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# **Records of the Zoological Survey of India**

Studies on crickets (Insecta : Orthoptera : Gryllidae)  
of Northeast India,  
by  
**M. VASANTH**

**Issued by the Director  
Zoological Survey of India, Calcutta**

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OF  
THE ZOOLOGICAL SURVEY OF INDIA  
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**Studies on crickets (Insecta : Orthoptera : Gryllidae)  
of Northeast India**

M. VASANTH  
*Zoological Survey of India  
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*Edited by the Director*  
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## INTRODUCTION

Crickets, of the Family Gryllidae, under the Order Orthoptera, are a group of insects with about 325 genera and over 2300 described species from all over the world. They may be readily distinguished by their long, tapering antennae, 3-segmented tarsi, unmodified forelegs, posterior legs adapted for leaping, and an elongated ovipositor among females. They exhibit sexual dimorphism, with the tegminal venation modified in the males of majority of the species to form a sound-producing organ. The female tegmina may be either well developed, or reduced, or totally absent. In some species both sexes are apterous. To the layman, crickets are more commonly heard than seen; their shrill sounds are familiar to everyone. Crickets are nocturnal insects, leading hidden lives. They vary in size from about 1.5 mm long to more than 50 mm in length. They are generally coloured brown, black or dull yellow. A few are of a greenish hue.

Northeast India, comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, is situated between 22° and 29° 28' N latitudes, and between 89° 45' and 97° 23' E longitudes, The region has always been relatively neglected with regard to its Gryllid fauna. The primary reason for this is probably, the remoteness and inaccessibility of that region. Northeast India provides ideal ecological conditions for Gryllids, with its varied climatic features, heavy rainfall, lush vegetation, hills and plains.

With these facts in view, an extensive taxonomic study of the Northeast Indian Gryllidae was undertaken, and the present paper is the fruit of the study. It is the first comprehensive and consolidated account of the taxonomy of the Gryllids of Northeast India.

Taxonomic studies on crickets date back to the time of Linnaeus (1758). Subsequently, Pallas (1771), De Geer (1773), Fabricius (1775), Lichtenstein (1796), Latreille (1804), Burmeister (1838), Serville (1838), Rambur (1839), Haan (1842), Stal (1861) and F. Walker (1859 - 1871) were the major scientists who published papers on the taxonomy of Gryllids in the hundred years between 1771 and 1871.

F. Walker's catalogue (1869 - 1871) contains descriptions of many "new genera" and innumerable "new species", which are mechanical enumerations/descriptions with irrelevant critical remarks and little understanding of the affinities of the insects dealt with.

The chief pillar in the foundation of the classification of Gryllids was erected by Saussure (1877 - 1878) in his monographs (see Classification). In an earlier work, Saussure (1874) has ignored Walker's British Museum Catalogue as being of no use unless the types are referred to.

Brunner (1882) has described 33 species of what he calls family *Gryllodea*. Brunner (1893) has also described many new genera and species mostly from Burma, and also from Java and Borneo. Saussure's (1894 - 1897) works are modifications and elaboration of his 1877 - 1878 monographs. T. J. Walker (1966) published a checklist of the Oecanthinae of the world.

The first records of Gryllids from India were made by F. Walker (1869 - 1871), but since his work lacks much value, Bolivar's (1900) studies of south Indian crickets may be regarded as the first sincere attempt at a taxonomic study of Indian crickets. Kirby (1906) has listed over 125 species from India, Burma and Sri Lanka, of which 80 are from India.

One of the most notable Gryllid-taxonomists, L. Chopard, has not only made extensive studies on African and European crickets, but he has also published (1918 - 1970) a great deal of his studies on Gryllids from India, Pakistan, Bangladesh, Sri Lanka, Burma, Thailand, Laos, the Malay Archipelago, Indonesia, Mentawai Islands (near Sumatra), New Guinea and the Philippines. His papers (1954, 1961, 1967-68, 1969) are particularly important. Chopard (1925 b, 1951) has also described and revised the Australian crickets. Jones and Chopard (1936) described a new cricket genus from India. Sandrasagara's (1954) checklist of the Sri Lankan Gryllidae and Bey-Bienko's (1966, 1968) studies on many Indonesian and Nepal species are other notable works. Chopard and Dreux (1966) have also described 2 new species from Nepal. Other papers dealing with Indian crickets, which merit mention, are Tandon and Shishodia (1974), Shishodia and Tandon (1975a, 1977), Tandon et. al. (1976), Bhowmik and Halder (1976), Bhargava (1976, 1981), Kaltenbach (1979), Vasanth (1980) and Bhowmik (1985).

Chopard (1924b) was the first to study crickets of Northeast India. He described 3 new genera, each with a new species, under two subfamilies - Nemobiinae and Phalangopsinae - from Meghalaya. Chopard's (1928b) "Revision of the Indian Gryllidae" contains the description of only one species from Northeast India, viz., Assam. Chopard (1935) has recorded 18 species from Meghalaya and Assam; these consist of one new genus and 4 new species.

Randell (1964), in a noteworthy work, has erected 5 new genera including 2 found in Northeast India. One of these, viz., *Velarifictorus* has now come to include several species placed in *Scapsipedus* Saussure. The other, *Plebeigryllus*, contains only one Indian species, *guttiventris* (Walker), which Chopard (1961) had transferred from *Gryllus* Linnaeus to *Platygryllus*.

Since 1967 there has been considerable amount of work on the taxonomy of Indian crickets, including the Northeast Indian region. Bhowmik (1967-1977) has recorded 14 species of Gryllids from Northeast India. Of these, 3 species of the genera *Anaxipha* Saussure, *Calypotrypus* Saussure and *Velarifictorus* Randell (described in *Scapsipedus* Saussure), and a variety of *Loxoblemmus equestris* Saussure, viz., *manipurensis*, were described as new. Tandon and Shishodia (1972) have recorded 20 species of Gryllids distributed over 10 genera from Arunachal Pradesh and the adjoining areas of Assam in Northeast India. Two of these - *Scapsipedus arorai* and *S. lohitensis* (now under *Velarifictorus* Randell) - were described by them as new. Shishodia and Tandon (1975b) have recorded 8 genera from Tripura. In a preliminary study on the Gryllidae of Meghalaya, Biswas *et al.* (1975) recorded 15 species as new to the state. Vasanth *et al.* (1975) described 2 new species of *Velarifictorus* and one of *Teleogryllus* from Meghalaya. Vasanth (1978) described, for the first time, the females of *Velarifictorus jaintianus* Biswas and Ghosh, *V. khasiensis* Vasanth and Ghosh (both described as new by Vasanth *et al.*, 1975) and of *Stephoblemmus humbertiellus* Saussure - all from North-East India. Townsend's (1980) work on 2 species of *Teleogryllus* Chopard, which are also found in Northeast India, is also of much importance.

A total of 81 species belonging to 39 genera distributed over 12 subfamilies of the Family Gryllidae known from Northeast India are dealt with in the present work. Of these, 1 genus and 4 species are new to science, undescribed morphs of one species are described for the first time, 9 species are new records from India/Northeast India, and new distributional records are presented for several species. 5 species have been treated as definite synonyms, while 3 have been placed as probable synonyms. A list showing the total number of world and Indian species of the various genera known from Northeast India is presented. Distribution maps, and a discussion on distribution are presented. Keys to all subfamilies of Family Gryllidae are provided. Within each Indian subfamily, keys have been provided for all the known Indian genera, but only those genera which have been recorded from Northeast India are dealt with in detail. Under each of these, a key is provided to all species known from that region. An attempt has been made to support keys to subfamilies and genera with generalised illustrations to highlight the characters mentioned, wherever it will facilitate better understanding. Where external morphological characters seem to be inadequate to distinguish between various species, especially in the subfamily Gryllinae, recourse to male genitalia characters has been taken in the keys. Although females of many species resemble one another, and are difficult to identify without males because they lack taxonomic characters so far as present knowledge goes, characters of females have been included in the keys to species, wherever possible.

As the current trend of taxonomic thought on Family Gryllidae leans rather heavily and, quite justifiably, on the structure of the male genitalia to distinguish between species, illustrations of male genitalia have been provided for those species where males have been studied, and where it has been possible to dissect out the genitalia. Anomalies have been discussed.

13 species for which material were not available during the present study ( marked with \*) are listed along with synonymies, diagnostic characters, measurements and distribution (all from literature), and remarks and location of type, while all other species are presented with synonymies, diagnostic characters, measurements, material-data, distribution, remarks and location of type. In such cases, characters and measurements given in parentheses indicate those from literature. As will be apparent from the material -data, help has been taken from the literature in enumerating the characters of both sexes even when material of only one sex have been studied. For new taxa (marked with \*\*), Holotype, and Allotype and paratypes, where found, are designated, and a full taxonomic description has been given. Type-locality is mentioned and a discussion is presented.

A brief account of the geography, climate and vegetation of Northeast India is given. A general account of the habits and habitats of crickets is presented. The classification of the group is briefly dealt with. Materials and methods used are briefly enumerated.

It is hoped that this work will provide the Gryllid taxonomist with a stepping stone for more intensive studies on this group.

## GEOGRAPHY, CLIMATE AND VEGETATION OF NORTHEAST INDIA

### *Physical features*

The states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura, which constitute Northeast India, are situated between 89°45' and 97°23' EL and 22°and 29°28' NL.

The region is comprised of two principal valleys— the Brahmaputra and Surma, and a series of mountains and hill ranges on the north, east and south.

The Surma valley is a level plain through which flows the river Surma, rising on the southern slopes of the mountains along the border of the Naga hills. The Brahmaputra valley, drained by the river Brahmaputra, is a 750 Km long, and a roughly uniform 80 Km wide alluvial plain bounded on the north by the Himalaya of Arunachal Pradesh and Bhutan, on the east by the Naga and Patkai hills, and on the south by the Khasi, Jaintia and Garo hills of Meghalaya. This valley is intensively cultivated and considerable areas of it are annually inundated during the monsoon by the river Brahmaputra, which overruns even the largest islands in it.

The Himalaya in Northeast India, specifically in Arunachal Pradesh, is about 720 Km long and rises rather abruptly from the Brahmaputra valley. It is traversed from east to west by the rivers Luhit, Dibang, Siang and Subansiri.

The eastern hill ranges are composed of the relatively narrow Patkai Hills with a mean elevation of 1200 m. They broaden out in the south forming the Naga Hills

composed of narrow ranges. The chief river in this area is Doiang. The Manipur Plateau, drained by the river Manipur, is situated south of the Naga Hills. Manipur has one of the largest natural lakes in India — the Logtak Lake. This is located 32 Km south of Imphal, the capital of Manipur, and is 64 sq.Km. in area with floating islands or “Phumdi” The Lushai Hills, extending southwards from Manipur, are disposed in a north-south direction with Tlong, Sonai, Tuivol, Koladyne and Karnaphuli as the main rivers.

South of the Brahmaputra Valley, from west to east, are the Garo, Khasi and Jaintia Hills of Meghalaya. The Garo Hills, which are drained principally by the river Someswari, rise sharply from the southern plains of Bangladesh and have a mean elevation of 1200 m. On the north there is a succession of hills towards river Brahmaputra. The Khasi Hills also rise abruptly from the plains of Bangladesh to over 1200 m in 18 Km; the ascent from the north is gradual. The Jaintia Hills, however, rise gently from the south. The southern and central parts of Meghalaya comprise the Shillong plateau. On the east, the Mikir Hills project into the Brahmaputra valley from the hill ranges of Meghalaya.

### *Climatic features*

Northeast India has a highly humid tropical climate. Its diverse physical features, consisting of valleys which are practically at sea level, and mountain and hill ranges averaging altitudes of 1200 m or more, rule out the existence of an ‘average’ annual temperature. While the plains swelter in the heat in summer, the hills experience a much lower temperature, and when the higher reaches of the hills are beset with temperature only a few degrees above freezing during December-January, the plains enjoy a much higher temperature.

The annual rainfall of 250 cm or more, chiefly during the southwest monsoon from June-September is mainly restricted to the hills. A highly restricted heavy annual rainfall of 1000 cm occurs on the southern slopes of the Shillong Plateau, mainly the Khasi Hills. The warm, moisture-laden clouds coming from the Bangladesh plains rise quickly on encountering these steep, precipitous slopes, and condense, resulting in heavy rainfall. Areas in the north of the Shillong Plateau receive relatively little rainfall. To the northeast, the Upper Assam Valley acts like a funnel into which is driven up moist air from the Brahmaputra itself, and receives a total rainfall of about 250 cm.

### *Vegetation*

Northeast India abounds in forests, grasslands, marshes and swamps. The region is composed of 3 major types of vegetation, viz., the tropical, the temperate and the alpine, each with numerous subtypes (Rao, 1974).

Tropical vegetation typically occurs upto 900 m and includes evergreen, semievergreen, and deciduous forests, grasslands and swamp. Tropical evergreen forests are found in the Assam valley, in the foothills of Eastern Himalayas and in the lower parts

of Naga Hills and Manipur. These forests are dark and thick. The deciduous forests, including the *Shorea* (*Sal*) forests occur in Goalpara, Kamrup, Nowgong and Darrang districts of Assam, and in the northern lower slopes of Garo and Khasi Hills.

Tropical grasslands with grasses reaching great heights occur in riparian flats inundated by the river Brahmaputra. These grasslands are different from those in the higher elevations of the Shillong Plateau and lower parts of North Cachar and Mikir Hills. In the Kaziranga National Park of Assam there is a combination of grassland, swamp forest and marsh. In north Kamrup, the combined effects of frequent heavy floods, fire, indiscriminate tree-felling and grazing have given rise to grasslands in place of original semi-evergreen and moist deciduous forests.

The swamp or marsh vegetation is a typical feature of the warm humid Assam Valley where there is a large number of stagnant ponds called *beels*, especially in Goalpara, Kamrup and North Lakhimpur districts.

Subtropical mixed forests occur in western Kameng, the inner valleys of Siang and Lohit districts in the Arunachal Himalaya, and in parts of Tirap district, adjoining the Patkai Hills and Burma border, in the areas reaching upto 1500 m.

Temperate vegetation occurs between approximately 1300 m to 1500 m in the Shillong Plateau, the Naga, Lushai (Mizo) and Mikir Hills, and in the Arunachal Himalaya. Temperate vegetation occurs in combination with tropical and subtropical vegetation in some suitable localities.

The temperate vegetation of the Khasi and Jaintia Hills is rich in species. The preserved "sacred" forests at Shillong Peak, Mawphlang and Mawsmi are such regions, representing relicts in highly disturbed and altered vegetation. The pine, *Pinus insularis* is a dominant tree above 900 m in the Khasi and Jaintia Hills. Dwarf grass dominates the vegetation of Cherrapunjee which, due to the very heavy rains, has chiefly bare rocks with the soil leached out.

Alpine vegetation is only found between 4500 m and 5000 m in Arunachal Pradesh. Trees are wanting and the region resembles a moorland. There is no discrete demarcation between alpine and subalpine vegetation.

## HABITS AND HABITATS

Most members of the Family Gryllidae appear to lead hidden lives and are primarily nocturnal.

### *Habitat Preference*

The field and house crickets ( subfamily Gryllinae ) are generally found beneath stones and logs of wood, on the soil, under leaf litter, in cracks and crevices between large boulders and rocks, and beneath unused house hold articles. Stone in heaps or

clusters provide them with good shelter. The chief arthropods sharing these kinds of microhabitat are spiders, collembolans, cockroaches, isopods and Dermaptera.

Many Gryllids are also seen to inhabit soil accumulated as a result of landslides, and recently ploughed soil. Members of the subfamilies Nemobiinae and Trigonidiinae occupy the wet grassy banks of rivers, streams and streamlets, lakes and ponds. Areas with dense undergrowth near a water source are ideal habitats for the latter subfamily. One genus of Nemobiinae occurs on large boulders in river banks, the colouration of such species merging remarkably well with their background; they move swiftly and are difficult to catch.

Tree crickets of the subfamily Oceanthinae are arboreal, occurring in bushes and trees and, not necessarily near a water source.

Species of subfamily Myrmecophilinae always live in association with ants or, rarely, with termites, perhaps as unobtrusive guests and have even been noticed, by the present author, accompanying ants in their migration from place to place.

Our present knowledge about the habits and habitats of subfamilies Mogoplistinae, Cachoplistinae, Pteroplistinae, Pentacentrinae, Scleropterinae, Phalangopsinae, Podoscirtinae, Itarinae and Eneopterinae is woefully poor, being restricted to isolated stray reports for a few species.

There are a few cave-dwelling Indian crickets of the subfamilies Nemobiinae and Phalangopsinae.

### *Food and Feeding Habits*

As a group, Gryllids are characteristically omnivorous, eating their food by biting and chewing. After digestion, the faecal matter is voided as pellets. Their demand for water, both as a pre-requisite to escape from desiccation and for breeding, is high. Crickets generally do not eat live prey, but when the prey is weak and unable to offer resistance, they will eat it. Some plant material is also eaten.

Cannibalism is a phenomenon in laboratory cultures of crickets; dying crickets are devoured by the stronger ones. Also, during fighting, parts of the body (e.g. legs) lost by one individual are fed upon by others.

### *Crickets as pests*

Although normally never assuming major pest status, some species of crickets have been recorded as pests of a variety of crops and trees, such as various garden plants, tobacco, rice, tea, coffee, potato, cotton, *Casuarina*, forest and shade trees, and orchard fruits. There is a record of a Gryllid causing considerable damage to textiles. One New World species of Oceanthinae has been reported to feed on aphids infesting tobacco.

### *Breeding habits*

The pre-oviposition phase of the reproductive biology of crickets has attracted more attention than their oviposition and embryonic and nymphal development. The steps leading to mating are interesting and complex in most crickets. Among many species, males produce sounds by the friction of a *file* (stridulating vein, provided with a series of downward-projecting teeth) of the right tegmen, over a *scraper*, which is a small portion of the inner margin of the left tegmen. These sounds are species-specific, and aid in the attraction of sexually responsive females. Copulation is preceded by a courtship with postures, movements and sounds differing subtly among various species. Insemination is by a spermatophore.

Gryllids lay their eggs with the help of an ovipositor. Except species of subfamilies Oecanthinae and Trigonidiinae, which insert their eggs into plant tissues, all other Gryllids lay their eggs individually in the soil. Metamorphosis is gradual, the nymphs passing through 5-9 stadia.

Although true parental care is unknown among crickets, behaviour of that nature has been described in a couple of species by Ghosh, 1912, and West and Alexander, 1963.

### HISTORICAL REVIEW

Chopard (1924b) was the first to study crickets of Northeast India. He described 3 new genera, each with a new species under two subfamilies - Nemobiinae and Phalangopsinae - from Meghalaya. Chopard's (1928b) "Revision of the Indian Gryllidae" contains the description of only one species from Northeast India, viz., Assam. Chopard (1935) has recorded 18 species from Meghalaya and Assam; these consist of one new genus and 4 new species.

Randell (1964) erected 5 new genera including 2 found in Northeast India. One of these, viz., *Velarifictorus* has now come to include several species placed in *Scapsipedus* Saussure. The other, *Plebeigryllus*, contains only one Indian species, *guttiventris* (Walker), which Chopard (1961) had transferred from *Gryllus* Linnaeus to *Platygryllus*.

Since 1967 there has been considerable amount of work on the taxonomy of Indian crickets, including the Northeast Indian region. Bhowmik (1967-1977) recorded 14 species of Gryllids from Northeast India. Of these 3 species of the genera *Anaxipha* Saussure, *Calyptotrypus* Saussure and *Velarifictorus* Randell (described in *Scapsipedus* Saussure.), and a variety of *Loxoblemmus equestris* Saussure viz., *manipurensis* were described as new. Tandon and Shishodia (1972) have recorded 20 species of Gryllids distributed over 10 genera from Arunachal Pradesh and the adjoining areas of Assam in Northeast India. Two of these - *Scapsipedus arorai* and *S. lohitensis* (now under *Velarifictorus* Bandell) - were described by them as new. Shishodia and Tandon (1975b) have recorded 8 genera Tripura. In a preliminary study on the Gryllidae of Meghalaya, Biswas *et. al* (1975) recorded 15 species as new to the state. Vasanth, *et. al.* (1975) described 2 new species of *Velarifictorus* and one of *Teleogryllus* from

Meghalaya. Vasanth (1978) described, for the first time, the females of *Velarifictorus jaintianus* Biswas and Ghosh, *V. khasiensis* and Ghosh (both described earlier by Vasanth, *et. al.*, 1975) and of *Stephoblemmus humbertiellus* Saussure - all from Northeast India.

## CLASSIFICATION

Orthopterists are divided in their opinion concerning the taxonomic rank to be given to many groups of Gryllids that are variously treated as families or subfamilies.

The earliest and the strongest base to Gryllid classification was given by Saussure (1877-1878) who divided the family into 6 tribes - *Gryllotalpiens*, *Grylliens*, *Myrmecophiliens*, *Oecanthiens*, *Trigonidiens* and *Eneopteriens* based on tarsal form and armature of posterior tibiae. He divided each of these, except the *Trigonidiens*, into legions consisting of numerous genera. Since then there appears to be no general agreement on the taxonomic rank of many groups.

Chopard (1951,1969) has raised the subfamilies to family status under superfamily Grylloidea. Bhowmik (1969a) has placed family Gryllidae under what he calls suborder Grylloidea, which undoubtedly refers to superfamily Grylloides, of most other authors. Kevan and his co-workers broadly followed Chopard's system of uprating most divisions in the Orthoptera by one grade. Vickery (1977) has summarised their system.

Randell (1964) has given a key to the tribes, subtribes and genera of Subfamily Gryllinae, founded totally on the characters of the male genitalia.

Chopard (1967-68) has divided the Gryllidae into 10 subfamilies *viz.*, Mogoplistinae, Myrmecophilinae, Scleropterinae, Cachoplistinae, Petroplistaenae, Pentacentrinae, Phalangopsinae, Trigonidiinae and Eneopterinae. Many of these have been further subdivided into tribes. Subfamily Oecanthinae has been given family rank, *viz.*, Oecanthidae. The present author is inclined to agree with B.C. Townsend of British Museum (Natural History), London (*personal communication*) whose opinion is that all divisions are just artificial tools to assist in the handling of a group and, if their use does not help people working on the group, then they are worthless. The present author also feels that divisions of subfamilies into tribes, etc. may often lead to confusion. Further, family rank for Oecanthinae is also highly debatable. T.J. Walker (1966), in his annotated checklist of the Oecanthinae of the world gives it subfamily rank. Bhowmik (1977b, 1977a,c) and Biswas, *et. al.* (1975) have followed the system of dividing family Gryllidae into subfamilies while Tandon and Shishodia (1972) have given family rank to the subfamilies. In the present work family Gryllidae has been divided into 14 subfamilies, *viz.*, Gryllinae, Nemobiinae, Mogoplistinae, Myrmecophilinae, Scleropterinae, Cachoplistinae, Pteroplistinae, Pentacentrinae, Phalangopsinae, Trigonidiinae, Eneopterinae, Podoscirtinae, Itarinae and Oecanthinae.

## MATERIALS AND METHODS

The present work embodies the result of studies on material collected from various parts of Northeast India by survey parties of the Zoological Survey of India, Eastern Regional Station, Shillong, since 1960. Identified material deposited in the National Zoological Collections, Z.S.I., Calcutta, and also some type specimens and other identified Gryllid material from the Central Entomological Laboratory, Z.S.I., Calcutta, The Academy of Natural Sciences, Philadelphia, U.S.A. and the British Museum (Natural History), London were studied for the purpose of comparison and confirmation. This material included collections from not only Northeast India, but from other parts of India and a few other countries as well.

Specimens of crickets were collected by the following methods; (1) Hand picking, (2) Pitfall trapping, (3) Sweeping and (4) Light trapping.

After collection, the material was killed with ethyl acetate in a 'killing bottle' and transferred to insect packets. Later, they were pinned after appropriate relaxation and setting. Alternately, the material was transferred straight into rectified spirit from the 'killing bottle', and preserved as such.

### *Preparation of Male Genitalia*

The genitalia of male specimens was prepared for study by the following method; the abdominal extremity was cut open and the genitalia removed. The dissected genitalia was then kept overnight in 10% cold potassium hydroxide solution to clear the muscles. (Keeping for a longer period of time in the KOH solution results in desclerotisation of the genitalic parts, making it extremely difficult for study). The muscles were cleared with the help of needles. The cleared genitalia was then washed thoroughly in distilled water, and preserved in 90% alcohol in a microvial. This was either kept along with the specimen (if the specimen were preserved in spirit), or, in case of a pinned specimen, it was kept separately, and an index-numbered label was given to both the genitalia and the specimen from which it was dissected out. Illustrations of the genitalia were made with the help of a camera lucida. The procedure of affixing the genitalia to a piece of paper kept with the pinned specimen was not adopted since this makes it impossible to study the ventral view of the genitalia.

## SYSTEMATIC ACCOUNT

### Key to the Subfamilies of Family GRYLLIDAE

1. Body short, oval ; posterior femora massive, hardly one and a half times as long as broad (Fig. 1)..... Myrmecophilinae
- Body elongated ; posterior femora slender, at least twice as long as broad (Fig. 2)..... 2

2. Second segment of tarsi compressed, minute (Fig. 3).....3  
 — Second segment of tarsi depressed, a little larger and heart-shaped (Fig.4).....11
3. Posterior tibiae with serrulated margins, lacking spines ( except in the genus *Acanthoplistus* Saussure of the subfamily Scleropterinae ) (Fig. 5).....4  
 — Posterior tibiae always armed with spines on superior margins (Fig.6) ( except in the genus *Xabea* Walker of the subfamily Oecanthinae ) ; serrulation may or may not be present .....7
4. Facial shield subquadrate, inserted between the antennal sockets; frontal rostrum wide (Fig.7).....5  
 — Facial shield transverse; width of frontal rostrum variable, although narrower (Fig. 8) .....6
5. Facial shield strongly transverse ; body covered with scales ; females always apterous ( Fig. 8 ) ; tegmina of males, when present, short and membranaceous ( Fig.9 ) ..... Mogoplistinae  
 — Facial shield almost flat ; body without scales ; males and females with fully developed tegmina ( Fig. 10 ) ..... Scleropterinae
6. Pronotal edges carinated ( Fig. 12 ) ; ovipositor of females slender with differentiated apical valves (Fig. 14) .....Cachoplistinae  
 — Pronotal edges rounded (Fig. 13); ovipositor wide, compressed, curved, sword-shaped, without differentiated apical valves (Fig. 15).....Pteroplistinae
7. Posterior tibiae non-serrulated between spines ( Fig.6).....8  
 — Posterior tibiae always serrulated between spines and at base (Fig. 16) (except in the genus *Aspidogryllus* Chopard of subfamily Phalangopsinae).....10
8. Head globular (Fig. 80); antennae inserted above middle of face ( Fig.71); male tegmina always with mirror ( Fig. 10 ).....9  
 — Head flattened in front (Fig. 79); antennae inserted beneath middle of face (Fig.72); male tegmina without mirror (Fig. 11) .....Pentacentrinae
9. Usually larger (> 8 mm), more robust insects ; spines of posterior tibiae immovable, without hairs ( Fig. 20 ) ; serrulation may be present ( Fig. 20 ) .....Nemobiinae  
 — Usually smaller (< 8mm), more slender, delicate insects ; spines of posterior tibiae movable, with hairs ( Fig. 20 ) ; serrulation never present ( Fig. 20 ).....Nemobiinae
10. Head elongated, horizontal ( Fig. 17 ) ; slender insects ; posterior femora feebly swollen ( Fig.22 ) ; tegmina transparent.....Oecanthinae

- Head short, vertical ( Fig.18 ) ; robust insects ; posterior femora strongly swollen at base (Fig.23 ) ; tegmina never transparent..... Phalangopsinae
11. Very small ( < 6mm ), delicate insects ; posterior tibiae without serrulation , and always with only 3 spines on each margin ( Fig. 24 ) .....Trigonidiinae
- Larger ( > 6mm ), sometimes quite robust insects ; posterior tibiae always serrulated ( Fig. 16 ) ; number of spines variable .....12
12. Posterior tibiae with short, subequal external apical spurs ; posterior metatarsi short ( Fig. 25 ) .....Podoscirtinae
- Posterior tibiae usually with 3 long apical spurs both on internal and external face; posterior metatarsi long (Fig. 26).....13
13. Frontal rostrum narrowing in front ( Fig. 27 ) , eyes projecting forward ( Fig. 27 ) ; male tegmina wide, with several oblique veins ( Fig. 29 ).....Itarinae
- Frontal rostrum with parallel margins (Fig. 28); eyes projecting laterally ( Fig.28); male tegmina generally with 2 oblique veins ( Fig. 30 )..... Eneopterinae

Subfamily (i) MYRMECOPHILINAE  
( Ant - loving crickets )

1877. *Myrmecophiliens* Saussure, *Mem. Sec. Geneve*, 25 : 289.  
 1882. *Myrmecophilidae*, Brunner, *Prodr. europ. Orthopt.*, 445  
 1894. *Myrmecophilinae*, Saussure, *Boil. Centr. Amer.*, 1 : 230.  
 1968. *Myrmecophilinae*, Chopard, *Orth. Cat.*, 12 : 242.  
 1969. *Myrmecophilidae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 180.

*Diagnostic characters* : Small, wingless, oval insects with small head and reduced eyes with clearly distinguishable ommatidia. Posterior femora much swollen, one and a half times as long as wide; posterior tibiae armed, on each superior margin, with a few tiny, movable spines. Cerci annulated, appearing to be segmented. Ovipositor stem with a membranaceous sheath, apical valves splayed, dagger-like.

Genus 1 *Myrmecophilus* Berthold, 1827

1827. *Myrmecophilus* Berthold, *Nat. Fam. Thierr.*, 409.  
 1829. *Myrmecophila*, Latreille, *Regne animal*, (ed. 2) 5 : 83.  
 1968. *Myrmecophilus*, Chopard, *Orth. Cat.*, 12 : 243.  
 1969. *Myrmecophilus*, Chopard, *Fauna Ind. Grylloidea*, 2: 181.

*Type-species*: *Blatta acervorum* Panzer, 1799.

*Diagnostic characters* : Forehead and tibial spines with normal pubescence; inferior margin of posterior femora plain, without any tubercles.

*Distribution* Cosmopolitan.

**Remarks:** This is the most familiar genus of subfamily Myrmecophilinae. It differs from *Myrmophilellus* Uvarov, in that in the latter genus, the forehead is strongly pubescent, the tibial spines and spurs as well as the posterior metatarsi and their spurs are provided with very long hairs, and the inferior margin of the posterior femora bears small tubercles.

### 1. *Myrmecophilus dubius* (Saussure)

1877. *Myrmecophilus dubius* Saussure, *Mem. Soc. Geneve* 25 : 293.

1906. *Myrmecophila dubius*, Kirby, *Synon. Cat. Orthopt.*, 2 : 55.

1968. *Myrmecophilus dubius*, Chopard, *Orth. Cat.*, 12 : 247.

1969. *Myrmecophilus dubius*, Chopard, *Fauna Ind. Grylloidea*, 2 : 182.

**Diagnostic characters:** *Female* : Very small, robust. General colouration brown, with a darker brown band along posterior margin of each abdominal tergite. *Head* small, forehead slightly pubescent ; eyes small, black, not protruding, with a few large, indistinct round ommatidia ; antennae brown, very thick in relation to body size ; frontal rostrum one a half times the width of first antennal segment ; maxillary palpi with first three or four segments brown, the last, or last two segments pale ; last segment widened much apically. *Pronotum* : narrowing anteriorly, with a yellow band towards posterior margin ; mesonotum with yellow band ; *Legs* : anterior tibiae without tympana ; posterior femora large, oval ; posterior tibiae with one fairly long external spine in distal half ; posterior matatarsi almost 3/4 the length of posterior tibiae. *Abdomen* : each abdominal tergite with a darker brown band along posterior margin ; cerci apparently 11-segmented, pointed apically, with yellow bristles. *Ovipositor* straight, fairly long, covered by a membranaceous sheath ; apical valves slender, splayed, with some small denticles.

*Male* unknown.

**Measurements** (Female) Body length : 2.8-3.2 ; length of pron : 1.0-1.1 ; width of pron : 1.5-1.6 ; length of post. fem : 1.7-1.8 ; length of post. tib : 1.2-1.3 ; length of ovip : 1.5.

**Material examined** 1 Female, Arunachal Pradesh, Subansiri dist., Tamen, Boasimla, 16.xi.1975 (K.R. Rao coll.) ; 1 Female, Meghalaya, Khasi Hills dist., Shillong, 26.x.1975 (M. Vasanth coll.) (ZSI Collections).

**Distribution** : India (Arunachal Pradesh, Meghalaya, Andaman Islands) ; Malaysia ; Indonesia (Sumatra).

**Remarks** : In India, this genus and species were so far known only from Port Blair, Andaman Islands. They are reported here for the first time from the Indian mainland. The yellow bands on the pro-and meso-nota of this specis are brighter in specimens preserved dry. Of the two specimens studied, one was collected from an unidentified



5. Pronotum of male feebly produced backwards, exposing a large part of tegmina (Fig. 41) ..... *Ornebius* Guerin  
 — Pronotum of male strongly produced backwards concealing tegmina almost completely (Fig. 42)..... *Ectatoderus* Guerin

Of the above 6 genera, only one genus *Cycloptiloides* Sjostedt is known from Northeast India, represented by a single species.

### Genus 2 *Cycloptiloides* Sjostedt, 1909

1909. *Cycloptiloides* Sjostedt, *Kilimandjaro-Meru Exp.*, 3 (17) : 110.

1968. *Cycloptiloides*, Chopard, *Orth. Cat.*, 12 : 237.

1969. *Cycloptiloides*, Chopard, *Fauna Ind. Grylloidea*, 2 : 205.

*Type-species*: *Cycloptiloides meruensis* Sjostedt, 1909.

*Diagnostic characters* : Head a little flattened ; frontal rostrum scarcely furrowed, wider than first antennal segment. Pronotum produced backward in male, covering the tegmina entirely. Anterior tibiae with tympana on internal face. Posterior tibiae very long, provided with inconspicuous denticles on superior margins. Paraprocts with a process.

*Distribution* : South Asia, Tropical Africa, South America.

*Remarks* : Although 8 species of the present genus are known from the world, only one is known from India.

### 2. *Cycloptiloides orientalis* Chopard

1925c. *Cycloptiloides orientalis* Chopard, *Ann. Soc. ent. Fr.*, 94 : 301.

1968. *Cycloptiloides orientalis*, Chopard, *Orth. Cat.*, 12 : 237.

1969. *Cycloptiloides orientalis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 205.

*Diagnostic characters* : *Male* : Head a little flattened; frontal rostrum wide, rounded, protruding. *Pronotum* feebly narrowing in front, posteriorly rounded, disc convex. *Legs* rufous, femora darkened at apex; posterior tibiae short, a little curved. (Posterior metatarsi slender, with scarcely visible spinules lost in the pubescence). *Tegmina* absent.

*Female* : differs from the male in the following characters : *Pronotum* a little longer than wide, anterior and posterior margins straight. *Ovipositor* short, almost straight, with apical valves feebly enlarged, the superior ones bearing a row of very small tubercles, each with a hair, along the inferior margin.

*Measurements* : Body length : Male 9.0 (Male, Female 5.0-5.5) ; length of pron : Male 3.5 (2.5-2.7), (Female 1.9) ; width of pron : Male 1.5; length of post fem : Male 4.5 (3.5), (Female 4.0) ; length of post. tib. Male 2.8 ; length of post. met ; Female 1.0.

*Material examined* : 1 Male S. Andaman Island, Katan, Baratang, 21.iii.1964 (B.S. Lamba coll.) (ZSI Collections).

*Distribution* India (Assam, Andaman Islands) ; Sri Lanka ; Malaysia.

*Remarks*: This is the only species of the genus *Cycloptiloides* Sjostedt recorded from India. In India, it is only known from Ledo, Assam, and the Andaman Islands, where its occurrence was previously unknown.

Although Chopard (1969) states that the spinules in the posterior matatarsi are scarcely visible, the specimen examined in the present study, while agreeing with the description in other characters, has clearly visible spinules. Further, Chopard (*loc. cit.*) states, under the characters of the genus, that both the sexes are apterous, whereas in the description of the species, under 'male' he has stated : 'Elytra completely hidden by pronotum'

*Location of type* : Museum National d'Histoire Naturelle, Paris, France.

### Subfamily (iii) SCLEROPTERINAE (Stiff-winged crickets)

1877. *Scleropterites* Saussure, *Mem. Soc. Geneve*, 25 : 317.

1932. *Scleropterinae*, Chopard, *Ark. Zool.* 23A (2, No.9) : 9.

1969. *Scleropteridae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 206.

*Diagnostic characters* : Small in size, body glabrous; facial shield very wide, flattened, prominent between antennae. Posterior tibiae with either spines (maximum 3) or serrulation, never both. Both sexes with well developed tegmina, a little corneous in female ; mirror perfect in male.

#### Key to the Indian Genera of Subfamily SCLEROPTERINAE

Posterior tibiae with spines, serrulation absent (Fig. 6) ; pronotal edges carinated (Fig.12) ..... *Acanthoplistus* Saussure  
 Posterior tibiae with serrulation, spines absent (Fig.5) ; pronotal edges rounded (Fig. 13).....*Scleropterus* Hann.

#### Genus 3 *Acanthoplistus* Saussure, 1877.

1877. *Acanthoplistus* Saussure, *Mem. Soc. Geneve*, 25 : 318.

1968. *Acanthoplistus*, Chopard, *Orth. Cat.*, 12 : 251.

1969. *Acanthoplistus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 207.

*Type-species* : *Acanthoplistus carinatus* Saussure, 1877.

**Diagnostic characters :** Head wide, much depressed; forehead strongly widened, directly followed by face. Pronotum squarish, with anterior margin concave, posterior straight; disc with keeled edges. Legs short and compressed; anterior tibiae provided with a large oval tympanum on external face and a smaller one on internal face; posterior tibiae with 3 spines on each superior margin. Male tegmina with well developed, divided mirror.

**Distribution :** South Asia, Far East, Tropical Africa.

**Remarks :** Five species of this genus are known from the world; only one of these is recorded from India.

### 3. *Acanthoplistus birmanus* Saussure

1877. *Acanthoplistus birmanus* Saussure, *Mem. Soc. Geneve*, 25 : 322.

1968. *Acanthoplistus birmanus*, Chopard, *Orth. Cat.*, 12 : 252.

1969. *Acanthoplistus birmanus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 207.

**Diagnostic characters :** *Male* : Small, black. *Head* flattened, punctated, with 3 almost glabrous longitudinal bands, frontal rostrum much wider than first antennal segment, weakly convergent; face short; 5th segment of maxillary palpi strongly widened. *Pronotum* : disc flat, with fine, regular punctation, lateral edges carinated; lateral lobes with denser and more regular punctation than disc. *Legs* : all tibiae and tarsi yellow; posterior femora thick, short, black with yellow tip. *Tegmina* smoky, translucent; mirror rounded behind, with a strongly curved dividing vein; 2 oblique veins; apical field with a few large areolae; lateral field blackish, with 5 plain, parallel veins. *Wings* usually short. *Abdomen* black, with yellow cerci.

*Female* differs from the male in the following characters : *Tegmina* presenting, in dorsal field, 5 parallel veins, the second furcate basally. *Ovipositor* short, brownish-yellow to yellow, deeply notched just proximal to beak-like apical valves.

**Measurements :** Body length : Male (8.0-9.0), Female 7.0-8.2 (10.0) ; length of pron: Male (2.0-2.1), Female 2.0-2.3 ; length of teg: Male (4.2-4.8), Female 2.6-4.6 ; length of post. fem: Male (4.2), Female 4,8 ; length of post. tib : Female 4.2; length ovip : 2.5-2.7 (3.0).

**Material examined :** 1 Female Assam, Cachar, Silouri, (no date) (*J. Wood-Mason coll.*) ; 1 Female U.P., (no further data) (*ZSI Collections*).

**Distribution :** India (Assam, U.P., Himachal Pradesh, Karnataka, Tamil Nadu) ; Burma ; Peninsular Thiland ; Tonkin ; Annam.

**Remarks :** This is the first record of this species and the genus *Acanthoplistus* Saussure from Northeast India.

*Location of type* : Genoa Museum, Genoa, Italy.

#### Genus 4 *Scleropterus* Haan, 1842

1842. *Scleropterus* Haan, *Temminck Verhandl. Orth.*, 232.

1968. *Scleropterus*, Chopard, *Orth. Cat.*, 12 : 251.

1969. *Scleropterus*, Chopard, *Fauna Ind. Grylloidea*. 2 : 210.

*Type-species* : *Gryllus (Scleropterus) coriaceus* Haan, 1842.

*Diagnostic characters* : Small, globular head ; frontal tostrum very wide. Pronotum long, narrowing in front, disc convex, punctated, with rounded edges. Anterior tibiae with tympana; superior margins of posterior tibiae serrulated, lacking spines. Male tegmina with large mirror, divided by an angulate vein, variable number of oblique veins; female tegmina corneous with longitudinal veins and dense transverse veinlets.

*Distribution* India ; Burma ; Malaysia , Thailand ; Indonesia ; Taiwan ; Annam ; Vietnam ; Japan.

#### 4. *Scleropterus coriaceus* (Haan)

1842. *Gryllus (Scleropterus) coriaceus* Haan, *Temminck Verhandl. Orth.*, 232.

1893. *Scleropterus punctatus*, Brunner, *Ann. Mus. Genova*, 13 : 204. Syn. nov ?

1968. *Scleropterus coriaceus*, Chopard, *Orth. Cat.*, 12 : 251.

1968. *Scleropterus punctatus*, Chopard, *Orth. Cat.*, 12 : 251.

1969. *Scleropterus coriaceus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 211.

1969. *Scleropterus punctatus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 212.

1977b. *Scleropterus coriaceus*, Bhowmik, *Rec. zool. Surv. India*, 73 : 31.

1977b. *Scleropterus punctatus*, Bhowmik, *Rec. zool. Surv. India*, 73 : 32.

*Diagnostic characters Male* : Variable colouration - black to pale yellowish-brown. *Head* globose, finely punctated ; frontal rostrum punctated upto level of clypeofrontal suture, at least double the width of first antennal segment ; antennae with about 6 whitish segments a short distance from base. *Pronotum*: disc and lateral lobes finely punctated. *Legs* posterior femora punctated on external face in regular oblique lines. Posterior tibiae with 11-17 denticles on supero-external margin, and about 6-8 on supero-internal margin. *Tegmina* extending beyond apex of abdomen, widened posteriorly; dorsal field with 3-5 oblique veins, large mirror divided by a sinuated vein, apical field usually quite short with 1-3 veins and a very irregular reticulation of large cells; lateral field with 2-5 veins, Sc. with distal branches and a few transverse veinlets. *Wings* long or short.

*Female* differs from the male in the following characters : *Tegmina* rarely shorter than abdomen; dorsal field usually convex, thick, opaque, with 4-5 longitudinal, almost parallel veins connected by numerous transverse veinlets, which being more irregular anteriorly, give the anterior part of the tegmina a punctated appearance. *Ovipositor*

slender, slightly curved upward, with small apical valves bearing at least 9-10 clear denticles.

**Measurements :** Body length: Male 7.0-9.5 (9.5-10.5), Female 8.8-9.5 (11.5); length with wings: Male 14.0-14.5, Female 15.0; length of pron: Male 2.0-2.8 (2.9-3.0), Female 2.7-3.0 (3.2); width of pron: Male 2.8-3.0, Female 2.7-3.2; length of teg: Male 4.5-8.5, Female 5.0-7.0 (8.3); length of post. fem: Male 4.8-5.0 (5.8-6.0), Female 5.5-6.0 (7.2); length of post. tibiae: Male 3.6-4.2, Female 4.0-4.7; length of ovip: 5.0-6.0.

**Material examined :** 4 Females Assam, Lakhimpur dist., Guijan, 17.xi.1974 (S.K. Chanda coll.), Sibsagar dist., Kaziranga Nat. Park, 7.x.1961 (R.N. Katiyar coll.) ; Arunachal Pradesh, Kobo, Missamari, 30.xi—8.xii.1911 (S.W. Kemp coll.), 29.xi.1965 (S.K. Bhattacharyya coll.); 1 Female U.P., Shaharanpur dist., Rajaji Sanctuary, 13.vii.1963 (T.D. Soota coll.) (ZSI Collections) ; 2 Males, 1 Female Assam, vicinity of Ledo, 8-18.x.1944 (J.W.H.Rehn coll) ; 1 Male paratype of *S. punctatus* Brunner, Burma, Pegu, Tikekeo, June, 1887 (L. Fea coll.) several males and females, Burma, Japan, September, October, (Y Hirse, H. Fruhstorfer, A.V.B.Crumb coll.) (ANSP Collections).

**Distribution :** India (Assam, Arunachal Pradesh, Karnataka, Kerala, U.P.) ; Burma, Taiwan, Annam, Vietnam, Indonesia, Thailand, Malaysia, Japan.

**Remarks :** The male of *Scleropterus punctatus* Brunner has already been synonymised with *S. coriaceus* (Haan). Present studies on a large number of identified as well as unidentified specimens, including a paratype of *S. punctatus* Brunner loaned by the Academy of Natural Sciences of Philadelphia, USA, show convincingly that the two species are one and the same, and the characters used to distinguish between them are vague and inconsistent in the nature. Dissection and study of the male genitalia will, in all probability, help in confirming the true identity of the two species, but permission for dissection could not be obtained during the present study from the Academy of Natural Sciences of Philadelphia. Thus, *S. punctatus* Brunner is treated here as a probable synonym of *S. coriaceus* (Haan).

Chopard (1969) has stated that the macropterous form seems common in the species, but of the 70 or more specimens examined by the present author only 3 are macropterous.

**Location of type :** The Academy of Natural Sciences of Philadelphia, USA.

#### Subfamily (iv) CACHOPLISTINAE (Beetle crickets)

1877. *Cachoplistites* Saussure, *Mem. Soc. Geneve*, 25 : 325.

1932. *Cachoplistidae*, Chopard, *Ark. Zool.*, 23A (2, No.9) : 10.

1968. *Cachoplistinae*, Chopard, *Orth. Cat.*, 12 : 253.

