775. *Systemae entomologiae*. xxxii + 832pp. Flensburgi & Lipsiae.

—1781. *Species insectorum.*, 1 : viii + 552 pp. Hamburgii et. Kilonii.

—1792. *Entomolgia systematica*, 1(2) : xx +538 pp. Copenhagen.

—1798. *Supplementum entomologiae systematicae*, 572 pp. Hafniae.

—1801. *Systema eleutheratorium*, 1 : xxiv + 506 pp.; 2 : 687 pp. Kiliae.

FAIRMAIRE, L. 1888. Descriptions de Coleopteres de l' Indo-China. *Annls Soc. Ent. Fr.*, 6(8) : 333–378.

FLETCHER, T.B. 1919. Early stage of *Agrypnus fuscipes*. *Bull. agric. Res. Inst. Pusa*, 89 : 25, 2 figs.

FLEUTIAUX, E. 1889. Contributions a la fauna Indo-Chinoise. Cicindelidae et Elateridae. *Annls Soc. ent. Fr.*, 9(6) : 137–146. Paris.

—1895. Contributions a la faune Indo-Chinoise, 15^e Memoire. Premiere addition aux Cicindelidae et Elateridae. *Annls Soc. ent. Fr.*, 63(1894) : 682–690. Paris.

—1903. Contributions a la fauna Indo-Chinoise, 18^e Memoire. *Annls. Soc. ent. Fr.*, 71(1902) : 569–580. Paris.

—1918a. Coleopteres Elaterides Indo Chinois de la collection du Museum d' Histoire Naturelle de Paris. Catalogue et descriptions des especes nouvelles. *Bull. Mus. Hist. Nat.*, 24 : 205–241. Paris.

—1918b. Nouvelles contributions a la fauna de l'Indo China Francaise. *Annls. Soc. Ent. Fr.*, 87 : 175–288.

—1919. Voyage de ch. Alluaud et R. Jeannel en Afrique Orientale (1911-1912). *Insects Coleopteres* : XIII, Elateridae, Trixagidae et Melasidae. Paris, France, 119 pp.

—1924. Fauna Entomologique de l'IndoChine Francaise, Fasc. 7, Melasidae et Elateridae. *Opusc. Inst. Sc. Indochine*, 2 : 184 pp.

—1926. Remarques et obsrvations sur le Catalogue des Elateridae (I re partie), de S. Schenkling. *Annls Soc. ent. Fr.*, 95 : 91–112.

—1927. Les Elaterides de l'Indochine Francaise (Catalogue raisonne) *Fauna Colon. Fr.*, 1 : 53–122 , 2 pls. Paris.

—1933a. Les Elaterides de l'Indochine Francaise, 5. *Annls Soc. ent. Fr.*, 101 : 205–235. Paris.

—1933b. Entomological investigations on the spike disease of Sandal (10). Melasidae & Elateridae. *Ind. For. Rec.*, 18(7) : 1-16.