**Diagnostic characters :** This subfamily comprises only one genus which is characterised by a transverse facial shield and by the pronotum, which is cuboid and dorsally excavated; the lateral edges of disc are compressed in the shape of a crest. Legs short, posterior tibiae lacking spines, but serrulated. Male tegmina with well developed mirror; female tegmina corneous, with protruding veins.

#### Genus 5 *Cachoplistus* Saussure, 1877

1873. *Cacoplistes* Brunner, *Mitth. Schweiz. ent. Ges.*, 4 : 169 (description without type).

1877. *Cachoplistus*, Saussure, *Mem. Soc. Geneve*, 25 : 325.

1968. *Cachoplistus*, Chopard, *Orth. Cat.*, 12 : 253.

**Type-species :** *Cachoplistus brunnerianus* Saussure, 1877.

**Diagnostic Characters :** Head tiny, globose ; vertex declivous, frontal rostrum narrow. Pronotum excavated dorsally, a little projecting in front. Tibiae quadrangular, anterior ones bearing a small internal tympanum ; posterior femora very slender ; posterior tibiae with 6 apical spurs, external short, subequal ; internal, chiefly median, a little longer. Tegmina extending upto extremity of abdomen, with numerous oblique veins in male. Other characters as given under subfamily.

**Distribution :** India ; Australia.

**Remarks :** Brunner (1873) did not designated a type-species for his genus *Cacoplistes*, later, Saussure (1877) erected the genus *Cachoplistus* and designated the type-species, *C. brunnerianus* and, therefore, *Cachoplistus* is treated as the valid name of the genus.

#### 5. *Cachoplistus regenhoferi* Saussure

(Figs. 134,135)

1877. *Cachoplistus regenhoferi* Saussure, *Mem. Soc. Geneve*, 25 : 329.

1969. *Cacoplistes regenhoferi*, Chopard, *Fauna Ind. Grylloidea*, 2 : 228.

**Diagnostic characters Male** Colouration brown to black, punctated, but punctation may not be very evident. *Head* small, globose, vertex sloping, frontal rostrum narrow ; antennae black, with a large white portion. *Pronotum* squarish, deep above, front margin slightly projecting over head, lateral edges crest-shaped. *Legs* with quadrangular tibiae, anterior ones with a small internal tympanum ; posterior femora thin, tibiae with serrulation. *Tegmina* large, wide, with brown veins; mirror slightly wider than long, divided by 2-3 equally spaced veins ; diagonal vein trifurcate at base ; anal field very large ; oblique veins 6 (8-10), almost parallel ; apical field wide, with a regular reticulation composed of projecting areolae ; lateral field with Sc. thickened at base, provided with 8 or 9 branches which are lost in a rough reticulation. *Wings* short.

**Female** differs from the male in the following characters : *Tegmina* weakly convex, strongly veined, with wrinkled appearance ; dorsal field with oblique veins ; lateral field with close reticulation. *Ovipositor* long, straight, with small, acute, very narrow apical valves.

**Measurements** : Body length : Male, Female 24.0-25.0 ; length with tegmina: Male, Female 27.0-27.5 ; length of pron : Male, Female 5.0-5.5 ; width of pron : Male, Female 7.0 ; length of teg : Male 21.5, Female 22.0 (Male, Female 21.5-22.0) ; length of post. fem: Male 16.0, Female 18.0 (Male, Female 15.0-18.0) ; length of post. tib : Male 18.5, Female 21.0 ; length of ovip : 12.5.

**Material examined** : 1 Male Assam, Sibsagar dist., Kaziranga Nat. Park, 7.x.1961 (R. N. Katiyar coll.) ; 1 Female West Bengal, Calcutta, (no date) (C.Pawa coll.) (ZSI Collections).

**Distribution** : India (Assam, West Bengal, Kashmir) ; Tonkin ? Australia.

**Remarks** : This species appears to be rather rare in occurrence. Since its description in 1877, it has been recorded from only four localities ( including one new locality within Assam, viz., Kaziranga National Park, in the present study ) in India.

Chopard ( 1969 ) has stated that there are only two veins dividing the mirror while in the figure of the male, 3 veins are shown.

**Location of type** : Natural History Museum, Vienna, Austria.

#### Subfamily (v) PTEROPLISTINAE (Feather-winged crickets)

**Remarks** : This subfamily is represented by only a single genus, *Pteroplistes* Brunner, and in India, by a lone species, *P. platycleis* (Bolivar). This has been recorded only from South India.

#### Subfamily (vi) GRYLLINAE (Field and House crickets)

- 1874. *Grylliens* Saussure, *Miss. Mexique, Orthopt.*, 379.
- 1882. *Gryllidae*, Brunner, *Prodr. europ. Orthopt.*, 419-423.
- 1894. *Gryllinae*, Saussure, *Biol. Centr. Amer.*, 1 : 21.
- 1964. *Gryllinae*, Randell, *Canad. Ent.*, 96 : 1567.
- 1967. *Gryllinae*, Chopard, *Orth. Cat.*, 10 : 17.
- 1969. *Gryllinae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 13.

**Diagnostic characters** : Colouration blackish, brownish or tawny. Size variable, characterised by a glohular head, minute and compressed second tarsal segment ; with strong, glabrous, immovable spines, serrulation in between spines on posterior tibiae

absent. Both pairs of wings generally moderately well to fully developed, although often reduced. Male tegmina nearly always with well-developed basal stridulatory organ.

### Key to the Indian genera of Subfamily GRYLLINAE

1. Posterior tibiae presenting serrulation proximal to spines (Fig. 43) .....2  
 — Posterior tibiae without serrulation (Fig 44) .....4
2. Anterior tibiae without tympanum (Fig. 37).....*Chopardia* Bhowmik  
 — Anterior tibiae with at least one tympanum (Fig. 38).....3
3. Anterior tibiae presenting a tympanum on each face (Figs, 45,46) .....  
 .....*Doulandrevus* Kirby  
 — Anterior tibiae presenting a tympanum on external face only (Figs, 47,48) .....  
 .....*Landreva* Walker
4. Body glabrous, or nearly so ; ocelli arranged in a straight line (Fig. 49) ; length of posterior femora at least equal to the combined lengths of tibia and tarus (Fig 51) .....5  
 — Body usually more pubescent; ocelli aranged in the form of a triangle (Fig. 50); length of posterior femora never greater than combined lengths of tibia and tarsus (Fig. 52) .....7
5. Pronotum greatly widening in front, with anterior margin strongly concave (Fig. 53) ; abdomen narrow at base (Fig. 53) ; female tegmina very short (Fig. 53) .....*Sphecogryllus* Chopard  
 — Pronotum only gradually widening in front with anterior margin feebly concave (Fig. 54); abdomen not narrow at base (Fig. 54); female tegmina fully developed (Fig. 54); .....6
6. Large, robust insects ; male pronotum widening more strongly in front (Fig. 55) anterior matatarsi very short, anterior and middle tibiae not ciliated with long hairs (Fig. 57); ovipositor very short in relation to body size (Fig. 59).....  
 ..... *Brachytrupes* Serville  
 — Smaller, more slender insects; male pronotum, if at all, very slightly widening in front, (Fig. 52) ; anterior metatarsi moderately long, anterior and middle tibiae ciliated with long hairs (Fig. 54); ovipositor longer in relation to body size (Fig.56)..... *Gymnogryllus* Saussure
7. Supra-anal plate bears a prominent pair of posteriorly projecting, heavily sclerotised structures (Fig. 61).....*Spinogryllus* gen. nov.  
 — Spura-anal plate bears no such structures (Fig. 62).....8

8. Face of male flattened, or more or less concave (Figs. 63,70,71); frontal rostrum with or without prolongation or process (Figs.65,66,69) .....9
  - Face of male convex (Fig. 64); frontal rostrum never with prolongation or process (Fig.66) .....15
9. Both sexes apterous (Fig. 66)..... *Scapsipedoides* Chopard
  - Tegmina present in both sexes in various degrees of development ( Fig. 67, 68, 54) .....10
10. Face of male flattened, or slightly concave .(Figs. 63, 70); frontal rostrum without prolongation or process (Fig. 66).....11
  - Face of male strongly flattened (Fig. 70); frontal rostrum prolonged, and may be provided with a process (Figs. 65,69) .....12
11. Frontal rostrum of male subangulate, prominent, with a small apical depression (Fig. 73) .....*Coiblemmus* Chopard
  - Frontal rostrum of male convex, with no special angulation or apical depression. (Fig. 74) .....*Velarifictorus* Randell
12. Frontal rostrum of male projecting, simply angular, with no process (Fig. 65) ..... *Loxoblemmus* Saussure
  - Frontal rostrum of male strongly projecting, presenting a corneous or membranaceous process (Figs 69, 75, 76).....13
13. Frontal rostrum of male with a wide, corneous process, which is never membranaceous (Fig. 69)..... *Stephoblemmus* Saussure
  - Frontal rostrum of male with an entire or divided membranaceous process (Fig 75, 76) .....14
14. Membranaceous process of frontal rostrum deeply divided into two large lobes (Fig. 75).....*Meristoblemmus* Jones & Chopard
  - Membranaceous process of frontal rostrum entire (Fig. 76)..... *Parasciobia* Chopard
15. Width of frontal rostrum subequal to that of first antennal segment (Fig. 77) .....16
  - Width of frontal rostrum always about double that of first antennal segment (Fig.78).....17
16. Head dorsally flattened (Fig. 79); ovipositor long (Fig. 60)....*Gryllodes* Saussure
  - Head dorsally rounded (Fig. 80); ovipositor rudimentary (Fig.81)..... *Itaropsis* Chopard

17. Body convex, cylindrical; female with imperfectly developed tegmina, often reduced to lateral pads (Fig. 69).....18  
 — Body more depressed; apterous (Fig. 66) or, when tegmina present in female, never reduced to lateral pads .....19
18. Subgenital plate with conical or rounded apex (Fig. 82); postero-lateral corners of epiphallus of male genitalia without styli (Fig. 84).....*Gryllopsis* Chopard  
 — Subgenital plate with apex concave or deeply notched (Fig. 83); epiphallus bearing styli on posterolateral corners (Fig. 85).....*Turanogryllus* Tarbinskii
19. Completely apterous (Fig. 66); anterior tibiae without tympana (Fig. 37) ..... *Cophogryllus* Saussure  
 — Tegmina well developed, at least in male sex (Figs. 54,68); anterior tibiae with at least one tympanum (Fig. 38).....20
20. Male tegmina with confused mirror and reduced apical field(Fig.86).....21  
 — Male tegmina with distinct mirror and apical field (Fig. 87).....22
21. Spines on posterior tibiae feebly movable .....*Nemobiodes* Chopard  
 — Spines on posterior tibiae immovable .....*Callogryllus* Sjostedt
22. Epiphallus deeply emarginate posteriorly forming an H-shaped structure (Figs. 84, 85).....23  
 — Epiphallus not H-shaped (Figs. 88,89,90); may be trilobed (Fig. 89).....24
23. Endoparameres with a broad transverse parameral muscle apodeme, but no expanded parameral muscle insertion area (Fig. 91).....  
 .....*Tratarogryllus* Tarbinskii  
 — Endoparameres with an expanded parameral muscle insertion, but no transverse parameral muscle apodeme (Figs. 92).....*Modicogryllus* Chopard
24. Anterior projections of ectoparameres approximately equal (Fig. 93).....25  
 — Internal anterior projection of ectoparameres much longer than external anterior one (Fig. 94).....26
25. Endoparameres with a transverse parameral muscle apodeme (Fig. 91) apex of ectoparamere not digitiform (Fig. 93).....*Melanogryllus* Chopard  
 — Endoparameres without a transverse parameral muscle apodeme (Fig. 95); apex of ectoparamere digitiform (Fig. 96).....*Gryllus* Linnaeus
26. Epiphallus posteriorly trilobed (Fig. 89).....27  
 — Epiphallus posteriorly not trilobed (Fig. 90).....*Lenigryllus* Chopard

27. Virga with a transverse parameral muscle insertion crest (Fig. 97).....28  
 — Virga without transverse parameral muscle insertion crest (Fig. 98).....29
28. Portion of virga just apicad the base broadly expanded, heavily sclerotised, dorsally excavate (Fig.99); endoparameres J- shaped (Fig. 99) .....  
 .....*Plebeiogryllus* Randell  
 — Virga with no such structure (Fig. 98) ; endoparamers C-shaped (Fig. 97).....  
 .....*Teleogryllus* Chopard
29. Endoparameres J-shaped without transverse parameral muscle apodemes (Fig. 98) .....  
 ..... *Acheta* Fabricius  
 — Endoparameres C-shaped with transverse parameral muscle apodemes (Fig. 91)  
 ..... *Platygryllus* Chopard

About one-third the total number of described species of crickets belong to this subfamily.

#### Genus 6 *Landreva* Walker, 1869.

1869. *Landreva* Walker, *Cat. Derm Salt. Br. M.*, 1 : 55.

1877. *Ectolandrevus*, Saussure, *Mem. Soc. Geneve*, 25 : 271.

1967. *Landreva*, Chopard, *Orth. Cat.*, 10 : 144.

1969. *Landreva*, Chopard, *Fauna Ind. Grylloidea*, 2 : 140.

*Type-species* : *Gryllus clarus* Walker, 1869.

*Diagnostic characters* : Body dorso-ventrally flattened, more or less glabrous and shining. Head slightly flattened; frontal rostrum narrow, projecting between antennal sockets and inclined; face short. Only external face of anterior tibiae presenting a small oval tympanium; posterior tibiae presenting a few denticles before spines. Male tegmina abbreviated, apically truncated, with reduced apical field and a great number of oblique veins; female tegmina short, sometimes in the form of lateral pads.

*Distribution* India; Sri Lanka.

*Remarks* : The major distinguishing character between *Landreva* Walker and the related genera *Duolandrevus* Kirby and *Endolandrevus* Saussure, is the presence of either one or two tympana, and their position. It would be worthwhile undertaking a revision of the three genera to compare other characters, e.g. the male genitalia, which could make it easier to separate them.

#### Key to the Northeast Indian species of Genus *Landreva* Walker

Frontal rostrum as wide as first antennal segment, flat above ; tegmina extending upto middle of 4th abdominal tergite, apically rounded ..... *clara* (Walker)

Frontal rostrum distinctly narrower than first antennal segment, furrowed above; tegmina extending only upto second abdominal tergite, apically truncated  
 ..... *indica* sp. nov.

### 6. *Landreva clara* (Walker)

1869. *Gryllus clarus* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 39.

1877. *Landrevus clarus*, Saussure, *Mem. Soc. Geneve*, 25 : 278.

1925d. *Landreva clara*, Chopard, *Ann. Mag. nat. Hist.*, (9) 15:516.

1967. *Landreva clara*, Chopard, *Orth. Cat.*, 10 : 144.

*Diagnostic characters: Male* Size large. General colouration rufous-brown; body provided with a fine, silky, copious pubescence. *Head* broad; frontal rostrum short, flat, finely shagreened; 5th segment of maxillary palpi triangular. *Pronotum* weakly widened anteriorly. *Legs* short, strongly built; anterior tibiae with external tymbanum only; posterior femora stout; posterior tibiae with 4 spines on each superior margin and with 8 internal, and 10 external denticles basally. *Tegmina* reaching upto middle of 4th abdominal tergite, apically and internally rounded; mirror small; diagonal vein long, obliquely placed; chords 3, the first connected to mirror by a small veinlet; oblique veins 7-2 long, and 5 short, separated by a space; stridulating vein winding; apical field highly abbreviated. *Abdomen* wide.

*Female* differs from the male in the following characters: *Legs*: posterior tibiae with 4-8 (8-10) denticles. *Tegmina* highly reduced in size, very widely separated, with a few straight veins, *Ovipositor* long, straight, with lanceolate apical valves, inferior ones shorter than superior.

*Measurements* Body length: Female 20.5 (Male, Female 18.0-20.0); length of pron: Female 3.5; (Male, Female 3.0-3.5); width of pron: Female 3.5 length of teg Male (5.0-7.0), Female 3.0; length of post. fem: Female 13.0; length of post. tib 10.5, length of ovip: 18.0 (15.0).

*Material examined*: 1 Female Arunachal Pradesh, Siang dist., Tappi (600 m), 23.x.1966 (S.K. Tandan and G.S. Arora coll.); 1 Female Sikkim, Tin Milan, 21. viii. 1959 (B.K. Tikader coll.) (ZSI Collections).

*Distribution* India (Arunachal Pradesh, Sikkim); Sri Lanka.

*Remarks*: First recorded from Sri Lanka, this species was later recorded by Bhowmik (1969a) from Sikkim in India. It is here recorded for the first time from Northeast India.

*Location of type*: British Museum (Natural History), London, England.

**\*\* 7. *Landreva indica* sp. nov.**  
(Figs. 136-138)

**Description : Male :** Large black species with pale legs. Head slightly wider than pronotum in front, rufous brown above with an indistinct broad, black, longitudinal band extending from occiput to apex of frontal rostrum ; antennae with first segment very wide, basal segments pale brown, distal ones darker ; frontal rostrum distinctly narrower than first antennal segment, with parallel margins projected between antennal sockets with a furrow above containing the anterior ocellus, which is half the size of the lateral ocelli ; genae black, mottled with rufous-brown ; plane of face almost at right angles to vertex, in profile protruded in the region of clypeofrontal suture ; in frontal view, face very wide, black except the pale yellowish anteclypeus ; clypeofrontal suture gently arched. *Pronotum* as wide in front as behind, convex-sided, anterior margin concave, with bristles, posterior margin straight ; disc black, flattened, with a slight depression in the region of the midline, lateral lobes pubescent, shallow, black, with antero-inferior angle indistinctly rufous-brown ; anterior margin with bristles. *Legs* yellow, stout ; external face of anterior tibiae with a medium-sized, oval tympanum ; posterior femora with inferior 1/3 of external face presenting a longitudinal dark brown band, knee region dark brown ; internal face, a little ahead of knee, with a blackish dot ; posterior tibiae with 5 external and 4 internal stout spines on superior margins, the internal ones being longer and more curved ; bases of external and internal spines with 5 and 3 denticles, respectively ; apical spurs stout, supero-external identical with last spine ; internal spurs with golden pubescence ; posterior matatarsi stout with 4 denticles on each superior margin. *Tegmina* extending only upto 2nd abdominal tergite, thick, apically truncated ; dorsal field dark brown, presenting 7 oblique veins, the first long, diverging towards external margin, and attached at base to the sinuated stridulating vein, others shorter ; anal field small ; mirror much wider than long, anterior-external margin longest, anterior internal margin very short ; external angle very acute, posterior angle obtuse ; anterior angle rounded, anterior internal angle a right angle, chords very angularly curved, the first attached to anterior internal angle of mirror by a veinlet ; apical field with 2 more or less horizontal veins, apex showing a few indistinct irregular cells ; lateral field of same colour as dorsal field, provided with 5 somewhat projecting, parallel veins ; Sc. unbranched. *Wings* absent. *Abdomen* black. *Genitalia* : epiphallus deeply emarginate posteriorly, the two postero-lateral projections almost meeting behind and swollen in the middle ; medially, the posterior emargination presents a conical prolongation with a small projection on either side of it.

*Female* unknown.

**Measurements :** (Male) Body length : 20.0 ; length of pron : 3.4 ; width of pron : 4.7 ; length of teg : 4.7 ; length of post. fem : 12.0 ; length of post. tib : 8.0.

**Material examined :** HOLOTYPE Male India, Meghalaya, Khasi Hills dist., Mawphlang, Law-Lyngdoh ( 1850 m), 27. xi. 1974 (R. Zoramthanga coll.).

*Type-locality* : India, Meghalaya, Khasi Hills dist., Mawphlang, Law-Lyngdoh (1850 m).

*Distribution* : India (Meghalaya).

*Remarks* : Of the 4 species of the present genus previously known from India, one, *L. hemiptera* (Bolivar) is restricted to South India, while another, *L. semialata* Chopard has been recorded from southern and western India and as far north as Kashmir. The third, *L. ebneri* Chopard is, so far, known only from Sikkim, while the fourth, *L. clara* (Walker), also known from Sikkim, is reported in the present study for the first time from Northeast India (Arunachal Pradesh). The present species is, therefore, the second species of the genus *Landreva* Walker to be recorded from Northeast India, and the first from Meghalaya.

The present species, although described from a single specimen, appears very distinctive from all the other four species of *Landreva* Walker so far known from India. It may be distinguished from *L. clara* (Walker) by the characters mentioned in the key, from *L. ebneri* Chopard by the fewer denticles on posterior tibiae and by the different tegminal venation and its truncated apex, and from *L. hemiptera* (Bolivar) by its larger size - 20 mm (vs 13mm). It comes closest to *L. semialata* Chopard, and *L. insignis* Walker known from Sri Lanka, but is different from the former in the following characters:

1. Male tegmina extending only upto apex of 2nd tergite (vs middle of 4th).
2. mirror very distinct (vs almost confounded with the apical reticulation), and
3. 7 (vs 5) oblique veins disposed in a different way; and from the latter in the following characters:
  1. Posterior (lateral) ocelli not united by any keel,
  2. Only 5 denticles at base of external spines (vs 10),
  3. male tegmina extending upto apex of 2nd abdominal tergite (vs 4th), and
  4. 7 (vs 6) oblique veins disposed differently.

The male genitalia is here figured for the first time for a species of *Landreva* Walker.

*Location of type* Eastern Regional Station, Zoological Survey of India, Shillong ; will be transferred, in due course, to the National Zoological Collections, Z.S.I., Calcutta.

Genus 7 *Brachytrupes* Serville, 1838

1838. *Brachytrupes* Serville, *Ins. Orthopt.*, 323.  
 1846. *Brachytrupes*, Agassiz, *Nom. Zool. Ind. Univ.*, 52.  
 1964. *Brachytrupes*, Randell, *Canad. Ent.*, 96 : 1587.  
 1967. *Brachytrupes*, Chopard, *Orth. Cat.*, 10 : 40.  
 1969. *Brachytrupes*, Chopard, *Fauna Ind. Grylloidea*, 2 : 15.

*Type-species* : *Gryllus membranaceus* Drury, 1773.

*Diagnostic characters* : Large, robust insects with feebly pubescent body and legs. Ocelli arranged in a straight line. Male pronotum strongly widened in front. Legs strong, anterior and medium tibiae provided with short and stout apical spurs; anterior metatarsi very short; posterior femora equal in length to tibia and tarsus taken together. Tegmina extend upto apex of abdomen. Ovipositor of female disproportionately short.

*Distribution* : India ; Bangladesh ; Burma ; Sri Lanka ; Singapore ; Malaysia ; Indonesia ; Taiwan ; Philippines ; Sicily ; Africa.

*Remarks* : The largest of the true crickets. Randell (1964) included *Brachytrupes* Serville along with 21 other genera in Tribe Gryllini Saussure, based on the structure of the male genitalia, and proposed a new tribe Gymnogryllini to include *Gymnogryllus* Saussure along with 6 other genera.

Key to the Northeast Indian species of Genus *Brachytrupes* Serville

Apical field of male tegmina with elongated areolae ; ovipositor straight, > 8 mm, pointing posteriorly, stem of equal width throughout, anterior emargination of epiphallus W-shaped; posterior emargination with sinuated margins .....  
 ..... *portentosus* (Lichtenstein)

Apical field of male tegmina with square areolae; ovipositor < 5 mm, pointing a little upwards, curved, stem narrowing distally; anterior emargination of epiphallus deeply U-shaped, posterior emargination with non-sinuated margins .....  
 ..... *orientalis* (Burmeister)

8. *Brachytrupes portentosus* (Lichtenstein)  
 (Figs. 139, 140)

1796. *Acheta portentosa* Lichtenstein, *Cat. Mus. Zool. Humburg*, 3 : 86.  
 1911. *Liogryllus formosanus*, Matsumura, *Mem. Soc. ent. Belgique*, 18 : 131.  
 1964. *Brachytrupes portentosus*, Randell, *Canad. Ent.*, 96 : 1587.  
 1967. *Brachytrupes portentosus*, Chopard, *Orth. Cat.*, 10 : 42.  
 1969. *Brychytrupes portentosus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 15.

**Diagnostic characters : Male :** Large, robust, brown. *Head* protruding prominently above the level of pronotum ; frontal rostrum more than twice the width of first antennal segment. *Pronotum* strongly widening in front , constricted in posterior one-third, anterior margin strongly concave, posterior sinuated ; disc dark chocolate-brown in colour ; impresses paler, more or less conspicuous. *Legs* stout ; anterior tibiae with an oval tympanum on each face, the external one placed in a depression and double the size of internal one ; spines and apical spurs of posterior tibiae strong, stout; anterior metatarsi very short , posterior matatarsi about half as long as posterior tibiae. *Tegmina* with 5 sinuated oblique veins ; apical field with 6 veins, and a regular reticulation of elongated areolae. *Genitalia* stout ; epiphallus large, H- shaped; anterior emargination W- shaped due to a 'mount' in midline, posterior emargination not very deep, with slightly sinuated margins.

*Female* differs from the male in the following characters *Tegmina* dorsal field generally with 3-4 oblique veins, the two innermost united at base, and a reticulation of squarish cells. *Ovipositor* short in relation to body length, straight with apical valves broader than stem.

**Measurement** Body length Male 20.0- 40.0, Female 33.5-39.5 ( Male, Female 30.0-44.0); length with wings Male 52.5-55.0 , Female 52.0-55.2; length of pron : Male 6.0 -7.5, Female 6.0-6.8 ( Male, Female 30.0 - 31.5) length of post fem : Male 20.5 - 23.5, Female 21 .0 -23.0 ( Male, Female 20.0-24.0); length of post. tib: Male 12.0-14.0, Female 11.0-14.0; length of ovip : 8.0-10.0

**Material examined** 3 Males , 9 Females Meghalaya, Khasi Hills dist., Umsning, November (*M.R. Rynth* coll.); Assam, Kamrup, Dist., Gauhati, May (*S.S. Guha* coll.) Darrang dist., Tezpur, Majgaon, June (*A.N.T Joseph* coll.); Sibsagar dist., Kaziranga Nat. Park, Jorhat, October (*R.N. Katiyar* coll.); Mizoram, Kolasib, Bungtlang, October (*T.G. Vazirani* coll.); Nagaland, Medziphema, no date (*M.V. Reddy* coll.) Dimapur, October ( *R.N. Katiyar* coll.) (*Z.S.I. Collections*) ; 1 Females Bangladesh, Dhaka, 9.v.1945 (*D. Leston* coll.)- B.M. 1945-86 (*B.M. collections*).

**Distribution** India( Assam, Meghalaya, Mizoram, Nagaland, W.Bengal, Bihar, U.P., Maharashtra, Karnataka, Tamil Nadu) ; Bangladesh; Burma; Malaysia; Singapore; Indonesia.

**Remarks** : Chopard (1969) , Tandon and Shishodia (1972), Biswas, *et al.* (1975) and Bhowmik (1976) have misspeltr the generic or specific name of this species.

Randell (1964) has listed *Brachytrypes terrificus* Walker, 1869 as a synonym of *Brachytrypes portentosus* (Lichtenstein). Bhowmik (1976) has remarked that although the material ( 4 males and 3 females ) examined by him tally with the description of *B. portentosus* (Licht.), they also strongly resemble *B. terrificus* Walker, 1869. He has expressed the view that if a consistency is seen in their resemblance to *terrificus* Walker, the latter may become a synonym of *portentosus* (Licht.)

M. S. Malhotra (*in litt.*) informed the present author that in the Himalayan foothills (Kasipur : Nainital dist. : U.P) the males of this species sit facing the entrance of their burrows from dusk and produce their loud calling song, and at the slightest disturbance, disappear into their burrows.

*Location of type* : Not known.

9. *Brachytrupes orientalis* (Burmeister)  
( Figs. 141,142)

1838. *Gryllus orientalis* Burmeister. *Handb. Ent.*, 2 : 735.  
1893. *Brachytrupes orientalis*, Brunner, *Ann. Mus. Genova*, 13 : 197.  
1931. *Brachytrupes portentosus* var. *orientalis*, Chopard, *Bull. Raffles Mus.*, 6 : 128.  
1964. *Brachytrupes orientalis*, Randell, *Canad. Ent.*, 96 : 1587.  
1967. *Brachytrupes orientalis*, Chopard, *Orth. Cat.*, 10 : 43.  
1969. *Brachytrupes orientalis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 17.

*Diagnostic Characters . Male* Less robust than *B. portentosus* (Licht.). *Head* with some golden yellow pubescence; eyes somewhat protruding. *Pronotum* as in *portentosus* (Licht.), but anterior widening and posterior constriction less prominent. *Tegmina* : dorsal field with 4-5 oblique veins, apical field with elongated areolae only towards antero- internal portion, other areolae squarish. *Genitalia* : epiphallus with a deep U-shaped anterior emargination; posterior emargination shallow, not sinuated as in *portentosus* (Licht.).

*Female* differs from the male in the following characters : *Tegmina* : dorsal field with 4-5 oblique veins, the first two or three united at base ; Cu. with 9 branches and a reticulation of regular square cells. *Wings* generally extend beyond tegmina. *Ovipositor* short, stem curved and pointing upwards, narrowing distally, broad at base; apical valves rather small, superior valves longer and more pointed than inferior.

*Measurements* Body length : Male 28.0-31.0, Female 30.0-31.0 (Male Female 24.0-26.0) ; length with wings : Male 42.0-44.5, Female 45.5; length of pron : Male 5.2-5.7, Female 5.5 (Male Female 4.0-4.8) ; width of pron : Male 9.0-10.0, Female 9.0-9.5 (Male Female 8.0 - 9.0) ; length of teg : Male 23.2-34.0, Female 27.0- 33.5 ( Male Female 16.5- 20.0) ; Length of post . fem Male 17.0-19.5, Female 18.5- 19.0; Length of post tib: Male 10.0-11.7, Female 10.0-10.7; length of ovip 4.0-4.5 ( 3.0- 4.0).

*Material examined* : 1 Male, 2 Female Meghalaya, Garo Hills dist., Anogiri, Damra, 8-23.xi.1973 ( *S. Biswas* coll.) ; 1 Male, 1 Female Maharashtra; 1 Female, Burma, Thingannyinaung to Myawadi, 24-26.xi.1911 ( *F. Gravely* coll.) (*ZSI Collections*) ; 1 Female, Malaysia, Kuala Lumpur, 17. x. 1928 (*N.C.E. Miller* coll.)- B. M. 1953-680 (*B.M. Collections*).

**Distribution:** India (Assam, Meghalaya, W. Bengal, Orissa, Tamil Nadu, Andaman Islands, Karnataka, Maharashtra) ; Sri Lanka ; Burma ; Malaysia.

**Remarks :** The female specimen of *B. orientalis* (Burm.) from Malaysia examined by the present author differs from the other specimens studied in the darker disc of pronotum, the colouration of which sharply contrasts with that of the head and tegmina, and in the slightly greater length of the ovipositor.

**Location of type :** Not known.

### Genus 8. *Gymnogryllus* Saussure, 1877.

1877. *Gymnogryllus*, Saussure, *Mem. Soc. Geneve*, 25 : 123.

1964. *Gymnogryllus*, Randell, *Canad. Ent.*, 96 : 1570.

1967. *Gymnogryllus*, Chopard, *Orth. Cat.*, 10 : 18.

1969. *Gymnogryllus*, Chopard, *Fauna Ind. Grylloidea*. 2 : 20.

**Type- species :** *Gryllus elegans* Guerin, 1834.

**Diagnostic characters :** Shape generally elongated. pronotum very feebly, if at all , widening in front Anterior and middle tibiae abundantly pubescent; anterior metatarsi long. Ovipositor of variable length, never rudimentary.

**Distribution :** India ; Sri Lanka ; Burma ; Pakistan ; S. Vietnam ; Thailand ; Malaysia ; Indonesia , Borneo , Sarawak ; Africa south of the Sahara.

**Remarks :** B. C. Townsend of British Museum ( Natural history), London ( *personal communication*) suggests that Randell (1964) , by placing too much emphasis of the male genitalia and having examined only 3 of the 20 known species of *Gymnogryllus* Saussure, has mistaken what are really specific characters, for generic ones.

The present author has personally encountered difficulty in identifying specimens of *Gymnogryllus humeralis* ( Walker) with the help of Randell's key; the genitalia of *humeralis* (Walker) do not agree with the general description of the genitalia of *Gymnogryllus* Saussure , provided by Randell, but the external morphology is strongly suggestive of *Gymnogryllus* Saussure.

### 10. *Gymnogryllus kashmirensis* Bhowmik (Fig. 145)

1967b. *Gymnogryllus kashmirensis* Bhowmik, *Sci. & Cult.*, 33 : 244-246.

1967. *Gymnogryllus minor*, Chopard, *Orth. Cat.*, 10 : 19.

1969. *Gymnogryllus minor*, Chopard, *Fauna Ind. Grylloidea*, 2 : 29.

1975. *Gymnogryllus minor*, Biswas, *et al.*, *Proc. zool. Soc.*, Calcutta, 28 (1) : 24.

**Diagnostic characters :** **Male :** Shining black, with usually reddish head and yellow-topped posterior femora. **Head** reddish, rarely black ; eyes large, black. **Tegmina :** dorsal

**field transparent; mirror obliquely placed, divided in the middle by a curved vein , with only posterior angle rounded, apical field with 5-7 regular veins and regular elongated cells; lateral field with 5 veins and 2 branches of Sc. Wings whitish in both macropterous and brachypterous forms. Abdomen black.**

**Female** differs from the male in the following characters : colour may be dark brown. **Tegmina** : dorsal field with 4-5 veins and irregular, variously-shaped areolae ; 2 branches of Cu. **Ovipositor** short.

**Measurements** : Body length : Male 10.5-12.0, Female 11.0-15.5 ; length with wings ; Male Female 19.0-22.0 ; length of pron : Male Female 2.0-2.7 (2 Female 2.5-3.0) ; width of pron : Male Female 3.7-4.0; length of teg : Male Female 8.0-9.5; length of post. fem : Male Female 7.5-8.7 ; length of post. tib : Male Female 4.2-5.0 ; length of ovip: 4.0-7.0.

**Material examined** : 2 Female Meghalaya, Khasi hills dist., Shillong, 12. viii. 1960 ( *S. N. Prasad* coll. ) ; Male Holotype and Female Allotype from Jammu, Jhajjar nala, October, 1964 ( *R. Tilak* coll. ) ; 4 Males , 5 Females Paratypes from Jammu, Jhajjar Nala, October, 1964 ( *S. Lal* coll. ) , 5 Males , 6 Females W. Bengal; U.P., Dehara Dun, 1964 ( *S. Lal* coll. ) ; Karnataka, Mysore University Campus, 1964 ( *S. Vasantha* coll. ) ; Rajasthan, Pilani, 19-20. ix. 1967 ( *H. L. Kundu* coll. ) ( *ZSI Collections* ) ; 2 Females : Tamil Nadu, Coimbatore, Nedungadu, May, ( *P.S. Nathan* coll. ) ( *ANSP Collections* ).

**Distribution** : India ( Assam , Meghalaya, W. Bengal, Bihar , U.P. Jammu, Rajasthan, M.P., Goa, Karnataka, Tamil Nadu, Pondicherry, Kerala) ; Burma ; Indonesia (Java) ; S. Vietnam.

**Remarks** Bhowmik described this species in 1967. Later, he ( 1977b ) opined that *Gymnogryllus minor* Chopard, 1969 is a synonym of *kashmirensis*, on the basis of his study of specimens deposited in the British Museum ( Natural History), London. Although the present author has studied the type series of *kashmirensis* he was unable to study the male genitalia due to their non-availability. He was also unable to study either the types or other identified male specimens of *minor* Chopard. Two females identified by Chopard as *G. minor* Chopard ( *ANSP Collections* ) have , however, been examined during the present study. These appear to be very similar to the types of *G. kashmirensis* Bhowmik, except in a few negligible colour variations. Chopard (1969) has not figured the male genitalia of either *G. minor* Chopard, or *G. erythrocephalus* (Serville) from which, he has opined , the genitalia of the former species does not differ appreciably.

Under the circumstances , Bhowmik's (1977b) contention that *G. minor* may be a synonym of *G. kashmirensis* Bhowmik appears highly probable.

**Location of types** Zoological Survey of India, Calcutta, India.

\* \* Genus 9. *Spinogryllus* gen. nov.

*Type-species Spinogryllus meghalayanus.*

*Diagnostic characters* : Medium- sized, dark-coloured insects. Head round, ocelli large ; frontal rostrum subequal to first antennal segment and slightly projected between antennal sockets. Pronotum narrowing anteriorly, impresses on disc prominent. Tegmina extending at least upto apex of abdomen, broad in the middle ; dorsal field with divided mirror and 2 oblique veins ; apical field large and neat, with regular reticulation. Abdomen : supra-anal plate bearing a heavily sclerotised structure which appears dorsally like an inverted U with the two arms widening behind, and with finely serrated posterior margins.

*Female* unknown.

*Remarks* : This genus apparently comes closest to *Itaropsis* Chopard, 1925 which it resembles in its narrow frontal rostrum, medially widening tegmina and tegminal venation, but can be distinguished from *Itaropsis* Chopard and all other Gryllinae by the prominent, paired heavily sclerotised structure borne on the supra-anal plate of the male; the male genitalia are also very different as seen in Fig 146,147. It is, at present, difficult to ascertain what purpose the sclerotised structure serves in nature ; it may be a secondary sexual character, or it may be used in copulation; the function of the structure will remain unknown until the female is also described, and both sexes are studied together alive. In any case, such a complicated structure as this, cannot constitute a freak form.

*Distribution* : India (Meghalaya).

\* \* 11. *Spinogryllus meghalayanus* gen. et sp. nov.  
(Figs. 144-145)

*Description* : *Male* : Medium-sized ; general colouration brownish -black. *Head* slightly wider than pronotum in front, round, dark brown to black above, shining ; occiput finely pubescent ; vertex sloping ; eyes oval, a little protruding ; antennae brown, with first segment brownish- yellow ; ocelli large, lateral ones round, anterior generally more horizontally disposed, all yellow, lateral ones sometimes whitish ; frontal rostrum narrow, subequal to first antennal segment, somewhat projected between antennal sockets, clypeofrontal suture generally straight, genae dark brown with parts yellow, somewhat concave in the region of clypeofrontal suture or, rarely, a little hollowed in the region of anteclypeus ; mandibles short, stout, with dark brown base ; maxillary palpi with 4th segment shorter than 3rd, 5th longest, widening towards apex, obliquely truncated. *Pronotum* narrowing towards the front, anterior margin concave, posterior straight, black, with impresses either rufous, or glabrous, or presenting prominent whitish - yellow depressions ; lateral lobes with some whitish hairs, antero-inferior margins curving gradually, and inferior margin gradually ascending posteriorly, variously coloured - either completely black, or black with yellow inferior part. *Legs* finely

pubescent ; all femora yellow proximally, brown distally; all tibiae light to dark brown, anterior tibiae with large, elongated, oval external tympana and with 5-6 spines on each superior margin, first external sometimes very tiny; posterior metatarsi slender, half the length of posterior tibiae, with 7-9 denticles with black apices on each superior margin. *Tegmina* extending upto or beyond apex of abdomen, sharply rounded at apex, broad in the middle; dorsal field shining, a little translucent, dark brown to blackish; mirror large, oval, anterior angle a right angle, other angles rounded, divided above the middle by a curved vein; oblique veins 2, long, sinuated, more or less parallel; chords long, gently curved, parallel, first chord sometimes connected to diagonal by a small veinlet, and to mirror by a straight or sinuated veinlet; diagonal straight, bifurcated at base, apical field generally large and neat, with 4-5 veins, and a reticulation of squarish areolae; lateral field usually slightly paler than dorsal field, with 4-6 free veins and interconnecting veinlets; Sc. unbranched or with 1-2 branches. *Wings* short. *Abdomen* : supraanal plate bears a heavily sclerotised structure which, in dorsal view, looks like an inverted U with the two arms widening behind, and with serrated posterior margins.

*Measurements* : Male Body length : 12.2-14.0 ; length of pron : 2.1-2.7 ; width of pron : 3.2-4.0 ; length of teg : 8.0-10.0 ; length of post fem: 8.5-9.7 ; length of post tib : 6.2-6.6.

*Material examined* : HOLOTYPE Male INDIA, Meghalaya, Khasi Hills dist., Shillong, Tripura Castle Road, 16.v.1975 (R. Mathew coll.) ; PARATYPES 4 Males Shillong, Malki Forest, Fruit Gardens, Tripura Castle Road, Arbutnot Road, 19-20.iv.1976, 8.v.1974, 8.vii.1962 (M. S. Jyrwa, R.S. Giri, S.N. Prasad coll.).

*Type - locality* : INDIA, Meghalaya, Khasi Hills dist., Shillong, Tripura Castle Road.

*Location of type* : Eastern Regional Station, Zoological Survey of India, Shillong ; will be transferred, in due course, to the National Zoological Collections, Zoological Survey of India, Calcutta, India.

#### Genus 10. *Velarifictorus* Randell, 1964.

1877. *Scapsipedus* Saussure (part), *Mem. Soc. Geneva*, 25 : 239.

1964. *Velarifictorus*, Randell, *Canad. Ent.*, 96 : 1586.

1967. *Velarifictorus*, Chopard, *Orth. Cat.*, 10 : 122.

1969. *Scapsipedus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 110.

1975. *Velarifictorus*, Vasanth, et al., *Oriental Ins.*, 9 (2) : 221.

*Type-species* : *Scapsipedus micado* Saussure, 1877.

*Diagnostic characters* : Crickets with an elongated, flattened or excavated face among males, which also possess a swollen frons and elongated mandibles, which may be excavated. Females have normal face and mandibles.

*Distribution* : Tropical Asia and Africa ; China ; Formosa ; Philippines ; Japan ; Madagascar.

*Remarks* : Tandon and Shishodia (1974) provided a key to the species of this genus from India, which was modified by Vasanth, *et al.* (1975). Bhowmik (1969b) described a species *V. bilobatus* in his Ph.D. Thesis which, however, has not been considered for inclusion in any of the keys. Biswas, *et al.* (1975) erroneously included *V. parvus* (Chopard) in the list of Gryllids from Meghalaya, and Vasanth, *et al.* (1975) merely based the key on the same record ; it has been seen during the present study that the specimen identified as *parvus* belongs to a genus different from *Velarifictorus* Randell. Vasanth (1978) has provided a key to the females of all species of *Velarifictorus* Randell known from India at that time.

Present studies also revealed that *V. khasiensis* Vasanth and Ghosh, 1975 should be regarded as a synonym of *V. raychaudhurii* (Bhowmik). *V. bhadurii* (Bhowmik) and *V. arorai* (Tandon and Shishodia) could also be regarded as definite synonyms of *V. sikkimensis* (Bhowmik), while *V. lohitensis* (Tandon and Shishodia) and *V. jaintianus* Biswas and Ghosh appear to be probable synonyms of *V. sikkimensis* (Bhowmik).

Key to the Northeast Indian Species of Genus  
*Velarifictorus* Randell

1. Head with transverse yellow band between ocelli .....2.
- Head without transverse yellow band between ocelli.....4.
2. Mandibles of males elongated, excavated.....  
..... *aspersus* (Walker).
- Mandibles may or may not be elongated, never excavated .....3.
3. Mandibles elongated; postero - median projection of epiphallus broader, with 2 denticle- like projections directed laterad.....*sikkimensis* (Bhowmik)
- Mandibles not elongated; postero - median projection of epiphallus narrower, without denticlelike projections .....*grylloides* (Chopard)
4. Face and mandibles of male slightly excavated .....*shillongensis* sp. nov.
- Face and mandibles of male not excavated .....5.
5. Occiput adorned with short longitudinal yellow lines; postero- median projection of epiphallus narrow; apices of ectoparameres slightly curved inward.....*raychaudhurii* (Bhowmik)
- Occiput without ornamentation; postero- median projection of epiphallus very broad ; apices of ectoparameres directed dorsally .....*jharnae* (Bhowmik)

12. *Velarifictorus aspersus* (Walker)  
(Figs. 148,149)

1869. *Gryllus aspersus* Walker , *Cat. Derm. Salt. Br. M.*, 1 : 39.  
1877. *Scapsipedus mandibularis*, Saussure, *Mem. Soc. Geneva*, 25 : 246.  
1931. *Scapsipedus aspersus*, Chopard , *Bull Raffles Mus.*, 6 : 130.  
1964. *Velarifictorus aspersus*, Randell, *Canad Ent.*, 96 : 1587.  
1967. *Velarifictorus aspersus*, Chopard, *Orth. Cat.*, 10 : 122.

**Diagnostic characters : Male : Head :** Lateral ocelli connected by yellow band ; face highly concave ; mandibles greatly elongated and excavated in the middle . **Legs :** internal apical spurs on posterior tibiae thickly pubescent. **Tegmina** with brown, more or less transparent dorsal field; mirror rectangular, divided by a straight or angulate vein behind the middle; 2 oblique veins, the anterior straight , posterior sinuate; apical field with 3 (4) veins and regular reticulation ; lateral field almost transparent with brown band along humeral edge.

**Female** differs from the male in the following characters : **Head :** face only weakly flattened; mandibles normal. **Tegmina :** veins of dorsal field feebly oblique , rather regular; transverse veinlets many , forming long , narrow cells.

**Ovipositor** with apical valves narrow, with smooth margins.

**Measurements :** Body length : Male 9.5-12.7 (12.7-18.0), Male (16.0-19.0) ; length of pron : Male 2.0-2.5 (3.0-3.5) , Female (3.0-3.7) ; width of pron : Male 3.2-4.2; length of teg : Male 6.5-8.5 ( 8.5-9.0), Female (8.0-13.0) ; length of post fem : Male 9.5-10.5 (9.0-11.0), Female ( 9.5-12.0) length of post. tib : Male 6.2-7.5 ; length of ovip : (9.0-14.0).

**Material examined :** 2 Males Arunachal Pradesh, Subansiri Dist ., Kimin I.B., 11. xi. 1975 ( *K. R. Rao & party* coll.); 2 Males Meghalaya, Garo hills dist., Anogiri, Rongjuli, 12. i. 1972, 8. xi. 1973 (*S. Biswas* coll.); 2 Females W. Bengal , Hooghly dist., Chinchura, 20.v.1975 (*M.K.Sarkar* coll) ; 1 Male U.P., Dehra dun, 9.viii.1961, 1 Male Jammu (*S.Lal* coll.) (*ZSI Collection*).