- 1936. Les Elaterides de l'IndoChine Francaise (Catalogue raisonne). *Annls Soc.ent. Fr.*, **105** : 279–300.
- 1940. Eaterides nouveaux. *Bull. et Annls Soc. Roy. Ent. Belg.*, **80** : 89–104.
- 1941a. Les Elaterides de francaise. Huitieme et derniere partie. *Annls Soc. ent. Fr.*, **109** : 19–40.
- 1941b. Elaterides nouveaux de Indochine francaise. *Bull. Soc. Zool. Fr.*, **65**(1940) : 184–189.
- 1942. Entomological results from the Swedish expedition to Burma and British India, Coleoptera : Elateridae. *Ark. Zool.*, **33A**(18) : 1–24.
- 1947. Revision des Elaterides del Indochine francaise. *Notes Ent. Chin.*, **11** : 233–420.
- GEMMINGER, M. & HAROLD, E. VON. 1869. *Catalogus Coleopterorum*, **5** : 1347–1604.
- GERMAR, E.F. 1840. Bemerkungen ber Elateriden. *Z. ent. (Germar)*, **5** : 133–192.
- GHOSH, A.K. 1992. Coleoptera : Elateridae. In : *Fauna of West Bengal, State Fauna Series*, **3**(Part 1) : 1–26. *Zool. Surv. India*.
- GURJEVA, E.L. 1973. A new tribe Megapenthini tribus n. (Coleoptera, Elateridae). *Zool. Zh.* **52** (3) : 448–451.
- 1974. Thoracic structure of click beetles (Coleoptera, Elatridae) and the significance of the structural characters for the system of the family. *Rev. Ent. Wash.*, **53**(1) : 67–79, 95 figs.
- 1983. New species and genus of the click-beetles (Coleoptera : Elateridae) from Iran, *Vest. Zool.*, **3**(5) : 81–82.
- HAYEK, C.M.F. VON. 1973. A reclassification of the subfamily Agrypninae, (Coleoptera Elateridae). *Bull. Br. Mus. nat. Hist. (Ent.)* suppl., **20** : 1–309.
- 1979. Additions and corrections to "A reclassification of the subfamily Agrypninae, (Coleoptera, Elateridae)." *Bull. Br. nat. Hist. (Ent.)*, **38**(5) : 183–261.
- 1990. A reclassification of the *Melanotus* group of genera. *Bull. Br. Mus. nat. Hist. (Ent.)*, **59** : 37–115.
- HERBST, J.F.N. 1806. *Natursystem aller bekannten in-und auslandischen Insecten.*, **10** : 285 pp.
- HOPE, F.W. 1831. Synopsis of the new species of Nepaul insects in the collection of Major General Hardwicke. In : J.E.Gray, *Zool. Misc. Part I*, : 21–32. London.
- 1840. *The Coleopterists' Manual*, part 3 : 191 pp. Illustrated. London.
- 1842. Family Phyllophoridae. *Proc. Zool. Soc. London*, **10** : 73–79.

- HORION, A. 1949. *Käferkunde für Naturfreunde* : 292 pp., 21 pls. Frankfurt am Main.
- 1953. Faunistic der Mitteleuropaischen. *Käfer*, 3 : 340 pp [Malacodermata Sternoxia (Elateridae bis Throscidae) München.]
- HYSLOP, J.A. 1917. The phylogeny of Elateridae based on larval characters. *Annls Ent. Soc. Am.*, 10 : 241–263.
- 1921. Genotypes of the elaterid beetles of the World. *Proc. U.S. natn. Mus.*, 58 (2353) : 621–673.
- JACOBSON, G.G. 1913. *Zhuki Rossii i Zapadnoi Evropy* (Beetles of Russia) 10 (SPb), : 721–864.
- KASAP, H. & CROWSON, R.A. 1975. A comparative anatomical study of Elateriformia & Dascilloidea (Coleoptera). *Trans. Roy. Ent. Soc. London*, 126 : 441–495.
- KIESENWETTER, H. VON. 1858. *Natuges Chichite der insecten Deutschlands Erste Abtheilung. Coleoptera* 5(2) (Signatures 12-24 : 179-384). Berlin. [The complete work was published in four parts between 1857 and 1863 (Kiesenwetter, *op. cit.* : vi)].
- 1870. Benerkungen zur Nomenclatur der Elateriden. *Col. Hefte* (ed. Harold), 6 : 34–36.
- KIRK, H.B. 1922. Biological notes on Elateridae and Melasidae. *Ent. News*, 33 : 236–240.
- KISHII, T. 1959. (name of the paper not available). *Bull. Heian High School*, : 7–8.
- LACORDAIRE, T. 1857. *Histoire naturelle des insects. Genera des Coleopteres*, 4 : 1–579. Paris.
- LANCHESTER, H.P. 1971. Subfamily Cardiophorinae. In : Hatch, M.H. *The beetles of the Pacific North West*, Part V : 35–48. Univ. Washington Press. Seattle, Washington, U.S.A.
- LATREILLE, P.A. 1804. *Histoire Naturelle, generale et particuliere, des erustaces et des insects*, 11 : 1–422.
- 1829. In Cuvier, G.L.C.F.D., *Le regne animal*. Nouvelle edition. 4, xxvii + 584 pp. Paris.
- 1834. Distribution methodique et naturelle des genres de diverses tribus d'insects Coleopteres de la famille des Sericornes. *Annls Soc. ent. Fr.*, 3 : 113–178.
- LAWRENCE, J.F. 1892. *Synopsis and Classification of living organisms*. Mc. Grawill : 72–132.
- LECONTE, J.L. 1853. Revision of the Elateridae of the United States. *Trans. Am. Phil. Soc.*, 10 : 405–508.
- LECONTE, J.L. & HORN, H. 1883. *Classification of the Coleoptera of North America*. Ed., 2 : 1–131.

- LESEIGNEUR, L. 1972. Coleopteres Elateridae de la Fauna de France Continentale et de Corse. *Bull. Mem. Soc. Linn. Lyon*, **41** (suppl.) : 379 +[2]pp. Illustrated.
- LINNAEUS, C. VON. 1758. *Systema Naturae*. 10th Ed. 1[ii] : 1-824. Holmiae.
- MAITI, P.K. 1983. Termite (Isoptera) Fauna of West Bengal, Their Recognition, Biology and Ecology. *Rec. zool. Surv. India, Occ. Paper*, No. **42** : 1-152 (1-2 pp.)
- MANI, M.S. 1974. Ecology and Biogeography in India. Dr. W. Junk, the Hague, vol. **23** : I-XIX + 1-773 pp.
- MUKHOPADHYAY & CHAKRABORTY, 2003. Elateridae : Coleoptera. In : *Fauna of Sikkim, State Fauna Series*, **9**(3) : 217-236, Zoological Survey of India.
- NAKANE, T. & KISHII, T. 1956. On the subfamilies of Elateridae in Japan. *Kontyu*, **24** : 201-206.
- OHIRA, H. 1962. Morphological and taxonomic study on the larvae of Elateridae in Japan : 1-179, 61 pls. Japan (Published by the author).
- 1967a. The Elateridae of the Ryukyu Archipelago, II. (Coleoptera). *Ent. Rev. Japan*, **19** : 41-48.
- 1967b. The Elateridae of the Ryukyu Archipelago, III. (Coleoptera). *Bull. Japan ent. Acad.*, **3**(5) : 27-38.
- 1969a. The Elateridae of the Rykyu Acrhipelago, VII. (Coleoptera) *Bull. Japan ent. Acad.*, **4** : 27-32.
- 1969b. (In Japanese) (IV). *Kontyu*, **37**(2) : 251-256.
- 1970. A list of the Elaterid beetles from South Asia preserved in the Hungarian Natural History Museum (Coleoptera) part I-V *Annls hist. Nat. Mus. natn. hung.*, **62** : 207-243.
- 1971a. A list of the Elaterid beetles from South Asia preserved in the Hungarian Natural History Museum (Coleoptera) part VI. *Annls hist. Nat. Mus. natn. hung.*, **63** : 205-216.
- 1971b. Notes on some beetles from South-east Asia. *Bull. Aichi Gakugei Univ. (Nat. Sci.)*, **22** : 225-236.
- 1973a. A list of the Elaterid beetles from South Asia preserved in the Hungarian Natural History Museum, Part VII. *Folia Ent. Hung.* **26**, (suppl) : 317-334.
- 1973b. Coleoptera : Elateridae from Ceylon. *Ent. Scand. Suppl.*, **4** : 27-38.
- 1973c. Elaterid beetles from Borneo in the Bishop Museum (Coleoptera). *Pacif. Insects*, **15** : 103-137.