**Distribution :** India (Arunachal Pradesh , Meghalaya, W. Bengal, U.P., Jammu, Andhra Pradesh , Karnataka , Maharashtra) ; Sri Lanka, Burma ; Malaysia ; Singapore; Indonesia (Java) ; Borneo, Annam ; Hong Kong ; China.

**Remarks :** This is the first record of this species from Arunachal Pradesh Although it has not yet been recorded from Assam, the specimens from Kimin, a locality on the border of Assam and Arunachal Pradesh, indicate its possible occurrence in Assam; in all likelihood, with further survey, the species may be found to be widely distributed in Northeast India. Both the specimens from Kimin were collected around 7.30 PM from a garden with the help of a torch, by locating their calling song.

*Location of type* : British Museum (Natural History), London , England.

13. *Velarifictorus sikkimensis* (Bhowmik)  
(Figs. 150,151)

- 1967c. *Scapsipedus sikkimensis* Bhowmik, *Proc. zool. soc.*, Calcutta, 20 : 126 (Male).  
 1967c. *Scapsipedus bhadurii*, Bhowmik, *Proc. zool. soc.*, Calcutta, 20 : 127. Syn. nov.  
 1972. *Scapsipedus arorai*, Tandon and Shishodia, *Oriental Ins.*, 6 (3) : 284. Syn. nov.  
 1972. *Scapsipedus lohitensis*, Tandon and Shishodia, *Oriental Ins.*, 6 (3) : 285. Syn. nov.  
 1975. *Velarifictorus jaintianus*, Biswas and Ghosh, in Vasanth, *et al.*, *Oriental Ins.*, 9 (2) : 223. Syn. nov ?  
 1975. *Gryllopsis femorata*, Biswas, *et al.*, *Proc. zool. soc. Calcutta*, 28 : 24 (Misidentification ; partim).  
 1978. *Velarifictorus jaintianus*, Vasanth, (Female), *Entomon*, 3 (2) : 274

*Diagnostic characters* : *Male* : Dark brown species. *Head* : occiput shining black, ornamented with 6-7 longitudinal yellow lines ; frontal rostrum  $1\frac{1}{2}$  times to double the width of first antennal segment ; with a transeverse yellow band connecting the lateral ocelli; face prominent, elongated , slightly concave ; mandibles elongated. *Legs*: internal face of anterior tibiae with an indistinct depression only, or plain. *Tegmina* reaching upto apex of abdomen, or shorter. Dorsal field shining brown, with 2 , rarely 3, oblique veins ; mirror rectangular, divided in the middle by a curved vein ; apical field with 2-4 veins; lateral field with 5-6 free veins - the first 3 being normally separated from the rest by a space.

*Female* differs from the male in the following characters *Head* : face and mandibles never elongated or prominent. *Tegmina* short, extending upto hind margin of 3rd to 5th abdominal tergite, very rarely reaching upto end of abdomen; dorsal field with 3-5 oblique veins, and Cu. with 3 branches ; of the free veins , the first and second inner ones may be branched. *Ovipositor* thin, with apical valves pointed , scarcely wider than stem.

*Measurements* : Body length Male 11.0-16.5, Female 11.0-18.0 ; length of pron : Male 2.5-3.5, Female 2.5-3.8 ; width of pron : Male 3.0-5.5, Female 3.5-5.7 ; length of teg : Male 7.5-10.0, Female 3.0-6.5 (10.0- in two specimens) ; length of post. fem : Male 9.0-12.5, Female 9.0-13.0 ; length of post. tib : Male 6.5-9.0, Female 6.0-9.0; length of ovip : 8.0-14.0.

*Material examined* : c 110 (35 Males, 75 Females) Assam, Sonai Rupai Forest, Kaziranga Nat. Park, February, November (K.R. Rao, M.Datta, S.K.Bhattacharyya, A.N.T. Joseph, coll.) ; Meghalaya, Khasi Hills dist., Shillong, Upper Shillong . Umtham, Old Barapani Road, Mawphlang, Nongkreng, Mawblang, Mawryngkneng ; Jaintia Hills dist., Thadlaskein, Garampani Forest; Garo Hills dist., Anogiri, Arivila Forest, Darugiri-Forest, Baghmara, Rongrengiri, February-December (S.Biswas, S.N. Prasad, R. Mathew, A.K.Ghosh, R.S.Giri, R.S.Pillai, A.S.Rajagopal. M. Vasanth, K.Deb, S.K.Chanda, A.R.Lahiri, M.S.Jyrwa, V.D.Srivastava, J.K.Prasad coll.) ; Arunachal Pradesh, Suban-

siri dist., Taliha, Mara, Kimin, Ziro, Chuknum Didi camp, May, November (*K.R. Rao & party, A.N.T. Joseph* coll.); Mizoram, Daranamhui, Tuilot, October-November (*K.R. Rao* coll. Male holotype of *Velarifictorus sikkimensis* (Bhowmik), N. Sikkim, Lachung (2127 m), 3.vii.1959 (*A.G.K.Menon* coll.) ; Male holotype of *V. bhadurii* (Bhowmik), U.P., Dehra Dun, Balupur, 14.vi.1961, (*S.Lal* coll.); Male holotype of *V.arorai* (Tandon and Shishodia) Aunachal Pradesh, Subansiri dist., Pakha camp (150 m), 26.x.1966 (*S.K.Tandon and G.S. Arora* coll) ; Male holotype of *V. lohitensis* (Tandon and Shishodia), Arunachal Pradesh, Lohit dist., Deopani (350m), 6.iii.1969 (*S.K. Tandon* coll.) ; Male holotype of *V. jaintianus* Biswas and Ghosh, Meghalaya, Jaintia Hills dist., Thadlaskein (1460 m), 17.vi. 1971, (*S.Biswas* coll.) 5 Males paratypes of same species, Khasi Hills dist., Maryngkneng (1400 m), old Barapani Road (1300 m), Shillong (1650 m), Jaintia Hills dist. Thadlaskein (1460 m), 17.vi. 1971 6. vi. 1973, 27.vii. 1961 (*S. Biswas, A.K.Ghosh, S.N.Prasad* coll.) (*ZSI collections*).

*Distribution* : India (Assam, Arunachal Pradesh, Meghalaya, Mizoram, W.Bengal, Sikkim, U.P.).

*Remarks* : This species has been given various names by different authors, viz., Bhowmik (1967c), Tandon and Shishodia (1972), and Vasanth, *et al.* (1975). Bhowmik (1967c) described *V. sikkimensis* and, in the same publication, described another species, *V. bhadurii*, both under *Scapsipedus* Saussure. The present author has examined the Male holotype of *V. bhadurii* (Bhowmik) and its genitalia. In his description of this species, Bhowmik (1967c) has described the face as ' ... convex and not depressed.' This is incorrect, as the face is distinctly concave. Further, the apical field of male tegmina has only 2 veins, not 4, as mentioned by Bhowmik (*loc.cit.*). *V. bhadurii* (Bhowmik) is, undoubtedly, a synonym of *V. sikkimensis* (Bhowmik).

The present author is also certain, after a careful study of the holotype of *V. arorai* (Tandon and Shishodia) that this species is also synonymous with *V. sikkimensis*. Morphologically, the holotype of *V. lohitensis* (Tandon and Shishodia) appears identical with *V. sikkimensis* (Bhowmik) and *V. arorai* (Tandon and Shishodia) and, it is strongly felt by the present author that it would also become a synonym of *V. sikkimensis* (Bhowmik), but unfortunately, the dissected genitalia of the holotype could not be located; its figure, as given by Tandon and Shishodia (1972) seems to be different from that of *V. sikkimensis* (Bhowmik). It has been tentatively placed as a synonym of the latter species in the present study. *V. jaintianus* Biswas and Ghosh is also tentatively placed here as a synonym of *V. sikkimensis*.

The genitalia of the male holotype of the present species appears to be lost; the genitalia of one specimen from Shillong, and 3 from Ziro, all identified as the present species by H.K. Bhowmik, have been examined during the present study, and they appear to be similar to that figured by Bhowmik (1967c) for *sikkimensis*.

This species is here recorded for the first time from Mizoram. It is abundant in Meghalaya during the monsoon. Vasanth (1977) has described the mating behaviour of this species under the name of *V. jaintianus* Biswas and Ghosh.

*Location of types* : Types of *V. sikkimensis* (Bhowmik), *V. arorai* (Tandon and Shishodia), *V. lohitisensis* (Tandon and Shishodia), *V. bhadurii* (Bhowmik) and *V. jaintianus* Biswas and Ghosh are all in the Zoological Survey of India, Calcutta, India.

#### 14. *Velarifictorus grylloides* (Chopard)

1967. *Scapsipedus grylloides* Chopard, *Orth. Cat.*, **10** : 123.

1969. *Scapsipedus grylloides* Chopard, *Fauna Ind. Grylloidea*, **2** : 114.

[Material not examined; description based on Chopard (1969)]

*Diagnostic characters* : *Male* : Head large ; lateral ocelli connected by a transverse yellow line ; face slightly flattened ; mandibles long, but not excavated ; genae ridged. *Pronotum* slightly widening in front. *Tegmina* reaching upto end of abdomen; mirror oblique, quadrangular, with anterior angle acute, divided by a wavy vein; 2 oblique veins; apical field rather short, rounded posteriorly, with 4 veins and a very dense, regular reticulation; lateral field translucent, with darkened superior part, with 5 separate veins and a 2- branched Sc. *Wings* short. *Genitalia* with postero-median projection of epiphallus narrow, apically truncated and feebly notched in the middle; ectoparameres very broad.

*Female* differs from the male in the following characters : *Tegmina* reaching over the middle of abdomen, almost truncated at apex; dorsal field brown with a yellow humeral band, the 3 free veins being somewhat confused, and with a reticulation of close elongated cells. *Ovipositor* feebly acute at apex.

*Measurements*: Body length : Male Female (16.0-17.0) ; length of pron: Male Female (3.5) ; length of teg : Male (9.0), Female (7.0) ; length of post. fem: Male Female (12.0) ; length of ovip : (12.0-13.0).

*Distribution* : India (Assam).

*Remarks*: This species was described by Chopard (1969) from the 0 holotype and 0 allotype from Assam. The present author was not able to note that although Chopard (loc. cit.) has examined only one female, he has given range of measurement for ovipositor length (*vide* Measurements).

*Location of types* : The Academy of Natural Sciences of Philadelphia, U.S.A.

#### 15. *Velarifictorus shillongensis* sp. nov.

(Figs. 152-155)

*Description* : *Male*: General colouration blackish, rarely with pale tegmina which sharply contrast with head and pronotum. Head big, black, shining ; eyes rather small; ocelli orange-yellow, a dull orange-yellow line usually extending a short distance below

the anterior ocellus ; antennae dark brown; frontal rostrum about  $1F_{(1,2)}$  times the width of first antennal segment ; clypeofrontal suture straight ; face black, with some parts reddish-brown to pale brown, a little excavated in profile, mandibles elongated and slightly excavated in middle: maxillary paili rather long, dark brown, 3rd and 4th segments subequal, 5th longer, more pubescent than others, widening apicad. *Pronotum* : sides parallel; anterior and posterior margins straight, with numerous stiff bristles ; *Legs* blackish, pubescent, slightly robust ; anterior tibiae with large, oval external tympanum only ; posterior femora stout ; posterior tibiae armed above with 5 pairs of dark brown, stout spines, internal ones strongly pubescent ; posterior metatarsi with 4 internal and 5-6 external denticles. *Tegmina* extending nearly upto apex of abdomen, wide, posteriorly rounded ; dorsal field dark brown, rarely pale brown ; mirror oval, with only external angle acute, other angles rounded, ratio of its width to length 2.5:1.7, undivided ; generally 2, rarely 3, sinuated oblique veins ; first and second chords strongly curved, the former connected to mirror by 1-2 veinlets and, sometimes, connected to diagonal vein by 1 veinlet ; diagonal vein long, curved towards chords, bifurcated at base. (In one paratype from Shillong diagonal fused to first chord for half the distance from base of the former); apical field reduced to a few irregular cells, lateral field blackish, generally provided with 3 curved, parallel veins and 2 branches of Sc. *Wings* short. *Abdomen* ventrally dark brown, pubescent; cerci long. *Genitalia* : bridge of epiphallus very narrow, curved, with a distinct antero-median, V-shaped emargination; postero-lateral projections somewhat pointed and diverging; postero-median projection of bridge quite large, broader and very shallowly notched posteriorly; internal anterior apodemes long and converging, ectoparameres slightly diverging posteriorly with pointed apices; internal anterior process very slender, division between internal and external anterior processes at about  $3/4$  the distance from base; mesal lobes small; endoparameres J-shaped in lateral aspect; spermatophore sac medium-sized, dorso-ventrally compressed; virga not distinctive, but its base marked by a crest-like transverse parameral muscle apodeme.

*Female* differs from the male in the following characters: *Head* with no facial excavation, mandibles neither elongated nor excavated. *Pronotum* slightly widening anteriorly, both anterior and posterior margins a little concave. *Tegmina* very short, reduced to lateral pads, reaching upto middle of metanotum, separated by a space 1.7-2.5 mm wide, internal margin oblique; dorsal field small, with 2-3 barely distinguishable veins ; lateral field deep, with 2 veins, Sc. entire, unbranched. *Wings* absent. *Ovipositor* straight, with pointed apical valves.

*Measurements*: Body length: Male Female 11.0-12.5 length of pron: Male 2.0-2.2, Female 2.2, width of pron: Male 3.0-4.0. Female 3.2-3.5; length of teg: Male 6.0-7.5 Female 0.5-1.0; length of post. fem: Male 7.5-8.0, Female 8.0-8.5; length of post. tib: Male 5.5-5.7, Female 5.7-6.5; length of ovip: 6.5-7.5,

*Material examined* : HOLOTYPE Male Meghalaya, Khasi Hills dist., Shillong, 8. ix. 1976 (M.S. Jyrwa coll.) ; ALLOTYPE Female same as holotype; PARATYPES 4 Males, 2 Females Shillong, Mawphlang, 3.vii.1975, 18.viii, 1975, 13.ix.1976, 20.viii.1974 (M.S. Jyrwa, A.K. Ghosh coll.).

*Type-locality* : India, Meghalaya, Khasi Hills dist., Shillong.

*Distribution* : India (Meghalaya).

*Remarks* : The species comes close to *V. latithorax* (Chopard) recorded from Bihar, but can be differentiated from the latter by the mirror being of very different shape, and undivided, shorter wings and, by the male genitalia.

*Location of types* : Eastern Regional Station, Zoological Survey of India, Shillong, India; will be transferred in due course to the National Zoological Collections, Zoological Survey of India, Calcutta.

### 16. *Velarifictorus raychaudhurii* (Bhowmik)

Figs. 156,157

1967c. *Scapsipedus raychaudhurii* Bhowmik, *Proc. zool. Soc., Calcutta*, 20 : 124.

1975. *Velarifictorus khasiensis*, Vasanth and Ghosh, in Vasanth, *et al., Oriental Ins.*, 9 (2) : 224. *Syn. nov.*

1975. *Gryllopsis femorata*, Biswas, *et al., Proc. zool. Soc., Calcutta*, 28 : 24 (Misidentification, partim).

1978. *Velarifictorus khasiensis*, Vasanth (Female), *Entomon*, 3 (2) : 275.

*Diagnostic characters* : *Male* : *Head* a little wider than pronotum, finely pubescent above, with 6 short vertical lines ; lateral ocelli not connected by transverse line ; face depressed ; frontal rostrum greater than double the width of first antennal segment ; mandibles moderately long, not excavated. *Legs* : anterior tibiae with only a small depression on internal face, rarely a small internal tympanum present. *Tegmina* reaching upto end of abdomen, or a little shorter; mirror as long as to slightly longer than wide, divided by a curved vein usually in the posterior part, rounded posteriorly, other angles angulated; oblique veins 2-3; apical field rather short, with 2-3 veins, and a reticulation of rather square cells.

*Female* differs from the male in the following characters : *Head* : mandibles not as prominent. *Tegmina* extending only upto end of 4th abdominal tergite, its internal margin and apex a little rounded; dorsal field with irregular, confused venation, with 4, rarely 6, oblique veins and many transverse veinlets; Cu. with 0-3 branches, not distinct. *Wings* : usually micropterous specimens; in a single macropterous specimen, double the length of tegmina.

*Measurements* : Body length : Male 10.5-14.5, Female 10.2-13.5; length with wings : Female (macropterous) 22.7; length of pron: Male 2.5-3.2, Female 2.5-3.0; width of pron: Male 3.5-4.6, Female 3.7-4.7; length of teg: Male 5.5-6.0, Female (micropterous) 4.0-5.3, Female (macropterous) 9.0; length of post. fem: Male 7.2-10.6, Female 8.0-9.5; length of post. tib : Male 5.0-7.2, Female 5.0-6.0; length of ovip: 9.0-10.2.

**Material examined** : 18(5 Males, 13 Females) Meghalaya, Khasi Hills dist., Umniuh, Mawblang, Myllem, Shillong, Upper Shillong, Umsning, Old Barapani Road, Barapani, Mawlyndep; Jaintia Hills dist., Sonapurdi; Garo Hills dist., Songsok, March-August, November (*G.M Yazdani, A.K.Mondal, S.Biswas, R.S. Pillai, A.K.Dutta, V.D.Srivastava, M.Vasanth, M. S. Jyrwa, A.R.Lahiri, K.Deb* coll.) ; Male holotype of *V. raychaudhurii* (Bhowmik), U.P., Dehra Dun, Rajpur (c 457 m), 20.viii.1960 (*K.C. Basu* coll.); Male holotype of *V. khasiensis* Vasanth and Ghosh, Meghalaya, Khasi Hills dist., Mawblang (1100m), 31. iii. 1971 (*R.S. Pillai* coll.) ; 4 Males paratypes of same species, Meghalaya, Garo Hills dist., Songsok (315 m) ; Khasi Hills dist., Umtham (870 m), Umniuh (1175 m), 16.xi.1973, 21.iv.1964, 3.vi.1971(*S. Biswas, A.K. Mondal, G.M. Yazdani* coll.) (*ZSI collections*).

**Distribution** : India (Meghalaya, U.P.).

**Remarks** : This species was originally described by Bhowmik (1967c) from U.P. Careful examination of the typeseries of the present species and that of *V khasiensis* Vasanth and Ghosh, and their male genitalia, revealed that the latter species is the same as *V. raychaudhurii* (Bhowmik) and should be considered as a synonym of the latter. One female macropterous specimen studied shows anteriorly narrowing pronotum with markedly sinuated posterior margin, long tegmina extending upto apex of abdomen, 5 branches of Cu., and clearer transverse veinlets than in micropterous forms. This species appears to be less common than *V. sikkimensis* in Northeast India.

**Location of types** : Types of *V. raychaudhurii* (Bhowmik) and *V. khasiensis* Vasanth and Ghosh are in the Zoological Survey of India, Calcutta, India.

### 17. *Velarifictorus jharnae* (Bhowmik) (Fig. 158)

1967c. *Scapsipedus jharnae* Bhowmik, *Proc. zool. Soc., Calcutta*, 20 : 123.

**Diagnostic characters: Male** : Colouration rufous. *Head* slightly reddish, shining, unornamented ; anterior ocellus conspicuous ; face shining, almost flat, not depressed; maxillary palpi with 5th segment stout, triangular, mandibles moderately long and stout. *Legs*: anterior tibiae perforated on external face only. *Tegmina* reaching upto apex of abdomen; mirror rounded posteriorly, other angles angulated, divided above the middle by a curved vein, united to first chord by 1-2 transverse veinlets.

**Female** unknown.

**Measurements** : (Male) Body length 17.5; length of pron:3.6; width of pron: 5.8; length of teg: 10.0; length of post. fem: 13.2; length of post. tib: 10.0.

**Material examined** : Male HOLOTYPE Manipur, Imphal valley, 6.ix.1945 (*M.L.Roonwal* coll.) ; Male PARATYPE same locality, 10-13.ix.1945 (*M.L.Roonwal* coll.) (*ZSI Collections*).

*Distribution* : India (Manipur).

*Remarks* : This species is known only from the male holotype and paratype, both of which have been examined during the present study.

*Location of type* : Zoological Survey of India, Calcutta, India.

Genus (11) *Loxoblemmus* Saussure, 1877.

1877. *Loxoblemmus* Saussure, *Mem. Soc. Geneve*, 25 : 249.

1964. *Loxoblemmus*, Randell, *Canad. Ent.*, 96 : 1577.

1967. *Loxoblemmus*, Chopard, *Orth. Cat.*, 10 : 125.

1969. *Loxoblemmus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 121.

*Type-species* *Loxoblemmus equestris* Saussure, 1877.

*Diagnostic characters* : Variable size. Occiput and vertex almost horizontal; anterior ocellus on inferior face of frontal rostrum which projects between antennae in males to give a truncated or angular appearance; face of males strongly flattened, those of females weakly so; first antennal segment, in many species, with a process in males.

*Distribution* : Southern Asia ; Philippines ; Japan ; Queensland ; Madagascar ; Tropical Africa.

*Remarks* : Randell (1964), in his studies on the Gryllinae based on the male genitalia, has referred to only 6 out of the 8 species of this genus (including the type-species) known at that time from India. With the subsequent addition of 5 more species, a total of 13 species are now known from India, including *L. intermedius* Chopard, recorded for the first time from India in the present study. Two species, viz., *L. hamulifer* Chopard and *L. intermedius* Chopard, are reported to be occurring in India by Chopard (1967) while no such mention is made by Chopard (1969) in his *Fauna of India* where their descriptions are incorporated. Seven species of *Loxoblemmus* Saussure are so far known from Northeast India.

Studies on this genus by the present author convince him that undue emphasis on the structure of the male genitalia to differentiate species will probably lead to confusion. It is felt that interspecific variation in male genitalia in this genus is rather limited ; the strongly flattened face, various features of the head, chiefly the size and shape of the face and frontal rostrum, and the presence or absence of process on first antennal segment, and its shape and size, appear to be more varied in the males of different species, and may be used as additional characters in separating the species, as these characters appear to be more constant in nature. But the females of the different species are very difficult to distinguish from one another. A revision of the Indian species of *Loxoblemmus* Saussure is necessary to establish a combination of characters for distinguishing between the various species.

Key to the Northeast Indian Species of Genus *Loxoblemmus* Saussure.

1. First antennal segment in males plain or with a denticle-like process on outer side; face never trilobate..... 2.
- First antennal segment always with an elongated process on outer side; face may be trilobate ..... 6.
2. Frontal rostrum in males 4 times the width of first antennal segment .....  
.....*macrocephalus* Chopard.
- Frontal rostrum, at the most, 2 1/2 times the width of first antennal segment ..... 3.
3. Face of males excavated ; labrum very broad .....*fletcheri* Chopard.
- Face of males flattened ; labrum not exceptionally broad .....4.
4. Frontal rostrum in males weakly convex and projecting slightly; first antennal segment may have a denticle-like process .....*equestris* Saussure
- Frontal rostrum strongly convex and projecting; process absent on first antennal segment .....5.
5. Frontal rostrum in males strongly projecting, forming a semicircle, and its edges forming a prominent swelling .....*haani* Saussure.
- Frontal rostrum less strongly projecting; edges without swelling .....  
.....*detectus* Serville.
6. Face strongly trilobate.....*jacobsoni* Chopard
- Face not trilobate.....*intermedius* Chopard

18. *Loxoblemmus macrocephalus* Chopard  
(Fig. 159)

1967. *Loxoblemmus macrocephalus* Chopard, *Orth. Cat.*, 10: 127.

1969. *Loxoblemmus macrocephalus*, Chopard, *Fauna Ind. Grylloidea*, 2: 130.

1972. *Loxoblemmus macrocephalus*, Tandon and Shishodia, *Oriental Ins.*, 6 (3): 288.

*Diagnostic characters: Male: Head* much wider than pronotum, 4.5-6.0 mm in broadest portion; occiput adorned with 6 short, yellow, vertical lines; frontal rostrum extremely wide, its apical margin with a narrow transverse yellow band; anterior ocellus in the middle of facial shield; first antennal segment plain. *Pronotum* widening anteriorly. *Legs:* posterior femora rather short and thick. *Tegmina* a little shorter than abdomen; dorsal field somewhat translucent; mirror angulate in front, rounded at the back, sometimes with a few cells in the posterior part; oblique veins 3-5; apical field short with 3 veins and a few large cells. *Wings* very short.

*Female* differs from the male in the following characters: *Head* not enlarged; frontal rostrum short and only moderately broad. *Pronotum* with parallel sides. *Tegmina* extending, at the most, upto end of 2nd abdominal tergite, closer to each other basally, but not overlapping.

*Measurements*: Body length: Male 12.5-14.5 (15.5), Female 11.2-13.5 (14.5); length of pron: Male 2.5-3.0, Female 2.5-2.7 (Male, Female 3.5); width of pron: Male 3.5-4.5, Female 3.2-3.7; length of leg: Male 5.7-6.5 (7.0), Female 3.7-4.0 (4.5); length of post.fem: Male 8.0-10.0, Female 9.0 (Male, Female 11.0); length of post. tib: Male 6.5-7.5, Female 6.5-6.7; length of ovip: 6.0.

*Material examined*: 3 Males Arunachal Pradesh, Siang dist., Bame bridge, Tachidoni (400 m), Tarak Village (200 m) 18-30.x.1966 (S.K. Tandon and G.S. Arora coll.); 7 Males, 10 Females Jammu, Himachal Pradesh, West Bengal (ZSI Collections); Male holotype and Female allotype, Assam, Ledo Road, 19 miles from Ledo, 20-22.ix.1944 and 19.v.1944 (J.W.H.Rehn coll.) (ANSP Collections).

*Distribution* : India (Assam, Arunachal Pradesh, W. Bengal, Himachal Pradesh, U.P., Jammu).

*Remarks*: After its original description based on material from Assam (Chopard, 1969), 3 males were recorded from Arunachal Pradesh by Tandon and Shishodia (1972). Bhowmik (1976) and Bhargava (1976) have not made any reference to each other's record of this species, possibly due to overlapping of publications. Bhowmik (1976) has, however, overlooked the record of this species by Tandon and Shishodia (1972), and has stated that since Chopard's (1969) description from Assam, his is the first reference of the occurrence of this species in a place other than its type-locality. Further, the types of this species have been examined during the present study, and Bhowmik's (1976) figure of the head and pronotum of this species does not seem to tally with the type.

The tegmina of the allotype overlap throughout their length.

*Location of types*: The Academy of Natural Sciences of Philadelphia, U.S.A.

### 19. *Loxoblemmus fletcheri* Chopard, (Figs: 160-162)

1935. *Loxoblemmus fletcheri* Chopard, *Ann. Mag. nat. Hist.*, ( 10 ) 16: 289.

1967. *Loxoblemmus fletcheri*, Chopard, *Orth. Cat.*, 10: 129.

1969. *Loxoblemmus fletcheri*, Chopard, *Fauna Ind. Grylloidea*, 2: 133.

*Diagnostic characters*: *Male*: Head and pronotum darker than tegmina. *Head* fairly large, black, somewhat shining; ocelli yellow, anterior one placed at anterior edge of frontal rostrum, which is 2 1/2 times the width of first antennal segment and projected between antennal sockets; face hollowed, clypeofrontal suture straight, labrum greatly widened. *Pronotum* slightly widening anteriorly, disc and lateral lobes black with whitish pubescence. *Legs*: posterior tibiae with 4 pointed spines on each superior margin.

***Tegmina*** reaching upto abdominal extremity, broad, apically rounded; mirror undivided, or divided near apex with 2 wide cells, or internal portion with 2 cells; oblique veins 2, long and sinuated (4 in a specimen from Upper Shillong, Meghalaya). ***Wings*** short.

***Female*** differs from the male in the following characters: ***Head*** with 4 shallow, usually indistinct, furrows; frontal rostrum double the width of the first antennal segment, only slightly projected between antennal sockets, with a deep groove-like depression, which may be horizontal or in the form of an inverted 'V' below it; below each antennal socket is a striated hollow; clypeofrontal suture very weakly arched in the middle. ***Tegmina*** very short, extending only upto apex of mesonotum, or a little more, separated by a space of 0.7-1.0 mm; dorsal field with very oblique internal margin, presenting 4-5 veins, of which 3rd or 4th bifurcated at base; lateral field usually with 2 straight veins, sometimes 3; Sc. unbranched. ***Ovipositor*** moderate-sized, almost straight, with short, acute apical valves.

***Measurements:*** Body length: Male 9.0-11.1. Female 9.5-10.5; length of pron: Male 2.0-2.2, Female 2.1-2.5; width of pron: Male 3.2-3.5, Female 3.0-3.5; length of teg: Male 5.5-5.7 (5.0), Female 0.7-1.0; length of post. fem; Male 6.5-6.7. Female 6.5-7.2; length of post. tib: Male 4.0-4.5, Female 4.0-4.7; length of ovip: 4.7-6.0.

***Material examined:*** 2 Males. 2 Females Meghalaya, Khasi Hills dist., Upper Shillong, 6.vi. 1974, 29.iv.1975 (*M. Vasanth, A.K. Ghosh* coll.); 1 Male, 4 Females Shillong, 26.vi.1972, 24.vi.1975, 28.iv.1974, 18.v.1974, 6.vi.1975 (*R.S. Giri, K. Deb, M. Vasanth, M.S.Jyrwa* coll.); 1 Male Old Barapani Road, 3.v.1975 (*M. Vasanth* coll.) (*ZSI Collections*).

***Distribution :*** India (Meghalaya).

***Remarks:*** The female of this species is described here for the first time.

***Location of type :*** British Museum (Natural History), London, England.

## 20. *Loxoblemmus equestris* Saussure (Figs. 163, 164)

1877. *Loxoblemmus equestris* Saussure, *Mem. Soc. Geneva*, 25 : 252.

1964. *Loxoblemmus equestris*, Randell, *Canad. Ent.*, 96: 1578.

1967. *Loxoblemmus equestris*, Chopard, *Orth. Cat.*, 10: 126.

1969a. *Loxoblemmus equestris* var. *manipurensis*, Bhowmik, *Zool. Anz.*, 182 ( 1/2)150.

1972. *Loxoblemmus detectus*, Tandon and Shishodia, *Oriental Ins.*, 6(3): 287 ( Misidentification).

1972. *Loxoblemmus taicoun*, Tandon and Shishodia, *Oriental Ins.* 6 (3): 288 (Misidentification).

***Diagnostic characters:*** ***Male: Head:*** Occiput with 6 longitudinal yellow lines; frontal rostrum nearly thrice as wide as first antennal segment, somewhat projecting in

between antennal sockets, with a transverse yellow band on top; face strongly flattened, oblique; first antennal segment with or without deticle-like process on external face. *Tegmina* extending nearly to apex of abdomen, dorsal field translucent, with 2, rarely 3, oblique veins; diagonal vein short, straight; first chord widely separated from it, apical field not very large, showing 2-3 veins (5 veins) and a reticulation of long, usually shapeless, sometimes square areolae. *Wings* about double the length of abdomen.

*Female* differs from the male in the following characters: *Head*: frontal rostrum less wide and projecting; face less flattened, *Tegmina*: dorsal field with 4 more or less parallel, oblique veins, the two innermost united very near base; Cu. with 3-4 weakly distinguishable branches. *Ovipositor* not very long, straight.

*Measurements*: Body length: Male 10.5-12.5 Female 10.0-11.5; length with wings: Male 18.0-18.5, Female 18.0-19.5; length of pron: Male 1.5-2.0, Female 2.0-2.5; width of pron: Male 2.7-3.5, Female 3.2-3.7; length of teg: Male 6.5-7.5, Female 7.5-8.5; length of post. fem: Male 7.2-8.0, Female 7.5-8.5; length of post. tib: Male 5.5-6.0, Female 5.0-6.0; length of ovip: 5.0-7.2.

*Material examined*: 2 Males, 3 Females Meghalaya, Garo Hills dist., Songsok R.F., Damra, Rongrengiri, April, November (S. Biswas coll.); 1 Male, 2 Females Arunachal Pradesh, Subansiri dist., Kimin, Taliha, May, November (K. R. Rao and party, A.N. T. Joseph coll.); 3 Males, 7 Females Siang dist., Rimi bridge (300 m), New Jining (100 m), Old Jining (500 m), Dali camp (300 m), Kambang (200 m), October (S.K. Tandon and G.S. Arora coll.); 5 Males, 15 Females Manipur, Dimapur Road, Ukhrul, October (M. L. Roonwal, Revd. W. Pettigrew coll.); numerous males and females, W. Bengal, M.P., Orissa, Jammu & Kashmir, U.P.; Sri Lanka (ZSI Collections).

*Distribution*: India (Arunachal Pradesh, Assam, Manipur, Meghalaya, W. Bengal, Bihar, Orissa, M.P., U.P., Jammu & Kashmir, Karnataka, Tamil Nadu, Andaman Islands); Sri Lanka; Burma; Malaysia; Indonesia (Java); Celebes.

*Remarks*: The occurrence of this species in Subansiri district of Arunachal Pradesh further extends its distribution in the Northeastern region.

Careful examination of the specimens of *Loxoblemmus equestris* var. *manipurensis* Bhowmik revealed that they do not differ in any appreciable way to justify the erection of a new variety. So, it has been synonymised in the present study under *L. equestris*.

This species is generally macropterous, although a specimen from Taliha (Arunachal Pradesh) is micropterous.

*Location of type*: Natural History Museum, Vienna, Austria.

## 21. *Loxoblemmus haani* Saussure

1877. *Loxoblemmus haani* Saussure, *Mem. Soc. Geneve*, 25: 257.

1964. *Loxoblemmus haani*, Randell. *Canad. Ent.*, **96**: 1578.

1967. *Loxoblemmus hanni*, Chopard, *Orth. Cat.*, **10**: 127.

1969. *Loxoblemmus haani*, Chopard, *Fauna Ind. Grylloidea*, **2**: 124.

**Diagnostic characters: Male:** This species closely resembles *L. detectus* (Serville), but it can be distinguished from the latter by the following characters: **Head:** frontal rowtrum strongly projecting, with apical margin curved in a semi-circle, and somewhat swollen; face flat, sloping. **Tegmina:** mirror with anterior angle almost a right angle (obtuse). **Wings** long.

**Female** unknown.

**Measurements:** (Male) Body length : 13.0-16.5 ( 18.0) ; length with wings : 22.0-26.0; length of pron : 3.0 (3.2); width of pron : 4.0 ; length of teg : 9.0 (10.5) ; length of post. fem: 9.0 (10.5) ; length of post. tib : 7.0.

**Material examined:** 2 Males Arunachal Pradesh, Siang dist., Dali camp, Kambang, 9-14.x.1966 (S.K. Tandon and G.S. Arora coll.)

**Distribution:** India (Arunachal Pradesh, W. Bengal) ; Indonesia (Java).

**Remarks:** Tandon and Shishodia (1972) first recorded this species from Northeast India in Arunachal Pradesh. They have mentioned that the males examined by them are very similar to the females described by Chopard (1969), but smaller. But, Chopard (*loc. cit.*) has described only the males of this species. Bhowmik ( 1969a, p.150) is of the opinion that the present species (spelt erroneously as *haanii*) is conspecific with *L. detectus* ( Serville). He has even placed *L. haani* Saussure as a synonym of *L. detectus* (Serville). Although the present author has not examined the types, he has examined specimens of both species ( those of the former identified by Tandon and Shishodia, and those of the latter by himself, and by Chapard) , and he is quite certain that the rather marked and considerable difference in the shape of the frontal rostrum is itself indicative of the distinctiveness of the two species.

**Location of type:** Brunner's Collection, Natural History Museum, Vienna, Austria.

## 22. *Loxoblemmus detectus* (Serville)

(Figs. 165,166)

1838. *Platyblemmus detectus* Serville, *Ins. Orth.*, 356.

1877. *Loxoblemmus detectus*, Saussure, *Mem. Soc. Geneve*, **25** : 255.

1967. *Loxoblemmus detectus*, Chopard, *Orth. Cat.*, **10** : 126.

1969. *Loxoblemmus detectus*, Chopard, *Fauna Ind. Grylloidea*, **2** : 123.

1972. *Loxoblemmus longipalpis*, Tandon and Shishodia, *Oriental Ins.*, **6** (3) : 287 (Misidentification).

**Diagnostic characters . Male:** Fairly large-sized. **Head:** occiput with 6 longitudinal

yellow lines; frontal rostrum projected, arcuate ; face strongly flattened, oblique, sometimes with some clear transparent wavy markings above anterior ocellus or upto clypeo-frontal suture ; maxillary palpi long. *Legs* : knees of posterior femora blackish. *Tegmina* reaching upto abdominal tip; mirror 1 1/2 times as long as broad, divided or not, anterior angle acute, external angle rounded, posterior a right angle ; oblique veins 2-3; apical field with 3 veins ; lateral field with 4-6 veins in two groups. *Wings* long. *Genitalia* with posterior emargination of epiphallus showing a triangularly notched median projection.

*Female* differs from the male in the following characters: Smaller in size. *Head*; frontal rostrum less projected, a little convex ; face less flattened, oblique, labrum wide. *Tegmina* : dorsal field with 4-5 oblique veins, which are sometimes indistinct, 6 branches of Cu., and a regular reticulation of elongated cells. *Ovipositor* medium-sized, with small apical valves.

*Measurements*: Body length: Male 15.0-19.0, Female 13.5-15.5 ; length with wings: Male 26.0-30.0, Female 22.7-25.5 ; length of pron : Male 2.0-3.0, Female 2.2-3.0; width of pron : Male 3.5-5.0, Female 3.7-4.5 ; length of teg : Male 8.0-12.5, Female 8.7-11.0; length of post. fem : Male 8.0-11.5, Female 9.0-11.0; length of post. tib : Male 6.5-9.5 Female 6.5-8.5 ; length of ovip : 7.5-8.5.

*Material examined*: 4 Males, 12 Females Arunachal Pradesh, Subansiri dist., Kimin I.B., Tamen, Daporizo, 11-19.xi. 1975 ( *K.R. Rao and party* coll. ) ; 2 Females Siang dist., New Jining (100 m), Along Road (200 m), 19.x.1966 ( *S.K. Tandon and G.S. Arora* coll.); 1 Male Mizoram, Aizawl dist., Serchip, Chamdur valley ( 500 m), 7.xi.1976 ( *K.R. Rao and party* coll. ) ; 2 Males W. Bengal, Calcutta, May, October ( *C. Pawa, F. Gravely* coll.); numerous males, U. P., Himachal Pradesh, Sikkim, and W. Bengal ( *ZSI Collections*).

*Distribution*: India (Arunachal Pradesh, Mizoram, W. Bengal, Sikkim, Bihar, U.P., Himachal Pradesh, Andaman Islands) Sri Lanka; Malaysia; Singapore.

*Remarks*: Collection from Mizoram offers a new distributional record for this species. The male specimen collected from Mizoram is micropterous.

*Location of type*: Museum National d'Histoire Naturelle, Paris, France.

### 23. *Loxoblemmus jacobsoni* Chopard (Figs. 167, 168)

1927. *Loxoblemmus jacobsoni* Chopard, *Ann. Soc. ent. Fr.*, **96** : 157.

1967. *Loxoblemmus jacobsoni*, Chopard, *Orth. Cat.*, **10** : 129.

1969. *Loxoblemmus jacobsoni*, Chopard, *Fauna Ind. Grylloidea*, **2** : 127.

1975. *Loxoblemmus jacobsoni*, Biswas, *et al.*, *Proc. zool. Soc., Calcutta*, **28** : 25.

*Diagnostic characters*: *Male* : *Head* small, black, pubescent ; occiput with 6 yellow, longitudinal lines ; frontal rostrum protruding forward forming an angle of more than

90, and presenting dorsally, near its anterior edge, an inconspicuous, transverse yellow band connecting lateral ocelli; face flattened, even concave, presenting around anterior ocellus a yellow marking extending upto edge of frontal rostrum, inferior angle of face extending on either side into two somewhat rounded, projecting angles which, along with frontal rostrum, give the face a strongly trilobed appearance; external process on first antennal segment 1 1/2 times to twice the length of the latter; clypeo-frontal suture obscure; palpi long, yellow. *Tegmina* generally shorter than abdomen; dorsal field with 3-4 variously disposed oblique veins; mirror as long as, or longer than, broad, with a posteriorly placed angular dividing vein forming one or two cells in the posterior part; diagonal vein short, straight; apical field small, with 3 veins and a reticulation of a few large irregular cells; lateral field black, with 4-5 parallel veins.

*Female* similar to that of *L. equestris* Saussure.

*Measurements*: (Male) Body length: 11.5-14.0; length of pron: 2.2-3.0; width of pron: 3.5-4.2; length of teg: 6.2-6.0 (Male Female 6.5); length of post fem: 7.0-8.7; length of post. tib: 5.5-5.7.

*Material examined*: 5 Males Meghalaya, Khasi Hills dist., Shillong, 19.v.1964 (S. Biswas coll.).

*Distribution*: India (Meghalaya); Malayasia; Indonesia.

*Remarks*: Biswas, *et al.* (1975) have indicated this species as a new record from Meghalaya. In fact, that was the first record of this species from India. The male genitalia is figured here for the first time.

*Location of type*: Museum National d' Histoire Naturelle, Paris, France.

#### 24. *Loxoblemmus intermedius* Chopard (Figs. 169,170)

1929b. *Loxoblemmus intermedius* Chopard, *Bull. Raffles, Mus.*, 2: 103.

1967. *Loxoblemmus intermedius*, Chopard, *Orth. Cat.*, 10: 129.

1969. *Loxoblemmus intermedius*, Chopard, *Fauna Ind. Grylloidea*, 2: 127

*Diagnostic characters*: *Male*: Head large with projected frontal rostrum - 2.5 times the width of first antennal segment which bears an elongated process about 1.5 times its length, face black, oblique, flattened, superiorly a little concave. *Tegmina* extending upto abdominal extremity, dorsal field with 2 anterior oblique veins shorter than and curved towards the 2 posterior ones, which are longer and united at base; mirror appearing like two mirrors, one smaller (formed by an angular dividing vein) identical with, and contained within, a larger one; chords long, curved, the first one connected to mirror by 2 curved veinlets, apical field with 3 veins and a small number of long cells. *Abdomen* subgenital plate elongated, apically rounded.

*Female* very similar to that of *L. equestris* Saussure and *L. jacobsoni* Chopard.

*Measurements*: Body length : Male 11.5 (11.0), (Female 12.0) ; length of pron : Male 2.2 ; width of pron : Male 4.0 ; length of teg : Male 5.5 (6.0), (Female 4.0-6.0) ; (Posterior legs missing) ; length of ovip : (8.5).

*Material examined* : 1 Male Meghalaya, Khasi Hills dist., Barapani, 19. v. 1964 (S. Biswas coll.).

*Distribution* : India (Meghalaya) ; Malaysia ; Mentawai Islands ; Indonesia (Sumatra) ; Borneo.

*Remarks* : This species is reported here for the first time from India. The male genitalia is also figured for the first time.

*Location of type* : British Museum (Natural History), London, England.

#### Genus 12 *Stephoblemmus* Saussure, 1877.

1877. *Stephoblemmus* Saussure, *Mem. Soc. Geneve*, 25 : 259.

1967. *Stephoblemmus*, Chopard, *Orth. Cat.*, 10 : 131.

1969. *Stephoblemmus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 136.

1975. *Stephoblemmus*, Bhowmik, *J. Bombay nat. Hist. Soc.*, 72 (2) : 381.

*Type-species* : *Stephoblemmus humbertiellus* Saussure, 1877.

*Diagnostic characters* Male with face strongly flattened in front and oblique, in female weakly so ; frontal rostrum of male projected between eyes to form a process which may bear a corneous prolongation, that of female not so. Legs slender. Tegmina shortened in both sexes, more so in the females ; mirror in males well developed.

*Distribution* : India; Sri Lanka.

#### 25. *Stephoblemmus humbertiellus* Saussure (Figs 171 - 173)

1877. *Stephoblemmus humbertiellus* Saussure, *Mem. Soc. Geneve*, 25 : 260.

1967. *Stephoblemmus humbertiellus*, Chopard, *Orth. Cat.*, 10 : 132.

1969. *Stephoblemmus humbertiellus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 136.

1975. *Stephoblemmus humbertiellus*, Bhowmik, *J. Bombay nat. Hist. Soc.*, 72 (2) : 381.

1978. *Stephoblemmus humbertiellus*, Vasanth, (Female) *entomon*, 3 (2) : 273.

*Diagnostic characters*: *Male*: size variable. *Head* black ; frontal rostrum prolonged anteriorly into a strongly widened process giving the vertex a constricted appearance, apically curved downwards and slightly notched, or apex of widened frontal rostrum produced into a slightly pliable, pale brown, strongly and medially notched corneous

process, bent downward apically ; lateral ocelli quite large, yellow, borne on dorso-lateral portions of process ; 3rd segment of maxillary palpi dark, 4th and 5th yellow to white ; clypeo-frontal suture generally effaced in the middle. *Pronotum* widened anteriorly. *Tegmina* extending, at the most, upto the end of 6th abdominal tergite ; dorsal field with smoky appearance and, sometimes, with a more or less prominent yellow spot on antero-lateral corners ; oblique veins 2 ; apical field almost absent.

*Female* differs from the male in the following characters : *Head* not so wide ; frontal rostrum not prolonged as in male ; face a little concave in the region of clypeo-frontal suture. *Legs* : internal tympanum on anterior tibiae absent or indistinguishable. *Tegmina* reaching only upto middle or end of 3rd abdominal tergite ; dorsal field usually black, usually with 3 oblique veins, the outermost 1-branched, and numerous transverse connecting veinlets forming irregular and shapeless areolae. *Ovipositor* short, straight, slender, with apical valves sharply pointed, scarcely wider than stem.

*Measurements* : Body length : Male 8.0-14.5, Female 8.5-10.0 ; length of pron : Male 1.7-2.1 (2.5), Female 1.8-2.5 ; width of pron : Male 2.0-3.5, Female 2.0-3.0 ; length of teg : Male 3.0-5.0 (5.3), Female 2.0-3.0 ; length of post. fem : Male Female 5.5-7.0 ; length of post. tib Male 3.5-4.7, Female 4.0-5.0 ; length of ovip : 4.7-5.5.

*Material examined* : 20 (6 Males, 14 Females) Meghalaya, Khasi Hills dist., Old Barapani Road, Barapani, Shillong, Upper Shillong, Umniuh, May-July, (M. Vasanth, S. Biswas, S.N. Prasad, M.S. Jyrwa, R. Mathew, A.R. Lahiri, G. M. Yazdani coll.) ; 1 Male U.P., Shaharanpur dist., Rajaji Sanctuary, 13.vii.1963 (T.D. Soota coll.) (ZSI Collections) ; 1 Female Assam, Ledo, 8.vi.1944 (J.W.H. Rehn coll.) (ANSP Collections).

*Distribution* : India (Assam, Meghalaya, U.P.); Sri Lanka.

*Remarks* : The genus remains monotypic. Although the male of the type-species was described in 1877, the female remained unknown till 1978. Bhowmik (1975) considered it a rare species, but as Vasanth (1978) has pointed out, and as will be evident from the number of specimens studied, it is fairly common in the vicinity of Shillong (Meghalaya) during the monsoon months.

One female specimen of this species from Assam, in the ANSP collections, was misidentified by Chopard as *Modicogryllus blennus* (Chopard). This specimen makes it the first record of this species from Assam.

*Location of type* : Museo Civico di Storia Naturale, Geneva, Switzerland.

### Genus 13 *Parasciobia* Chopard, 1935.

1935. *Parasciobia* Chopard, *Ann. Mag. nat. Hist.*, (10) 16 : 290

1967. *Parasciobia*, Chopard, *Orth. Cat.*, 10 : 143.

1969. *Parasciobia*, Chopard, *Fauna Ind. Grylloidea*, 2 : 138.

*Type-species* : *Parasciobia indica* Chopard, 1935

*Diagnostic characters* : Size small. *Head* with eyes wide apart ; frontal process of male widening above antennae, parallel-sided further ahead ; forehead presenting a large truncated veil ; face flattened in both sexes. Male tegmina a little shorter than abdomen, with small mirror and very short apical field. Female tegmina extending only upto metanotum, widely separated.

*Distribution* : India.

*Remarks* : Chopard (1935) stated that the female is unknown but included the description of the female. The genus remains monotypic, represented only by the type-species described from Meghalaya, India ; the study of its male genitalia may reveal its probable affinities with *Stephoblemmus* Saussure more clearly.

## 26. *Parasciobia indica* Chopard

1935. *Parasciobia indica* Chopard, *Ann. Mag. nat. Hist.*, (10) 16 : 290.

1967. *Parasciobia indica*, Chopard, *Orth. Cat.*, 10 : 143.

1969. *Parasciobia indica*, Chopard, *Fauna Ind. Grylloidea*, 2 : 138.

[Material not examined , description based on Chopard (1935).]

*Diagnostic characters Male* : *Head* as wide as pronotum , eyes placed wide apart, forehead prolonged in a large truncated veil ; face flattened, glabrous, frontal process widening proximally, parallel-sided distally. *Legs* pubescent ; anterior tibiae with only external perforation ; *Tegmina* slightly shorter than abdomen ; mirror small, undivided, irregularly rounded ; chords feebly curved, diagonal vein long, straight ; oblique veins 2; apical field brown, with 3 veins.

*Female* differs from the male in the following characters : *Head* : forehead very wide, convex, apically truncated without veil ; face sloping. *Tegmina* short, extending only upto end of metanotum, widely separated medially, dorsal field with 6 longitudinal veins. *Ovipositor* short, with beak-shaped apical valves.

*Measurements* : Body length . ( Male Female 11.0 ; length of pron : Male 2.2 ; length of teg : Male 4.0 ; length of post. fem : Male Female 6.5 ; length of ovip 5.5 ).

*Distribution* : India (Meghalaya).

*Remarks* : This small species is so far known only from the type (Male) and a female, both collected and described from Shillong, Meghalaya, India. Intensive collection in and around Shillong failed to yield any specimens of this species. It is probably related to *Stephoblemmus* Saussure, which could only be confirmed by studying the male genitalia, which, however, could not be procured for the present study.

*Location of type* : British Museum (Natural History), London, England.

Genus 14 *Grylloides* Saussure, 1874.

1874. *Grylloides* Saussure, *Miss. Mexique, Orthopt.*, 6 : 409.

1964. *Grylloides*, Randell, *Canad. Ent.*, 96 : 1588.

1967. *Grylloides*, Chopard, *Orth. Cat.*, 10 : 107.

1969. *Grylloides*, Chopard, *Fauna Ind. Grylloidea*, 2 : 85.

*Type-species* : *Gryllus sigillatus* Walker, 1869.

*Diagnostic characters* : Gryllus-like in appearance ; head smaller, flattened dorsally; frontal rostrum narrow.

*Distribution* : Cosmopolitan in the Tropics.

27. *Grylloides sigillatus* (Walker)  
(Figs. 174,175)

1869. *Gryllus sigillatus* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 46.

1877. *Grylloides sigillatus*, Saussure, *Mem. Soc. Geneva*, 25 : 210.

1964. *Grylloides sigillatus*, Randell, *Canad. Ent.*, 96 : 1588.

1967. *Grylloides sigillatus*, Chopard, *Orth. Cat.*, 10 : 108.

1969. *Grylloides sigillatus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 85.

*Diagnostic characters* : *Male* : Body depressed. *Head* : vertex flattened ; ocelli quite large, lateral ones prominent ; frontal rostrum narrower than first antennal segment. *Pronotum* dull yellow with a dark brown band posteriorly, and a brown spot on each impress. *Tegmina* reaching upto middle of 4th abdominal tergite, truncated and feebly rounded at apex ; apical field small ; lateral field with 3 free, more or less parallel veins; Sc. with 2 branches. *Abdomen* yellow, with some dark brown spots dorsally.

*Female* differs from the male in the following characters : *Tegmina* reduced to short, lateral lobes, separated medially by a space 1.5-2.0 mm wide, internal margins strongly oblique ; dorsal field with 3-4 indistinct veins. *Abdomen* : first abdominal tergite with a transverse blackish band.

*Nymphs* : very similar to the adults in colouration and markings.

*Measurements* : Body length : Male 14.0 - 16.0, Female 11.0 - 18.0; length of pron : Male 2.0 - 2.7, Female 2.0 - 3.0; width of pron : Male 3.0 - 4.0, Female 3.5 - 5.0; length of teg : Male 5.5 - 6.2, Female 0.7 - 1.8; length of post. fem : Male 8.7 - 10.5, Female 9.5 - 13.0; length of post. tib : Male 6.0 - 7.0, Female 6.5 - 10.0; length of ovip : 10.0 - 16.5.

*Material examined* : 1 Male, 1 Female Meghalaya, Garo Hills dist., Rongram, Anogiri, 4.iii.1975, 8.xi.1973 (*S. Biswas* coll.); 3 Females Jaintia Hills dist., Sonapurdi,

27.viii.1974 (A.R. Lahircoll.); 2 nymphs Assam, Darrang dist., Tezpur, 8.xi.1975 (M. Vasanth coll.); Goalpara dist., Deagdhoya Pahar, 17.i.1972 (S. Biswas coll.); 2 nymphs Manipur, Moreh, 20.i.1976 (A. K. Ghosh coll.); numerous males and females, W. Bengal, Bihar, Himachal Pradesh, Jammu & Kashmir, Rajasthan, Maharashtra, M.P., Orissa, Andhra Pradesh, Andaman and Nicobar Islands (ZSI Collections).

*Distribution* India (Assam, Meghalaya, Manipur, W. Bengal, Bihar, Orissa, U.P., Himachal Pradesh, Jammu & Kashmir, Panjab, Rajasthan, Maharashtra, M.P., Karnataka, Kerala, Andhra Pradesh, Tamil Nadu, Andaman and Nicobar Islands) ; Sri Lanka; Malaysia ; Pakistan.

*Remarks* : This anthropophilous species, which the present author has found to be quite easily available in various parts of Maharashtra and Tamil Nadu, appears to be less abundant in Northeast India. It is a new record from Meghalaya and Manipur; new distributional records within Assam are also reported here. Although not yet recorded from Burma, its occurrence there is certain as it has been collected from Moreh on the Indo-Burmese border. It seems to be a very adaptable species, and Bhowmik (1970) has even recorded it from a sea beach in the Nicobar Islands.

The calling song of this species is a continuous series of short chirps.

*Location of type* : British Museum (Natural History), London, England.

#### Genus 15 *Gryllopsis* Chopard, 1928.

- 1928b. *Gryllopsis* Chopard, *Rec. Ind. Mus.*, 30 : 13.  
 1964. *Gryllopsis*, Randell, *Canad. Ent.*, 96 : 1571.  
 1967. *Gryllopsis*, Chopard, *Orth. Cat.*, 10 : 27.  
 1969. *Gryllopsis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 68.

*Type-species* *Gryllodes hebraeus* Saussure, 1877.

*Diagnostic characters* : Robust, cylindrical body; head big, rounded. Anterior tibiae without internal tympana. Tegmina well developed in males, very wide; females apterous, or with very short tegmina, often reduced to lateral pads. Subgenital plate with conical or rounded apex. Male genitalia bereft of styli on postero - lateral corners of epiphallus.

*Remarks* Biswas, *et al.* (1975) have reported two species of *Gryllopsis* Chopard, viz., *femorata* Chopard and *pubescens* Chopard as new records from Meghalaya. After carefully studying all those specimens, the present author has found that they are all wrongly identified, and none of them belongs to the genus *Gryllopsis* Chopard.

A total of 8 species of *Gryllopsis* Chopard are known from India. They are :

1. *G. furcata* (Saussure) from U.P., M.P., Karnataka, Tamil Nadu,
2. *G. falconneti* (Saussure) from U.P., Jammu, M.P., Maharashtra,

3. *G. flavifrons* Chopard from Karnataka,
4. *G. famorata* Chopard from Karnataka, Tamil Nadu,
5. *G. robusta* Chopard from Tamil Nadu,
6. *G. pubescens* Chopard from W. Bengal;
7. *G. arenicola* (Annandale) from Tamil Nadu, and
8. *G. rajasthanensis* Bhowmik from Rajasthan.

As none of the above species has been recorded from Northeast India, the genus still remains to be discovered in that region.

#### Genus 16 *Turanogryllus* Tarbinskii, 1940.

1940. *Turanogryllus* Tarbinskii, *Salt. orthopt. Ins. Azerb. S.S.R.* 19 : 115.  
 1963. *Paragryllopsis*, Chopard, *Bull. Res. Council Israel*. 118/4 : 169.  
 1964. *Turanogryllous*, Randell, *Canad. Ent.*, 96 : 1571.  
 1967. *Turanogryllus*, Chopard, *Orth. Cat.*, 10 : 34.

*Type-species* *Gryllus lateralis* Fieber, 1853.

*Diagonstic characters* Head globose, body cylindrical. Male tegmina well developed, those of female generally reduced to small pads. Subgenital plate concave or deeply notched; dorsal lobes of ectoparameres externally visible. The most noteworthy feature is the presence of styli on the posterolateral corners of epiphallus.

*Distribution* : India, Pakistan, West Asia, U.S.S.R., Africa.

*Remarks* Randell (1964), in his studies on the male genitalia of Gryllinae, showed that the most notable feature of the genus *Turanogryllus* Tarbinskii, is the presence of styli on the external apical corners of the epiphallus. Chopard (1967) transferred five Indian species of the genus *Gryllopsis* Chopard, viz., *babaulti* Chopard, *histrion* (Saussure), *maculithorax* Chopard, *rufoniger* Chopard and *virgulatus* (Bolivar), to *Turanogryllus* Tarbinskii, because of the presence of styli in the genitalia of the male. Chopard's (*loc. cit.*) inclusion of a sixth Indian species, *Gryllopsis fascifrons* Chopard, in *Turanogryllus* is, however, debatable until a male is described for this species. Another Indian species, *Gryllopsis pakistana* Chopard, has also been brought under *Turanogryllus* by Chopard (*loc. cit.*) in the name of *T. pakistanus* (Chopard). *T. pakistanus* (Chopard), however, is a junior secondary homonym of *T. pakistanus* Ghouri & Ahmed, 1959. Hence, a replacement name is required for Chopard's species. The present author here proposes the new name *T. malirensis* after its type-locality, Malir in Pakistan.

Later, Bhowmik (1969a) described two additional species of *Turanogryllus*, viz., *T. quadrilineatus* and *T. dehradunensis*; the latter species has been spelt thus in the original publication, and also by Bhowmik (1975). But, Bhowmik (1969a), while discussing the affinities of *T. quadrilineatus*, has spelt it as *dehradunensis*. Acting as first reviser under Article 32 of the International Code of Zoological Nomenclature, the present author here selects *dehradunensis* as the correct name since the type-locality of

the species is Dehra Dun. Bhowmik (1975) transferred *Gryllopsis jammuensis* Bhowmik, described only on the basis of the female, to *Turanogryllus*. Since the most striking feature of the genus *Turanogryllus* is the presence of styli in the male genitalia, it is not possible to assign any female to this genus with certainty, especially when the male for the species is unknown. Therefore, the present author feels that this transfer can be firmly established only after the description of the male.

Vasanth (1980) has described 2 new species of this genus from Maharashtra, India, thus making a total of 11 species of the genus from India. But, so far, only 2 species of the genus are recorded from Northeast India.

Key to the Northeast Indian species of the Genus *Turanogryllus* Tarbinakii.

Pronotal disc yellow with a dark brown spot on either side of midline on posterior one-third; male tegminal mirror undivided; female tegmina short, < 1.5 mm, always micropterous; post-erolateral lobes of ectoparameres shorter, broader, without hook-like process ..... *histrion* (Saussure).

Pronotal disc with a dark brown irregular band in posterior half, impresses and median portion rufous; tegminal mirror divided; female tegmina longer, > 2.0 mm (in micropterous forms) or much longer in macropterous forms, postero-lateral lobes of ectoparameres longer, more slender, with a 'hook-like' process ..... *rufoniger* (Chopard).

### 28. *Turanogryllus histrion* (Saussure) (Figs. 176, 177)

1877. *Grylloides histrion* Saussure, *Mem. Soc. Geneve*, 25 : 229.  
1933b. *Gryllopsis histrion*, Chopard, *Rev. Suisse Zool.*, 40 (1): 163.  
1967. *Turanogryllus histrion*, Chopard, *Orth. Cat.*, 10 : 35.  
1969. *Gryllopsis histrion*, Chopard, *Fauna Ind. Grylloidea*, 2 : 70.  
1975. *Gryllopsis pubescens*, Biswas, et al., *Proc. zool. Soc., Calcutta*, 28 : 24 [ Misidentification, partim ].

*Diagnostic characters: Male* : Head globular, shining ; of the 6 longitudinal yellow lines on the occiput, 2 median ones reaching upto lateral ocelli ; ocelli large, yellow ; width of frontal rostrum double the first antennal segment. *Pronotum* : disc weakly convex, pubescent, yellow, with dark brown spots, one on either side of midline in the posterior one- third, and a few scattered brown spots in the posterior half ; lateral lobes yellow. *Tegmina* leave 2-5 abdominal tergites exposed ; dorsal field with 3 oblique veins, 2 anterior ones united at base ; apical field fairly large in relation to size of tegmina, with 5 veins and a regular reticulation of squarish areolae, all veins somewhat effaced, although discernible. *Abdomen* : subgenital plate medially notched behind.

*Female* differs from the male in the following characters : *Head* : frontal rostrum wider. *Tegmina* very short, widely separated, internal margins oblique; dorsal field

with 2-4 veins, lateral field deep, yellow, with 4 slightly curved veins; Sc. usually unbranched. Abdomen cylindrical, each tergite showing a blackish marking in the middle.

*Nymphs* : Head and body of paler hue, but referable to this species without difficulty.

*Measurements* : Body length : Male 9.5-14.5, Female 11.0-14.5; length of pron : Male 2.0-3.0, Female 2.5-3.0; width of pron : Male 3.0-4.0, Female 3.5-3.7; length of teg : Male 4.5-4.7 (4.2), Female 0.7-1.2 (1.0-1.5); length of post. fem : Male 8.5-10.5 (6.5), Female 8.2-9.0; length of post. tib : Male 5.5-8.5, 06.Female-6.5; length of ovip: 8.0-10.5 (7.5).

*Material examined* : 16 (3 Males, 5 Females, 8 nymphs) Meghalaya, Garo Hills dist., Damra Forest, Rongjeng, April (*R.S.Pillai* coll.) ; Khasi Hills dist., Barapani, June (*M.Vasanth* coll.) ; Assam, Sibsagar dist., Kaziranga Nat. Park, Kohima, Sukhna Beel, Diphlumukh, February, October (*M.Datta* coll.) ; numerous males and females, W.Bengal, Himachal Pradesh (*ZSI Collections*)

*Distribution* : India (Assam, Meghalaya, W.Bengal, Bihar, Punjab, Himachal Pradesh, Tamil Nadu).

*Remarks* : This species was known only from Assam in Northeast India. It is here recorded for the first time from Meghalaya.

Biswas, *et al.* (1975) mistakenly identified 2 female specimens, actually of the present species, as *Gryllopsis pubescens* Chopard, an error likely to occur when female specimens of *Turanogryllus Tarbinskii* are identified without comparable males.

*Location of type* : Museo Civico di Storia Naturale, Geneve, Switzerland.

### 29. *Turanogryllus rufoniger* (Chopard)

Figs. 178, 179

1925c. *Grylloides rufoniger* Chopard, *Ann. Soc. ent. Fr.*, 94 : 292.

1935. *Gryllopsis rufoniger*, Chopard, *Ann. Mag. nat. Hist.*, (10) 16: 288.

1967. *Turanogryllus rufoniger*, Chopard, *Orth. Cat.*, 10 : 36.

1969. *Gryllopsis rufoniger*, Chopard, *Fauna Ind. Grylloidea*, 2 : 71.

*Diagnostic characters* : Male : Head rounded, shining, dark brown; longitudinal lines on occiput rufous, ocelli large, yellow; frontal rostrum a little greater than twice the width of first antennal segment ; clypeofrontal suture sharply arched in the middle; face yellow below anterior ocellus. *Pronotum* : disc with an irregular dark brown band in posterior half, impresses and middle of anterior portion rufous ; lateral lobes yellow. *Legs* yellow, posterior femora dark brown towards knees. *Tegmina* a little shorter than abdomen; dorsal field dark brown, shining, a little transparent; mirror with anterior

angle obtuse, posterior rounded; oblique veins 3, diverging externally; apical field with 5-6 veins and a reticulation of regular, small, square cells; lateral field with 6 parallel veins connected posteriorly by feeble veinlets. *Abdomen* : subgenital plate deeply notched at apex.

*Female* differs from the male in the following characters : *Tegmina* extending upto middle or end of metanotum; dorsal field pale rufous brown to black, with 3-4 oblique veins which converge towards inner margin; lateral field neat, with generally 5 veins, inferior-most short, Sc.unbranched. In macropterous adult specimens, tegmina reach upto end of abdomen or beyond, dorsal field dark brown to almost black with 3 roughly parallel oblique veins, 3-4 branches of Cu. and a reticulation formed of fairly large square and elongated areolae. *Wings* (in macropterous form) dark brown and extending beyond tegmina. *Abdomen* : subgenital plate only very slightly concave.

*Measurements* : Body length : Male 11.5-13.5, Female 11.0-18.5; length with wings (macropterous Female) : 21.0-22.5; length of pron : Male 2.2-2.5 (3.0), Female 2.7-3.5; width of pron : Male 3.5-4.0, Female 3.7-5.2; length of teg : Male 7.0 (8.0), Female (micropterous) 2.0-3.7, Female (macropterous) 9.0-9.7; length of post. fem: Male 9.0-9.5 (10.5), Female 9.0-11.0; length of post. tib : Male 6.7-7.0, Female 7.5-8.5; length of ovip: 11.0-14.0

*Material examined* : 24 (3 Males, 21 Females, including 3 macropterous forms) Meghalaya, Khasi Hills dist., Shillong, Upper Shillong, Umniuh, Barapani, Old Barapani Road, Mawphlang ; Jaintia Hills dist., Garampani, June-October, December (G.M. Yazdani, S.Khera, R.S. Pillai, A.K.Ghosh, S.K. Subhani, S.Biswas, S.N.Prasad, R.P. Ghosh, A.K.Dutta, R. Mathew, S.K.Chanda coll.) ; Manipur, Ukhrul, no date (W. Pettigrew coll.) ; 2 Males, 7 Females U.P., Dehra Dun, June (J.C.Tripathi coll.) ; Punjab, Hoshiarpur dist., Gagret forest, August (R.K. Bhanotar coll.) (ZSI Collections); 2 Females (1 macropterous), Upper Burma (ANSP Collections).

*Distribution* : India (Meghalaya, Manipur, W.Bengal, U.P., Punjab, Karnataka); Burma; Laos.

*Remarks* : In Northeast India, this species has been recorded from only one locality, viz., Shillong, Meghalaya. The distribution within this state is extended. It is also recorded for the first time from Manipur.

Chopard (1969) comments that macroptery is a rare phenomenon in this species. Macropterous females are being recorded here from India for the first time.

*Location of type* Museum National d'Histoire Naturelle, Paris, France.

#### Genus 17. *Cophogryllus* Saussure, 1877

1877. *Cophogryllus* Saussure, *Mem. Soc. Geneva*, 25: 232.

1964. *Cophogryllus*, Randell, *Canad. Ent.*, 96 : 1574.

1967. *Cophogryllus*, Chopard, *Orth. Cat.*, 10 : 37.

1969. *Cophogryllus*, Chopard *Fauna, Ind. Grylloidea*, 2 : 98.

*Type - species* : *Cophogryllus delalandi* Saussure, 1877.

*Diagnostic characters* : Apterous species without tympana on anterior tibiae. In male genitalia virga long, apically forked, mesal lobes not articulated with ectoparamers, and fused on median line.

*Distribution* : Tropical Africa; Asia, including India; south America.

*Remarks* : 6 species have been included in this genus from all over the world 9 of these are known from India, but only from females. Randell (1964) has referred *Cophogryllus maculatus* chopard, 1955 from Africa to this genus, other than the type-species, and opined that the other species described under this genus are, undoubtedly, species of other genera. Bhowmik (1969b) has felt that the majority of the species described under this genus might be apterous male nymphs or females of othe Grylline genera. It is possible that what Randell (1964) and Bhowmik (*loc. cit.*) have stated may be true; The present author has examined the type specimens (females) of 2 species of this genus, viz., *C. ornatus* Chopard, and *C. brunneus* Chopard. They do not look very different from the females of many other Gryllinae. It would , therefore, be wise to describe the males in detail before arriving at any conclusion.

#### \* 30. *Cophogryllus bilineatus* Chopard

1967. *Cophogryllus bilineatus* Chopard, *Orth. Cat.*, 10 : 39.

1969. *Cophogryllus bilineatus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 105.

[Material not examined; description based on Chopard (1969)].

*Diagnostic characters* : *Female* : general colouration black, shining, with an orange-yellow band extending, on each side from frontal rostrum to first abdominal tergite. *Head* broad, feebly flattened, very sparsely punctated; frontal rostrum and face very broad, the former with carinated edges, yellow bands from occiput along eyes to lateral ocelli; antennae and palpi black; maxillary palpi short *Pronotum* : its width one and a half times its length, slightly widening anteriorly; disc almost flat, smooth, and presenting, apart from the lateral yellow bands, a very narrow short yellow line near the middle of posterior margin, which is continued on the abdomen, upto the apex. *Legs* : anterior and median black, finely pubescent; anterior tibiae unperforated; posterior femora thick, blackish, weak yellow striations on external face ; posterior tibiae with 4 spines on each superior margin. *Abdomen* dorsoventrally flattened and widened in the middle. *Ovipositor* long, straight with enlarged beak-like apical valves.

*Male* : unknown.

**Measurements :** (Female) Body length : (11.0) ; length of pron: (2.8); width of pron: (4.5); length of post fem : (8.5); length of ovip : (9.0).

**Distribution :** India (Assam).

**Remarks :** Chopard (1969) , who described this species from a single female from Assam, is skeptic about its inclusion in this genus, and expresses the view that the discovery of the male , in future, may necessitate srection of a new genus for it.

**Location of type :** british Museum (Natural History) , London, England.

### Genus 18. *Modicogryllus* Chopard, 1961.

1961. *Modicogryllus* Chopard, *Eos*, 37: 272.

1964. *Modicogryllus*, Randell, *Canad, Ent.*, 96: 1583.

1967. *Modicogryllus*, Chopard, *Orth. Cat.*, 10 : 73.

**Type-species :** *Gryllus conspersus* Schaum, 1853.

**Diagnostic characters :** generally small insects with pubescent body. male genitalia with bridge of epiphallus very narrow in relation to total length of epiphallus; endoparameres with an expanded parameral muscle insertion, but without transverse parameral muscle apodemes.

**Distribution :** Cosmopolitan.

**Remarks** It may be noted that because of delayed publication of Chopard's *Fauna of India* on Gryllids (1969) , the genus *Modicogryllus* erected by Chopard (1961) contains 4 species viz., *semiobscurus* (Chopard), *ehsani* (Chopard) , *rehni* (Chopard) , and *minimus* (Chopard) from northeast India, which are described under *Gryllus* Linnaeus in *Fauna of India*.

#### Kay to the northest Indian Species of genus *Modicogryllus* Chopard

1. Posterior emargination of epiphallus without median projection .....2
- Posterior emargination of epiphallus with a median projection.....4
- 2 Bridge of epiphallus postero-medially notched.....*semiobscurus* (Chopard)
- Bridge of epiphallus postero-medially entire, without notch.....3
3. Veins of lateral field of tegmina separated from one another , and strongly curved , epiphallus dorso-ventrally broader apically , and ectoparameres posteriorly slender.....*confirmatue* (Walker)
- Veins of lateral field closer and straight ; in lateral view, epiphallus apically , more slender and ectoparameres slender only at apex.....*ehsani* (Chopard)

4. Colouration blackish with fulvous legs , head without any ornamentation .....*blennus* (Saussure)  
 — Body and legs of same colour ; head with ornamentation.....5
5. Head with 2 transverse yellow bands ; postero-median projection of epiphallus angulated .....*rehni* (Chopard)  
 — Head without transverse band , but occiput with vertical lines; postero-median projection of epiphallus with rounded margins.....*minus*(Chopard)

\* 31. *Modicogryllus semiobscurus* (Chopard)

1961. *Modicogryllus semiobscurus* Chopard, *Eos*, 37 : 273.

1967. *Modicogryllus semiobscurus* Chopard, *Orth. Cat.*, 10 : 81.

1969. *Gryllus semiobscurus*, Chopard, *Fauna Ind . Grylloidea*, 2 : 67.

[ Material not examined; description based on Chopard (1969)].

**Diagnostic characters : Male :** Colouration dark brown with yellowish spots. **Head** round, blackish dorsally with light occiput and a rather narrow yellow band between lateral ocelli; face as long as wide; palpi yellowish. **Pronotum :** one and a half times as wide as long , slightly enlarged anteriorly. **Legs** yellow, with brown patches. **Tegmina** slightly shorter than abdomen; length and breadth of mirror equal, its anterior angle a right angle , posterior rounded , divided in the middle; oblique veins 2; apical field short with 3 veins and a few large areolae ; lateral field with 4 moderately spaced veins. **Wings** short **Genitalia :** bridge of epiphallus very narrow, feebly notched in the middle , ectoparameres very broad, apically pointed and curved dorsally.

**Female** unknown.

**Measurements :** (Male) body length (11.0) ; length of pron; (2.5); length of teg : (7.0); length of post fem : (7.0)

**Distribution :** India (Assam).

**Location of type :** The Academy of Natural Sciences of Philadelphia, U.S.A.

32. *Modicogryllus confirmatus* (Walker)

(Figs. 180, 181)

1859. *Acheta confirmata* Walker, *Ann. Mag. nat. Hist.*, (3) 4 : 221.

1869. *Gryllus confirmatus*, Walker, *Cat, Derm. Salt. Br. M.*, 1 : 371.

1877. *Gryllus confirmatus*, Saussure, *Mem. Soc. Geneva*, 25 : 188.

1961. *Modicogryllus confirmatus*, Chopard, *Eos*, 37 : 272.

1975. *Modicogryllus confirmatus*, Biswas, *et. al ., Proc., zool. Soc., Calcutta*, 28 : 25.

1975. *Modicogryllus ? flavus*, Biswas, *et. al., Proc. zool. Soc., Calcutta*, 28 : 25 [ Misidentification].

**Diagnostic characters : Male :** Head small, blackish, shining, with 6 longitudinal yellow lines on occiput, and a transverse yellow line between lateral ocelli. *Pronotum* : disc pubescent. *Tegmina* : mirror divided about the middle by a curved, or sometimes sinuated, vein. In 2 specimens studied - one from Damra, Meghalaya, and the other from Moirang, Manipur - mirror has 3 large cells within; chords gently curved; apical field neat, with 3 veins and regular square areolae. *Genitalia* differs from the figure given by Chopard (1969) in being broader, with shallower anterior and posterior emarginations, and is similar in all essential respects, to that figured by Bhowmik (1977c).

**Female :** differs from the male in the following characters : *Tegmina* : dorsal field with 3-4 oblique veins and a reticulation of fairly large, squarish and rectangular areolae. *Ovipositor* longer than posterior tibiae, slender, straight, with apical valves pointed.

**Measurements :** Body length : Male 13.0-14.0, Female 11.5-13.5; length with wings : Male 20.0-22.0, Female 20.0-21.7; length of pron : Male 2.0-2.5, Female 2.0-2.5; width of pron : Male 3.5-4.0, Female 3.7-4.2; length of teg : Male 7.0-8.5, Female 7.0-8.0; length of post fem : Male 7.0-7.5, Female 7.5-8.0; length of post tib : Male 5.0-5.5, Female 5.0-5.5; length of ovip : 8.0-9.0.

**Material examined :** 18 (9 Males, 9 Females) Assam, Darrang dist., Mangaldai; Sibsagar dist., Kaziranga Nat. Park, Diphlumukh, Mihimukh, February, December (S.W. Kemp, M. Datta coll.); Arunachal Pradesh, Siang dist., Jeep camp, October (S.K. Tandon and G.S. Arora coll.); Meghalaya, Khasi Hills dist., Shillong; Garo Hills dist., Songsok, Damra, Arivila forest, March, July, November (R.S. Pillai, S. Biswas coll.); Manipur, Moirang, Imphal valley, March, September (M. Datta, M.L. Roonwal coll.); numerous males and females, W. Bengal, Orissa, U.P., Rajasthan, Maharashtra, M.P. Andaman Islands, Burma (ZSI Collections); 1 Female Sri Lanka, Peradeniya, 3.vi. 1911 (E.E. Green coll.) - B.M. 1925 - 279 (B.M. Collections).

**Distribution :** India (Assam, Arunachal Pradesh, Meghalaya, Manipur, W. Bengal, Bihar, Orissa, U.P., Haryana, Rajasthan, Maharashtra, M.P., Karnataka, Tamil Nadu, Andaman Islands); Nepal; Bangladesh; Burma; Sri Lanka; Pakistan; Malaysia; Thailand; China; Iran.

**Remarks** Bhowmik's (1977c) 'ventral view' of the male genitalia of this species appears to be the 'dorsal view'. The genitalia of the specimens in the present study tally with this figure of Bhowmik's. Surprisingly, by a mere change in its positioning, i.e. by varying the angle at which it is viewed, it also closely resembles the genitalia of *M. clarellus* (Saussure) figured by Chopard (1961). As the types of neither species could be procured, it was not possible to arrive at any conclusion as to the distinctiveness of each of these species during the present study.

Further, one female specimen from Sri Lanka, received on loan for study from the British Museum (Natural History), London and identified as *confirmatus*, appears

similar to the specimens studied except for a few negligible colour variations, and in the shorter ovipositor, which is equal in length to the posterior tibiae. In fact, the length of the ovipositor in relation to that of the posterior tibiae, is taken as a character to separate the females of *M. confirmatus* (Walker) and *M. clarellus* (Saussure) by Bhowmik (1969b).

Biswas, *et. al.* (1975) have placed one female specimen in *Modicogryllus* Chopard with a question mark, *viz.*, *M. ? flavus*. The present author has examined this specimen since then, and it appears to him as belonging to *M. confirmatus* (Walker).

*Location of types* British Museum (Natural History), London, England.

### 33. *Modicogryllus ehsani* (Chopard) (Fig. 182)

1961. *Modicogryllus ehsani*, Chopard, Eos, 37 : 273.

1967. *Modicogryllus ehsani*, Chopard, Orth. Cat., 10 : 81.

1969. *Modicogryllus ehsani*, Chopard, Fanua Ind. Grylloidea, 2 : 64.

*Diagnostic characters* Male resembles *M. confirmatus* (Walker). *Head* : occiput with 6 short vertical lines; a transverse yellow line connects lateral ocelli. *Pronotum* very pubescent. *Tegmina* distinctly shorter than abdomen; dorsal field translucent; mirror divided by an angulale vein; oblique veins 2 (3); apical field with 3 veins and very few large squarish cells; lateral field with 4 straight, rather close veins. *Wings* long.

*Female* differs from the male in the following characters : *Tegmina* extending, at the most, upto 6th abdominal tergite; dorsal field with 3 straight veins, and large, irregular areolae. *Ovipositor* straight with narrow, lanceolate apical valves.

*Measurements* Body length : Male 10.0-12.0 (9.5), Female 9.0-13.0; length with wings : Male 16.5-18.5, Female 16.0-18.0; length of pron : Male 2.0, Female 2.1-2.5; width of pron : Male 3.0-3.1, Female 3.0-3.5; length of teg : Male 4.7-6.5 (4.0), Female 4.5-7.5 (3.2); length of post. fem : Male 6.0-7.0, Female 7.0-7.7; length of post. tib : Male 4.5-5.0, Female 5.0; length of ovip : 6.2-8.0.

*Material examined* 1 Female Assam, Ledo Road - 19 miles from Ledo, 24. ix. 1944 (*J. W. H. Rehn* coll.); several males and females, Karnataka, Nedungadu; Tamil Nadu, Coimbatore, Tindivanam, May (*P. S. Nathan* coll.) (*ANSP Collections*).

*Distribution* India (Assam, Karnataka, Tamil Nadu), Pakistan.

*Remarks* Two females examined from the ANSP Collections are micropterous. Superficially, it is not very easy to distinguish this species from *M. confirmatus* (Walker), but their genitalia appear to be very different.

In Northeast India, this species is known only from Assam. It shows a discontinuous distribution in India, being also recorded from Karnataka and Tamil Nadu in the South. Its type-locality is 'Malir' in Pakistan.

*Location of type* British Museum (Natural History), London, England.

34. *Modicogryllus blennus* (Saussure)  
(Fig. 183)

1877. *Grylloides blennus* Saussure, *Mem. Soc. Geneve*, 25 : 216.

1931. *Gryllus blennus*, Chopard, *Bull. Raffles Mus.*, 6 : 130.

1961. *Modicogryllus blennus*, Chopard, *Eos*, 37 : 274.

1967. *Modicogryllus blennus*, *Orth. Cat.*, 10 : 82.

*Diagnostic characters* : Male black with rufous-yellow legs. Head shining, unornamented ; ocelli yellow. Legs : only posterior femora darkened at apex. Tegmina slightly shorter than abdomen, with smoky parts ; mirror of equal length and breadth ; oblique veins 2 ; apical field with few veins.

*Female* differs from the male in the following characters : Legs : internal tympanum of anterior tibiae almost invisible. Tegmina : dorsal field with 3-4 very irregularly disposed veins. Ovipositor short, with small acute apical valves.

*Measurements* Body length Male 9.0, Female 8.0-9.5 (Male Female 10.0-12.0) ; length with wings (macropterous) Male (15.0-16.0), Female 14.0-16.2 ; length of pron : Male 1.5-2.0, Female 1.8-2.0 ; width of pron : Male 2.5-2.7, Female 2.5-3.0 ; length of teg : Male 5.0, Female 4.2-5.2 (Male Female 5.5) ; length of post. fem : Male 5.5, Female 5.5-6.0 (Male Female 5.5-6.5) ; length of post. tib : Male 4.0, Female 4.0-4.5 ; length of ovip ; 3.5-5.0 (6.0).

*Material examined* : 3 Males, 2 Females U.P., Nainital dist., Lalkua, 4. x. 1974 (P.K. Maiti coll.) ; 4 Females from Burma (ANSP Collections).

*Distribution* India (? Assam, W.Bengal, U.P., Rajasthan, Tamil Nadu) ; Burma ; Sri Lanka ; Malaysia ; Indonesia ; (Java) ; Australia ; Solomon Islands.

*Remarks* The present author has examined one female specimen from Assam, identified as *blennus* by Chopard, from the ANSP Collections. This is actually a female of *Stephoblemmus humbertiellus* Saussure. If this is the only specimen from Assam identified as *blennus* (Sauss.) in the ANSP Collections, the species will remain unrecorded from Northeast India, and as such a query mark precedes 'Assam' under 'Distribution'

*Location of type* : Rijksmuseum voor de Geschiedenis der Natuurwetenschappen, Leyden.

\* 35. *Modicogryllus rehni* (Chopard)

1961. *Modicogryllus rehni* Chopard, *Eos*, 37 : 274.  
 1967. *Modicogryllus rehni*, Chopard, *Orth. Cat.*, 10 : 81.  
 1969. *Gryllus rehni*, Chopard, *Fauna Ind. Grylloidea*, 2 : 66.

[ Material not examined ; description based on Chopard (1969) ]

**Diagnostic characters : Male :** Head small, blackish above with an ornamentation of two transverse yellow bands - one on occiput, another narrower, connecting the lateral ocelli ; length and breadth of face equal ; clypeofrontal suture almost straight ; antennae yellow ; palpi light brown. *Pronotum* : disc almost flat, yellowish, with brown spots ; lateral lobes blackish. *Legs* yellowish spotted with brown ; anterior tibiae perforated on external face only, with a large oval tympanum ; posterior femora with brown striations on external face. *Tegmina* almost reaching upto the end of abdomen ; mirror somewhat apically placed, of equal length and breadth, with a right anterior angle and round rosterior angle ; oblique veins 3 ; apical field composed of only one row of large cells ; lateral field with 4 regularly spaced veins. *Wings* very short.

*Female* differs from the male in the following characters : *Tegmina* reaching only upto apex of second abdominal tergite, with oblique internal margin ; dorsal field brown with yellow humeral band and 3, somewhat irregular veins. *Ovipositor* short and thick, with apical valves acute, slightly flattened.

**Measurements :** Body length : Male (10.0), Female (11.0) ; length of pron : Male (2.2), Female (2.5) ; length teg : Male (5.0), Female (2.5) ; length of post fem : Male (7.5), Female (8.0) ; length of ovip : (5.5)

**Distribution :** India (Assam ) ; Burma.

**Remarks :** Chopard (1961) stated the distribution of this species as 'Assam', while Chopard (1969) has given its type-locality as 'Burma', making no mention of Assam, In all probability, Assam is the incorrect locality.

**Location of type** The Academy of Natural Sciences of Philadelphia, U.S.A.

36. *Modicogryllus minimus* (Chopard)

(Fig. 184)

- 1928b. *Gryllus minimus* Chopard, *Rec. Ind. Mus.*, 30 : 12.  
 1961. *Modicogryllus minimus*, Chopard, *Eos*, 37 : 274.  
 1967. *Modicogryllus minimus*, Chopard, *Orth. Cat.*, 10 : 81.

**Diagnostic characters** *Male :* Head clypeofrontal suture almost straight. *Pronotum*: disc a little narrowed in front. *Legs* yellowish, with brown spots and

patches, anterior tibiae with large, elongated, external tympana and small round internal ones. Tegmina a little shorter than, or reaching upto abdomen; dorsal field with 4 oblique veins, the first inconspicuous, and not parallel, to the rest; mirror with anterior and internal (external) angles right angles, the other two rounded, undivided; apical with only 2 rows of cells; lateral field transparent, with 4 veins, feebly curved at base.

*Female* differs from the male in the following characters: *Tegmina* covering half the abdomen; dorsal field with 4(6) oblique veins, the second branching, a 5th vein arising one-third the distance from base. *Ovipositor* rather short, feebly curved.

*Measurements* Body length Male Female 8.5-10.0; length with wings: Male 16.2, Female 17.0; length of pron Male Female 2.0; width of pron: Male 3.2, Female 3.0; length of teg Male 5.5, Female 5.0 (3.0); length of post. fem: Male 6.2-6.5, Female 6.8; length of post. tib: Male 5.0, Female 5.5; length of ovip: 5.0.

*Material examined*: 1 ♂ Arunachal Pradesh, Siang dist., Rimi bridge (300 m), 11. x. 1966 (S.K. Tandon and G.S. Arora coll.); ♂ types, W. Bengal, E. Himalays, Darjeeling dist., Sureil (5000'), 11-31. x. 1917 (N. Annandale and P. Gravelly coll.) (ZSI Collections).

*Distribution*: India (Arunachal Pradesh, Assam, W. Bengal, Bihar); Burma.

*Remarks* Tandon and Shishodia (1972) retained the earlier name of *Gryllus minimus*. Chopard (1928b) stated that the types are 1 Male and 1 Female. However, the tube containing the types now contains no male specimen. It is either misplaced or lost.

*Location of type* Zoological Survey of India, Calcutta.

#### Genus 19 *Gryllus* Linnaeus, 1758.

1758. *Gryllus* Linnaeus, *Syst. Nat.* (ed. X), 1: 425.

1877. *Liogryllus*, Saussure, *Mem. Soc. Geneve*, 25: 134.

1961. *Gryllus*, Chopard, *Eos*, 37: 269.

1964. *Gryllus*, Randell, *Canad. Ent.*, 96: 1591.

1967. *Gryllus*, Chopard, *Orth. Cat.*, 10: 45.

*Type-species*: *Gryllus (Acheta) campestris* Linnaeus, 1758.

*Diagnostic characters* Medium to large-sized crickets with rounded head, convex face; both sexes with well developed tegmina. In male genitalia, epiphallus posteriorly trilobed, endoparameres without transverse parameral muscle apodemes, and apex of ectoparameres digitiform.

*Distribution* Cosmopolitan.

**Remarks :** Chopard (1967, 1969) has placed *Acheta* Fabricius, 1775 and *Tartarogryllus* Tarbinskii, 1940 under *Gryllus* Linnaeus. All the three above-mentioned genera are very different from one another, chiefly in their male genitalia, so the synonymy of the former genera under *Gryllus* Linnaeus does not seem to be justified.

### 37. *Gryllus bimaculatus* De Geer

(Figs. 185,186)

1773. *Gryllus bimaculatus* De Geer, *Mem. Ins.*, 3 : 521.

1877. *Liogryllus bimaculatus*, Saussure, *Mem. Soc. Geneve*, 25 : 139.

1961. *Gryllus bimaculatus*, Chopard, *Eos*, 37 : 269.

1964. *Gryllus bimaculatus*, Bandell, *Canad. Ent.*, 96 : 1592.

**Diagnostic characters :** *Male* : robust, large, with very variable colouration - from completely black to specimens with reddish-brown to black head and pronotum contrasting with almost yellow, shining tegmina. *Head* reddish brown to black, ocelli yellow. *Pronotum* of same colour as head. *Legs* : posterior metatarsi at least half as long as posterior tibiae. *Tegmina* : 4 oblique veins, chords strongly curved; apical field large, with 6 veins and a reticulation composed of mostly rectangular cells. *Wings* long.

*Female* differs from the male in the following characters : *Tegmina* : dorsal field with 3 oblique veins, 7 branches of Cu. and a reticulation of irregular, elongated cells. *Ovipositor* dark brown, slender, straight.

**Measurements :** Body length : Male 20.0-30.0, Female 18.0-30.0 ; length with wings : Male 36.0-42.0, Female 30.0-40.0 ; length of pron Male 4.0-5.0, Female 3.7-5.0 ; width of pron : Male Female 6.0-9.0 ; length of teg : Male 15.0-19.5, Female 13.0-18.2 ; length of post. fem : Male 11.0-14.0, Female 10.7-13.5 ; length of post. tib : Male 9.0-11.5, Female 8.2-12.0 length of ovip : 11.5-19.0.

**Material examined :** 1 Male, 3 Females Meghalaya, Khasi Hills dist., Shillong, Barapani, May, July, September, November (*M.S. Jyrwa, M. Vasanth, S. Biswas, R. K. Varshney* coll. ) ; 1 Male, 1Female : Arunachal Pradesh, Kameng dist., Pinjuli (244 m), Sanglichu, May (*A.N.T Joseph, K.C. Jayaram* coll.) ; numerous males and females, W. Bengal, Kurseong, March (*F. Gravely* coll.) ; Sikkim ; U.P., Horai, Sahewa, March April (? coll.) : Himachal Pradesh ; Rajasthan ; Gujarat ; Maharashtra ; M.P., Harra Sarrai, February, March (*H.S. Pruthi* coll.) ; Andhra Pradesh ; Tamil Nadu ; S. Andaman and Nicobar Islands ; Nepal ; Pakistan ; Srilanka ; Singapore (ZSI Collections).

**Distribution :** India (Arunachal Pradesh, Meghalaya, Sikkim, W.Bengal, Bihar, U.P., Himachal Pradesh, Punjab, Jammu & Kashmir, Rajasthan, Gujarat, Maharashtra, M.P., Karnataka, Andhra Pradesh, Tamil Nadu, Pondicherry, S. Andaman and Nicobar Islands), Pakistan, Sri Lanka ; Burma ; Malaysia ; Singapore, Nepal ; Tropical Africa.

**Remarks :** This common species, which is the only species of the genus *Gryllus* Linnaeus known from India, appears to be relatively uncommon in Northeast India and was, surprisingly, not so far recorded from Assam. Its calling song is loud and shrill.

**Location of type :** De Geer collections , State Museum of Natural History, Stockholm, Sweden.

### Genus 20 *Lenigryllus* Chopard, 1961.

1961. *Lenigryllus* Chopard, *Eos*, 37 : 270.

1967. *Lenigryllus*, Chopard, *Orth. Cat.*, 10 : 61.

**Type-species :** *Gryllus meruensis* Sjostedt, 1910.

**Diagnostic characters :** Body stouter and more strongly pubescent than *Gryllus* Linnaeus. Epiphallus posteriorly not trilobed ; internal anterior projection of ectoparameres much longer than external anterior one.