- 1978. Some elaterid beetles from Nepal collected by the Hokkaido University Scientific Expeditions to Nepal Himalaya. *New. Entomol. Ueda*, 27(4) : 89–96. Illustrated.
- OHIRA, H. & BECKER, E. 1971. Elateridae (Coleoptera) from the Canadian Nepal Expedition (1967). 1. Descriptions 3 new species of *Silesis*. *Orient. Insects*, 5(4) : 577–582.
- 1972. Elateridae (Coleoptera) from the Canadian Nepal Expedition (1967). 3. Descriptions of new species and records of *Dima*, *Penia* and *Neocsikia* new genus. *Orient Insects*, 6(4) : 531–537.
- 1973a. Elateridae (Coleoptera) from the Canadian Nepal Expedition (1967). 4. Descriptions of new species and records of the subfamilies Negastrinae and Hypnoidinae. *Orient. Insects*, 7(1) : 69–77.
- 1973b. Elateridae (Coleoptera) from the Canadian Nepal Expedition (1967). 5. Records and descriptions of *Paracalais*, *Compsolacon*, *Meristhus*, *Pectocera* and *Octocryptus* species. *Orient. Insects*, 7(4) : 461–469.
- 1974. Elateridae (Coleoptera) from the Canadian Nepal Expedition (1967). Descriptions of new species and records of *Zorochrus*, *Melanotus* and *Silesis*. *Orient. Insects*, 8(4) : 557–562.
- 1986, PLATIA, G., Due nuovi generi e cinque nuove specie della sottofamiglia. Melanotinae Candeze della fauna indomalese (Coleoptera : Elateridae). *Acta Coleopt.*, 2(1) : 1–8.
- PLATIA, G. & SCHIMMEL, R. 1991. IL species of the genus *Silesis* Candeze (Coleoptera., Elateridae) from Indian & Chinese region. *Fragm. Entomol. Roma*, 23(1) : 101–177.
- 1993. New species and new records of *Silesis* Candeze from the Indian and Chinese region Coleoptera, Elateridae). *Fragm. Entomol. Roma*, 25(1) : 117–127.
- 1995a. I Priopus Della Regione Indiana (Coleoptera, Elateridae, Melanotinae). *Labori-Soc. Ven. Sc. Nat.*, 20 : 53–65. Venezia, 31 Gennaio.
- 1995b. The species of the genus *Szombatya* Platia, 1986 (Coleoptera, Elateridae, Melanotinae). *Acta Zool. hung.*, 41(2) : 93–101.
- 1996. Nuove species e Nuovi dati di *Silesis* Candeze della regione Indiana e Chinese (Coleoptera, Elateridae) *Fragm. Entomol. Roma*, 28(2) : 245–255.
- PLATIA, G. & GUDENZI, I. 1997. Revisione delle specie del genere *Drasterius* Eschscholtz della regione orientale (Coleoptera : Elateridae, Conoderini). *Lambillionea*, XCVII : 402–416.
- PEDIGO, L.P. 1996. Entomology and Pest Management, Prentice Hall of India Pvt. Ltd., New Delhi : 347–350.
- QUATE, L.W. & THOMPSON, S.E. 1967. Revision of click-beetles of genus *Melanotus* in

- America North of Mexico (Coleoptera, Elateridae). *Proc. U.S. natn. Mus.*, **121** (3568) : 1-83.
- REITTER, E. 1905. Bestimmungs. Tabelle der europäischen Coleopteren. 56 Heft. Elateridae. *Verh. Naturforsch. Ver. Brunn*, **43** : 1-122.
- REDTENBACHER, L. 1849. Fauna Austriaca. xxvii + 883pp. Wien. 1858m Fauna Austriaca, Edn. 2 : cxxvi + 1017pp., 1 pl. wien.
- SCHENKLING, S. 1925. *Coleopterorum Catalogus*. W. Junk. Pars. 80. Elateridae, I : 263 pp. Berlin.
- 1927. *Coleopterum Catalogus*. W. Junk. Pars 88. Elateridae 2 : 264-636. Berlin.
- SCHIMMEL, R. & PLATIA, G. 1991. Revision des subtribus *Dimina* Candeze, 1863, aus dem Himalaya; mit Bestimmungstabellen der Gattungen und Arten (Coleoptera : Elateridae). *Entomol. Basil.*, **14** : 261-382.
- 1992a. New species of the supraspecific taxon *Dimina* Candeze, 1863 from South East Asia. *Beitr. Entomol.*, **42**(2) : 293-315.
- 1992b, Die Arten supraspezifischen Taxons *Sendoniinae* Schenkling, 1927 (Coleoptera : Elateridae), *Entomol. Basil.*, **15** : 229-254.
- SCHWARZ, O. 1902a. *Cremnostethus* und *Metriaulacus* nov.gen. Elateridarum. Ein Beitrag zur Kenntniss der Elateriden Gattung *Melanotus*. *Duet. Ent. Zeit.* 1901(2); 197-199.
- 1902b. Neue Elateriden aus dem tropischen Asien, den malayischen Inseln und den Inseln der S-dsee. *Duet. Ent. Zeit.*, 1902 : 305-350.
- 1905. Neue Elateriden aus der Malayischen zone. *Duet, ent. Zeit.*, 1905 : 257-266.
- 1906a. Coleoptera, Family Elateridae. In Wytsmann, *Genera Insect.* Fasc., **46A** : 1-112.
- 1906b. Coleoptera, Family Elateridae. In Wytsmann, *Genera Insect.* Fasc., **46B** : 113-224.
- 1907. Coleoptera, Family Elateridae. In Wytsmann, *Genera Insect.* Fasc., **46C** : 225-370.
- SNODGRASS, R.E. 1935. Principles of Insect morphology; ix + 667pp. Tata Mcgrahill Pub. Co. Ltd.
- STEBBING, E.P. 1914. Indian Forest Insects of Economic importance Coleoptera, Eyre & Spottiswoode Ltd. : I-xvi + 648.
- STIBICK, J.N.L. 1971. The generic classification of the *Negastriinae* (Coleoptera : Elateridae), *Pacif. Insects*, **13** : 371-390.
- 1976. A revision of the *Hypnoidinae* of the World (Coleoptera : Elateridae) Part I. The *Hypnoidinae* of North and South America. The genera *Berninelsonius* and *Ligmargus* EOS, **51** : 143-223.