**Distribution :** India ; Africa.

**Remarks :** *Lenigryllus* , a genus erected by Chopard (1961), includes only one species from Northeast India and , in fact, from the whole of India, viz., *L. quadrimaculatus* (Saussure). Recently, Otte and Cade ( 1984 ) have placed *Lenigryllus* Chopard as a synonym of *Gryllus* Linne, expressing reservations about the characters viz., stocky and pubescent body ascribed to *Lenigryllus* by Chopard (1961).

### 38. *Lenigryllus quadrimaculatus* (Saussure) (Fig. 187)

1877. *Gryllus quadrimaculatus* Saussure, *Mem. Soc. Geneve*, 25 : 172.

1961. *Lenigryllus quadrimaculatus*, Chopard, *Eos*, 37 : 270.

**Diagnostic characters :** **Male :** Robust species with brownish-black general colouration. **Head** large, presenting 4 vertical bands on occiput. **Pronotum :** a little widening in front ; disc slightly depressed. **Legs :** posterior femora stout ; posterior tibiae with 6-7 spines on each superior margin. **Tegmina** reaching upto end of 4th abdominal tergite, with 2 white spots on each tegmen - one at base externally, the other at apex, near external angle of mirror ; oblique veins 4, of which 3 are clear, parallel, sinuated, besides a fine indistinct vein not parallel to other 3, placed ahead of them , apical field short ; lateral field with 6 veins. **Wings** short. **Abdomen** of same colour as rest of body.

**Female** differs from the male in the following characters : **Pronotum** with parallel sides. **Tegmina** extending upto end of 3rd abdominal tergite, with somewhat

oblique internal margin and rounded apex ; dorsal and lateral fields with 5 regular veins. *Ovipositor* long, with narrow, acute apical valves.

*Measurements* : Body length : Male 24.0 (24.0-26.0), Female (24.0-27.5) ; length of pron: Male 5.9 (5.8-6.2). Female (5.5-6.5) ; length of teg : Male 10.5 (10.0-10.5), Female (6.2-7.0) ; length of post. fem : Male 18.0 (16.0-18.2), Female (16.0) ; length of post tib : Male 12.7 (12.7-13.2) ; length of ovip : (16.0-19.5).

*Material examined* : 1 Male Karnataka, Mysore University campus, 1964 (S. Vasantha coll.) (ZSI Collections).

*Distribution* : India (Assam, Rajasthan, Karnataka, Tamil Nadu) ; Annam.

*Remarks* : *Lenigryllus quadrimaculatus* (Saussure) was transferred from *Gryllus* Linnaeus to a newly erected genus *Lenigryllus* by Chopard in 1961. Randell (1964) has made neither any mention of *Lenigryllus* Chopard in his tribal revision of *Gryllus*, nor reference to the present species under *Gryllus* Linnaeus. The distribution of the present species in Assam has been mentioned by Chopard (1961,1967), but there is no reference to Assam by Chopard (1969). This is the only species of the genus *Lenigryllus* Chopard known from Northeast India.

*Lenigryllus quadrimaculatus* (Saussure) is more allied in its male genitalia to *Teleogryllus* Chopard, than to *Gryllus* Linnaeus, which it resembles in its external morphology.

*Location of type* : Not known.

#### Genus 21 *Plebeiogryllus* Randell, 1964.

1964. *Plebeiogryllus* Randell, *Canad. Ent.*, 96 : 1597.

1967. *Plebeiogryllus*, Chopard, *Orth. Cat.*, 10 : 94.

*Type-species* : *Gryllus plebejus* Saussure, 1877.

*Diagnostic characters* : Depressed and pubescent body, medium-sized. Tegmina well developed. Epiphallus of male genitalia posteriorly trilobed, virga with transverse parameral muscle insertion crest ; portion of virga just apical the base broadly expanded, heavily sclerotised, dorsally excavate ; endoparameres J-shaped.

*Distribution* : India ; Sri Lanka ; Burma.

*Remarks* : Randell (1964) erected this genus to include a few species placed under *Platygyryllus* by Chopard (1961), forming a natural group more closely allied to *Acheta* Fabricius than to *Platygyryllus*. The present genus differs from *Acheta* in having much longer internal anterior apodemes of epiphallus, virga with a large

transverse parameral muscle apodeme at base, and with broadly and deeply expanded portion just apicad the base, and in the origin of internal anterior projection of ectoparameres close to apex of the latter. *Plebeiogryllus* Randell may be distinguished from *Platygryllus* by the characters enumerated in the key.

Only one species of this genus, viz., *P guttiventris* (Walker) is known from India, including Northeast India.

39. *Plebeiogryllus guttiventris* (Walker)  
(Figs. 188, 189)

1871. *Gryllus guttiventris* Walker, *Cat. Derm. Salt. Br. M.*, 5, suppl., 6 Male.

1871. *Gryllus configuratus*, Walker, *Cat. Derm. Salt. Br. M.*, 5, suppl., 8 Female.

1961. *Platygryllus guttiventris*, Chopard, *Eos*, 37 : 276.

1964. *Plebeiogryllus guttiventris*, Randell. *Canad. Ent.*, 96 : 1598.

1967. *Plebeiogryllus guttiventris*, Chopard, *Orth. Cat.*, 10 : 94.

*Diagnostic characters* : Male : Head shining, narrower than pronotum in front, occiput with 6 short, vertical yellow lines ; ocelli yellow, lateral ones round, anterior thin, horizontal ; frontal rostrum twice as wide first antennal segment ; face convex, shining ; maxillary palpi black. *Pronotum* : concave anterior and weakly sinuated posterior margins. *Legs* stout ; very large, elongated, oval, external tympana and very tiny, round internal ones on anterior tibiae. Distal spines of posterior tibiae longer than proximal ones. *Tegmina* a little shorter than abdomen ; dorsal field translucent, with 4-5 sinuated oblique veins, the second may be furcate ; diagonal vein very long ; apical field with 3 veins, and irregular square cells. *Wings* pale, long or micropterous.

*Female* differs from the male in the following characters : *Tegmina* : dorsal field with 4 oblique veins and 3 branches of Cu., and a more or less regular reticulation of long narrow areolae. *Ovipositor* straight.

*Measurements* : Male Female Body length : 13.6-17.5 ; length with wings : 20.0-24.0 ; length of pron : 2.2-3.5 ; width of pron 4.0-4.7 ; length of teg : 8.5-9.5 ; length of post. fem 7.7-10.0 , length of post. tib 4.5-5.7 , length of ovip 7.5-9.5.

*Material examined* 1 Male Manipur, Ukhrul dist., T. M. Kasom village, 21. i. 1977 (S.G. Patil & party coll.) ; numerous males and females, W.Bengal, Calcutta, May-July, November ; Bihar, Chota Nagpur, November ; U.P., Dehra Dun, October, November ; Maharashtra, Pune dist., Kohlapur dist., Solapur dist., June-September (M.S. Pradhan & party, M. Vasanth, M.S. Malhotra coll.) (ZSI Collections).

*Distribution* : India (Manipur, W. Bengal, Bihar, Orissa, U.P., Maharashtra, Goa, M.P., Karnataka, Kerala, Tamil Nadu, Pondicherry) , Sri Lanka , Burma ; throughout the Oriental Region.

**Remarks :** This species has been observed to be extremely common in Maharashtra, especially during the monsoon months when it is found beneath almost every other stone ; Bhowmik (1977c) has also recorded it as being abundant in W. Bengal during the rainy season ; however, it appears to be of very rare occurrence in Northeast India. After having studied Gryllids collected since 1960, and even after personally making intensive collections in several parts of Northeast India, the present author has come across only one male specimen from Manipur. This probably explains why this species has remained unknown so far in Northeast India.

The present author has had the opportunity to study numerous specimens of this species. Comparison of their male genitalia with that of the specimen from Manipur revealed that the genitalia of the latter is only half the size of that of the former, although structurally, the two are identical ; there is also no proportionate difference in body length.

Chopard (1969) erected a subspecies *obscurus* from Sri Lanka which , according to him, has the genitalia identical with the type specimen, but which differs from the latter in a few details of colouration and tegminal venation. Specimens of *P. guttiventris* (Walker) have also been recorded from the type-locality of subspecies *obscurus*. If the genitalia of *P. guttiventris* (Walker) is structurally the same as that of *P. guttiventris obscurus* Chopard, it is likely that the two represent inter-breeding populations unless they differ in other behavioural and biological aspects. Further, Chopard (1969) has encountered only 2 specimens with the characters of the subspecies erected by him. This is too small a sample to consider erection of a subspecies. Mayr (1969) has stated that “.....subspecies are to be named only if they differ ‘taxonomically’, that is, by sufficient diagnostic morphological characters” The characters by which Chopard’s subspecies *obscurus* differs are, in the opinion of the present author, far too inadequate to justify the erection of a subspecies.

The calling song of this species is composed of a series of long chirps interspersed by gaps or pauses of almost equal duration as the chirps.

**Location of type :** British Museum (Natural History), London , England.

#### Genus 22 *Teleogryllus* Chopard, 1961.

1961. *Teleogryllus* Chopard, *Eos*, 37 : 277.

1964. *Teleogryllus*, Randell, *Canad. Ent.*, 96 : 1595.

1967. *Teleogryllus*, Chopard, *Orth. Cat.*, 10 : 95.

**Type-species :** *Gryllus posticus* Walker, 1869.

**Diagnostic characters :** A genus composed of usually large-sized species with pubescent body, long legs, well-developed tegmina. Epiphallus posteriorly trilobed, virga with a transverse parameral muscle insertion crest and without the broadly expanded, heavily sclerotised, dorsally excavate structure as in *Plebeiogryllus* Randell; endoparameres C-shaped.

**Distribution :** India ; Burma ; Bangladesh ; Tropical Asia ; Philippines ; Australia ; New Zealand ; New Caledonia ; Norfolk Island ; Formosa ; Japan ; Africa.

**Remarks :** The species of this genus form a group quite distinct from *Gryllus* Linnaeus. Chopard (1961) erected this genus to contain several species formerly placed under *Gryllus* Linnaeus. Recently, Townsend (1980) has made some nomenclatural changes within the genus.

**Key to the Northeast Indian Species of Genus *Teleogryllus* Chopard**

1. Usually larger, more robust species ; head may be with yellow ornamentation ; ovipositor in female > 12.5 mm ..... 2.
- Smaller, less robust species ; head with no ornamentation ; ovipositor in females < 11.5 mm ..... 4.
2. Head presenting a yellow band or spot along internal margin of each eye ..... 3.
- Head without or with faint yellow band along internal margin of eyes ..... *mitratus* (Burmeister)
3. Head with a yellow band along each eye ; length of posterior femora thrice its greatest width ; epiphallus apically broader ..... *occipitalis* (Serville)
- Head with a yellow spot between each eye and lateral ocellus ; length of posterior femora four times its greatest width ; epiphallus apically more acute ..... *gracilipes* (Saussure)
4. Head small, occiput black ; 4th and 5th segments of maxillary palpi white ..... *bicoloripes* (Chopard)
- Head big, occiput rufous ; 4th and 5th segments of maxillary palpi never white ..... *fletcheri* (Chopard)

**40. *Teleogryllus occipitalis* (Serville)**  
(Figs. 190,191)

1838. *Gryllus occipitalis* Serville, *Ins. Orth.*, 339. (Same specimen as neotype of *G. perspicillatus* Serville).
1838. *Gryllus perspicillatus*, Serville, *Ins. Orth.*, 338.
1877. *Gryllus mitratus*, Saussure, *Mem. Soc. Geneve*, 25 : 154.
1961. *Teleogryllus mitratus*, Chopard, *Eos*, 37 : 277.
1969. *Gryllus mitratus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 41.
1972. *Gryllus testaceus*, Tandon and Shishodia, *Oriental Ins.*, 6 (3) : 284.  
[Misidentification]
1975. *Teleogryllus mitratus*, Biswas, et. al., *Proc. zool. Soc., Calcutta*, 28 (1) : 25.
1976. *Teleogryllus mitratus*, Bhowmik, *Ind. Mus. Bull.*, X1 (1) : 44.
1976. *Teleogryllus mitratus*, Bhowmik and Halder, *Newsl. zool. Surv. India*, 2 (4) : 143.

1976. *Teleogryllus mitratus*, Tandon, et al., *Newal. zool. Surv. India*, 2 (4) : 170  
 1977c. *Teleogryllus mitratus*, Bhowmik, *Rec. zool. Surv. India*, 73 : 235.  
 1977. *Teleogryllus mitratus*, Shishodia and Tandon, *Newsl. zool. Surv. India*, 3 (3) : 125.  
 1980. *Teleogryllus occipitalis*, Townsend, *J. nat. Hist.*, 14 : 154.

*Diagnostic characters : Male* : Size and general colouration very variable, in shades of brown. *Head* dark brown to black, with 6 faintly visible, yellow longitudinal lines on occiput ; lateral ocelli obscured by a broad yellow band on inner margin of each eye. *Pronotum* wider than long, ratio of width to length 1.41-1.82, disc flat, pubescent. *Legs* : posterior tibiae with 5-6 internal, 6-7 external strong spines on superior margins. *Tegmina* reaching upto apex of abdomen, dark brown to pale yellowish-brown ; dorsal field with 3-4 oblique veins, and sometimes, one or more smaller ones ; mirror less than 3.1 mm wide ; lateral field with veins separated into two groups. *Wings* long.

*Female* differs from the male in the following characters : *Head* : occiput may lack ornamentation. *Tegmina* : dorsal field shining, with 5 oblique, very regular veins, 3 innermost ones united at base, Cu. with 5-7 branches ; a regular reticulation of squarish areolae in anterior inner part, and elongated areolae elsewhere ; Ovipositor between 64.1% and 83.3% of total length.

*Measurements* : Body length : Male 14.7-23.5, Female 14.0-25.0 ; length with wings : Male 25.0-33.7, Female 26.5-37.0 ; length of pron : Male 2.7-4.0, Female 3.0-4.0 ; width of pron : Male Female 5.0-6.7 ; length of teg : Male 11.0-16.2, Female 12.0- 17.2 ; length of post. fem : Male 10.0-14.0, Female 11.0-15.0; length of post. tib : Male 7.5-11.0, Female 8.0-11.2 ; length of ovip : 12.5-19.5.

*Material examined* : 156 (44 Males, 69 Females, 43 nymphs) Meghalaya, Garo Hills dist., Damra ; Jaintia Hills dist., Thadlaskein, Sonapurdi ; Khasi Hills dist., Mawrynkneng, Shillong, Upper Shillong, Mowing, Umphrinai, Nongkrenge, Barapani, Old Barapani Road, Mawlyndep, Mawphlang, Umsning, Umran, Umniuh, Umtyngar, February, April-December (S. Biswas, S.K. Subhani, S.N. Prasad, B.K. Tikader, R. P. Ghosh, R.S. Giri, G.M. Yazdani, M.R. Rynth, M. Vasanth, R.K. Varshney, V.D. Srivastava coll.) ; Assam, Sibsagar dist., Kaziranga Nat. Park, February (M.Datta & party coll.) ; Arunachal Pradesh, Subansiri dist., Hapoli, Ziro, Daporizo, Bela village ; Kameng dist., Chun village, Milankang ; Siang dist., Dali camp, Kambang, New Jining, Pading village, Lekhabali, Maghabasti, Siji village, April, May, October, November (K. R. Rao & party, A. N. T Joseph, S. K. Tandon and G. S. Arora, K.C. Jayaram coll.) ; Manipur, Ukhrul, Imphal, August-October (W. Pettigrew, M.L. Roonwal coll.) ; numerous males and females, W. Bengal, Sikkim, U.P., Himachal Pradesh, Orissa, Andaman Islands ; Nepal ; Indonesia (Java) ; Bangladesh.

*Distribution* : India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Sikkim, W.Bengal, Bihar, Orissa, M.P., U.P., Himachal Pradesh, Karnataka, Tamil Nadu,

Andaman Islands) ; Bhutan ; Sri Lanka ; Malaysia ; Tibet ; Japan ; Philippines ; Nepal ; Indonesia ; Bangladesh ; Thailand ; Vietnam ; Borneo ; Sulawesi.

*Remarks* : Townsend (1980) extended the distribution of this very common species in Meghalaya to Garo Hills district, and is of the opinion that the types of *T. mitratus* (Burmeister) are actually *T. testaceus* (Walker), and not that which all authors since Saussure, have referred to as *mitratus*. He further stated that *Gryllus testaceus* Walker, 1869 is a primary homonym of *Gryllus testaceus* De Geer, 1773, and must, therefore, be discarded in favour of a replacement name. Hence, he suggested the name *T. mitratus* (Burmeister) for the species which has so far been called *T. testaceus* (Walker), while resurrecting an available homonym, *Gryllus occipitalis* Serville 1838 as the valid name for the species which has been known as *mitratus*. Thus, he has opined, the species so far called *T. testaceus* (Walker) is now to be referred to as *T. mitratus* (Burmeister), and the species which has been called *T. mitratus* (Burmeister) is now to be called *T. occipitalis* (Serville). He has designated a neotype for the latter species. The specimens identified by Tandon and Shishodia (1972) as *Gryllus testaceus* actually belong to the present species.

*Location of neotype* British Museum (Natural History), London, England.

\* 41. *Teleogryllus gracilipes* (Saussure)

1877. *Gryllus gracilipes* Saussure, *Mem. Soc. Geneve*, 25 : 160.

1961. *Teleogryllus gracilipes*, Chopard, *Eos*, 37 : 277.

1967. *Teleogryllus gracilipes*, Chopard, *Orth. Cat.*, 10 : 100.

1969. *Gryllus gracilipes*, Chopard, *Fauna Ind. Grylloidea*, 2 : 47.

[ Material not examined; description based on Chopard (1969)]

*Diagnostic characters: Male* : Head brown, with a yellowish spot between ocelli and eyes ; face and genae yellowish ; occiput with 4 weak furrows covered with pubescence. Pronotum brown, weakly narrowed in front. *Legs*: posterior legs long, the length of their femora four times the greatest width ; posterior tibiae with 6-7 pubescent spines on superior margins ; posterior matatarsi very long and pubescent. *Tegmina* yellowish-brown with a brown lateral band ; mirror slightly longer than broad, nearly round ; oblique veins 4 ; apical field rather large, with 4 veins and a regular reticulation ; lateral field with 5 veins and 5 branches of Sc. Wings long.

*Female* differs from the male in the following characters: *ovipositor* long, slender, with acute apical valves.

*Measurements* Male Female Body length: (20.0-22.0) ; length with wings : (34.0-36.0) ; length of pron (4.0-4.7) ; length of teg: (13.0-15.0) ; length of post. fem: (16.0-18.5) ; length of ovip : (16.0-18.0).

*Distribution* : India (Assam, M.P.) ; East Africa.

*Remarks*: Although this species has been recorded from Northeast India (Assam), the present author has not come across even a single specimen during his studies.

Chopard (1969) did not provide the description of the female although the ovipositor is described and its measurement is given. His retention of the former name (*Gryllus gracilipes*) is because the *Fauna of India* was in press at the time of publication of Chopard (1961).

*Location of type* : Museo Civico di Storia Naturale, Geneva, Switzerland.

42. *Teleogryllus mitratus* (Burmeister)  
(Figs. 192,193)

1838. *Gryllus mitratus* Burmeister, *Handb. Ent.*, 2 : 34. LECTOTYPE Male  
1869. *Gryllus testaceus*, Walker, *Cat. Derm. Salt. Br.M.*, 1: 38. (Primary homonym of *Gryllus testaceus* De Geer, 1773)  
1961. *Teleogryllus testaceus*, Chopard, *Eos*, 37 : 277.  
1967. *Teleogryllus testaceus*, Chopard, *Orth. Cat.*, 10 : 99.  
1969. *Gryllus testaceus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 40.  
1975. *Teleogryllus meghalayanus*, Lahiri and Ghosh, in Vasanth, *et al.*, *Oriental Ins.*, 9 (2) : 226.  
1976. *Teleogryllus testaceus*, Bhowmik, *Ind. Mus. Bull.*, 11 (1) : 44.  
1977c. *Teleogryllus testaceus*, Bhowmik, *Rec. zool. Surv. India*, 73 : 236.  
1980. *Teleogryllus mitratus*, Townsend, *J. nat. Hist.*, 14 : 158.

*Diagnostic characters* : Male : General colouration somewhat reddish-brown, tegmina and legs often paler. Head sometimes with a faint yellowish band long internal margin of eyes; lateral ocelli round, anterior ocellus horizontal. Pronotum wider than long, but generally rather longer than in *T. occipitalis* (Serville), ratio of width to length between 1.1 and 1.6. Legs: posterior metatarsi with 5-6 internal and 7-9 external, more or less blunt, denticles. Tegmina reaching upto apex of abdomen; first chord connected to diagonal by 3-5 veinlets ; mirror greater than 3.2 mm wide; 3-4 main oblique veins and, rarely, 1-2 smaller ones. Lateral field with all veins equally distant from one another.

*Female* differs from the male in the following characters: *Tegmina* : dorsal field with regular oblique veins and numerous transverse veinlets forming elongated cells; *ovipositor* longer than that of *T. occipitalis* in relation to length of body, being between 70.9% to 101.0% of the total length.

*Measurements* Male Female Body length : 22.5-25.0 (21.0-28.0) ; length with wings : 34.0-39.0 (31.0-38.0) ; length of pron : 4.2-5.0 (4.0-6.0) ; width of pron : 7.2-7.7 ; length of teg : 16.0-18.5 ; length of post. fem : 15.5-17.0 ; length of post. tib : 12.0-13.5 ; length of ovip : 19.0-25.0 (12.0-20.0).

*Material examined* : 1 Male Meghalaya, Garo Hills dist., Anogiri, 7.xi.1973(S.Biswas coll.) , 1 Male Jaintia Hills dist., Sonapurdi, 7.viii.1974 (A.R.Lahiri coll.) ; Male holotype of *Teleogryllus meghalayanus* Lahiri and Ghosh, Meghalaya, Khasi Hills dist., Shillong, 30.viii.1963 (S.N.Prasad coll.) ; Female allotype of *T. meghalayanus* Lahiri and Ghosh, Meghalaya, Garo Hills dist., Damra, 14.iv.1971 (R.S.Pillai coll.) and Male paratype of the same species, Meghalaya, Garo Hills dist.,

Dainadubi, 9.iv.1971 (*R.S.Pillai* coll.) ; numerous males and females , Andaman and Nicobar Islands, W. Bengal, M.P.; Indonesia (Java) ; Tenasserim (*ZSI Collections*).

*Distribution* : India (Meghalaya, Assam, W. Bengal, Bihar, Orissa, U.P., M.P., Karnataka, Tamil Nadu, Kerala, Andaman and Nicobar Islands) ; Sri Lanka ; Nepal ; Burma ; Malaysia ; Singapore ; Indonesia ; Thailand ; Borneo ; Indochina ; Philippines ; Tenasserim ; China ; Vietnam.

*Remarks* : As has been discussed under *T. occipitalis* (Serville), Townsend (1980) is of the opinion that *T. testaceus* (Walker) should now be called *T. mitratus* (burmeister).

*Location of lectotypes and paralectotypes* : British Museum (Natural History), London, England.

#### 43. *Teleogryllus bicoloripes* (Chopard) (Figs. 194, 195)

1961. *Teleogryllus bicoloripes* Chopard, *Eos*, 37 : 277.

1967. *Teleogryllus bicoloripes* Chopard, *Orth. Cat.*, 10 : 100.

1969. *Gryllus bicoloripes*, Chopard, *Fauna Ind. Grylloidea*, 2 : 49.

*Diagnostic characters* : *Male* : Head and pronotum black, contrasting with brown legs and tegmina. *Head* fairly large, shining; ocelli large, bright yellow ; frontal rostrum almost double the width of first antennal segment ; maxillary palpi dark brown, with 4th and 5th segments white. *Pronotum*: disc and lateral lobes black, with whitish pubescence. *Legs* completely rufous-brown, or with femora rufous, tibiae dark brown; all femora blackish at apex. *Tegmina* extending upto apex of abdomen; mirror oval, as broad as, or broader than, long with rounded angles, divided a little behind or about middle; 3-4 sinuated oblique veins; apical field with a regular reticulation composed of squarish and rectangular areolae. *Genitalia* : epiphallus slender, very much elongated, median lobe longest , narrow at base, broadest a little before apex, the latter acutely rounded, gradually curved dorsally with a ridge in midline.

*Female* differs from the male in the following characters: *Tegmina* : dorsal field with 3-4 somewhat protruding oblique veins, 3-5 branches of Cu. and areolae of various shapes and sizes. *Ovipositor* rather long, straight, with lanceolate apical valves.

*Measurements* : Body length : Male 12.0-13.0, Female 12.0-15.5 ; length of pron: Male 2.5-2.8, Female 2.5-3.0 ; width of pron : Male 3.8-4.0, Female 3.5-4.2 length of teg Male 7.5-8.5, Female 6.5-10.5 ; length of post. fem : Male 8.2-10.0, Female 8.5-11.5 ; length of post. tib : Male 7.0-8.0, Female 6.8-9.0 ; length of ovip: 9.0-10.0.

**Material examined** : 13 (9 Males, 4 Females ) Meghalaya, Khasi Hills dist., Mawblang, Shillong, Old Barapani Road, Barapani, Umtham, Cherrapunjee, Nongpoh, March-May, September (R.S. Pillai, M.Vasanth, A.K. Mondal, M.S. Jyrwa, S.Biswas coll.); 1 Female from Jammu, September (H.K. Bhowmik coll.) (ZSI Collections).

**Distribution** : India (Meghalaya, Jammu) ; Burma.

**Remarks** : Chopard (1969) described this species from Burma. Biswas, *et al.* (1975) recorded it from India for the first time without making any comment to that effect. Its present distribution within India is highly restricted to the Khasi Hills district of Meghalaya, and Jammu.

**Location of types** : The Academy of Natural Sciences of Philadelphia, U.S.A.

\* 44. *Teleogryllus fletcheri* (Chopard)

1935. *Gryllus fletcheri* Chopard, *Ann. Mag. nat. Hist.*, (10) 16: 285. Female

1961. *Teleogryllus fletcheri*, Chopard, *Eos*, 37 : 278.

1967. *Teleogryllus fletcheri*, Chopard, *Orth. Cat.*, 10 : 101.

1969. *Gryllus fletcheri*, Chopard, *Fauna Ind. Grylloidea*, 2 : 49.

[Material not examined ; description based on Chopard (1935)]

**Diagnostic characters** : *Female* : Rufous-brown, strongly pubescent, *Head* big, rounded ; occiput reddish, unadorned, face yellowish ; ocelli big, *Yellow*, *Pronotum* weakly widening in front, its anterior margin a little concave, posterior straight ; disc convex, rufous ; lateral lobes inferiorly yellowish. *Legs* pubescent ; anterior and median femora proximally rufous-yellow, light brown in apical half ; anterior tibiae with a large, oval, external tympanum, and internal face with only a depression ; posterior femora somewhat long and feebly swollen, their external face light brown with a ring before apex and yellowish knees ; tibiae much shorter than femora with 6 pairs of dorsal spines. *Tegmina* almost reaching apex of abdomen, brownish ; dorsal field with 4 slightly oblique, projecting veins, the 1st and 4th forked ; transverse veinlets few and irregular ; lateral field with 5 equally distant veins. *Wings* short. *Ovipositor* moderately long, rather slender, apical valves acute, superior ones weakly arched.

*Male* unknown.

**Measurements** : Female (Body length : 11.0 ; length of pron : 2.2 ; length of teg: 6.5; length of post. fem : 8.5 ; length of post. tib : 6.0; length of ovip : 8.5).

**Distribution** : India (Meghalaya).

**Remarks** : Although the type-locality of this species is Shillong (Meghalaya), no specimen could be collected in and around Shillong during the present study.

Since the characters on which Chopard(1961) erected the genus *Teleogryllus* are based on male genitalia, the exact generic position of the present species, for which the male is yet to be discovered and described, remains to be ascertained.

*Location of type* : British Museum (Natural History), London, England.

Subfamily (vii) NEMOBIINAE  
(Ground Crickets)

1877. *Nemobites* Saussure, *Mem. Soc. Geneve*, 25 : 65.

1930. *Nemobitae*, Shiraki, *Ins. Matsum.*, 4 : 195.

1969. *Nemobitae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 156.

*Diagnostic characters* : This subfamily comprises small crickets with body covered by pubescence and bristles. Spines of posterior tibiae slender, articulated and hairy. Second tarsal segment minute, compressed. Male tegmina, when present, with only one oblique vein and reduced apical field. Sex glands well developed on male hind tibiae or on the bases of the tegmina. Ovipositor with feebly enlarged apical valves, the margins of which are usually serrate.

Key to the Indian Genera of Subfamily NEMOBIINAE

1. Tegmina and wings present in both sexes (fig.54).....2.
- Both sexes completely apterous (Fig. 66) .....*Scottiola* Uvarov.
2. Tegmina of male with distinct mirror (Fig. 87).....3.
- Both sexes with similar tegminal venation ; no mirror in male tegmina (Fig. 100).....4.
3. Apical spurs of posterior tibiae 6 - 3 on each side (Fig. 102 a,b).....*Pteronemobius* Jacobson & Bianchi.
- Apical spurs of posterior tibiae 5 -3 external and 2 internal (Fig. 103 a,b) .....*Speonemobius* Chopard
4. Legs very long in relation to body size, anterior and median legs longer than body (fig. 100) ; tegminal veins protruding .....*Paranemobius* Saussure
- Legs short in relation to body size, anterior and median legs shorter than body (Fig. 101) ; tegminal veins not protruding .....*Homonemobius* Chopard

Genus 23. *Scottiola* Uvarov, 1940.

1912. *Scottia* Bolivar, *Trans. Linn. Soc. London*, 15 : 278.

1940. *Scottiola*, Uvarov, *Ann. Mag.nat. Hist.*, (11) 6: 377. (nom. nov.).

1967. *Scottiola*, Chopard, *Orth. Cat.*, 10 : 192.

1969. *Scottiola*, Chopard, *Fauna Ind. Grylloidea*, 2 : 177.

*Type-species* : *Scottia chagosensis* Bolivar, 1912.

*Diagnostic characters* : Both sexes apterous; body covered with pubescence and bristles. Posterior tibiae with 3 external and 2-3 internal spines.

*Distribution* : India ; Sri Lanka ; Malaysia ; Samoa ; Sarawak ; Chagos Archipelago ; Seychelles Islands.

*Remarks* : Of the 3 species of the genus *Scottiola* Uvarov known from India, viz., *S. minima* (Chopard), *S.divarna* Bhowmik and *S. elongata* Bhowmik, only the first is known from Northeast India (Assam).

#### 45. *Scottiola minima* (Chopard)

1928 b. *Scottia minima* Chopard, *Rec. Ind. Mus.*, 30 : 5.

1967. *Scottia minima*, Chopard, *Orth. Cat.*, 10 : 193.

1969. *Scottia minima*, Chopard, *Fauna Ind. Grylloidea*, 2 : 177.

*Diagnostic characters*: Small, apterous. Body with long, black bristles. Head large, globular, with yellowish-brown bands on occiput ; frontal rostrum broad, with 4 rows of bristles ; palpi with 5th segment darkened at apex ; antennae yellowish, ringed with brown. Pronotum: disc convex, rufous. Legs: anterior tibiae with small, oval tympana on external face , posterior femora markedly swollen ; posterior tibiae with 3 brown rings, and 3 very long spines on each superior margin. *Ovipositor* short, straight, with apical valves rather large, almost wholly smooth, superior margins scarcely denticulated.

*Male* unknown.

*Measurements* : Female Body length : 4.5 ; (length of post. fem : 3.8 ; length of ovip : 2.5).

*Material examined* : Female Holotype, India, Assam-Bhutan frontier, Mangaldai, 5. xii. 1910 (*W. Kemp coll.*), Regd. No. ZSI 6178/H1 (*ZSI Collections*).

*Distribution* : India (Assam).

*Remarks* : This species is known only from the female holotype, which was examined during the present study, and was found to be in a very poor condition ; its antennae and ovipositor are broken, its pronotum is damaged, and all its legs are wanting.

*Location of type* : Zoological Survey of India, Calcutta, India.

Genus 24. *Pteronemobius* Jacobson and Bianchi

1905. *Pteronemobius* Jacobson and Bianchi, *Prem. i. Lozhn. Ross Imp.*, St. Ptersburg, 10: 450.

1967. *Pteronemobius*, Chopard, *Orth. Cat.*, 10 : 160.

1969. *Pteronemobius*, Chopard, *Fauna Ind. Grylloidea*, 2 : 157.

*Type-species* : *Nemobius tartarus* Saussure, 1874.

*Diagnostic characters* : *Pronotum* narrowing in front. First of the 4 intenal spines in posterior tibiae of males small, tuberculate and glandular, and plays a role in mating. Sc. in lateral field of tegmina always unbranched.

*Distribution* : Cosmopolitan.

*Remarks* : Of the 13 species of this genus known from India, 9 have been recorded from Northeast India.

Key to the Northeast Indian Species of Genus *Pteronemobius* Jacobson and Bianchi

1. Female tegmina with false veins between principal veins ; epiphallus postero-medially notched, with a rather semi-circular process on either side ; postero-lateral extremities of epiphallus curved inward.....*strigipennis* (Chopard)  
— Female tegmina without false veins; male genitalia may be different .....2.
2. Posterior femora presenting blackish bands .....3.  
— Posterior femora without bands .....4.
3. Maxillary palpi with 4th and 5th segments white, contrasting with other dark segments; posterior tibiae of male with 4 internal spines, those of female with 3; epiphallus posteromedially not notched .....*fascipes* (Walker)  
— Maxillary palpi dull yellowish; posterior tibiae of both sexes with 4 spines on internal margin; epiphallus postero-medially notched .....*cskii* (Bolivar)
4. Lateral lobes of pronotum and lateral field of tegmina blackish, contrasting with pale dorsal parts.....*taprobanensis* (Walker)  
— Lateral lobes of pronotum and lateral field of tegmina of same colour as disc of pronotum and dorsal field of tedgmina respectively .....5.
5. Head and pronotum dark brown, tegmina yellowish ; antennae very pubescent .....*pilicornis* Chopard  
— Colouration of head and pronotum similar to that of tegmina ; antennal pubescence feeble.....6.

6. Apical portion of male tegmina effaced ; females with 3 external spines only on posterior tibiae.....7.  
 — Apical portion of male tegmina normal; females with 4 external spines on posterior tibiae .....8.
7. Last 2 segments of maxillary palpi white, contrasting with rest of the segments; females with 3 internal spines on posterior tibiae.....*pantelianus* Chopard  
 — Last 2 segments of maxillary palpi neither white nor different from other segments; females with 4 internal spines on posterior tibiae .....*montanus* Chopard
8. Ovipositor > 3.5mm in length; male genitalia with forceps more slender and curved .....*indicus* (Walker)  
 — Ovipositor <3 mm in length; male genitalia with forceps stouter and less curved .....*concolor* (Walker)

46. *Pteronemobius strigipennis* (Chopard)  
 (Figs. 196,197)

1928 b. *Nemobius* (?) *strigipennis* Chopard, *Rec. Ind. Mus.*, 30 : 4.

1967. *Nemobius* (?) *strigipennis*, Chopard, *Orth. Cat.*, 10 : 189.

1969. *Pteronemobius* (?) *strigipennis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 168.

1969 a. *Pteronemobius strigipennis*, Bhowmik, *Zool. Anz.*, 182 (1/2): 147.

*Diagnostic characters* : Male : Head a little bigger than pronotum in front ; face black ; labrum and anteclypeus dark brown. *Pronotum*: disc yellow with a few black spots and patches. *Legs* pubescent ; anterior tibiae with only oval external tympana; posterior femora stoutish, proximally yellow with some oblique dark brown striations, distally dark brown without striations ; posterior tibiae dark brown, with 3 external and 4 internal slender spines. *Tegmina* dull yellow, with dark brown anal field. Mirror dark brown within, divided obliquely by a straight vein ; chords long and parallel ; lateral field superiorly blackish, inferiorly yellowish, with 3 (5) parallel veins and unbranched Sc. *Genitalia* very similar to that figured by Bhowmik (1969a).

*Female* : please see 'Remarks'

*Measurements* : Male Body length : 5.5 ; length of pron : 1.1 ; width of pron : 1.6 ; length of teg : 3.0 ; length of post. fem : 4.2 ; length of post. tib. 3.0 ; (length of ovip:- Chopard, (1969) - 3.0).

*Material examined* : 1 Male: Arunachal Pradesh, Subansiri dist., Kimin, Sarpargiri, 9.xi.1975 (K.R.Rao & party coll.) ; Female holotype of *Nemobius* (?) *strigipennis* Chopard W. Bengal, Darjeeling dist., Soom, alt. 4000' - 5000', 14.vi.1914 (F.H.Gravelly coll.) - Regd. No. zsi 394/H5 (ZSI Collections)

*Distribution* : India (Arunachal Pradesh, W. Bengal, Bihar, U.P.).

*Remarks* : Chopard (1928b) described this species and placed it tentatively in the genus *Nemobius* Serville. In 1969, he transferred it, again tentatively, to *Pteronemobius* Jacobson and Bianchi. His indecision was due to the fact that the single female on which his description was based lacked hind legs and, Chopard (1951) distinguished *Nemobius* Serville and *Pteronemobius* Jacobson and Bianchi by the number of internal spines on the hind tibiae - 3 in the former, 4 in the latter. Bhowmik (1969 a), after studying a series of 11 males and 9 females from three populations, came to the conclusion that the species certainly belonged to *Pteronemobius*. He described the male and figured its genitalia, but did not give any measurement either for males or for females. The present author has studied the holotype carefully; the insect is certainly a Nemobiine cricket of uncertain generic status ; the presence of false veins between the 4 longitudinal principal veins is illusory as there are no false veins at all. Since the overlapping tegmina are transparent, the veins of the lower tegmina seen through the upper one give the impression of false veins. Bhowmik's (1969 a) males and females could not be located, although the male genitalia of one of the specimens was examined by the present author. This is identical with the genitalia of specimens of *P. taprobanensis* (Walker) dissected and studied by him. It appears that at least Bhowmik's (*loc. cit.*) males may probably be males of *P. taprobanensis* (Walker).

*Location of type* : Zoological Survey of India, Calcutta, India.

47. *Pteronemobius fascipes* (Walker)  
(Figs. 198,199)

1869. *Eneoptera fascipes* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 67.

1877. *Nemobius histrio*, Saussure, *Mem. Soc. Geneva*, 25 : 95.

1931. *Pteronemobius fascipes*, Chopard, *Bull. Raffles Mus.*, 6 : 134.

1967. *Pteronemobius fascipes*, Chopard, *Orth. Cat.*, 10 : 169.

1969. *Pteronemobius fascipes*, Chopard, *Fauna Ind. Grylloidea*, 2 : 164.

1972. *Pteronemobius csikii*, Tandon and Shishodia, *Oriental Ins.*, 6 (3) : 289 [Misidentification].

*Diagnostic characters* : *Male* Head small, pale yellow, with a broad, longitudinal black band (sometimes absent) from occiput to vertex ; lateral ocelli considerably bigger than anterior one ; first antennal segment black, the rest pale brown; face black ; 1st to 3rd segments of maxillary palpi black, 4th and 5th white. *Pronotum* narrowing in front ; disc pale ; lateral lobes black. *Legs* : all tibiae with alternate black and yellow bands; tympanum only on external face of anterior tibiae. Posterior femora yellow with 3 blackish bands, the first only not reaching inferior margin; posterior tibiae with 3 external and 4 internal spines. *Tegmina* ending a little short of abdomen, bluntly rounded at apex ; dorsal field with chords free or joined almost at, or half-way from, base , mirror with 1-2 apical cells ; lateral field black. *Wings*: all specimens studied micropterous.

*Female* differs from the male in the following characters: *Head* : 1st and 2nd antennal segments black, the rest yellow, *Legs*: posterior tibiae with 3 apines on each margin. Tegmina extending from upto 5th abdominal tergite to almost upto apex of abdomen, apically rounded or oblique ; dorsal field in shades of black and dull yellow, never completely black, with 4-5 somewhat parallel, brownish, projecting, longitudinal veins, and whitish, smoky, frequently indistinct, cross veins ; Cu. unbranched. *Wings* both micropterous and macropterous specimens studied.

*Measurements* : Body length : Male 5.0-6.0, Female 4.5-6.5 ; length with wings: Female 8.2-9.0 , length of pron : Male 1.0, Female 1.0-1.5; width of pron : Male 1.2, Female 1.5-1.7 ; length of teg : Male 2.8-3.7, Female 1.5-3.2 ; length of post. fem: Male 3.1-4.0, Female 3.5-5.2 ; length of post. tib : Male Female 2.5-3.0 ; length of ovip : 2.0-3.0.

*Material examined* : 109 (36 Males, 68 Females, 5 nymphs) : Meghalaya , Khasi Hills dist., Shillong, upper Shillong; Jaintia Hills dist., Sonapurdi, Shangpung ; Garo Hills dist., Damra, August, November, December (*R. Mathew, M.S.Jyrwa, M. Vasanth, S. Biswas, A.R. Lahiri, S.K.Ghanda* coll.) ; Assam Kamrup dist., Balajan, Patacharkuchi; Lakhimpur dist., Guijan, N. Lakhimpur, Sadiya, February, March, November, December (*K.R. Rao, S.K.Tandon, S.K. Chanda* coll.) ; Arunachal Pradesh, Subansiri dist., Taliha, Ziro, Kimin; Siang dist., Lekhabali, New Jining, October, November (*K.R. Rao & Party, S.K. Tandon and G.S. Arora* coll.) ; Manipur, Ukhrul dist., Sankai, Domba, Tongou, Litan, Shakvao, Shikemai, January (*S.G. Patil, H. Khajuria* coll.) , numerous specimens, W. Bengal, Bihar, Orissa, Himachal Pradesh, M.P., Goa (*ZSI Collections*).

*Distribution* : India (Assam, Manipur, Arunachal Pradesh, Meghalaya, W.Bengal, Sikkim., Bihar, Orissa, U.P., Himachal Pradesh, Haryana, Jammu & Kashmir, Maharashtra, Goa, M.P., Karnataka, Kerala, Tamil Nadu) ; Sri Lanka ; Singapore ; Burma ; Indonesia (Java).

*Remarks* This ubiquitous species was previously unknown in Manipur, and now its distribution is hereby extended to all the districts of Meghalaya. In Arunachal Pradesh , it is recorded for the first time from Subansiri and Lohit districts.

Some variability in colouration has been noted during the present study; in a pale male specimen collected from under boulders in a dried -up river bed in Arunachal Pradesh, the characteristic black bands on the posterior femora are indistinct ; similary in two females from Assam and Meghalaya, the posterior femora are black in colour in distal 1/3 to 1/2, pale in the proximal 2/3 to 1/2.

*Location of type* : British Museum (Natural History), London, England.

48. *Pteronemobius csikii* (Bolivar)

(Figs. 200, 201)

1901. *Nemobius csikii* Bolivar, Zichy. Zool. Ergebn., 2 : 243.  
 1925d. *Pteronemobius csikii*, Chopard, Ann. mag. nat. Hist., (9) 15 : 507.  
 1967. *Pteronemobius csikii*, Chopard, Orth. Cat., 10 : 170.  
 1969. *Pteronemobius csikii*, Chopard, Fauna Ind. Grylloidea, 2 : 165.

**Diagnostic characters :** *Male* : Superficially resembling *P. fascipes* (Walker). Head dull yellowish, with a broad brown to black vertical band in middle, which is occasionally absent ; clypeofrontal suture almost straight. Legs : anterior and median femora, and all tibiae with alternating yellow and black markings ; posterior tibiae with 4 internal spines. Tegmina extending nearly to apex of abdomen, apically rounded ; dorsal field broad, translucent, dark brown with parts yellowish, veins paler ; mirror apically and diagonally placed, about twice as broad as long, with 2 cells in postero-internal region ; apical field short, consisting of a row of large cells which may be indistinct ; lateral field with 3-4 parallel veins and, sometimes, some yellow connecting veinlets forming square cells. Wings : micropterous or macrop-terous. Genitalia : epiphallus with deep U-shaped anterior emargination, posteriorly narrowed and notched ; in ventral view 2 curved arms in posterior half almost meet medially.

**Female** : differs from the male in the following characters : Tegmina : dorsal field with 3-4 veins which may unite posteriorly ; there may also be some large cells apically or throughout dorsal field. Ovipositor straight, superior apical valves with 2 rows of strong denticles each — one lateral, another dorsal.

**Measurements** Body length : Male 5.0-6.0, Female 5.5-6.0 ; length with wings: Male 9.5-10.8, Female 10.5-11.0, length of pron : Male 1.0, Female 1.0-1.2 ; width of pron Male 1.6-2.0 ; Female 1.8-2.0 ; length of teg : Male, Female 3.0-4.0 ; length of post.fem Male 4.2-5.0, Female 4.0-5.0 ; length of post. tib : Male 3.0-3.2, Female 3.0-3.4 ; length of ovip : 3.0-3.5.

**Material examined** : 1 Male Arunachal Pradesh, Subansiri dist., Tamen (Kamala river), 16.xi.1975 (K.R. Rao & party coll.) (ZSI Collections) ; several males and females, Karnataka, Nedungadu, ; Tamil Nadu, Coimbatore, Tiruchirapalli, May (P.S. Nathan coll.) (ANSP Collection).

**Distribution** : India (Assam, Arunachal Pradesh, Bihar, U.P., Haryana, Rajasthan, Karnataka, Tamil Nadu) ; Sri Lanka ; Burma, China.

**Remarks** : Although superficially akin to *P. fascipes* (Walker), the present species is very different in the structure of its male genitalia. It also appears to be less common than *fascipes*. In Arunachal Pradesh, it was previously not reported from Subansiri district; earlier Tandon & Shishodia (1972) identified a female specimen from Arunachal Pradesh (Siang district) as belonging to the present species, but it is most probably, a *fascipes*. The characters distinguishing between the females of the two species are chiefly in colouration; so, since *fascipes* - a more common

**species**— has also been collected from the same locality and on the same day in far greater numbers , the possibility that their specimen is *fascipes* is very high.

*Location of type* : Not known.

#### 49. *Pteronemobius pilicornis* Chopard

1967. *Pteronemobius pilicornis* Chopard, *Orth. Cat.*, 10 : 167.

1969. *Pteronemobius pilicornis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 167.

1975. *Pteronemobius pilicornis*, Biswas, *et al.*, *proc. zool. Soc., Calcutta*, 28 (1) : 26.

*Diagnostic characters : Female* : Tegmina appearing much lighter than head and pronotum. Head : frontal rostrum narrow ; antennae thick, pubescent. *Pronotum* narrowing in front. *Legs* : anterior tibiae with large external tympana. *Tegmina* shining, extending upto apex of 6th abdominal tergite, translucent and appearing light due to yellowish colour of wings seen through them ; veins of dorsal field nearly straight, and evenly spaced, 5 in number, transverse veinlets few. *Wings* quite long. *Ovipositor* short, with wide apical valves, the margins of which are finely denticulated.

*Male* unknown.

*Measurements* : Female Body length : 6.0 ; length with wings : 11.0 ; length of pron: 1.1 ; width of pron : 1.5 ; length of teg : 3.0 ; length of post. fem : 4.1 ; length of post tib : 3.1 ; length of ovip : 2.0

*Material examined* Female Holotype, Burma, Toungoo, no date (A.V.B.Crumb coll) — ANSP/5976 (*ANSP Collections*).

*Distribution* : India (Meghalaya?) ; Burma.

*Remarks* : Chopard (1969) erected this species on the basis of the single female, which the present author has examined. The characters stated by Chopard for erecting this new species *viz.*, pubescent antennae, long 5th maxillary palpal segment, are not sound enough to justify the erection, especially, in view of the lack of a male specimen ; perhaps, only when more specimens of both sexes are collected and studied, can the identity of this species be ascertained.

Biswas, *et. al.* (1975) recorded this species (a single female) for the first time from India (Meghalaya). The present author has examined this specimen , and it appears to be *P. concolor* (Walker). Hence, in the distribution of the species, Meghalaya has been recorded with a query mark, in the present paper.

*Location of type* : The Academy of Natural Sciences of Philadelphia, U.S.A.

50. *Pteronemobius taprobanensis* (Walker)

1869. *Trigonidium taprobanense* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 102.  
 1877. *Nemobius infernalis*, Saussure, *Mém. Soc. Geneve*, 25 : 83 (micropterous form).  
 1924a. *Pteronemobius javanus*, Chopard, *Rec. Ind. Mus.*, 6 : 182.  
 1925d. *Pteronemobius taprobanensis*, Chopard, *Ann. Mag. nat. Hist.*, (9) 15 : 507.  
 1967. *Pteronemobius taprobanensis*, Chopard, *Orth. Cat.*, 10 : 168.  
 1969. *Pteronemobius taprobanensis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 163.

*Diagnostic characters : Male* : Of variable colouration — pale to dark. *Head*: frontal rostrum a little wider than first antennal segment, antennae yellow with brown pubescence ; last segment of maxillary palpi usually black. *Pronotum* weakly widening posteriorly ; lateral lobes black, at least in superior 2/3. *Legs* with abundant, fine brown pubescence ; posterior tibiae with 3 external, 4 internal spines. *Tegmina* : dorsal field yellow, with some patches of brown contrasting with dark brown superior band of lateral field ; mirror generally with one cell in posterior part and two in internal part ; apical field almost null with a few large cells. *Wings* short, or long (macropterous forms).

*Female* differs from the male in the following characters : *Legs* : posterior tibiae with 3 spines on each superior margin. *Tegmina* of varying length — from upto middle of abdomen to apex ; dorsal field showing 3-4 sometimes prominent, more or less parallel, veins, and some transverse veinlets forming rectangular areolae ; Cu. unbranched. *Ovipositor* very feebly curved, widening apically ; superior part of apical valves denticulate.

*Measurements* : Body length : Male 5.5-6.5, Female 5.0-6.0 ; length with wings : Male 10.0-10.7, Female 10.0-10.2 ; length of pron : Male, Female 1.0-1.2 (1.3) ; width of pron : Male 1.5-2.0, Female 1.5-1.7 ; length of teg : Male 3.0-3.5, Female 2.0-4.0 ; length of post. fem : Male Female 3.5-4.0 ; length of post. tib : Male 3.0-3.2, Female 2.7-3.0 ; length of ovip : 2.0-2.7 (2.2-3.2).

*Material examined* : 57 (25 Males, 32 Females) Meghalaya, Garo Hills dist., Damra, Rongrengiri, Jaintia Hills dist. Sonapurdi, August, November (S. Biswas, A.R. Lahiri coll.) ; Assam, Kamrup dist., Mai River, Balajan ; Lakhimpur dist., Shaikhoa R.F., Guijan, Kumsong R.F. ; Sibsagar dist., Joysagar ; Darrang dist., Tezpur, Majgaon, March, May, November, December (S.K. Chanda, K.R. Rao & party, A.K. Mondal, A.N.T. Joseph coll.) ; Arunachal Pradesh, Subansiri dist., Kimin, Daporizo ; Siang dist., Lekhabali, Siji village, Maghabasti, New Jining, Kambang, Lohit dist., Roing, March, October, November (K.R. Rao & party, S.K. Tandon and G.S. Arora, coll.) ; Manipur, Churachandpur, March (K.R. Rao coll.) ; several males and females, W. Bengal, Bihar, M.P., Maharashtra, Rajasthan, Andaman and Nicobar Islands (ZSI Collections) ; 1 Male, 1 Female, Sri Lanka, Peradenia, 24. v. 1909, ?. vi. 1909 (E.E. Green coll.) — B.M. 1925 - 279 (BM Collections).

**Distribution :** India (Arunachal Pradesh, Assam, Manipur, Meghalaya, W. Bengal, Bihar, Orissa, Tamil Nadu, Maharashtra, M.P., Rajasthan, Andaman and Nicobar Islands ) ; Bangladesh ; Sri Lanka ; Burma ; Malaysia ; Indonesia.

**Remarks :** This species was originally described from a female holotype. During the course of the present study, it has been observed that the male genitalia of this species appears identical with that of *P strigipennis* (Chopard), figured by Bhowmik (1969a), suggesting a close resemblance, if not a complete synonymising. As stated earlier, the female type of *strigipennis*, in reality, does not show any false veins ; so, the separation of the present species from *strigipennis* further appears arbitrary. In order to ascertain the true identity of both species, studies of life cycles, behaviour and songs, need to be carried out. This species is recorded for the first time from Manipur and Meghalaya.

**Location of type :** British Museum (Natural History), London, England.

51. *Pteronemobius indicus* (Walker)  
(Figs. 202, 203)

1869. *Nemobius indicus* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 58.

1967. *Pteronemobius indicus*, Chopard, *Orth. Cat.*, 10 : 167.

1969. *Pteronemobius indicus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 159.

**Diagnostic characters :** *Male :* Large for the genus ; uniform brown in colouration. *Head* smaller than pronotum, with 4 feebly marked longitudinal lines on occiput. *Legs :* last of 4 internal spines on posterior tibiae bent and swollen a little at base. *Tegmina* somewhat transparent, shining ; mirror of irregular shape, with 3 small areolae within, on internal and posterior sides. *Wings* long.

*Female* differs from the male in the following characters : *Legs :* first internal spine not tuberculate, last internal not especially swollen and bent at base, internal spines becoming progressively longer distally. *Tegmina* dorsal field with 4 oblique veins.

**Measurements :** Body length : Male 7.0-7.5, Female 6.5-6.7 (Male Female 7.5-8.5) ; length with wings : Male 12.0-13.5, Female 12.5 (Male Female 12.0-14.0) ; length of pron : Male Female 1.2-1.5 ; width of pron : Male 2.0-2.5, Female 2.0 ; length of teg : Male 4.5-4.7, Female 4.2-4.5 ( Male Female 4.0-5.5) ; length of post fem : Male Female 5.0-5.5 (5.2-6.0) ; length of post. tib : Male 4.0-4.7, Female 3.7-4.5 ; length of ovip : 3.5-4.5 (5.0).

**Material examined :** 13 ( 7 Males , 6 Females) Meghalaya, Garo Hills dist., Damra, 20-21. xi. 1973 (*S. Biswas* coll.) ; Assam, Kamrup dist., Kahitama ; N. Lakhimpur dist., Lakhimpur dist., Shaikhoa R. F, Dirok, 3-4. x. 1966, 8. xi. 1974, 17. xii. 1974 (*K.R.Rao, S.K. Tandon and G.S. Arora, S.K. Chanda* coll.) ; 1 Female, Goa, Margao, 22. iii. 1966 (*K.S. Pradhan & party* coll.) (*ZSI Collections*) ; 1 Male,

Thailand, Nakornayok Banjik, 5. i. 1927 (*W.R.S. Ladell* coll) — B.M. 1929 — 399 (*BM Collections*).

**Distribution :** India (Assam, Arunachal Pradesh, Meghalaya, W. Bengal, Andaman Islands, Tamil Nadu, Maharashtra, Goa) ; Sri Lanka ; Burma ; Malaysia ; Thailand.

Appears to be widespread in Tropical Asia, Sumatra, Indo-China and Mentawai Islands.

**Remarks :** This species may be distinguished from *P. concolor* (Walker), which it resembles closely, chiefly by 1. its larger size, 2. longer ovipositor (*vide* key), and, 3. its epiphallus presenting longer, more curved and slender double-branched forceps. This species also appears to be much more scarce than *P. concolor* (Walker).

**Location of Type :** Originally in the collection of the Zoological Survey of London, which (collection) has now been disbanded , present location unknown.

52. *Pteronemobius pantelianus* Chopard  
(Figs. 204, 205)

1967. *Pteronemobius pantelianus* Chopard, *Orth. Cat.*, 10 : 168.

1969. [*Pteronemobius panteli*, Chopard (not Hebard)], *Fauna Ind. Grylloidea*, 2 : 167.

**Diagnostic characters :** *Male* : Almost black, glabrous. *Head* broader than pronotum in front. First two antennal segments black, the rest brown ; lateral ocelli appreciably bigger than anterior ; last two segments of maxillary palpi white, others brown. *Pronotum* . disc almost flat. *Legs* yellowish to dark brown ; anterior tibiae with fairly large, white, external tympana only ; posterior tibiae with 3 external, 4 internal brownish spines with yellow apices. *Tegmina* black, shining, weakly rounded at apex ; mirror undivided, anterior angle a right angle, posterior rounded ; apical field small, somewhat efaced, with a few indistinct cells ; lateral field with 3 parallel veins. Wings absent. Genitalia similar in all respects to that figured by Chopard (1969).

*Female* differs from the male in the following characters : *Legs* : 3 spines on each superior margin of posterior tibiae. *Tegmina* apically truncated, shorter ; dorsal field with 4 parallel, equidistant veins, 2nd furcate near apex, 3rd and 4th joined a little before apex. *Ovipositor* reddish brown, short stout, weakly curved, apical valves moderately large, carinated and denticulated.

**Measurements :** Body length : Male 6.0, Female 4.0-4.2 ; length of pron : Male Female 1.0 (1.2); width of pron : Male 1.5, Female 1.5-1.8 ; length of teg : Male 3.2 (3.4), Female 2.2-2.5 ; length of post. fem : Male 3.5, Female 3.0 ( Male Female 4.0) ; length of post. tib : Male 2.2, Female 2.1 ; length of ovip: 1.5-2.0 (2.5).

**Material examined** : 1 Male Meghalaya, Khasi Hills dist., Shillong, May-June, 1976 (M.V.Reddy coll.) ; 3 Females Upper Shillong, 6. vi. 1974 (M.Vasanth coll.); 5 Males, 5 Females, W.Bengal, Darjeeling dist., (*ZSI Collections*).

**Distribution** : India (Meghalaya, W. Bengal).

**Remarks** : The present name of this species, as it appeared in the *Orthopterorum Catalogus* (Chopard, 1967) is *P. pantelianus*. Chopard's *Fauna of India*, which actually contains much earlier work, has the name *P. panteli* for it ; this became a junior secondary homonym of *P. panteli* (Hebard), a totally different species, when the latter, which was previously placed in *Nemobius/Brachynemobius* (Hebard's nomenclature) was transferred by Chopard (1967) to *Pteronemobius*. So, Chopard (*loc. cit.*) used the replacement name *P. pantelianus* for his species, but did not make any species indication that this is a new name for *P. panteli* (Chopard), as should have been done. But, the replacement name is valid because Chopard (1967) makes a clear reference to the original description and figure of *panteli* as it appeared in the *Fauna of India*.

The specimens examined in the present study do not possess the white bands on the 3rd and 8th abdominal tergites as stated by Bhowmik (1976).

**Location of types** : Pantel's Collection, Museum National d'Histoire Naturelle, Paris, France.

### 53. *Pteronemobius montanus* Chopard (Figs. 206, 207)

1933a. *Pteronemobius montanus* Chopard, *Stylops*, 2 (5) : 117.

1967. *Pteronemobius montanus*, Chopard, *Orth. Cat.*, 10 : 168.

1969. *Pteronemobius montanus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 161.

**Diagnostic characters** *Male* ; Brown-coloured, rarely blackish. *Legs* : posterior femora stout, with some large blackish spots on internal face, knees black ; posterior tibiae with 4 internal spines, the first small and tuberculate, 3 external spines *Tegmina* bluntly rounded at apex ; mirror generally effaced, divided into cells ; apical field effaced ; lateral field with 4 parallel veins. *Genitalia* : in dorsal view, epiphallus wider anteriorly than posteriorly ; anterior emargination broad ; postero-lateral projections narrowing, but bluntly rounded, almost meeting apically.

*Female* differs from the male in the following characters : may be paler in colour. *Legs* : posterior tibiae with 3 external, 4 internal spines, the first of latter being small, but not tuberculate. *Tegmina* shorter than abdomen and that of male; dorsal field translucent, with 4 veins, 1st and 2nd internal united a little before apex, 3rd forked apically ; lateral field with 3 parallel veins. Ovipositor stout, a little

curved upwards, the stem widest just ahead of apical valves, the latter occupying more than 1/3 the total length, sharply pointed at apex.

*Measurements* : Body length : Male 4.7-5.7, Female 4.0-5.0 ; length of pron: Male 1.0-1.5, Female 1.2-1.4 ; width of pron : Male 1.5-1.7, Female 1.5-1.8 ; length of teg : Male 2.4-4.0, Female 1.7-2.1; length of post. fem Male 3.5-4.5, Female 3.2-4.2 ; length of post. tib : Male 2.5-3.0, Female 2.7-3.1; length of ovip : 2.0-2.5.

*Material examined* 5 Males, 2 Females Arunachal Pradesh, Subansiri dist., Kimin, Daporizo, Tamen, 10-19. xi. 1975 (K.R.Rao coll.) ; Meghalaya, Khasi Hills dist., Mawphlang, 22. v. 1975 (S. Biswas coll.) (ZSI Collections) ; 1 Male Assam, Ledo Road, 19 miles from Ledo, 30. ix. 1944 (J.W.H. Rehn coll.) (ANSP Collections).

*Distribution* : India (Arunachal Pradesh, Meghalaya, Assam, W.Bengal, Sikkim); Burma.

*Remarks* : This species is recorded for the first time from Arunachal Pradesh and Meghalaya ; the male is also described here for the first time.

Chopard (1969) has remarked that a single male of this species from Assam exhibits an effaced mirror. This male, and all the 5 males examined during the present study showed this feature.

*Location of type* : British Museum (Natural History), London, England.

#### 54. *Pteronemobius concolor* (Walker) (Figs. 208, 209)

1871. *Eneoptera concolor* Walker, *Cat. Derm. Salt. Br. M.*, 5 suppl. : 10.

1931. *Pteronemobius concolor*, Chopard, *Bull. Raffles Mus.*, 6 : 134.

1967. *Pteronemobius concolor*, Chopard, *Orth. Cat.*, 10 : 160.

1969. *Pteronemobius concolor*, Chopard, *Fauna Ind. Grylloidea*, 2 : 160.

*Diagnostic characters* : *Male* : Small species, closely resembling *P. indicus* (Walker). *Head* lateral ocelli yellow, appreciably bigger than anterior. *Tegmina* almost identical to that of *indicus*. *Wings* : both micropterous and macropterous specimens were examined.

*Female* differs from the male in the following characters : *Tegmina* reaching upto end of abdomen in macropterous forms, but upto end of 5th, or middle of 6th abdominal tergite in micropterous forms, dorsal field dark brown with yellow humeral margins ; 4 oblique veins, the two internal ones united 2/3 from base, and some cross-veins producing rectangular areolae.

*Measurements* : Body length Male 5.5-6.5, Female 5.5-6.0 ( Male Female 6.0-7.5) ; length with wings : Male 11.0, Female 10.5 ( Male Female 10.0-11.5) ; length

of pron : Male 1.0-1.1, Female 1.0-1.2 ; width of pron : Male 1.5-1.7, Female 1.2-1.7 ; length of teg : Male 3.5-4.2, Female 2.2-4.0 ( Male Female 3.5-4.5) ; length of post. fem Male 4.0-5.5, Female 4.0-4.2 ; length of post. tib : Male Female 3.0 ; length of ovip : 1.8-2.5 (2.5-3.0)

*Materil examined* : 116 (56 Males, 60 Females) Meghalaya, Khasi Hills dist., Upper Shillong, Shillong ; Jaintia Hills dist., Sonapurdi, June-September, November, December (A.R. Lahiri, M. Vasanth, A.C. Sukla, J.K. Prasad, M. S. Jyrwa, S.N. Prasad coll.) ; Assam, Lakhimpur dist., Kumsong R.F., Shaikhoa R.F. ; Kamrup dist., Phalaguri, Balajan, Kahitama, November, December (S.K. Chanda, K.R. Rao & party coll.) ; Arunachal Pradesh, Subansiri dist., Hapoli, Ziro, November (K.R. Rao coll.) ; Manipur, Kongvai, New Haven, Litan, Mao, Tongou, Imphal valley, 16 miles north of Imphal on Dimapur Road, January, March, Septmber, October (M. Datta, S.G. Patil, A.K. Ghosh, H.Khajuria, M.L. Roonwal coll.) ; Mizoram, Kolasib, November (K. R. Rao coll.) ; numerous males and frmals, W. Bengal, Darjeeling dist., U.P., Orissa, Rajasthan, M.P.,Goa (ZSI Collections) ; 1 Female Pakistan, Peshawar, Tara, 1916 (Fletcher coll.) — B.M. 1933 - 74 (BM Collections).

*Distribution* : India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, W. Bengal, Orissa, U.P., Karnataka, Rajasthan, Tamil Nadu, M.P., Maharashtra, Goa, Great Nicobar Islands) ; Burma ; Sri Lanka ; Malaysia.

*Remarks* : This otherwise extremely common species is a new record from Arunachal Pradesh, Meghalaya and Mizoram. Contrary to Chopard's (1969) view that this species is scarce in the micropterous condition, a large number of specimens studied by the present author are micropterous.

Superficially closely resembling *P. indicus* (Walker), the present species can be differentiated from the former by the characters noted under 'Remarks' of *P. indicus*.

*Location of type* : British Museum (Natural History), London, England.

#### Genus 25 *Speonemobius* Chopard, 1924.

1924b. *Speonemobius* Chopard, *Rec. Ind. Mus.*, 26 : 85

1967. *Speonemobius*, Chopard, *Orth. Cat.*, 10 : 184.

1969. *Speonemobius*, Chopard, *Fauna Ind. Grylloidea*, 2 : 169.

*Type-species* : *Speonemobius decoloratus* Chopard, 1924.

*Diagnostic characters* Akin to *Pteronemobius* Jacobson and Bianchi. Head big, rounded. Posterior tibiae with 3 external and 2 internal apical spurs.

*Distribution* : India.

**Remarks :** This genus is composed of three species which are all known from Northeast India (Assam, Meghalaya). One of the characters which Chopard (1942b) stated as characteristic to this genus is the presence of 2 internal and 3 external spines on posterior tibiae. This probably held good then, since only the type-species was known at that time, but Chopard (1969) has repeated this character even though one species described by him viz., *S. punctifrons* presents 3 spines on each margin. Alternatively, it is possible that the males and females of *Speonemobius* Chopard may possess unequal number of spines, as in many species of *Pteronemobius* Jacobson and Bianchi ; *S. punctifrons* Chopard, which is known only from a single female, has 3 spines, while *S. decoloratus* Chopard and *S. decolyi* Chopard known only from males have 2 internal and 3 external spines.

Key to the Northeast Indian Species of Genus *Speonemobius* Chopard.

1. Posterior tibiae with 3 spines on each superior margin .....  
.....*punctifrons* Chopard.
- Posterior tibiae with 2 internal and 3 external spines ..... 2.
2. Size larger (9 mm) ; legs relatively longer ; general colouration whitish, with darker tegmina ..... *decoloratus* Chopard.
- Size smaller, not more than 6.2 mm ; legs relatively shorter ; general colouration darker .....*decolyi* Chopard.

55. *Speonemobius punctifrons* Chopard

1967. *Speonemobius punctifrons* Chopard, *Orth. Cat.*, 10 : 185.

1969. *Speonemobius punctifrons*, Chopard, *Fauna, Ind. Grylloidea*, 2 : 171.

**Diagnostic characters :** *Female :* Head dorsally yellowish-brown ; frontal rostrum yellowish with small brown spots and black bristles ; maxillary palpi rather long - 5th segment triangular, darkened at apex. *Pronotum* weakly narrowed anteriorly ; lateral lobes with straight inferior margins. *Legs :* anterior tibiae with small external tympana, posterior tibiae with 3 spines on each superior margin. *Tegmina* slightly shorter than abdomen ; dorsal field brownish, quite pubescent ; darker at base with a light humeral band ; veins thick, light in colour than background, oblique, irregular, 3 in number, Cu. forked ; lateral field translucent, with 3 veins. *Wings* long. *Ovipositor* long, gently curved, apical valves narrow, acute, with smooth margins.

*Male* unknown.

**Measurements :** Female Body length : 4.5 ; length with wings : 9.0 ; length of pron : 1.0 ; width of pron : 1.3 ; length of teg : 2.2 ; length of post. fem : 3.8 ; length of post tib : 3.0 ; length of ovip : 2.5.

**Material examined :** Female Type Assam, Ledo Road, 1.4-10.8 miles from Ledo. 8. x. 1944 (J.W.H. Rehn coll.) — ANSP/5974 (*ANSP Collections*).

*Distribution* : India (Assam).

*Remarks* : Of the 3 species of *Speonemobius* Chopard known so far from India, the present species is known only from one female, while the other two, viz., *decoloratus* Chopard, and *decolyi* Chopard, are known from males only. *S. punctifrons* Chopard differs, as already stated earlier, from the other two in a character, viz., the presence of 3 spines on both the internal and external margins of posterior tibiae, which could indicate a specific difference, but all the three species, being known only from very scanty material, the present species only from a single female, caution should be exercised in labelling it as a separate species with certainty until more females, and males too, are collected and studied for all the three species.

*Location of type* : The Academy of Natural Sciences of Philadelphia, U.S.A.

\* 56. *Speonemobius decoloratus* Chopard

1924b. *Speonemobius decoloratus* Chopard, *Rec. Ind. Mus.*, 26 : 85.

1967. *Speonemobius decoloratus*, Chopard, *Orth. Cat.*, 10 : 184.

1969. *Speonemobius decoloratus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 169.

[Material not examined ; description based on Chopard, 1924b].

*Diagnostic characters* : *Male* : Head somewhat big, whitish, face presenting 2 narrow, indistinct brown stripes, and a brown spot beneath each eye ; palpi white ; 5th segment of maxillary palpi large, triangular. *Pronotum* wider than long, disc whitish with 2 pyriform brown markings. *Legs* : posterior femora moderately stout ; posterior tibiae greyish with 2 internal, long and slender, and 3 external whitish spines ; apical spurs 5—3 external, the inferior very minute, 2 internal which are long and gently curved. *Tegmina* slightly shorter than abdomen, apically rounded, dorsal field black with conspicuous whitish veins and posterior margin ; diagonal vein short ; mirror big, divided into a very large internal cell and 2 small external ones ; apical field abbreviated, with only a few indistinct cells

*Female* unknown.

*Measurements* : (Male) Body length : (9.0) ; length of pron : (1.6) ; length of teg : (5.0) ; length of post. fem : (7.5) ; length of post. tib : (6.0).

*Distribution* India (Meghalaya).

*Remarks* : This species is known only from the male holotype from Garo Hills in Meghalaya. Unfortunately, this type appears to be untraceable in the Zoological Survey of India, Calcutta, where it was deposited.

Chopard (1969) described the species in detail, although he has not described or figured the genitalia.

*Location of type* : Zoological Survey of India, Calcutta, India (apparently lost).

57. *Speonemobius decolyi* Chopard  
(Figs. 210, 211)

1967. *Speonemobius decolyi* Chopard, *Orth. Cat.*, 10 : 185.

1969. *Speonemobius decolyi*, Chopard, *Fauna Ind. Grylloidea*, 2 : 170.

*Diagnostic characters* : *Male* : Small robust insect. *Head* wider than pronotum in front ; occiput dark brown ; vertex yellow with a black horizontal band between eyes ; frontal rostrum about 1 times the width of first antennal segment ; face black, maxillary palpi white. *Pronotum* weakly narrowing in front. *Legs* : posterior femora stoutish ; apical spurs 2 on internal side, superior a little longer, 3 on external side, medial almost double the subequal superior and inferior. *Tegmina* widening posteriorly, apically almost truncated ; dorsal field black, with yellow margins, apex more broadly yellow ; diagonal vein short, yellow ; mirror and apical field indistinct ; lateral field black with 3 veins.

*Female unknown.*

*Measurements* : Male Body length : 5.5 (6.2) ; length of pron : 1.0 ; width of pron : 1.6 ; length of teg : 3.0 ; length of post. fem : 4.2 (4.5) ; length of post. tib : 3.5

*Material examined* 1 Male Arunachal Pradesh, Subansiri dist., Tamen, Paja Nallah, 16. xi. 1975 (K.R. Rao & party coll.).

*Distribution* : India (Assam, Arunachal Pradesh, W. Bengal).

*Remarks* : Recorded previously from Assam and W. Bengal, the distribution of this species is now extended upto Arunachal Pradesh. The specimen examined differs from the description of Chopard (1969) in one notable feature, viz., in having the supero-internal apical spurs of posterior tibiae a little longer than the inferior (vs superior much shorter than inferior).

Chopard's (1969) figure of the male genitalia of this species showing only the dorsal view of the epiphallus is far too inadequate to prove helpful. More detailed figures of both dorsal and ventral views are presented here.

The present author was unable to obtain the type for study and comparison with his single specimen.

*Location of type* : Pantel's Collection, Museum National d' Histoire Naturelle, Paris, France.

Subfamily (viii) OECANTHINAE  
(Tree Crickets)

1878. *Oecanthiens* Saussure, *Mem. Soc. Geneve*, 25 : 450.  
 1878. *Oecanthidae*, Seoane, *Orthopt. Span. Port. Halbins*, 16 : 457.  
 1901. *Oecanthinae*, Azam, *Misc. Ent.*, 9 : 104.  
 1966. *Oecanthinae*, T. J. Walker, *Florida Ent.*, 49 (4) : 265.  
 1968. *Oecanthidae*, Chopard, *Orth. Cat.*, 12 : 426.  
 1969. *Oecanthidae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 266.

*Diagnostic characters* : Very slender, delicate insects of a whitish, greenish or yellowish colouration. *Head* horizontally lengthened. *Pronotum* elongated, narrowing in front ; metanotum of male exhibiting a large glandular pit. *Legs* long, slender; anterior tibiae with large oval tympana on both faces ; posterior tibiae with or without spines, always serrulated. *Tegmina* transparent, with large divided mirror in male. *Ovipositor* with wide, truncated, toothed apical valves.

Genus 26 *Oecanthus* Serville, 1831.

1831. *Oecanthus* Serville, *Ann. Sci. Natur.*, 22 : 134.  
 1966. *Oecanthus*, T.J. Walker, *Florida Ent.*, 49 (4) : 265.  
 1968. *Oecanthus*, Chopard, *Orth. Cat.*, 12 : 427.  
 1969. *Oecanthus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 266.

*Type-species* : *Acheta italica* Fabricius, 1781 (= *Gryllus pellucens* Scopoli, 1763), selected by Rehn, 1904.

*Diagnostic characters* : As given above for the subfamily, except that spines are always present on posterior tibiae.

*Distribution* : World-wide.

*Remarks* : This genus differs from the only other Old World genus of the subfamily Oceanthinae, viz., *Xabea* Walker, 1869 in that the latter has no spines on posterior tibiae. *Xabea* is not represented by any Indian species. A third genus, *Neoxabea* Kirby, 1906, is found in the New World only.

58. *Oecanthus indicus* Saussure  
(Fig. 212, 213)

1878. *Oecanthus indicus* Saussure, *Mem. Soc. Geneve*, 25 : 454.  
 1966. *Oecanthus indicus*, T. J. Walker, *Florida Ent.*, 49 (4) : 268.  
 1968. *Oecanthus indicus*, Chopard, *Orth. Cat.*, 12 : 432.  
 1969. *Oecanthus indicus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 267.

*Diagnostic characters* : *Male* : Delicate, slender, greenish in life, straw-coloured on preservation. *Head* small, prognathous ; occiput adorned with a dark brown longitudinal band along midline extending on to vertex. Frontal rostrum narrower than first antennal segment which is a little elongated. *Pronotum* longer than broad,

narrowing anteriorly, anterior margin weakly concave, posterior sinuated ; lateral lobes shallow. *Legs* very finely and sparsely pubescent ; anterior tibiae proximally swollen, roughly triangular in cross-section ; posterior tibiae with 3 external, 4 internal small pointed spines, serulations in between spines and at base, all spines and denticles apically black ; posterior metatarsi very slender. *Tegmina* widened and rounded posteriorly, dorsal field nearly transparent ; anterior angle of mirror greater than  $90^\circ$ , other angles rounded ; 2 sinuated oblique veins ; chords very close together, first chord anteriorly attached to a straight diagonal vein, which is widely separated from chords by a thin veinlet ; apical field null ; lateral field apposed to body, with 1 free vein and 9 parallel branches of Sc.

*Female* differs from the male in the following characters : *Head* : occiput with 2 longitudinal bands or none. *Legs* : posterior tibiae with 2-3 external and 3 internal spines. *Tegmina* slender ; dorsal field with regular oblique veins ; lateral field with 1-2 veins, 6-8 branches of Sc. *Ovipositor* slender, apical valves brown, ending in strong, sharp teeth.

*Measurements* : Body length : Male 11.0 (11.15-13.5), Female 10.0-13.0 (upto 15.0) ; length with wings : Male 16.2, Female 16.0-20.0 ; length of pron : Male 2.0, Female 1.9-2.2 ; width of pron : Male 1.6, Female 1.2-1.6 ; length of teg : Male 11.0-12.0, Female 10.0-11.5 ; length of post. fem : Male 6.5-7.0 (upto 10.0) ; Female 6.0-7.7 (8.0-8.3) ; length of post.tib. : Male 7.0, Female 7.0-8.0 length of ovip : 6.0-8.2 (4.5-8.5).

*Material examined* : 3 Males, 6 Females Meghalaya, Khasi Hills dist., Kyrdemkhulai, 19. iv. 1977 (S.K. Chanda coll.) ; Arunachal Pradesh, Tirap dist., Changlang ; Lohit dist., Deopani, Roing ; Kameng dist., Tanga valley, January, March, May (S.K. Tandon, A.N.T Joseph, C.B. Srivastava coll.) ; Assam, Darrang dist., Sonai Rupai Forest, 7 xi. 1975 (K.R. Rao & party coll.) (ZSI Collections).

*Distribution* : India (Arunachal Pradesh, Assam, Meghalaya, W. Bengal, Bihar, Orissa, M.P., Maharashtra, Karnataka, Tamil Nadu, Andaman Islands) ; Sri Lanka; Malay Archipelago ; Philippines.

*Remarks* : This is the first record of this species, and of the subfamily Oecanthinae, from Assam and Meghalaya, Tandon and Shishodia (1972) were the first to record this species, and the subfamily, from eastern India.

The present species is green in life, and gradually loses its colour on preservation.

T. J. Walker (1966) has commented (p. 267, Sr. No. 8) : 'Saussure (1878, 456) states that the type of *Oecanthus sinensis* F. Walker, 1869 is possibly a nymph of *O. indicus* ; if he is right, *indicus* is a junior synonym of *sinensis*'

*Location of types* : Museum d'Histoire Naturelle, Geneva, Switzerland [5 Females syntypes]

Subfamily (ix) PHALANGOPSINAE  
(Spider crickets, Long-legged crickets, and true cave crickets)

1878. *Phalangopsites* Saussure, *Mem. Soc. Geneve*, 25 : 403.  
 1925b. *Phalangopsinae*, Chopard, *Ark. Zool.*, 18A (6) : 11.  
 1968. *Phalangopsinae*, Chopard, *Orth. Cat.*, 12 : 264.  
 1969. *Phalangopsidae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 234.

*Diagnostic characters* : Generally rather large-sized Gryllids with long legs. *Head* small, vertical. Posterior femora strongly swollen at base ; posterior tibiae with denticles between spines (except in the genus *Aspidogryllus* Chopard) and at base. When tegmina is well developed in males, mirror with not less than 2 dividing veins.

Key to the Indian Genera of Subfamily PHALANGOPSINAE

1. Legs relatively short ( Fig. 101 ) ; posterior femora gently narrowing apically (Fig. 22) ; both sexes winged (Fig. 54)..... *Larandopsis* Chopard.
- Legs long (Fig. 100) ; posterior femora apically strongly narrowed (Fig. 23); both sexes either winged or apterous (Figs. 54, 66).....2.
2. Male always without tegmina (Fig. 66) .....3.
- Male always with tegmina (Fig. 54).....5.
3. First abdominal tergite very large, extending above others in the form of a triangular shield (Fig. 104).....*Aspidogryllus* Chopard.
- First abdominal tergite normal (Fig. 66)..... 4.
4. Supero-internal apical spur of posterior tibiae longer than the median (Fig. 105).....*Opilionacris* Sjostedt.
- Supero-internal apical spur shorter than the median (Fig. 106).....  
.....*Arachnomimus* Saussure.
5. Tegmina of male with perfect mirror (Fig. 87).....6.
- Tegmina of male without distinct mirror (Fig. 86) .....8.
6. In males, tegmina scarcely extending upto abdominal extremity (Fig. 9); apical field very short (Fig. 9) ; in females, tegmina absent (Fig. 66).  
.....7
- In males, tegmina extending beyond abdominal extremity with well developed apical field (Fig. 29) ; in females tegmina well developed (Fig. 54).....*Homoeogryllus* Guerin.
7. Tegmina in males with triangular mirror, partly reticulated in posterior part and withonly 3 oblique veins (Fig 107)..... *Kempiola* Uvarov.

- Tegmina in males without triangular mirror and posterior reticulation ; more than 4 oblique veins (Fig. 108) .....*Parendacustes* Chopard
8. Female spterous (Fig. 66).....*Phalangopsina* Chopard.
- Female always with tegmina extending at least upto half of abdomen (Fig 68).....*Paragrylloides* Karny.

Genus 27. *Larandopsis* Chopard, 1924.

- 1924b. *Larandopsis* Chopard, *Rec. Ind. Mus.*, 26 : 86.  
 1968. *Larandopsis*, Chopard, *Orth. Cat.*, 12 : 272.  
 1969. *Larandopsis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 240.

*Type-species* : *Larandopsis choprai* Chopard. 1924.

*Diagnostic characters* : Frontal rostrum equal in width to first antennal segment. Pronotum wide, lateral lobes nearly triangular, their inferior margins strongly ascending behind. Anterior tibiae perforated on internal face ; posterior femora gently narrowing apically. Posterior tibiae with 4 spines on each margin. Both sexes with tegmina and wings.

*Distribution* : India (Meghalaya).

*Remarks* : This genus is represented by only one species known from nymphs of both sexes only. (See also 'Remarks' under *L. choprai* (Chopard)).

\* 59 *Larandopsis choprai* Chopard

- 1924b. *Larandopsis choprai* Chopard, *Rec. Ind. Mus.*, 26 : 86.  
 1968. *Larandopsis choprai*, Chopard, *Orth. Cat.*, 12 : 272.  
 1969. *Larandopsis choprai*, Chopard, *Fauna Ind. Grylloidea*, 2 : 241.

[Material not examined ; description based on Chopard, 1924 b]

*Diagnostic characters* : *Male & Female (Immature)* : Reddish-yellow varied with brown. *Head* slightly narrower than pronotum, with 4 fine brown lines above; face yellow with some brownish markings ; maxillary palpi with 5th segment long. *Pronotum* wide, convex dorsally, anterior margin slightly notched with bristles ; disc brownish, presenting an irregular whitish band and a large, somewhat rounded, yellowish spot on each side ; lateral lobes triangular. *Legs* long, yellowish with brown bands ; anterior tibiae with trace of tympanum on inner face ; posterior femora gently narrowing apically ; posterior tibiae with 4 pairs of spines, supero-external margin with a few tiny denticles at base and between spines. *Tegmina* present. *Wings* present. *Abdomen* dorsally with golden pubescence, yellowish medially, brownish laterally.

**Measurements** : (Immatures) ; Body length : 10.0 ; length of post fem : 9.5; length of post. tib : 9.0.

**Distribution** : India (Meghalaya, Garo Hills dist., Siju cave).

**Remarks** : This species, which is the sole representative of the genus *Larandopsis* Chopard, has been described from immature specimens of both sexes. The type, which was deposited in the Indian Museum (=Zoological Survey of India), is now untraceable.

The practice of describing new species and new genera from only immature specimens is unwise, as this leads to incomplete descriptions, especially with reference to typically adult characters, e.g. tegmina, genitalia, and ovipositor. Even measurements may be incorrect. The identity of the present species, and even the genus *Larandopsis* Chopard remains uncertain, more so as the type appears to be lost.

**Location of type** : Zoological Survey of India, Calcutta, India , probably lost.

#### Genus 28. *Homoeogryllus* Guerin, 1847.

1847. *Homoeogryllus* Guerin in Lefebvre, *Voy. Abyssinie*, 6 : 336.

1870. *Meloimorpha*, Walker, *Cat. Derm. Salt. Br. M.*, 3 : 468.

1968. *Homoeogryllus*, Chopard, *Orth. Cat.*, 12 : 285.

1969. *Homoeogryllus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 241.

**Type-species** : *Homoeogryllus xanthographus* Guerin, 1847.

**Diagnostic characters** : Large in size. *Head* small, dorsally convex ; frontal rostrum narrow, furrowed ; eyes small, protruding ; palpi very long. *Pronotum* anteriorly narrowing, feebly saddle-shaped. *Legs* long, slender ; anterior tibiae with small tympana ; posterior tibiae serrulated and armed with 2-3 spines ; external apical spurs short, superior approximately equal to median, medio-internal longer than superior. Both sexes singed ;

**Distribution** : Tropical Africa ; South Asia ; Japan.

**Remarks** : Only 2 species of this genus are known from India of which only one, *H. cincticornis* (Walker) is recorded from Northeast India.

#### 60. *Homoeogryllus cincticornis* (Walker) (Figs. 214, 215)

1870. *Meloimorpha cincticornis* Walker, *Cat. Derm. Salt. Br. M.*, 3 : 469.

1935. *Homoeogryllus cincticornis*, Chopard, *Ann. Mag. nat. Hist.*, (10) 16 : 293.

1968. *Homoeogryllus cincticornis*, Chopard, *Orth. Cat.*, 12 : 287.

1969. *Homoeogryllus cincticornis*, Chopard, *Fauna Ind. Gryllodiea*, 2 : 242.

**Diagnostic characters :** *Male* : Colouration black to pale brown. *Head* small, eyes small, protruding ; frontal rostrum long and narrow ; first antennal segment large, elongated, broad, black, second segment also black, the rest alternating black and yellow ; face almost perpendicular to vertex, labrum yellow. *Pronotum* narrowing anteriorly ; disc saddle-shaped ; postero-inferior portion of lateral lobes inflected. *Legs* : posterior femora basically, broad apically filiform, with a deep longitudinal external furrow ; posterior metatarsi about 1/3 the length of posterior tibiae. *Tegmina* reaching upto or beyond abdominal extremity, rounded and widening posteriorly ; dorsal field with prominent veins ; oblique veins 5-8 — 3-5 long, parallel, sinuated, and 2-3 shorter ones in the angle of stridulating vein, which diverge towards the external margin ; first chord angular, connected from its angle to anterior angle of mirror by a veinlet ; diagonal vein with a branch ; apical field strongly delimited from dorsal field ; lateral field apposed to sides of body, inflected inferiorly ; Sc. with 16 branches. *Wings* short. *Genitalia* : epiphallus large, its bridge with a small anterior median notch and a bluntly rounded projection postero-medially ; postero-lateral projections broad and bluntly pointed, pubescent and curved toward each other at apices, inferior part with a pair or long, somewhat sinuated, apically pointed processes which cross each other.

*Female* differs from the male in the following characters : *Tegmina* slightly shorter than abdomen, blackish with yellowish oblique veins and abundant, very irregular, more or less anastomosed, transverse veinlets. *Ovipositor* straight, slender, with very narrow, smooth apical valves.

**Measurements :** Body length : Male 14.5-15.5, Female 22.5 (Male Female 15.0-18.0) ; length of pron : Male 2.0-2.1, Female 2.5 ; width of pron : Male 2.7-3.5, Female 3.0 ; length of teg : Male 12.0-15.0, Female 11.1 (Male Female 14.0-18.0) ; teg. max. width : Male Female 9.0-10.0 ; length of post fem : Male 11.0-14.0, Female 14.0 ( Male Female 14.5-15.0) ; length of post. tib : Male 11.5-14.5 ; Female 15.5 ; length of ovip : 13.0 (15.0).

**Material examined :** 1 Male Meghalaya, Khasi Hills dist., Nongpoh, 19.ix.1973 (S. Biswas coll.) ; 4 Males M.P. ; Maharashtra, Pune, no date (R.H. Kamble coll.) ; 1 Female U.P. ; 2 Males Pakistan (ZSI Collections).

**Distribution :** India (Meghalaya, Maharashtra, Tamil Nadu, M.P., U.P.) ; Pakistan.

**Remarks :** The type of this species bears the locality data 'Hindusthan' (Chopard, 1969). If this is not a specimen collected from anywhere in Northeast India, then the present specimen from Meghalaya is the first record of this species and the genus *Homoeogryllus* Guerin from Northeast India.

The present author has observed this species sitting on the wall in a house and producing its 'calling song' which sounds, to the human ear, similar to that of *Gryllodes sigillatus* (Walker) — a continuous series of chirps — but each chirp is longer, louder and more shrill than in the latter species.

In the laboratory, these insects showed a tendency to hide under stones ; they were seen to eat beetles and small cockroaches.

*Location of type* : British Museum (Natural History), London, England.

Genus 29. *Kempiola* Uvarov, 1940.

- 1924b. *Kempiella* Chopard, *Rec. Ind. Mus.*, 26 : 87.  
 1940. *Kempiola*, Uvarov, *Ann. Mag. nat. Hist.*, (11) 5 : 175.  
 1968. *Kempiola*, Chopard, *Orth. Cat.*, 12 : 287.  
 1969. *Kempiola*, Chopard, *Fauna Ind. Grylloidea*, 2 : 252.

*Type species* : *Kempiella longipes* Chopard, 1924.

*Diagnostic characters* : Frontal rostrum almost equalling breadth of first antennal segment. Pronotum strongly transverse. Legs very long ; anterior tibiae with small internal tympana ; posterior femora apically long, filiform ; posterior tibiae with 4 spines on each margin ; medio-external apical spur equal to superior, medio-internal longer than supero-internal. Male tegmina with a big mirror which triangular and partly reticulated posteriorly.

*Distribution* : India.

\* 61. *Kempiola longipes* (Chopard)

- 1924b. *Kempiella longipes* Chopard, *Rec. Ind. Mus.*, 26 : 87.  
 1968. *Kempiola longipes*, Chopard, *Orth. Cat.*, 12 : 287.  
 1969. *Kempiola longipes*, Chopard *Fauna Ind. Grylloidea*, 2 : 252.

[Material not examined ; description based on Chopard (1924b)]

*Diagnostic characters* : *Male* : Medium-sized. *Head* small ; occiput and vertex very convex, covered with black pubescence ; face yellowish, shining ; maxillary palpi very long ; eyes narrow ; ocelli absent. *Pronotum* : disc with fine golden pubescence, and long blackish hairs mainly near midline, lateral lobes strongly diverging from body. *Legs* long, slender ; anterior tibiae with small, oval tympanum at base of internal face, tarsi long, chiefly metatarsi, which are provided with spinules beneath. Posterior femora strongly narrowed near middle. Posterior tibiae with 4 spines on each margin, and a few tiny denticles between them. *Tegmina* reaching upto apex of 2nd abdominal tergite, dorsal field blackish with testaceous band along external margin, anal field testaceous ; mirror large, triangular, with some posterior reticulation ; oblique veins 3 ; chords indistinct, except first, which is connected to mirror by 4 veinlets ; apical field short ; lateral field high, blackish ; Sc. with many parallel branches. *Wings* absent. *Abdomen* : 10th tergite with 2 long, rounded processes ; subgenital plate long. *Genitalia* somewhat triangular, with epiphallus divided into 3 acute process.

*Female* differs from the male in the following characters : apart from a few colour difference, it is apterous. *Abdomen* : subgenital plate a little notched at apex. *Ovipositor* long, apical valves very slightly enlarged, the superior ones finely striated.

*Measurements* : Body length : ( Male Female 10.5-12.0) ; length of pron : (Male Female 2.5) ; length of teg : (Male 5.0) ; length of post. fem : (Male Female 14.0); length of post. tib : (Male Female 16.0) ; length of cerci : (Male Female 17.0) ; length of ovip : (9.5)

*Distribution* : India (Assam).

*Remarks* : Chopard (1924b, 1969) has given a detailed description of this species. Unfortunately, the type was not available for study.

*Location of type* : Zoological Survey of India, Calcutta, India ; probably missing.

#### Subfamily (x) TRIGONIDINAE (Sword-tailed crickets)

1874. *Trigonidiens* Saussure, *Miss. Mexique, Orthopt.*, 3 : 361.  
 1878. *Trigonidiidae*, Seoane, *Orthopt. Span. Port. Halbins.* 10.  
 1894. *Trigonidiinae*, Saussure, *Biol. Centr. Amer. Orthopt.*, 1 : 232.  
 1968. *Trigonidiinae*, Chopard, *Orth. Cat.*, 12 : 303.  
 1969. *Trigonidiidae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 273.