- 1978. A revision of the Hypnoidinae of the World (Coleoptera : Elateridae) Part II. The Hypnoidinae of North and South America *EOS*, 52 : 309–386.
- 1979a. A revision of the Hypnoidinae of the World Part III. Hypnoidinae of Eurasia *EOS*, 53 : 223–307.
- 1979b. Classification of the Elateridae (Coleoptera), Relationships and Classification of the subfamilies and tribes. *Pacif. Insects*, 20(2-3) : 145–186.
- 1980a. A revision of Hypnoidinae of the world (Coleoptera, Elateridae). Part IV. The Hypnoidinae of India *EOS*, 54 : 247–273.
- 1980b. A revision of Hypnoidinae of the world (Coleoptera, Elateridae). Part V. The Hypnoidinae of India Indexes. *EOS*, 55–56 : 227–294.
- SUZUKI, W. 1982. Notes on the genus *Neocsikia* Ohira & Becker (Coleoptera; Elateridae). *Trans. o.t. Shikoku ent. Soc.*, 16(1-2) : 77–82.
- SUZUKI, W. & DOLIN, W. 1984. Eine neue Art der Gattung *Penia* Castelnau.(Coleoptera : Elateridae) Aus Darjeeling, Indien. *Entomol. Basil*, 168–172.
- TIKADER, B.K. 1983. Threatened Animals in India. Zoological Survey of India, Calcutta : 1–307.
- VAN DYKE, E.C. 1932. Miscellaneous studies in Elateridae and related families of Coleoptera. *Proc. Calif. Acad. Sci.*, 20(4) : 291–465.
- VAN ZWALUWENBURG, R.H. 1959. Some type designations with notes on Pacific Elateridae (Coleoptera). *Pacif. Insects*, 1(No. 4) : 347–414.
- VATS, L.K. & CHAUHAN, R.L. 1991a. Species of *Cardiophorus* from North India. *Res. Bull Panjab Univ.*, 42 (I-IV) : 11-29.
- 1991b. Species of *Melanotus* from North India. *J. Ent. Res.*, 15(3) : 187–196.
- 1991c. Species of Hypnioidinae from North India (Coleoptera : Elateridae). *J. ent. Res.*, 15(4) : 294–300.
- 1992a. Two new species of Ampedinae (Coleoptera : Elateridae) *J. ent. Res.*, 16(1) : 20–33.
- 1992b. Description of species of *Anchastus* Le Conte from North India. *J. ent. Res.*, 16(3) : 185–188.
- 1993a. Species of *Silesis* Candeze from North India (Coleoptera : Elateridae). *Uttar Pradesh J. Zool.*, 13(1) : 37-43.
- 1993b. Species of *Heteroderes* Latreille from North West India. *Entomon*, 18(3 & 4) : 169–173.

- VATS, L.K. & KASHYAP, S.L. 1992a. Seven new species of *Adelocera* Latreille from North West India. *J. ent. Res.*, 16(1) : 1–12.
- 1992b. Forty-eight species *Agrypnus* Eschscholtz including forth new additions from North West India. *J. ent. Res.*, 16(2) : 87–154.
- 1992c. Description of three species including two new species of subfamily Denticollinae from North India. *J. ent. Res.*, 16(4) : 247–251.
- 1993. Species of *Lanelater* Arnett from North India (Elateridae : Coleoptera). *Indian Journal of Forestry*, 16(3) : 214–222.
- WESTWOOD, J. O. 1848. *The cabinet of Oriental Entomology*. Smith, London : 88pp.
- WU, J.F. 1937. Elateridae, *Catalogus Insectorum Sinensium*, 3 : 432–472.
- ZIMSEN, E. 1964. *The type material of J. C. Fabricius* : 656 pp. 2 pls. Copenhagen.