*Diagnostic characters* : Small, delicate Gryllids, superficially resembling the *Nemobiinae*. *Head* somewhat big ; frontal rostrum short and wide ; antennae long and slender. *Legs* long, second tarsal segment flattened ; posterior tibiae non-serrulated, armed always with 3 spines on each margin, and 5 apical spurs-3 extenal and 2 internal. *Tegmina* different in the two sexes, with the males exhibiting a large mirror and only one oblique vein, or similar. *Ovipositor* of female lateraly compressed, curved upward a little, with long acute apical valves, scarcely wider than stem.

#### Key to the Indian Genera of Subfamily TRIGONIDIINAE

1. Tegmina glabrous .....2.
- Tegmina clothed with fine pubescence.....7.
2. Tegmina quite different in the two sexes (Figs, 109,110), males always with distinct anal field and mirror (Fig. 109) .....3.
- Tegmina alike or almost so in the two sexes (Fig. 110) .....5.
3. Tegmina of females presenting false veins between principal ones (Fig.111); pronotum rounded in front (Fig. 112).....*Homoeoxipha* Saussure
- Tegmina of females without false veins (Figs. 110); pronotum not rounded, only a little convex in front (Fig. 113) .....4.

4. Male tegmina membranaceous, female tegmina corneous and strongly convex .....*Paratrigonidium* Brunner  
 — Tegmina of both sexes membranaceous, those of female feebly convex ..... *Anaxipha* Saussure
5. Tegmina of both sexes identical, with false veins between the principal ones giving a finely striated appearance (Fig. 114)...*Trigonidium* Rambur.  
 — Tegmina without false veins between principal veins (Fig.110).....6.
6. Tegmina venation quite similar in both sexes (Fig. 110).....*Metioche* Stal.  
 — Tegmina venation differing, though not strikingly, in the two sexes, the male showing a distinct anal field, stridulating and oblique veins, but no clear-cut mirror (Fig. 115).....*Trigonidomorpha* Chopard.
7. Tegmina veins of both sexes similar — longitudinal, parallel (Fig. 116) .....*Metiochodes* Chopard  
 — Tegmina veins usually more or less anastomosed in males (Fig 117) ; those of females longitudinal, parallel (Fig. 116) ....*Amusurgus* Brunner

Genus 30. *Homoeoxipha* Saussure, 1874.

1874. *Homoeoxipha* Saussure, *Miss. Mexique, Orth.*, 3 : 363.

1878. *Homoeoxiphus*, Saussure, *Mem. Soc. Geneve*, 25 : 467.

1968. *Homoeoxipha*, Chopard, *Orth. Cat.*, 12 : 303.

1969. *Homoeoxipha*, Chopard, *Fauna Ind. Grylloidea*, 2 : 275.

*Type-species* *Phyllopalpus locyides* Walker, 1869.

*Diagnostic characters* : Small, delicate insects with wide head and rounded, protruding eyes. Pronotum narrowing in front with anterior margin rounded. Legs somewhat long ; anterior tibiae with an oval tympanum on external face, that on internal face may be absent. Tegmina well developed, that of male with mirror, anal field, stridulating and oblique veins, that of female with false veins between principal veins.

*Distribution* : India ; Sri Lanka ; Burma ; New Guinea ; Malay Archipelago ; North Australia ; Tropical Africa.

*Remarks* : Only one species of this genus, viz., *H. lycoides* (Walker) is known from India.

62. *Homoeoxipha lycoides* (Walker)

(Figs. 216, 217)

1869. *Phyllopalpus lycoides* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 71.

1878. *Homoeoxiphus histrio*, Saussure, *Mem. Soc. Geneve*, 25 : 467.

- 1925d. *Homoeoxipha lycoides*, Chopard, *Ann. Mag. nat. Hist.*, (9) 15 : 532.  
 1968. *Homoeoxipha lycoides*, Chopard, *Orth. Cat.*, 12 : 304.  
 1969. *Homoeoxipha lycoides*, Chopard, *Fauna Ind. Grylloidea*, 2 : 275.

*Diagnostic characters* : *Male* : Head black to reddish ; frontal rostrum about as wide as first antennal segment and projected between antennal sockets ; face shining. *Pronotum* longer than wide, disc and lateral lobes coloured, in shades of rufous, yellow and dark brown. *Legs* : anterior tibiae with a big, oval tympanum on both faces, or with only a depression on internal face. *Tegmina* bluntly rounded apically; dorsal field yellowish, with more or less distinct smoky scattered patches ; lateral field with 2 parallel veins. *Wings* short or long. *Genitalia* : anteriorly much broader than posteriorly ; anterior emargination of epiphallus of an apically broadened V shape ; posteriorly notched, with lobes neither short nor rounded, as mentioned by Chopard (1969).

*Female* differs from the male in the following characters : *Tegmina* a little shorter than abdomen ; dorsal field brown to yellowish-brown, generally with 7 parallel projecting veins — 4 principal veins, the innermost forked at base, and 3 false veins. *Ovipositor* with denticulated apical valves.

*Measurements* : Body length : Male 4.7-5.7, Female 5.2-6.0 ; length with wings: Male Female 10.0-10.5 ; length of pron : Male 0.8-1.0, Female 1.0 ; width of pron: Male Female .7, Female 0.7-1.0 ; length of teg : Male 3.5-4.5, Female 3.0-4.0 ; length of post fem : Male 3.7-4.2, Female 3.8-4.2 ; length of post tib : Male 3.7-4.0, Female 3.7-4.7 ; length of ovip : 1.5-2.0 (4.0)

*Material examined* 12 ( 4 Males, 8 Females) Meghalaya, Garo Hills dist., Damra, 20. xi. 1973 (*S. Biswas* coll.) ; Assam, Kamrup dist., Santosh river ; Sibsagar dist., Kaziranga Nat. Park ; Darrang dist., Sonai Rupai Forest ; Lakshmipur dist., Guijan, January, February, November (*H.K. Bhowmik, M. Datta, K.R. Rao, S.K. Chanda* coll.); Arunachal Pradesh, Lohit dist., Namsai ; Subansiri dist., Sabargiri, Tamen, Taliha, March, November (*S.K. Tandon, K.R. Rao* coll.) ; several males and females E. Bengal, U.P., Andaman Islands, Sri Lanka (*ZSI Collections*).

*Distribution* : India (Assam, Arunachal Pradesh, Meghalaya, W. Bengal, Bihar, U.P., Tamil Nadu, Karnataka, Andaman Islands) ; Bangladesh ; Burma ; Sri Lanka; Malaysia ; Singapore ; widely distributed in the Indo-Australian region.

*Remarks* : In Northeast India, this species was previously unknown from Meghalaya. It was known only from the Siang and Lohit districts of Arunachal Pradesh ; its distribution in that state is now extended to the Subansiri district. In Assam, its distribution is extended to Lakhimpur and Sibsagar districts.

Chopard (1969) gives the measurement of the ovipositor as 4.0 mm. This seems to be unusually large. None of the females examined by the present author has an ovipositor exceeding 2.0 mm in length.

*Location of type* : British Museum (Natural History), London, England.

Genus 31 *Paratrigonidium Brunner*, 1893.

1893. *Paratrigonidium* Brunner, *Ann. Mus. Genova*, 13 : 208.

1968. *Paratrigonidium*, Chopard, *Orth. Cat.*, 12 : 324.

1969. *Paratrigonidium*, Chopard, *Fauna Ind. Grylloidea*, 2 : 284.

*Type-species* : *Paratrigonidium nitidum* Brunner, 1893.

*Diagnostic characters* : A badly defined genus, close to *Anaxipha* Saussure. Brunner gives its principal character as the membranaceous tegmina of males, and corneous, convex tegmina of females.

*Distribution* : India ; Burma ; Malay Archipelago ; Formosa ; Hawaii.

*Remarks* : Only the type-species of this genus is recorded from Northeast India. As it has been possible to study only one specimen of one species, viz., *nitidum*, which did not show any marked difference from specimens of *Anaxipha*, it has been impossible to define any characters for this genus, during the present study.

### 63. *Paratrigonidium nitidum* Brunner

1893. *Paratrigonidium nitidum* Brunner, *Ann. Mus. Genova*, 33 : 209.

1968. *Paratrigonidium nitidum*, Chopard, *Orth. Cat.*, 12 : 324.

1969. *Paratrigonidium nitidum*, Chopard, *Fauna Ind. Grylloidea*, 2 : 285.

*Diagnostic characters* : *Male* : Black with yellow legs. *Head* wider than pronotum in front ; occiput, vertex and face black, with a rufous patch on either side of frontal rostrum ; eyes large, palpi long, slender, yellow ; first antennal segment black, others yellow. *Pronotum* narrowed and convex in front ; disc dull black, pubescent ; lateral lobes black. *Legs* yellow ; anterior tibiae with 2 tympana of equal size one on each face. Posterior femora plain. *Tegmina* very dark brown, wide, shining, extending beyond apex of abdomen ; mirror large, lateral field with 2 parallel veins *Wings* long, black. *Abdomen* brown, cerci yellow.

*Female* differs from the male in the following characters : *Tegmina* convex, subacute at apex. *Ovipositor* flavous at base, darkened in the middle.

*Measurements* : Male Body length : 5.0 (Male Female 5.5-6.0) ; length with wings : 9.0 ; length of pron : 1.0 Male Female 1.2-1.6) ; width of pron : 1.7 ; length of teg : 4.0 (3.5-4.0) ; length of post. fem : 5.0 (3.5-4.0) ; length of ovip : (2.0) ; [post. tibiae missing in the specimen examined].

*Material examined* : 1 Male Assam. Ledo Road, 19 miles from Ledo. 23. ix. 1944 (J.W.H. Rehn coll.) (ANSP Collections).

*Distribution* : India (Assam ) ; Burma.

*Remarks* : Only one male specimen from Northeast India could be examined during this study ; the longitudinal brown band on the posterior femora, as mentioned by Chopard (1969) was, however, not discernible ; it may be possible that the 'type' shows this character. Further, the specimen examined does not appear to be very different from specimens of *Anaxipha* Saussure.

*Location of type* : Genoa Museum, Genoa, Italy.

### Genus 32 *Anaxipha* Saussure, 1874.

1874. *Anaxipha* Saussure, *Miss. Mexique, Orth.*, 3 : 370.  
 1878. *Anaxiphus*, Saussure, *Mem. Soc. Geneve*, 25 : 475.  
 1968. *Anaxipha*, Chopard, *Orth. Cat.*, 12 : 305.  
 1969. *Anaxipha*, Chopard, *Fauna Ind. Grylloidea*, 2 : 277.

*Type-species* : *Acheta exigua* Say, 1825.

*Diagnostic characters* : Head wider than pronotum ; eyes vertically lengthened; fifth segment of maxillary palpi elongated, triangular. Anterior tibiae with tympanum on one or both sides. *Tegmina* membranaceous, extending upto extremity of abdomen, with large mirror in male ; parallel, distant veins in female.

*Distribution* : World-wide.

*Remarks* : So far, only one species of *Anaxipha* Saussure, viz., *longipennis* (Serville) is known from Northeast India ; *Anaxipha manipurensis* Bhowmik described from Manipur and W. Bengal is treated here as a synonym of *A. longipennis* (Serville).

### 64. *Anaxipha longipennis* (Serville) (Figs. 218, 219)

1838. *Trigonidium longipenne* Serville, *Ins. Orth.*, 351.  
 1878. *Cyrtoxiphus longipennis* Saussure, *Mem. Soc. Geneva*, 25 : 484.  
 1924. *Anaxipha longipennis*, Chopard, *Rec. Ind. Mus.*, 26 : 188.  
 1968. *Anaxipha longipennis*, Chopard, *Orth. Cat.*, 12 : 316.  
 1968. *Anaxipha manipurensis*, Bhowmik, *Proc. zool. Soc., Calcutta*. 21 : 149. Syn. nov.  
 1969. *Anaxipha longipennis*, Chopard, *Fauna Ind. Grylloidea*. 2 : 278.

*Diagnostic characters* : *Male* : Elongated, slender, generally pale yellow, sometimes brown. *Head* dorsally convex, last segment of maxillary palpi elongated, triangular; eyes somewhat protruding. Pronotum narrowing anteriorly with long hairs, especially in the anterior and posterior margins and on lateral lobes. *Legs* yellow; anterior tibiae with a tympanum on each face; posterior legs slender. *Tegmina* translucent to transparent, very pale yellow; mirror one and a half times as long as

wide. Wings long.

*Female* differs from the male in the following characters : *Tegmina* : dorsal field with 4-5 straight veins of which internal veins may be united, and a few transverse veinlets forming elongated areolae.

*Measurements* : Body length : Male, Female 4.5-5.0; length with wings : Male 8.7-9.5, Female 8.6-9.0; length of pron : Male, Female 0.6-0.8; width of pron : Male, Female 1.3-1.5; length of teg : Male 4.0-4.5, Female 3.8-4.0; length of post. fem : Male 3.6-3.8. Female 3.5 (00 4.5); length of post. tib : Male 3.6-4.0, Female 3.55; length of ovip : 1.4-1.5 (1.5-1.8).

*Material examined* : 2 Males Meghalaya, Garo Hills dist., Damra, 20.xi. 1973 (S. Biswas coll.); Male holotype, 2 Males, 2 Females paratypes of *Anaxipha manipurensis* Bhowmik, Manipur, Imphal valley, 31. viii. 1945 (M.L. Roonwal coll.); 1 Male paratype of the above species, W. Bengal, Calcutta, Hastings, 19.vi. 1965 (M.S. Shishodia coll.); several males and females W. Bengal, Karnataka, Sri Lanka (ZSI Collections) ; 2 Males, 4 Females Assam, Ledo, May, June, August - October (J.W.H. Rehn coll.); 2 Males, 4 Females Tamil Nadu, Coimbatore (P.S. Nathan ? coll.); 1 Male, 1 Female Upper Burma (ANSP Collections).

*Distribution* : India (Assam, Meghalaya, Manipur, W. Bengal, Orissa, Tamil Nadu, Karnataka, Andaman Islands) ; Sri Lanka ; Malaysia ; Burma ; Mauritius ; East Africa ; Australia (Queensland).

*Remarks* : The present author has examined the type specimen of *Anaxipha manipurensis* Bhowmik. Some of the characters stated by Bhowmik (1968) to distinguish this species, viz., general shape and 3 tibial spines on posterior tibiae, are characters not distinctive to this species. "Elongate shape" as mentioned by Bhowmik (loc.cit.) in the description, and 3 tibial spines are characters shared by all the genera of subfamily Trigonidiinae. Further, the specimens have no character distinguishing them from *Anaxipha longipennis* (Serville) and, as such *manipurensis* is treated here as a synonym of *A. longipennis* (Serville).

The present species, which was known only from Assam in Northeast India, is here recorded for the first time from Meghalaya. With the new synonymy of *A. manipurensis* Bhowmik, its distribution is further extended to Manipur. Interestingly, the present distribution of this species in India extends through the Northeastern states of Manipur, Assam and Meghalaya, to W. Bengal, and then to the south (with a gap in Andhra Pradesh) to Tamil Nadu and Karnataka. It is strikingly absent from western and northern India. Outside India, the species is distributed further east from Manipur, south in Malaysia and Australia.

The male genitalia of this species show highly asymmetrical postero-lateral projections, in many specimens.

*Location of type* Museum National d'Histoire Naturelle, Paris, France.

Genus 33 *Trigonidium* Rambur, 1839.

1839. *Trigonidium* Rambur, *Faune Andal.*, 2 : 39.  
 1968. *Trigonidium*, Chopard, *Orth. Cat.*, 12 : 340.  
 1969. *Trigonidium*, Chopard, *Fauna Ind. Grylloidea*, 2 : 303.

*Type-species* : *Trigonidium cicindeloides* Rambur, 1839.

*Diagnostic characters* : Tegminal venation identical in the two sexes with false veins between the principal ones, all veins straight and parallel, giving the tegmina a striated appearance.

*Distribution* : S. Asia, S. Europe, Africa, Madagascar, Australia, New Zealand.

*Remarks* : Two species of this genus - *cicindeloides* Rambur and *humbertianum* (Saussure) are known from Northeast India. Since the characters used to distinguish the two are not distinctive, there is a tendency among present-day taxonomists (Townsend, personal communication) to designate *humbertianum* as a subspecies of *cicindeloides*, but these have been treated, tentatively, as separate species in the present paper. For further comments *vide T humbertianum* (Saussure).

Key to the Northeast Indian species of Genus *Trigonidium* Rambur.

Tegmina more convex; wings not extending beyond tegmina.; anterior tibiae not perforated ..... *cicindeloides* Rambur

Tegmina less convex and longer; wings long, extending well beyond tegmina; anterior tibiae perforated ..... *humbertianum* (Saussure)

65. *Trigonidium cicindeloides* Rambur  
 (Figs. 220, 221)

1839. *Trigonidium cicindeloides* Rambur, *Faune Andal.*, 2 : 39.  
 1968. *Trigonidium cicindeloides*, Chopard, *Orth. Cat.*, 12 : 340.  
 1969. *Trigonidium cicindeloides*, Chopard, *Fauna Ind. Grylloidea*, 2 : 304.

*Diagnostic characters* : *Male* : Small, black, shining. *Head* with whitish pubescence; antennae pubescent, yellow, with first 3 segments and maxillary palpi black. *Pronotum* slightly narrowing in front; disc and lateral lobes with whitish pubescence. *Legs* : anterior and median femora reddish, tibiae black; posterior legs variously coloured in shades of reddish to yellow. *Tegmina* a little convex, principal veins and false veins together giving a striated appearance. *Genitalia* broader anteriorly than posteriorly; anterior emargination V-shaped with rounded apex; posteriorly, there is a narrow emargination in the midline; posterolateral projections broad, each curving outward and presenting denticulations in posterior margins.

**Female** : Externally differing from the male only in the presence of ovipositor, which is curved upward, apical valves occupying nearly 1/2 its length, pointed, finely denticulated.

**Measurements** : Body length : Male 3.7-5.0, Female 4.2-5.0; length of pron : Male 0.7-1.0, Female 0.7-1.1; width of pron : Male 1.0-1.2, Female 0.7-1.1; length of teg : Male 2.5-3.2, Female 2.7-3.5, length of post. fem : Male 3.5-4.0, Female 3.5-4.5; length of post. tib : Male 3.2-4.0, Female 3.5-4.2; length of ovip : 1.7 (2.2).

**Material examined** : 34 (14 Males, 20 Females) Meghalaya, Khasi Hills dist., Shillong, Old Barapani Road, May, September (*M. Vasanth* coll.); Assam, Kamrup dist., Santosh River, Balajan, Manas Wildlife Sanctuary; Darrang dist., Sonai Rupai Forest, Missamari; Sibsagar dist., Kaziranga National Park, January, February, November, December (*H.K. Bhowmik, K.R. Rao, S.K. Bhattacharyya and A.N.T Joseph, M. Datta* coll.); Arunachal Pradesh, Subansiri dist.. Daporizo; Kameng dist.. Tanga valley, Dunn bridge, May, October (*S. K. Tandon and G.S. Arora, A.N.T Joseph* coll.); Manipur, Ukhrul dist., Shikemai, Litan, Singnat, Keithenmanbi, January, Maroh (*S. G. Patil, K.R. Rao, A.K. Ghosh* coll.); Mizoram, Chhiatlang, 8.xi.1975 (*K.R.Rao* coll.); numerous specimens from W. Bengal, Orissa, Himachal Pradesh, Maharashtra, Goa, Karnataka, Andaman Islands, Nepal, Burma (*ZSI Collections*); 1 Male from Spain, Malaga, Castillo de Fuengirola, 5.ix.1962 (*P.M. Newman* coll.) - B.M. 1962-539 (*B.M. Collections*).

**Distribution** : India (Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, W. Bengal, Bihar, Orissa, Himachal Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Andaman Islands) ; Sri Lanka ; Nepal ; Burma ; Malaysia ; widely distributed from S. Europe to S. Asia and all over Africa.

**Remarks** : This species is a new record from the states of Manipur, Mizoram and Meghalaya. A female specimen from Arunachal Pradesh in the Zoological Survey of India Collections at Calcutta (ZSI Regd. No. 5607/H5) which bears the name of this species appears to be very different from other specimens of the present species. It is larger in size and more strongly convex; the 5th segment of its maxillary palpi almost equal to the 3rd, apically not as wide as in *cicindeloides* Rambur. Posterior femora with 2 longitudinal brown bands on external face - one superiorly, the other inferiorly. The tegminal venation is very different from that of *cicindeloides* Rambur with its veins more protruding and fewer in number. Dorsal field with 6 principal veins and 4 false veins, the first internal false vein short.

**Location of type** : British Museum (Natural History), London, England.

#### 66. *Trigonidium humbertianum* (Saussure)

1878. *Homoeoxiphus humbertianum* Saussure, *Mem. Soc. Geneve*, 25 : 468.

1925d. *Trigonidium humbertianum*, Chopard, *Ann. Mag. nat. Hist.*, (9) 15 : 525.

1968. *Trigonidium cicindeloides humbertianum*, Chopard, *Orth. Cat.*, 12 : 342.

1969. *Trigonidium humbertianum*. Chopard, *Fauna Ind. Grylloidea*, 2 : 305.

**Diagnostic characters : Male and Female :** This species differs from the preceding one only in some minor colour characters, and in the characters set down in the key. Even the latter are not rigid (*vide* Remarks). Some specimens examined were micropterous, as in *cicindeloides* Rambur.

Male genitalia appears to be identical with that of *cicindeloides* Rambur.

**Measurements :** Body length : Male 4.5-5.0, Female 4.7-5.5; length with wings: Male 9.7, Female (macropterous) 9.0; length of pron : Male 0.7-1.0, Female 0.7-0.9; width of pron : Male Female 1.0-1.1; length of teg : Male 3.2-3.7, Female 3.5; length of post. fem : Male 3.7, Female 3.7-3.9; length of post. tib : Male Female 3.7-4.0; length of ovip : 1.5-1.7.

**Material examined :** 13 (4 Males, 9 Females) Meghalaya, Khasi Hills dist., Nongkren, 13.ix.1962 (*S.N.Prasad* coll.); Assam, Mangaldai, Sibsagar dist., Kazinanga National Park; Kamrup dist., Manas Wildlife Sanctuary; Darrang dist., Rohini Kalha, January, February, December (*S.W. Kemp. M. Datta & party, K.R. Rao, R. P. Ghosh* coll.) Arunachal Pradesh, Tirap dist., Deomali Forest; Subansiri dist., Tamen, November (*G.S.Arora, K.R.Rao & party* coll.); Manipur, Nongthoukong, 12 Km N.E. of Moirang, Mantripukhri, January, March (*K.R.Rao, H.Khajuria* coll.); several specimens from W. Bengal, M. P., Maharashtra, Gujarat, Sri Lanka (*ZSI Collections*); 1 Male Pusa coll, no date -*Chopra* B,M, 1927-77 (*B.M. Collections*).

**Distribution :** India (Arunachal Pradesh, Assam, Manipur, Meghalaya, Bihar, W. Bengal, Orissa, Tamil Nadu, Kerala, M. P., Maharashtra, Gujarat); Sri Lanka; Malaysia; widely distributed in the Oriental Region.

**Remarks :** This species is here recorded for the first time from the states of Arunachal Pradesh, Manipur and Meghalaya.

There is practically no external difference between the present species and *T cicindeloides* Rambur, even the male genitalia being identical. The characters used in the key to separate the two species are unsuitable because they are unstable. The present author has examined 3 micropterous specimens of *humbertianum* (Saussure) although macroptery has been believed to be a distinctive character of this species. Chopard (1969) also doubts the validity of the present species (p.305, last two lines).

Two specimens - one named *T cicindeloides cicindeloides* Rambur, and the other, *T cicindeloides humbertianum* (Saussure) studied by the present author from the British Museum collections, and the name given by Chopard (1968), indicate that some present-day taxonomists prefer to give these two species subspecific status under the species *cicindeloides*. B.C.Townsend of British Museum (Natural History), London who, incidentally, has identified the two aforesaid specimens, feels

(*personal communication*) that *cicindeloides*, *humbertianum* and *guineese* (from Africa) are separated by characters which do not necessarily indicate specific or subspecific status. He says that there are in the British Museum collections specimens of all three from a single locality in Africa, which may, perhaps, indicate that they are simply three forms of the one species, viz., *T. cicindeloides*. The present author has also examined specimens of *cicindeloides* and *humbertianum* from a single locality in Assam. He is inclined to agree with Townsend's view.

*Location of type* : Not known.

#### Genus 34 *Metioche* Stal, 1877.

1877. *Metioche* Stal, *Oefv. Vat. Akad. Forh.*, 34 (1) : 46.  
 1878. *Piestoxiphus*, Saussure, *Mem. Soc. Geneva*, 25 : 467.  
 1968. *Metioche*, Chopard, *Orth. Cat.*, 12 : 331.  
 1969. *Metioche*, Chopard, *Fauna Ind. Grylloidea*, 2 : 295.

*Type-species* : *Trigonidium vittaticole* Stal, 1861.

*Diagnostic characters* : Tegmina with or without very feeble pubescence; venation very similar in both sexes, the veins feebly oblique, somewhat irregular, more or less divided, transverse veinlets numerous.

*Distribution* : Indo-Australian region, Philippine Islands.

*Remarks* : Although 5 species of this genus have been found to occur in India, only one, *M. vittaticollis* (Stal) has been recorded from Northeast India.

#### 67. *Metioche vittaticollis* (Stal)

1861. *Trigonidium vittaticolle* Stal, *Eugenie's Resa, Orthopt.* 10 : 317.  
 1925b. *Metioche vittaticollis*, Chopard, *Ark. Zool.*, 18A (6) : 32.  
 1968. *Metioche vittaticollis*, Chopard, *Orth. Cat.*, 12 : 331.  
 1969. *Metioche vittaticollis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 297.

*Diagnostic characters* : Coloration very dark brown to straw-coloured.

*Male* Head black, pubescent; eyes large in relation to head, strongly protruding; face black, palpi yellow, 5th segment large, triangular. Tegmina dark brown, slightly translucent; dorsal field with 4 irregular veins, the two innermost short, the most external forked a short distance from base, transverse veinlets many; lateral field with 4 veins, the first short. *Wings* very long.

*Female* differs from the male in the following characters. *Head* : face with a yellow spot below each antennal socket. *Tegmina* transparent. *Ovipositor* curved upward ; apical valves occupying almost half the total length, the superior valves very finely denticulated.

**Measurements** : Body length : Male Female 5.0 (5.5); length with wings : Male Female 9.5 (10.0); length of pron : Male 0.9, Female 1.0; width of pron : Male 1.4, Female 1.6; length of teg : Male Female 4.0; length of post. fem : Male 4.8, Female 4.3; length of post. tib; Male 4.2; length of ovip : 1.9.

**Material examined** : 1 Male Assam, Ledo Road, 19 Miles from Ledo, 9.x. 1944 (J.W.H.Rehn coll.); 1 Male without locality (ANSP Collections) - Acc. No. 14507.

**Distribution** : India (Assam) ; Malaysia ; Thailand ; Philippines ; North Australia.

**Remarks** : Bhowmik (1970) has recorded a female specimen from Great Nicobar Island. When this specimen was examined it turned out to be a species of *Pterone-mobius* Jacobson and Bianchi, possibly *concolor* (Walker).

**Location of type** : Swedish Museum of Natural History, Stockholm, Sweden.

#### Subfamily (xi) PODOSCIRTINAE

1878. *Podoscirtites* Saussure, *Mem. Soc. Geneva*, 25 : 553.

1930. *Podoscirtinae*, Chopard, *Sarawak Mus. Jour*, 4(1) : 31.

1969. *Podoscirtinae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 326.

**Diagnostic characters** : Shape of body may be elongate and slender, or shorter and oval; posterior tibiae serrulated at base and between spines; very short and almost equal external spurs and long internal spical spurs, the superior longest; posterior metatarsi usually short and with strong denticulations.

**Remarks** : A total of 7 genera are known from India, of which 6 are represented in the study area.

#### Key to the Indian Genera of subfamily PODOSCIRTINAE

1. Tegmina of male with well-developed mirror (Fig. 30) ..... 2.
- Identical tegminal venation in both sexes (Fig. 110) ..... 5.
2. Anterior tibiae strongly swollen and dilated at base (Fig. 120) ; colouration more contrasting and vivid ..... *Mnesibulus* Stal.
- Anterior tibiae with only a weak basal dilatation (Fig. 121); colouration duller - brownish, greenish or yellowish ..... 3.
3. General colouration greenish or yellowish ; disc of pronotum flat, with angular edges (Fig. 12).....*Calyptotrypus* Sussure.
- General colouration brownish; disc of pronotum feebly convex with rounded edges (Fig. 13).....*Madasumma* Walker.

- 4. Slender insects, body parallel-sided (Fig. 118) ; Ovipositor without clear-cut apical valves (Fig. 122) .....5.
- Stouter insects, body with convex sides (Fig. 119) ovipositor presenting distinct apical valves (Fig. 123).....6.
- 5. Tegminal veins very regular, longitudinal, parallel (Fig. 116); length to breadth ratio of head greater than 1 (Fig. 124).....*Patiscus* Stal.
- Tegminal veins somewhat oblique and irregular (Fig. 117); length to breadth ratio of head less than, or a bout, 1 (Fig. 125).....*Euscyrtus* Guerin.
- 6. Anterior tibiae unperforated (Fig. 37); posterior margin of pronotum weakly sinuated (Fig. 113).....*Corixogryllus* Bolivar.
- Anterior tibiae perforated on internal face only (Fig. 38); posterior margin of pronotum strongly sinuated (Fig. 112).....*Aphonoides* Chopard.

Genus 35 *Calyptotrypus* Saussure, 1878

- 1878. *Calyptotrypus* Saussure, *Mem. Soc. Geneve*, 25 : 563.
- 1968. *Calyptotrypus*, Chopard, *Orth. Cat.*, 12 : 365.
- 1969. *Calyptotrypus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 327.

*Type-species* : *Platydictylus helvolus* Saussure, 1839.

*Diagnostic characters* : General colouration greenish or yellowish. Pronotum flattened above with more or less carinated edges. Anterior tibiae perforated on both faces, internal face with a weakly swollen margin; posterior tibiae with a variable number of small spines, and with serrulations proximal to and between them. Tegmina reaching beyond abdomen; mirror rounded, divided by a more or less straight vein. Ovipositor with denticulated apical valves.

*Distribution* : India ; Burma ; China ; Malaysia.

*Remarks* : Two species, viz., *C. hofmanni* Saussure and *C. bimaculatus* (Chopard) are known from Northeast India.

Key to the Northeast Indian species of Genus *Calyptotrypus* Saussure

- Tenth abdominal tergite forming two long lobes.....*hofmanni* Saussure.
- Tenth abdominal tergite of male unmodified.....*bimaculatus* (Chopard).

68. *Calyptotrypus hofmanni* Saussure  
(Figs. 222, 223)

- 1878. *Calyptotrypus hofmanni* Saussure, *Mem. Soc. Geneve*. 25 : 569.
- 1968. *Calyptotrypus hofmanni*, Chopard, *Orth. Cat.*, 12 : 366.
- 1969. *Calyptotrypus hofmanni*, Chopard, *Fauna Ind. Grylloidea*. 2 : 335.

*Diagnostic characters : Male* : Narrow, elongated, straw-coloured, with a green tinge here and there, indicating the possibility of a green colour in life. *Head* as wide as pronotum in front; eyes a little projected; ocelli large, yellow; first antennal segment large, squarish, yellow, frontal rostrum narrower than and projected between first antennal segment, parallel-sided; face yellow, its plane perpendicular to that of head. *Pronotum* narrowing in front; edges of disc bluntly keeled. *Legs* : anterior tibiae with a tympanum on each face, internal with weakly swollen margins; posterior femora slender; posterior tibiae with 5 external, 7 internal spines and very few denticles between them; denticles greater in number at base of external spines. *Tegmina* translucent; dorsal field yellow, tinged with green, veins brown; mirror large; 6 oblique veins, the first 3 long, parallel, the rest smaller, curved towards the first three; first chord connected to diagonal by 1 veinlet and to mirror by 2; apical field long, with 5 (4) veins and square areolae — larger anteriorly; lateral field with 2 veins, 11 branches of Sc. Wings a little longer than tegmina. *Abdomen* : 10th tergite very deeply notched, forming 2 long, somewhat conical lobes, rounded at apex. *Genitalia* agrees in all essential respects with the figure given by Chopard (1969), but the long inferior processes have an outwardly directed spinous process  $1/3$  the distance from apex, not shown in Chopard's figure. Bhowmik's (1977b) figure shows 2 such processes on each inferior process.

*Female* differs from the male in the following characters : *Tegmina* : dorsal field with several regularly parallel, slightly oblique veins and a reticulation of small, regular squares. *Abdomen* : subgenital plate carinated, deeply and angularly notched.

*Measurements* : Male Body length : 20.0-21.0 ( Male Female 16.0-18.0); length with wings : 29.5 (Male Female 24.0-28.0); length of pron : 2.7-4.5; width of pron: 4.5-6.7; length of teg : 19.2-24.0; length of post. fem : 9.0-12.0 (Male Female 8.5-10.0); length of post. tib : 9.0-11.0; length of ovip : 11.0.

*Material examined* : 1 Male Meghalaya, Garo Hills dist., Nephak Bil, 12.iv.1973 (S. Biswas coll.); 2 Males Arunachal Pradesh, Subansiri dist., Pamir Bridge, Chuknu, 18-22.v.1966 (A.N.T Joseph coll.)

*Distribution* : India (Arunachal Pradesh, Meghalaya); Burma; Indonesia (Java).

*Remarks* : Bhowmik (1977b), who was the first to record this species from India, recorded two male specimens from Arunachal Pradesh. The present author has come across this species for the first time from Meghalaya. Unfortunately, no female could be examined by him.

*Location of type* : Stuttgart Museum, West Germany.

### 69. *Calyptotrypus bimaculatus* (Chopard)

1928b. *Madasumma bimaculata* Chopard, *Rec. Ind. Mus.*, 30 : 32.

1968. *Calyptotrypus bimaculatus*, Chopard, *Orth. Cat.*, 12 : 366.

1969. *Calyptotrypus bimaculatus*, Chopard, *Fauna Ind. Grylloidea*. 2 : 336.

**Diagnostic characters : Male** : Elongated, yellowish, more or less greenish on the sides. **Head** small, flattened; frontal rostrum very narrow, with a deep depression containing anterior ocellus; eyes small. **Legs** : anterior tibiae rather swollen, with a tympanum on each face, the internal one narrow, slit-like. **Tegmina** narrow, long, brownish, with greenish humeral band; anal field large, stridulating vein showing a right angle bend; mirror small, roundish; diagonal vein short; 5-6 somewhat regular oblique veins; apical field with distant veins and wide reticulation. **Wings** slightly longer than tegmina.

**Female** unknown.

**Measurements** Male Body length : 17.0; length with wings : 25.0; length of pron : 3.0; length of teg 13.5; length of post. fem 10.5; length of post. tib : 10.0.

**Material examined** 1 Male Arunachal Pradesh, Kameng dist., Dirong Dzong, 7.viii.1961 (B. Biswas coll.).

**Distribution** : India (Arunachal Pradesh, Sikkim); Bhutan.

**Remarks** : Since its description from Bhutan in 1928 by Chopard, this species was not recorded further until 1977 when Bhowmik recorded it from Sikkim and Arunachal Pradesh. Only Bhowmik's (1977b) specimen from Arunachal Pradesh could be examined in the present study. Chopard (1969) has given a very detailed description of this species.

**Location of types** Museum National d'Histoire Naturelle, Paris, France.

### Genus 36 *Madasumma* Walker, 1869.

1869. *Madasumma* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 64.

1968. *Madasumma*, Chopard, *Orth. Cat.*, 12 : 367.

1969. *Madasumma*, Chopard, *Fauna Ind. Grylloidea*, 2 : 341.

**Type-species** : *Madasumma ventralis* Walker, 1869.

**Diagnostic characters** : Generally brownish in colour. Disc of pronotum slightly convex with rounded edges. Ovipositor presenting denticulations on apical valves, which is a good character to identify females of the species of this genus.

**Distribution** : S. Asia : Madagascar; Philippines; Australia.

**Remarks** : Chopard (1968) included *Calyptotrypus* Saussure as a synonym of *Madasumma*. But *Calyptotrypus* differs from *Madasumma* in the disc of pronotum having angular edges (rounded edges in *Madasumma*), and should be regarded as a valid genus.

*Madasumma* is represented by 4 species in Northeast India, including one new species described in the present paper.

Key to the Northeast Indian species of Genus *Madasumma* Walker.

1. Tegmina with conspicuous white spots ..... 2.
- Tegmina without white spots.....3.
2. Tegmina with 3 very conspicuous white spots; epiphallus with a pair of pointed, dorsally directed structures ..... *biswasi* sp. nov.
- Tegmina with only 2 inconspicuous white spots; dorsally directed structures of epiphallus not very pointed.....*melanonotum* Chopard.
3. Tegminal mirror distinctly much longer than broad; posterior abdominal region of male normal; subgenital plate wide and short.....
- .....*assamensis* Chopard.
- Length and breadth of mirror subequal; posterior abdominal region of male highly differentiated; subgenital plate long.....*darjilingensis* Chopard.

\*\* 70. *Madasumma biswasi* sp. nov.  
(Figs. 224-226)

*Description* *Male* Body elongated, slender, brown-coloured. *Head* a little wider than pronotum in front, yellowish; part of vertex and frontal rostrum black; eyes protruding; ocelli large, yellow, disposed in a triangle; first antennal segment elongated, large; frontal rostrum projecting, converging apically, about as wide as first antennal segment, provided with many bristles; clypeofrontal suture straight; face yellow with some scattered blackish markings; maxillary palpi pubescent, yellow, 4th segment shorter than 3rd, 5th subequal to 3rd, its inferior margin straight, superior curved, apex broad. Pronotum narrowing in front; disc centrally yellowish-brown, laterally black, anterior margin straight with bristles, posterior sinuated; lateral lobes yellow with bristles, inferior convex. *Legs* pubescent, yellow; anterior tibiae with an oval tympanum and a split-like internal one; posterior femora fairly stout; posterior tibiae with 5 yellow spines with brown apices on each superior margin, with denticles between and proximal to them; posterior metatarsi very short. *Tegmina* reaching a little beyond abdomen; dorsal field pubescent, brown, with 3 prominent white spots — one ahead of stridulating vein, a second at external angle of mirror and a third behind mirror, which is longer than wide, widening anteriorly, anterior angle obtuse, internal and posterior angles rounded, dividing vein a little ahead of middle, curved. Oblique veins 4, the first long and straight, the second long and sinuate, the other two short, curved towards first two; chords strongly curved, parallel; diagonal vein almost straight; apical field showing 3 veins and large square cells anteriorly and smaller ones posteriorly; lateral field pale, 3 somewhat parallel brown veins and 5-6 branches of Sc. *Wings* just a little longer than tegmina.

**Abdomen** dark brown ventrally. **Genitalia** : epiphallus longer than broad, large, with a posterior notch and a pair of dorsally directed pointed projections; anterior emargination broadly U-shaped; postero-ventral areas with some denticulated structures.

**Female** : unknown.

**Measurements** : Male Body length : 17.8; length with wings : 22.2; length of pron : 2.5; width of pron : 3.0; length of teg : 14.0; length of post. fem : 10.5; length of post. tib : 9.5.

**Material examined** : HOLOTYPE Male Meghalaya, Garo Hills dist. Sollagiri, 25.ii.1975 (S. Biswas coll.).

**Type-locality** : India, Meghalaya, Garo Hills dist., Sollagiri.

**Distribution** : India (Meghalaya).

**Discussion** : This species comes closest to *M. soror* Chopard and *M. saussureana* Chopard, but differs from the former by 1. the absence of 3 wide dark brown bands on the dorsum of head, 2. shape of genitalia, and from the latter by 1. the presence of only 4 oblique veins (vs 7), 2. the absence of 2 brown bands on dorsum of head, and, 3. shape of genitalia. It also differs from both by the presence of 3 prominent white spots on dorsal field of tegmina.

**Location of type** Eastern Regional Station, Zoological Survey of India, Shillong; will be transferred in due course to the National Zoological Collections Z.S.I., Calcutta, India.

71. *Madasumma melanonotum* Chopard  
(Fig. 227)

1968. *Madasumma melanonotum* Chopard, *Orth. Cat.*, 12 : 369.

1969. *Madasumma melanonotum*, Chopard, *Fauna Ind. Grylloidea*, 2 : 352.

**Diagnostic characters** **Male** **Head** dorsally black with fine pubescence; occiput with 2 short yellow lines; face, cheeks, antennae, palpi yellowish. **Pronotum** weakly narrowing anteriorly, anterior margin straight, posterior sinuated. **Legs** : anterior tibiae with an oval tympanum on internal face; posterior femora with 8-9 small brown spots along both inferior margins. **Tegmina** light brown with a white spot in external angle of mirror, and another behind mirror; mirror narrowing and rounded posteriorly; 5 oblique veins - 2 long, the first straight, the second sinuated, and 3 shorter ones curved towards the second oblique vein; apical field composed of 5 veins and a reticulation of regular long cells. **Wings** a little longer than tegmina. **Abdomen** : subgenital plate strongly narrowing from middle to apex, which has a small slit.

**Female** : unknown.

*Measurements* : Male Body length : 14.5; length with wings : 21.5; length of pron : 2.7; width of pron : 3.2 (at middle); length of teg : 13.0; length of post. fem : 11.0; length of post. tib : 10.0.

*Material examined* : Holotype Male Assam, Ledo Road, 4 Miles from Ledo, 24.viii.1944 (J.W.H.Rehn coll.) — 5977 (ANSP Collections).

*Distribution* : India (Assam).

*Remarks* : This species is known only from the male holotype which has been examined by the present author.

*Location of type* : Academy of Natural Sciences, Philadelphia, U.S.A.

\* 72. *Madasumma assamensis* Chopard

1968. *Madasumma assamensis* Chopard, *Orth. Cat.*, 12 : 369.

1969. *Madasumma assamensis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 361.

[Material not examined ; description based on Chopard (1969)]

*Diagnostic characters* Male : Head small ; frontal rostrum narrower than first antennal segment; eyes somewhat big, round; ocelli small; palpi yellowish, mottled with brown. *Pronotum* narrowing in front, anterior margin weakly concave, posterior margin sinuated; disc almost flat, lateral lobes longer than high, inferior margins straight. *Legs* short, very hairy; anterior tibiae with a fairly large oval external tympanum and a slit-like internal one. *Tegmina* long, narrow, light brown, with yellowish edges, finely pubescent; mirror one and a half times as long as broad, strongly narrowing posteriorly, the posterior margin almost angular, dividing vein ahead of middle; 5 oblique veins — 2 long, 3 short; spacial field with 5 veins. *Abdomen* : subgenital plate wide, short, narrowing posteriorly.

*Female* : unknown.

*Measurements* : (Male) Body length : 17.0; length with wings 24.0; length of pron : 3.5; length of teg : 17.0; length of post. fem : 10.0.

*Distribution* : India (Assam).

*Remarks* : Chopard (1969) has described the species from a male, but the symbol before the description is that of female (Female), which obviously, is a misprint; this species is known only from the holotype from Assam. The type could not be procured for the present study. Chopard's (*loc. cit.*) description is adequate, and he has also figured the male genitalia.

*Location of type* : United States National Museum, Washington D.C., U.S.A.

73. *Madasumma darjilingensis* Chopard  
(Figs. 228, 229)

1928b. *Madasumma darjilingensis* Chopard, *Rec. Ind. Mus.*, 30 : 34.

1968. *Madasumma darjilingensis*, Chopard, *Orth. Cat.*, 12 : 369.

1969. *Madasumma darjilingensis*, Chopard, *Fauna Ind. Grylloidea*, 2 : 355.

*Diagnostic characters* : Male : Body large. Head globular, uniformly brown; eyes feebly projecting; frontal rostrum flat, narrowing in front; first antennal segment broadly elongated; ocelli fairly large; face concave in profile in the region of clypeofrontal suture. Pronotum strongly narrowing in front; disc brown with yellowish lateral edges. Legs hairy. internal tympanum on anterior tibiae split-like; base of posterior femora broad. Tegmina extending beyond abdomen, pubescent; dorsal field wide, brown; chords long, strongly curved; oblique veins 6-7 — 3 long, somewhat parallel, others smaller, a little curved; apical field with 4 veins and large areolae. Wings a little longer than tegmina. Abdomen : posterior margin of 9th tergite thick and feebly notched, 10th tergite widely notched, forming two triangular lobes; subgenital plate either long, pointed, acute with a furrow, or with a narrow mid-ventrally grooved posterior prolongation, the groove extending upto a distance of half its length. Genitalia agrees well with that figured by Chopard (1969).

*Female* Ovipositor : inferior apical valves with 3 strong teeth (Chopard, 1969).

*Measurements* : Male Body length : 18.7-21.5 (25.0); length with wings : 25.0; length of pron : 2.9-3.0 (3.5); width of pron : 4.0; length of teg : 18.5-20.0; length of post. fem : 11.0 (13.0); length of post. tib : 11.0.

*Material examined* : 3 Males Meghalaya, Khasi Hills dist., Shillong, 30.ix.1963, 13.viii.1974, 12.ix.1975 (M.S.Jyrwa, S.N. Prasad, R. Mathew coll.); 1 Male Himachal Pradesh, Solan Saproon, 1.ix.1969 (O.B.Chotani coll) (Z. S. I. Collections).

*Distribution* : India (Meghalaya, W. Bengal, Himachal Pradesh); Bhutan.

*Remarks* : Known earlier from the hilly regions of W. Bengal, Bhutan and Himachal Pradesh, this species has been recorded from Shillong (Meghalaya = erstwhile Assam) in Northeast India.

One of the three specimens examined from Shillong was abnormal in some respects. Although a mature male, as evidenced by the presence of fully developed genitalia, it had 2 pairs of under-developed tegminal/wing pads over and above the wings. It also showed a hollow with thickened margins and profuse pubescence lining them in the region of meso - and metanota.

Chopard (1928b) described only the male; later, Chopard (1969) has described the female. The present author has been unable to study any female of this species. The tube which is supposed to contain Chopard's type now contains an insect of *Oecanthus* sp. (Female). The labels in the tube are correct. It is quite probable that

the type specimen has either been misplaced or lost.

*Location of type* : Zoological Survey of India, Calcutta, India; apparently lost.

**Genus 37 *Patiscus* Stal, 1877.**

1877. *Patiscus* Stal, Oefv. Vet.-Akad. Forh., 34 (10) : 51.

1968. *Patiscus*, Chopard, Orth. Cat., 12 : 42.

1969. *Patiscus*, Chopard, Fauna Ind. Grylloidea, 2 : 400.

*Type-species* : *Euscirtus (Patiscus) dorsalis* Stal, 1877.

*Diagnostic characters* : General shape akin to *Euscirtus* Guerin, but head more elongated and usually narrowed; eyes horizontally lengthened. Tegminal veins parallel, longitudinal, transverse veinlets forming square areolae. Wings may feebly extend beyond tegmina.

*Distribution* : India ; Malaysia ; Philippines ; Burma.

*Remarks* : Of the 4 Indian species belonging to this genus, 3 are known to occur in Northeast India.

Key to the Northeast Indian species of Genus *Patiscus* Stal.

1. Tegmina reaching upto apex of abdomen .....*malayanus* Chopard
- Tegmina covering only part of abdomen.....2.
2. Larger (>15 mm); tegmina covering half of abdomen .....  
.....*cephalotes* (Saussure)
- Smaller (12 mm); tegmina covering only first 3 tergites of abdomen  
.....*brevipennis* Chopard.

**\* 74 *Patiscus malayanus* Chopard**

1968. *Patiscus malayanus* Chopard, Orth. Cat., 12 : 423.

1969. *Patiscus malayanus*, Chopard, Fauna Ind. Grylloidea, 2 : 400.

[Material not examined : description based on Chopard (1969)]

*Diagnostic characters Male* : Long and narrow in shape. Head elongated, vertex flattened, with 5 feebly visible brown bands, frontal rostrum about the width of first antennal segment, eyes horizontally lengthened; palpi short. *Pronotum* : disc almost flat, with abundant fine hairs, and 5 small brown spots along both anterior and posterior margins. Legs pubescent; anterior and median legs short; anterior tibiae with a large oval internal tympanum and a narrow one; posterior femora long and narrow; posterior tibiae armed with 8 external and 10 internal spines. Tegmina reaching upto abdominal extremity; dorsal field straight parallel veins- 3 free, and

2 branches of Cu. ; lateral field with straight parallel veins ; Sc. with 2 branches. *Wings* longer than tegmina. *Genitalia* very long, deeply notched at apex and bearing two long and narrow lobes.

*Female* differs from the male in the following characters : *Ovipositor* : basally broad, curved downwards at apex.

*Measurements* : (Male Female) Body length : 15.0-16.0; length of teg: 8.5-10.0; length of post. fem : 9.0-10.5 ; length of ovip: 8.5.

*Distribution* : India (Assam) ; Malaysia.

*Remarks*: In India, this species is so far known only from Assam. From Chopard's(1969) figures, its genitalia (Fig.282) appears to be of the same basic type as that of *Euscirtus necydaloides* (Walker) (Fig.281). The genitalia, the type or other identified specimens of neither species could be examined and, as such no conclusion about the two species could be arrived at in the present study.

*Location of type* : Museum National d'Histoire Naturelle, Paris, France.

\* 75. *Patiscus cephalotes* (Saussure)

1878. *Euscirtus cephalotes* Saussure, *Mem. Soc. Geneve*, 25 : 628.

1968. *Patiscus cephalotes*, Chopard, *Orth. Cat.*, 12 : 422.

1969. *Patiscus cephalotes*, Chopard, *Fauna Ind. Grylloidea*, 2 : 402.

[Material not examined ; description based on Chopard(1969)]

*Diagnostic characters: Male*: Slender in shape ; yellowish with brown lateral band. *Head* wider than pronotum, dorsally flattened ; frontal rostrum long with parallel margins ; eyes weakly protruding. *Pronotum* square ; posterior margin of disc sinuated; lateral lobes with brown bands which form a continuation of bands of the same colour behind eyes. *Tegmina* covering only half the abdomen , dorsal field with 5 straight veins and veinlets forming square areolae , lateral field with a brown band and 5 veins. *Wings* shorter than tegmina. *Abdomen* : 10th tergite with straight posterior margin and rounded angles ; epiproct deeply furrowed, narrow ; sub-genital plate very long and narrow.

*Female* differs from the male in the following characters *Abdomen* extremity normal. *Ovipositor* sinuated.

*Measurements* : Body length : (Male) 15.0, (Female) 17.0; length of pron : 2.5; length of teg : (Male) 4.5, (Female) 6.5; length of post. fem : (Male) 10.0, (Female) 10.6; length of ovip : 9.0.

*Distribution* : India (Assam, Sikkim) ; Formosa?

*Remarks* : No specimens of this species could be collected or examined. Chopard(1969) has stated that its genitalia is very close to those of *necydalooides*, obviously referring to *Euscyrthus necydalooides* (Walker).

*Location of type* Museo Civico di Storia Naturale, Geneva, Switzerland.

76. *Patiscus brevipennis* Chopard  
(Fig. 230)

1968. *Patiscus brevipennis* Chopard, *Orth. Cat.*, 12 : 423.

1969. *Patiscus brevipennis* Chopard, *Fauna Ind. Grylloidea*, 2 : 403.

*Diagnostic characters* : *Male* : Yellowish-brown in colour with a broad lateral blackish band. *Head* short, slightly convex dorsally ; frontal rostrum nearly as broad as first antennal segment ; eyes feebly elongated. *Pronotum* : both anterior and posterior margins of disc with long hairs. *Legs* short, anterior tibiae with large internal tympana, and smaller external ones; posterior femora rather strongly dilated at base; posterior tibiae armed with 7-9 external, 9 internal spines. *Tegmina* reaching upto apex of 3rd abdominal tergite, with oblique internal margins; dorsal field with 4 parallel, straight veins, Cu. with one basal or apical branch; lateral field with 3 veins and 1-2 branches of Sc. *Wings* very short. *Abdomen* subgenital plate greatly elongated.

*Female* : identical with male except that subgenital plate is not very elongated. *Ovipositor* flattened, weakly sinuated, with ventrally curved apex.

*Measurements* : Body length : Male 14.5, Female 10.8; length of pron : Male 1.8, Female 1.5 (2.0); width of pron : Male 2.2, Female 1.8; length of teg : Male 5.0, Female 3.1; length of post. fem. and tib : Male 9.0; length of ovip: 6.5 (7.5).

*Material examined* : 1 Male Assam, vicinity of Ledo, 2. vii.1944 (*J.W.H. Rehn* coll.); 1 Female from Burma (*ANSP Collections*).

*Distribution* : India (Assam); Burma; Malaysia.

*Remarks* : Superficially akin to *Euscyrthus* spp., the present species differs from the former greatly in tegminal venation and structure of male genitalia. The male has remained undescribed so far ; male genitalia of this species is also figured here for the first time.

*Location of type* : Museum National d'Histoire Naturelle, Paris, France.

Genus 38. *Euscyrthus* Guérin, 1844

1844. *Euscyrthus* Guérin, *Icon. R. anim. Ins.*, 334.

1874. *Euscirtus*, Saussure, *Miss. Mexique. Orthopt.*, 3 : 500.

1968. *Euscyrthus*, Chopard, *Orth. Cat.*, 12 : 418.

1969. *Euscyrthus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 391.

*Type -species* : *Euscyrtus bivittatus* Guerin, 1844.

*Diagnostic characters* : Long and narrow in shape. Head short, cubical. Pronotum flattened above. Anterior and median legs very short ; anterior tibiae generally perforated on both faces ; posterior legs very long, femora feebly dilated. Tegminal venation similar in both sexes. Ovipositor of female without distinguishable apical valves.

*Distribution* : Africa south of the Sahara ; Madagascar ; Seychelles; Mauritius; S.Asia; Philippines; North Australia; Mexico.

*Remarks* : Three of the four species of this genus known from India have been recorded from Northeast India.

#### Key to the Northeast Indian species of Genus *Euscyrtus* Guerin

1. Frontal rostrum as wide as first antennal segment ..... *hemelytrus* (Haan)  
 — Frontal rostrum narrower than first antennal segment .....2.
2. Tegmina extending at least upto middle of 6th abdominal tergite .....  
 .....*concinus* (Haan)  
 — Tegmina extending, at most, upto apex of 3rd abdominal tergite.....  
 .....*angustifrons* Chopard.

#### 77. *Euscyrtus hemelytrus* (Haan)

1842. *Gryllus* (*Eneoptera*) *hemelytrus* Haan, *Temminck Verhandl., Orthopt.*, 231.

1878. *Euscirtus hemelytrus*, Saussure, *Mem. Soc. Geneve*, 25 : 627.

1931. *Euscyrtus hemelytrus*, Chopard, *Bull. Raffles Mus.*, 6 : 145.

1968. *Euscyrtus hemelytrus*, Chopard, *Orth. Cat.*, 12:419.

1969. *Euscyrtus hemelytrus*, Chopard, *Fauna Ind.Grylloidea*, 2 : 392.

*Diagnostic characters* : *Male* : General colouration yellow, with some dark markings on head and pronotum. *Head* a little wider than pronotum, yellow, with 4 blackish longitudinal bands, rarely only slightly or not at all delineated; frontal rostrum squarish, as wide as first antennal segment; face swollen, maxillary palpi small, 5th segment club-shaped. *Pronotum* with parallel sides; disc pubescent, black with yellow lateral parts; lateral lobes superiorly dark, inferiorly paler. *Legs* : anterior tibiae with an oval tympanum on each face; posterior tibiae with 7-9 external, 8-10 internal dark brown spines, serrulation between internal spines less than between external spines. *Tegmina* reaching, at the most, upto middle of 4th abdominal tergite, apically somewhat truncated; dorsal field centrally dark and laterally yellow, with 2 irregular veins united shortly from base, and 3 branches of Cu. — 2 basal, the 3rd apical, sometimes only one; veins in lateral portions projecting and yellow; reticulation of elongated cells; Lateral field with brown veins. *Wings* shorter than tegmina or long. *Abdomen*: 9th tergite with thick margins which are less prominent than in *concinus* (Haan); posterolateral corners of 8th tergite with a conical projection.

*Female* differs from the male in the following characters : *Pronotum* : disc may be dark brown with yellow lateral parts, lateral margins slightly concave. *Abdomen*: 8th and 9th tergites normal. *Ovipositor* long, slender, S-shaped, dorso-ventrally flattened apically.

*Measurements* : Body length: Male 7.2-8.0, Female 8.2-9.0; length with wings : Female 14.0-16.0; length of pron : Male 1.0, Female 1.0-1.4; width of pron: Male 1.5, Female 1.5-2.0; length of teg: Male 2.5-3.0, Female 3.0-5.5; length of post fem: Male 6.2-7.0, Female 8.0; length of post. tib: Male 6.1-7.2, Female 7.8-8.0; length of ovip : 6.5-8.0.

*Material examined* : 4 Males Assam, Mangaldai dist., Mazbhat; Kamrup dist., Manas Wildlife Sanctuary, Patacharkuchi, Kahitama, 10-21.xii.1974, 11-15.x.1910 (K.R. Rao & party, S.W. Kemp coll.); 2 Females from W. Bengal, E. Himalayas, Sukna, 1.vii.1909 (N. Annandale coll.) ; U.P., Kangra dist., Dehra dun, Panoh, 21.ix.1967 (M. Prasad coll.) (ZSI Collections); 2 Males, 10 Females Assam, vicinity of Ledo, June, September-November (J.W.H. Rehn coll.); several males and females from Burma, Japan, Philippines (ANSP Collections).

*Distribution* : India (Assam, W. Bengal, U.P., Nicobar Islands), Sri Lanka; Burma; Malaysia; Indonesia; (Java) Batavia; Moluccas; North Australia; Japan; Philippines.

*Remarks* : This species has been recorded only from U.P. Assam, W. Bengal and Nicobar Islands in India. The 9th abdominal tergite serves as a good character to separate the males of this species from *E. concinnus* (Haan.). Macropterous specimens usually have tegmina reaching upto the 6th or 7th abdominal tergites. Specimens from Assam in the ANSP Collections are darker in colour and also have some brown spots on the tegmina, wings and external face of posterior femora.

*Location of type* : Lost.

### 78. *Euscyrthus concinnus* (Haan)

(Figs. 231, 232)

1842. *Gryllus* (Eneoptera) *concinnus* Haan, *Temminck Verhandl. Orthopt.*, 231.

1878. *Euscirtus concinnus*, Saussure, *Mem. Soc. Geneve*, 25 : 626.

1924a. *Euscyrthus concinnus*, Chopard, *Rec. Ind. Mus.*, 26:188.

1968. *Euscyrthus concinnus*, Chopard, *Orth. Cat.*, 12 : 419.

1969. *Euscyrthus concinnus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 394.

*Diagnostic characters*: *Male* : Larger than *hemelytrus* (Haan), straw-coloured. *Head* ornamented with 4 brown longitudinal bands, which may be indistinct, and a yellow band behind each eye which is, sometimes, obscure; eyes protruding; first antennal segment large; frontal rostrum narrower than first antennal segment, with concave margins; face swollen, oblique. *Pronotum* : disc flat, completely yellow, or brown with yellow internal parts, posterior margin strongly sinuated. *Legs*: anterior tibiae with an

... tympanum on each face; posterior tibiae with 9-10 external and 9-12 internal slender spines; *Tegmina* reaching upto middle of 5th of 6th abdominal tergite; dorsal field with oblique internal margin, rounded apex and irregular, variable venation—the 2 innermost veins usually united 1/3 to 2/3 the distance from base, Cu. with 1-2 branches; reticulation of elongated cells; lateral field presenting some regular transverse veinlets. *Abdomen*: each antero-lateral portion of thickened margin of 9th tergite with 3 nodule-like structures.

*Female* differs from the male in the following characters: *Tegmina* extending upto middle or end of 8th abdominal tergite; venation of dorsal field very variable, although basically similar to that of male. *Abdomen*: 9th tergite simple.

*Measurements*: Body length : Male 9.5-10.5, Female 9.5-11.0; length with wings: Male 14.5-15.7, Female 16.2-18.2; length of pron: Male 1.0-1.1, Female 1.2-1.4; width of pron: Male 1.6-1.7, Female 1.7-2.0; length of teg: Male 5.0-6.0, Female 6.2-7.0; length of post. fem: Male 8.0-8.5, Female 7.5-9.2; length of post. tib: Male 7.9-8.5, Female 7.5-8.8; length of ovip : 8.2-9.0.

*Material examined*: 34 (10 Males, 24 Females) Meghalaya, Garo Hills dist., Damra, 20.xi.1973 (*S.Biswas* coll.); Assam, Kamrup dist., Manas Wildlife Sanctuary, Patachar kuchi; N. Lakhimpur dist., October-December (*S.Biswas, K.R. Rao & party, S.K.Tandon and G.S.Arora* coll.) 3 Males, 1 Female from W.Bengal, Midnapore dist., Brahman Sasan, 3.vi.1971 (*S. Khera & party* coll.) (*ZSI Collections*); 1 Male, 2 Females Assam, Ledo Road, 11.vi.1944, 20-29.ix.1944 (*J.W.H. Rehn* coll.); 1 Female from Tamil Nadu, Salem dist., No date (*P.S. Nathan* coll.); numerous males females from Burma (*ANSP Collections*).

*Distribution*: India (Assam, Arunachal Pradesh, Meghalaya, W. Bengal, Karnataka, Tamil Nadu, Great Nicobar Island); Sri Lanka ; Malaysia; Singapore; Moluccas; Burma; Indonesia (Java); Thailand; Cochin-China.

*Remarks*: This species was previously unknown from Meghalaya. Chopard (1969) described the male genitalia of this species as “.....presenting nearly the same shape as those of *E. hemelytrus* “ Apart from the elongated nature of the genitalia of *E. concinnus* (Haan) (stouter in *hemelytrus* (Haan)), those of *concinnus* seem to possess no spinulose lobes as in *hemelytrus*. The material examined is definitely *concinnus* morphologically, but the specimens have genitalia more or less akin to Chopard's (1969) figure of the genitalia of *hemelytrus* (Haan). Unfortunately, the types of both *E. concinnus* (Haan) and *E. hemelytrus* (Haan) are lost.

*Location of type* : Lost.

\* 79. *Euscyrtus angustifrons* Chopard

1968. *Euscyrtus angustifrons* Chopard, *Orth. Cat.*, 12 : 421.

1969. *Euscyrtus angustifrons* Chopard, *Fauna Ind. Grylloidea*, 2 : 395.

[Material not examined; description based on Chopard(1969)]

**Diagnostic characters: Female:** Head slightly wider than pronotum, light brown dorsally with two narrow yellowish lines near middle and a wide yellow band behind each eye; frontal rostrum narrow, slightly longer than first antennal segment, with parallel margins. *Pronotum* weakly widening in front; disc with lateral portions presenting a yellow band each, behind the band on head; lateral lobes with strongly sinuated inferior margin. *Legs*: posterior femora long, strongly spotted with brown; posterior tibiae with 8 external, 9 internal spines and feeble serrulation. *Tegmina* reaching upto apex of 3rd abdominal tergite, with strongly oblique internal margin; dorsal field very light brown with yellow humeral band, 4 strong, feebly oblique veins, and a very wide reticulation; lateral field with 3 veins. *Wings* abortive. *Abdomen*: 10th tergite with concave posterior margin; epiproct strongly furrowed. *Ovipositor* depressed, sinuated and bent downwards at apex.

*Male* unknown.

**Measurements:** (Female) Body length: 11.0; length: of pron : 1.8; length of post. fem: 9.0; length of ovip: 10.0.

**Distribution:** India (Assam).

**Remarks :** The present species is known only from Assam. The male is yet to be described. As it is known now, the species is said to be distinguishable from *E. concinnus* (Haan) chiefly by its shorter tegmina. The discovery of the male may provide a better clue as to its true specific identity.

**Location of type :** Museum National d Histoire Naturelle, Paris, France.

### Subfamily (xii) ITARINAE

1878. *Phormincterites* Saussure, *Mem. Soc. Geneve*, 25 : 536.

1932. *Itarinae*, Chopard, *Ark. Zool.*, 23 A (2, No.9): 15.

1969. *Itarinae*, Chopard, *Fauna Ind. Grylloidea*, 2: 314.

**Diagnostic characters:** Head small, frontal rostrum a little narrowing in front; eyes projecting forward. Posterior tibiae with 3 long apical spurs on each face, median longer than the other two. Posterior metatarsi long. Tegmina of male wide, with many oblique veins.

#### Key to the Indian Genera of Subfamily ITARINAE

Legs long; anterior tibiae compressed, perforated with an oval tympanum on each face (figs. 126 a,b); posterior tibiae with long, movable spines (Fig. 128); supero-internal apical spurs very long (Fig. 130); mirror of male tegmina divided by 1-3 veins (Fig. 132); apical valves of ovipositor denticulated (Fig. 123).....*Phaloria* Stal.

Legs shorter , anterior tibiae with an oval external tympanum, internal one slit-like

(Fig. 127 a,b); spines of posterior tibiae short (Fig. 129); supero-internal apical spur short (Fig. 131); mirror divided by only one vein (Fig. 133); ovipositor with smooth, lanceolate apical valves (Fig. 60).....*Itara* Walker.

Genus 39. *Itara* Walker, 1869.

1869. *Itara* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 64.

1878. *Phorminctor*, Saussure, *Mem. Soc. Geneve*, 25 :549.

1968. *Itara*, Chopard, *Orth., Cat.*, 12 : 357.

1969. *Itara*, Chopard, *Fauna Ind. Grylloidea*, 2 : 314.

*Type-species: Itara sericea* Walker, 1869.

**Diagnostic characters :** Head small, rounded; frontal rostrum broad, dorsally convex. Pronotum strongly narrowing anteriorly, edges rounded. Legs rather short, slender, pubescent; anterior tibiae with a long, oval external tympanum, internal face with a swelling opening backwards by a slit ; posterior femora short, with weak basal swelling; posterior tibiae serrulated and presenting short spines, last external one shorter than preceding one. Male tegmina wide, oblique veins many; Sc. curved towards apex; apical field with several veins. Ovipositor with smooth, lanceolate apical valves.

**Distribution :** India; Malaysia; Vietnam.

**Remarks :** Out of two species recorded from India, only one species, *I. minor* Chopard is known from Northeast India.

80. *Itara minor* Chopard  
(Figs. 233,234)

1925c. *Itara minor* Chopard, *Ann. Soc. ent. Er.*, 94 : 312.

1968. *Itara minor*, Chopard, *Orth. Cat.*, 12 : 358.

1969. *Itara minor*, Chopard, *Fauna Ind. Grylloidea*, 2:316.

**Diagnostic characters: Male :** Wide-bodied, light brown species. *Head* sparsely pubescent; vertex sloping; lateral ocelli round, anterior one horizontal ; frontal rostrum a little projected in between antennal sockets, about one and a half times the width of first antennal segment , face concave in profile. *Pronotum:* anterior margin concave, posterior sinuated , disc a little hollowed in middle with whitish pubescence, impresses clear. *Legs:* posterior tibiae with 4 spines on each superior margin and denticles only proximal to spines; posterior metatarsi with many strong denticles. *Tegmina* with fine pubescence; mirror oval, transverse, all angles rounded, with a sinuated dividing vein in middle ; chords long, curved, first one connected to mirror by a long veinlet; oblique veins 4, rarely 5, 3 arising from a vein which forms an arc with the stridulating vein and is attached to the latter, 4th arising from angle of stridulating vein, posteriormost oblique vein long, almost straight for 2/3 the distance from base, then sharply curved, others short; apical field large with 6 regular veins and a reticulation of elongated cells in

anterior internal portion, no cells in anterior external part, and small irregular cells in posterior part; lateral field with 3 veins and 7 branches of Sc. *Wings* extending beyond tegmina. *Abdomen*: subgenital plate elongated, rounded at apex.

*Female* differs from the male in the following characters: not as wide as in male. *Pronotum*: impresses not so distinct. *Tegmina* dorsal field with 3 veins and 4 branches of Cu., reticulation of irregular cells towards base and mid-external region, and regular elongated cells in mid-internal and apical region; lateral field with 4 branches of Sc. *Abdomen*: subgenital plate with V-shaped apical notch. *Ovipositor* thin, apical valves smooth

*Measurements* : Body length : Male 16.5 (15.0), Female 12.2 (16.0-20.0); length with wings : Male 22.0, Female 22.5 (Male Female 17.0-20.0); length of pron : Male 1.8, Female 2.0 (Male Female 2.2) width of pron : Male Female 3.0; length of teg : Male 14.5 (13.0-16.0), Female 15.0 (12.0-15.0); length of post fem: Male 8.0, Female 9.7; length of post. tib: Male 6.0, Female 7.0; length of ovip: 11.5 (8.0-13.0).

*Material examined*: 1 Male, 1 Female Meghalaya, Khasi Hills dist., Shillong, May-June, 1976 (M.V. Reddy coll.); 2 Males, 3 Females from W.Bengal, Darjeeling dist., Maharashtra (ZSI Collection).

*Distribution* India (Meghalaya, W.Bengal, Maharashtra); Malaysia; Vietnam.

*Remarks* : This species was previously known only from the Garo Hills district of Meghalaya. Its distribution is now extended to the Khasi Hills district of that state. The species, however, appears to be uncommon.

*Location of type*: Museum National d'Histoire Naturelle, Paris, France.

#### Subfamily (xiii) ENEOPTERINAE

1874. *Eneopterites* Saussure, *Miss. Mexique, Orthopt.*, 3 : 464.

1878. *Eneopteriens*, Saussure, *Mem. Soc. Geneve*, 25:502.

1893. *Eneopteridae*, Brunner, *Ann. Mus. Genova*, 13 : 212.

1894. *Eneopteriens*, Saussure, *Biol. Centr. Amer. Orthopt.*, 1 : 255.

1968. *Eneopterinae*, Chopard, *Orth. Cat.*, 12 : 347.

1969. *Eneopterinae*, Chopard, *Fauna Ind. Grylloidea*, 2 : 306.

*Diagnostic characters*: Frontal rostrum usually wide; eyes big, laterally protruding. Posterior tibiae armed with spines, profuse serrulation, and 6 long apical spurs, median longest on each face.

#### Genus 40 *Xenogryllus* Bolivar, 1890.

1890. *Xenogryllus* Bolivar, *Jorn. Sci. Lisboa*, (2) 1:232.

1968. *Xenogryllus*, Chopard, *Orth. Cat.*, 12 : 349.

1969. *Xenogryllus*, Chopard, *Fauna Ind. Grylloidea*, 2:307.

*Type-species: Xenogryllus eneopteroides* Bolivar, 1890.

**Diagnostic characters:** Frontal rostrum broad, truncated anteriorly, with angulate sides. Pronotum narrowing in front; disc flat; lateral lobes with angulated insertion. Legs rather long; anterior tibiae with an oval tympanum on external face; posterior femora feebly swollen at base; posterior tibiae serrulated almost from base; external apical spurs long, median longest, medio-internal one extending almost to apex of metatarsi. Male tegmina with large mirror, divided by an almost straight vein; apical field long; female tegmina with oblique veins. Ovipositor long, slender, apical valves smooth, lanceolate.

**Distribution :** Tropical Africa; S. Asia; Japan; China; Formosa.

**Remarks** This genus is the only representative of the subfamily Eneopterinae, in India. Of the 3 species of this genus found in India, *X. transversus* (Walker) has been recorded from Northeast India.

81. *Xenogryllus transversus* (Walker)  
(Fig. 235)

1869. *Platydictylus transversus* Walker, *Cat. Derm. Salt. Br. M.*, 1 : 88.

1968. *Xenogryllus transversus*, Chopard, *Orth. Cat.*, 12: 350.

1969. *Xenogryllus transversus*, Chopard, *Fauna Ind. Grylloidea*, 2 : 310.

1977b. *Calyptotrypus roonwali*, Bhowmik, *Rec. zool. Surv. India*, 73 : 35. Syn. nov.

**Diagnostic characters: Male:** Head brown with a black longitudinal band from occiput to frontal rostrum, the latter wider than first antennal segment; eyes laterally projecting; face sloping with many brown dots. *Pronotum* narrowing in front; disc brown with a black longitudinal marking on midline, which gradually widens behind, and is in line, in front, with black marking on head; lateral lobes with rounded inferior margin. *Legs* pubescent; fore and median legs very short in relation to posterior legs; anterior tibiae with an oval external tympanum and a slit-like posteriorly opening internal tympanum; posterior femora slender, especially distally, with a longitudinal external groove; posterior tibiae with 4 spines on each superior margin in distal half, and a profuse serrulation both at base and between spines. *Tegmina* transparent, extending almost upto abdominal extremity, long and narrow; 2 long straight, parallel oblique veins; mirror slightly longer than broad, all angles rounded, divided by a highly curved vein at about middle, and connected to first chord; there are a few black spots— one in the concavity of 2nd chord, one each at the anterior, internal and posterior angles of mirror; a black horizontal band present in posterior margin of anal field; apical field very clear, with 4 distinct veins and very regular, square and rectangular cells; lateral field with 5-6 free veins and 14-17 parallel branches of Sc.

**Female** differs from the male in the following characters: *Pronotum* not as narrow in front. *Tegmina* extending beyond abdomen; dorsal field with a black spot on each lateral edge 4 mm. from base, 3 roughly parallel veins ending before half the distance from base, and 6 branches of Cu., numerous transverse veinlets forming large, regular

cells, which are smaller in apical half; lateral fiels with 11-12 branched Sc., *Wings* long. *Ovipositor* very long, with apical valves no wider than stem, very small, with rounded tips.

*Measurements* : Body length : Male 32.0 (31.0), Female 23.5-25.5; length with wings : Male 37.0, Female 35.0-40.0; length of pron: Male 2.7-4.0, Female 3.5-4.0; width of pron: Male 4.5, Female 4.2-6.0; length of teg: Male 22.6-24.0 (25.5), Female 22.0-26.0 (20.5); length of post. fem: Male 20.8-23.0, Female 20.0-23.0; length of post. tib : Male 23.0, Female 20.0-21.5; length of ovip: 26.0-26.5 (23.5).

Material examined : 1 Female Arunachal Pradesh, Siang dist., Basar, No date (*N.N. Katiyar* coll.); Male holotype of *Calyptotrypus roonwali* Bhowmik from Manipur, Imphal valley (2000'), 11.x.1945 (*M.L.Roonwal* coll.); 1 Male from W. Bengal, Jalpaiguri, Sulka para, 29.viii.1975 (*H.K.Bhowmik* and *P.Halder* coll.) (*ZSI Collections*) ; 1 Female Assam, vicinity of Ledo, 10.x.1944 (*J.W.H.Rehn* coll.) (*ANSP Collections*).

*Distribution* : India (Assam, Arunachal Pradesh, Manipur, Sikkim, W.Bengal); Bangladesh; Burma.

*Remarks* : Careful examination of the holotype of *Calyptotrypus roonwali* Bhowmik revealed that the specimen actually belongs to the present species; thus, *C. roonwali* Bhowmik is here synonymised with the present species.

In Northeast India, this species is a new record from Manipur and Arunachal Pradesh.

*Location of type*: British Museum (Natural History), London England.

## DISTRIBUTION

Out of about 325 genera of Gryllids known from the world, 86 are known to occur in Bangladesh, Burma, India, Pakistan and Sri Lanka. 74 of these are definitely known to occur in India alone (Table I). 39 of these genera (including one new genus erected in the present paper) consisting of 81 species (including 4 new to science), belonging to 12 subfamilies are found in the Northeast Indian states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura.

As will be evident from Fig.IA, less than a quarter of the total world genera are known from India, while more than half the Indian genera occur in Northeast India (Fig. IB). 18 species (over 22% of the total) belonging to 13 genera are endemic to Northeast India. 3 of these genera- all presently monotypic - viz., *Parasciobia* Chopard, *Larandopsis* Chopard and *Spinogryllus* gen. nov. occur only in the state of Meghalaya (Figs. IB, III). The last named viz., *Spinogryllus* shows a complicated sclerotised structure on the supra-anal plate, the like of which has not been encountered in any other Gryllid. From the above, coupled with the fact that 45 species belonging to 27 genera (including 4 new

species described here ) are recorded from Meghalaya, it is evident that a high degree of speciation is prevalent there. Northeast India, as a whole, shows a considerable degree of speciation with respect to its Gryllid fauna.

Table II and Maps 3-11 show the distribution of the Northeast Indian genera of Gryllids in the various states of that region. The more widely distributed genera are *Loxoblemmus* Saussure, *Pteronemobius* Jacobson and Bianchi, *Trigonidium* Rambur, *Velarifictorus* Randell, *Brachytrupes* Serville, *Modicogryllus* Chopard, *Teleogryllus* Chopard, *Gryllodes* Saussure, *Anaxipha* Saussure and *Euscyrthus* Guerin. It must be stressed here that paucity of genera in the states of Nagaland and Mizoram and, to a lesser extent, in Manipur and Tripura, does not necessarily indicate a dearth of Gryllid taxa in these states. The deficiency may be largely due to insufficient survey and collection in these states.

Fig. III shows that the number of species and genera from Assam and Meghalaya is almost equal and so is the number of species and genera exclusively known from Assam (19 spp. and 8 gen.) and from Meghalaya (18 spp. and 6 gen.). The number of genera and species of Gryllids of Arunachal Pradesh is almost one and a half times and double that of Manipur genera and species respectively, but each of the two states has only one exclusive genus and species. Arunachal Pradesh has over double the number of exclusive species than Manipur.

The two hilly states of Meghalaya and Arunachal Pradesh share 10 genera of Gryllids with Assam, which is, by and large, a plain. Fig. IV indicates the schematic representation of Gryllid genera common to all the three states and to any two of them. Although 7 genera, viz., *Brachytrupes* Serville, *Gymnogryllus* Saussure, *Stephoblemmus* Saussure, *Gryllodes* Saussure, *Turanogryllus* Tarbinskii, *Anaxipha* Saussure, and *Madasumma* Walker are common to Meghalaya and Assam, without being present in Arunachal Pradesh, only 2 genera, viz., *Scleropterus* Haan and *Xenogryllus* Bolivar are found both in Assam and Arunachal Pradesh, being unknown in Meghalaya. The 4 genera which are known to occur both in Arunachal Pradesh and Meghalaya without a representative in Assam are *Myrmecophilus* Uvarov, *Landreva* Walder, *Gryllus* Linnaeus and *Calyptorhynchus* Saussure. These 4 genera (with the exception of *Gryllus*, which has been reported to occur in the plains in a few places), are restricted to hilly terrain on the Indian mainland, and one (*Myrmecophilus*) has been collected from the Andaman Islands(?).

The distribution of the majority of the Northeast Indian species is cosmopolitan. But more than a third of the total number of species are Indo-Chinese forms. Fig. II shows that 56.5% and 60% of the Northeast Indian genera are common to Burma, Sri Lanka and Southeast Asia respectively. The Far East has a smaller percentage (40%) of genera common with Northeast India. The small percentage (18%) of Gryllid genera common to both Bangladesh and Northeast India, which are geographically contiguous, may be misleading. Insufficient survey and collection may again be the answer. A few species, such as *Gryllodes sigillatus* (Walker), *Modicogryllus confirmatus* (Walker), *M. ehsani* (Chopard), *Gryllus bimaculatus* De Geer, *Plebeiogryllus guttiventris* (Walker), *Teleo-*

*gryllus occipitalis* (Serville), *T. mitratus* (Burmeister), *Homoeoxipha lycoides* (Walker), *Anaxipha longipennis* (Serville) and *Trigonidium cicindeloides* Rambur are very widely distributed in India. But two of these common species viz., *P. guttiventris* and *M. ehsani* are known only by a paltry number of specimens from one state each in Northeast India (Table II).

13 subfamilies of Gryllids have so far been recorded from India, while 12 of them are present in Northeast India. 85% of the Gryllids known so far from Northeast India belong to 4 subfamilies, viz., Gryllinae, Nemobiinae, Trigonidiinae and Podoscirtinae. The remaining 15% belong to the other 8 subfamilies.

From the above, the following conclusions can be broadly arrived at:

1. Northeast India, as a whole, shows a high degree of speciation.
2. Four subfamilies seem to have undergone a greater degree of diversity.
3. Some species appear to have a distinct preference to hilly regions.
4. The occurrence of the cosmopolitan species in Northeast India may either be due to a wide distribution of the species, or by a later introduction by Man.
5. Perhaps, the ecological conditions, like high humidity, diverse altitudes, and litter, may be responsible for speciation of Gryllids in Northeast India.

TABLE I

LIST OF THE NUMBER OF WORLD AND INDIAN SPECIES OF  
NORTHEAST INDIAN GENERA OF FAMILY GRYLLIDAE

Subfamily Gryllinae	World species	Indian species	Species occurring in NE INDIA
1. Genus <i>Gymnogryllus</i> Sauss.	20	5	1
2. " <i>Turanogryllus</i> Tarbinskii	23	11	2
3. " <i>Cophogryllus</i> Sauss.	26	9	1
4. " <i>Brachytrupes</i> Serv.	8	3	2
5. " <i>Gryllus</i> Linne.	42	1	1
6. " <i>Lenigryllus</i> Chop.	4	1	1
7. " <i>Modicogryllus</i> Chop.	89	18	6
8. " <i>Plebeiogryllus</i> Randell	3	1	1
9. " <i>Teleogryllus</i> Chop.	32	10	5
10. " <i>Gryllodes</i> Sauss.	2	2	1
11. " <i>Velarifictorus</i> Randell	23	16	6
12. " <i>Loxoblemmus</i> Sauss.	38	13	7
13. " <i>Stephoblemmus</i> Sauss.	1	1	1
14. " <i>Parasciobia</i> Chop.	1	1	1
15. " <i>Landreva</i> Walker	10	5	2

**Subfamily Nemobiinae**

16. Genus <i>Pteronemobius</i> Jac. & Bia.	92 + 1 ?	11 + 1?	9
17. " <i>Speonemobius</i> Chop.	4	3	1
18. " <i>Scottiola</i> Uvarov	12	3	1

**Subfamily Mogoplistinae**

19. Genus <i>Cycloptiloides</i> Sjostedt	8	1	1
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**Subfamily Myrmecophilinae**

20. Genus <i>Myrmecophilus</i> Berthold	40	3	1
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**Subfamily Scleropterinae**

21. Genus <i>Scleropterus</i> Haan	3	3	1
22. " <i>Acanthoplistus</i> Sauss.	5	1	1

**Subfamily Cachoplistinae**

23. Genus <i>Cachoplistus</i> Sauss.	3	1	1
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**Subfamily Phalangopsinae**

24. Genus <i>Larandopsis</i> Chopard	1	1	1
25. " <i>Homoeogryllus</i> Guerin	10	2	1
26. <i>Kemniola</i> Uvarov	3	3	1

**Subfamily Trigonidiinae**

27. Genus <i>Homoeoxipha</i> Sauss.	8	1	1
28. " <i>Anaxipha</i> Sauss.	103	2	1
29. " <i>Paratrigonidium</i> Brunner	30	2	1
30. " <i>Metioche</i> Stal	42	5	1
31. " <i>Trigonidium</i> Rambur	5	2	2

**Subfamily Eneopterinae**

32. Genus <i>Xenogryllus</i> Bolivar	4	3	1
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**Subfamily Itarinae**

33. Genus <i>Itara</i> Walker	7	2	1
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**Subfamily Podoscirtinae**

34. Genus <i>Calypotrypus</i> Sauss.	20	4	2
35. " <i>Madasumma</i> Walker	52	12	4
36. " <i>Euscyrtus</i> Guerin	26	4	3
37. " <i>Patiscus</i> Stal	9	4	3

**Subfamily Oecanthinae**

38. Genus <i>Oecanthus</i> Serville	46	3	1
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Other than the above 38 genera already known from NE India, one new genus, *Spinogryllus*, with one species *S. meghalayanus* gen. et. sp. nov. - is described in the present paper under subfamily Gryllinae.

### SUMMARY

The Gryllid fauna of Northeast India has always been poorly known. This region, comprising the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, has posed difficulties to the collector in terms of its remoteness, rough terrain and climate. This prompted the present study, the outcome of which is this paper - the first major comprehensive work on the taxonomy of the Gryllid fauna of Northeast India.

The paper deals with 81 species belonging to 39 genera and 12 subfamilies of the Family Gryllidae. 1 genus and 4 species are described as new to science, undescribed morphs of 1 species are described for the first time, and 9 species are newly recorded from India/Northeast India. 5 species are treated as definite synonyms, and 3 have been placed as probable synonyms. Material studied include specimens not only from Northeast India, but from other parts of India as well. A few specimens collected from other countries have also been examined. Some specimens deposited in the British Museum (Natural History), London and The Academy of Natural Sciences of Philadelphia, USA were also studied.

The first part of the present paper includes brief chapters on the geography, climate and vegetation of Northeast India, and habits and habitats of Gryllids dealing with habitat preferences, food and feeding habits, pest status and breeding habits. A historical review, classification and materials and methods are also briefly dealt with.

The systematic account constitutes the main body of the paper. Keys to subfamilies have been supported, as far as practicable, with generalised *illustrations* to facilitate easy understanding. An attempt has been made, wherever possible, to include female characters also, in the keys to species. Important synonyms have been listed; diagnostic characters, and any additional character which the author came across, have been enumerated. Material data and location of type specimens have been provided. Measurements have been given. Distribution and remarks are presented. For genera, the type-species is mentioned. For new taxa, types are designated and type-locality is mentioned. A full description and discussion are presented. Male genitalia have been illustrated in all cases where it has been possible to dissect and study them, as this anatomical feature is considered to be of very great importance in Gryllid taxonomy. That this character may not be of paramount importance in all genera is discussed in the case of the genus *Loxoblemmus* Saussure, where male genitalia do not present great variations among different species.

Finally, a chapter on distribution is presented which brings out quite clearly the fact that Northeast India has been a veritable paradise for speciation among Gryllids.

Over 50% of the Indian genera occur in Northeast India. 3 genera out of 39 are endemic to Northeast India, while more than 22% of the total known species from Northeast India, are endemic to that region.

It is certain that Northeast India contains many more taxa still waiting to be discovered. The ecology of that region is ideal for Gryllids. The present work has shown, beyond reasonable doubt, that a great deal more of fruitful research could be undertaken on Northeast Indian Gryllids.

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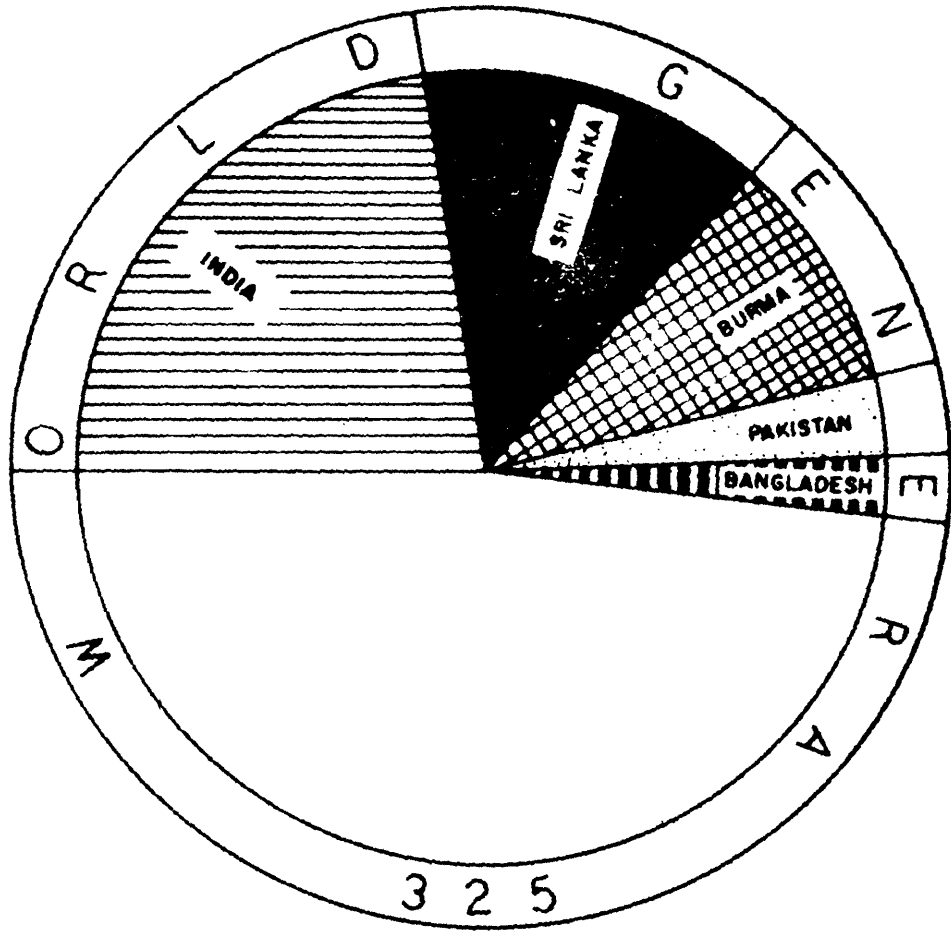
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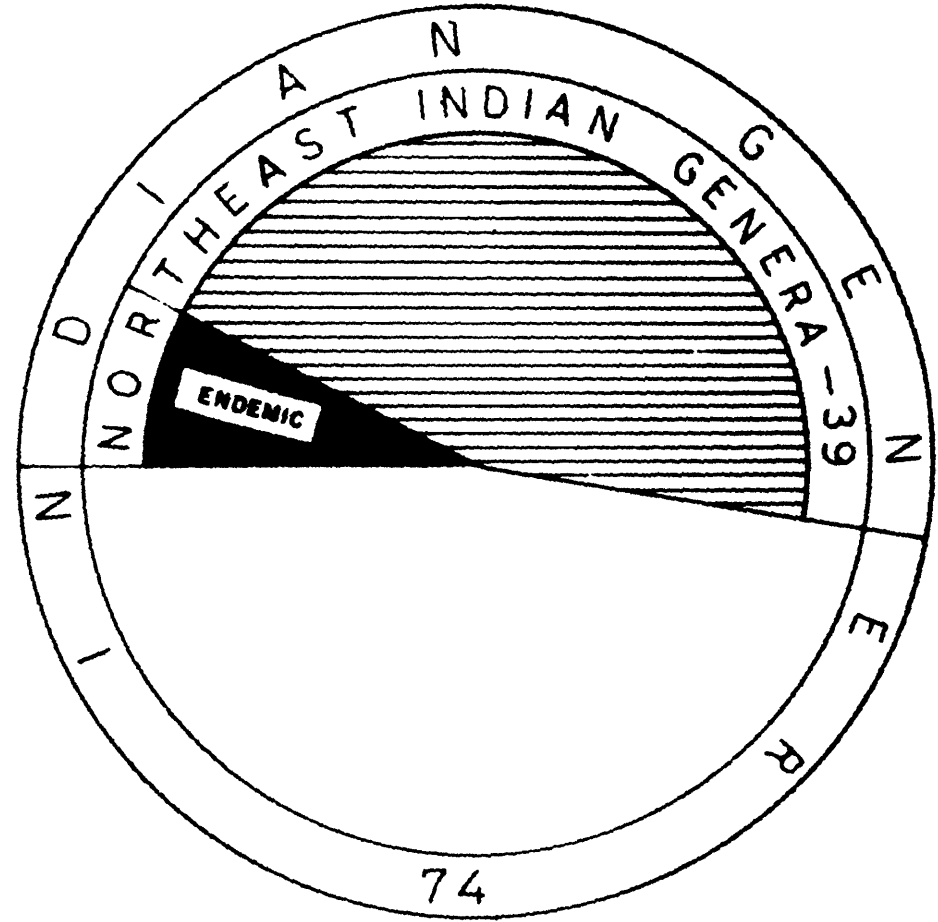
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A

Fig. I



B

Fig. I: A Relative numbers of Gryllid genera found in India and neighbouring countries B. relative numbers of Gryllid genera found in Northeast India and genera endemic to Northeast India.

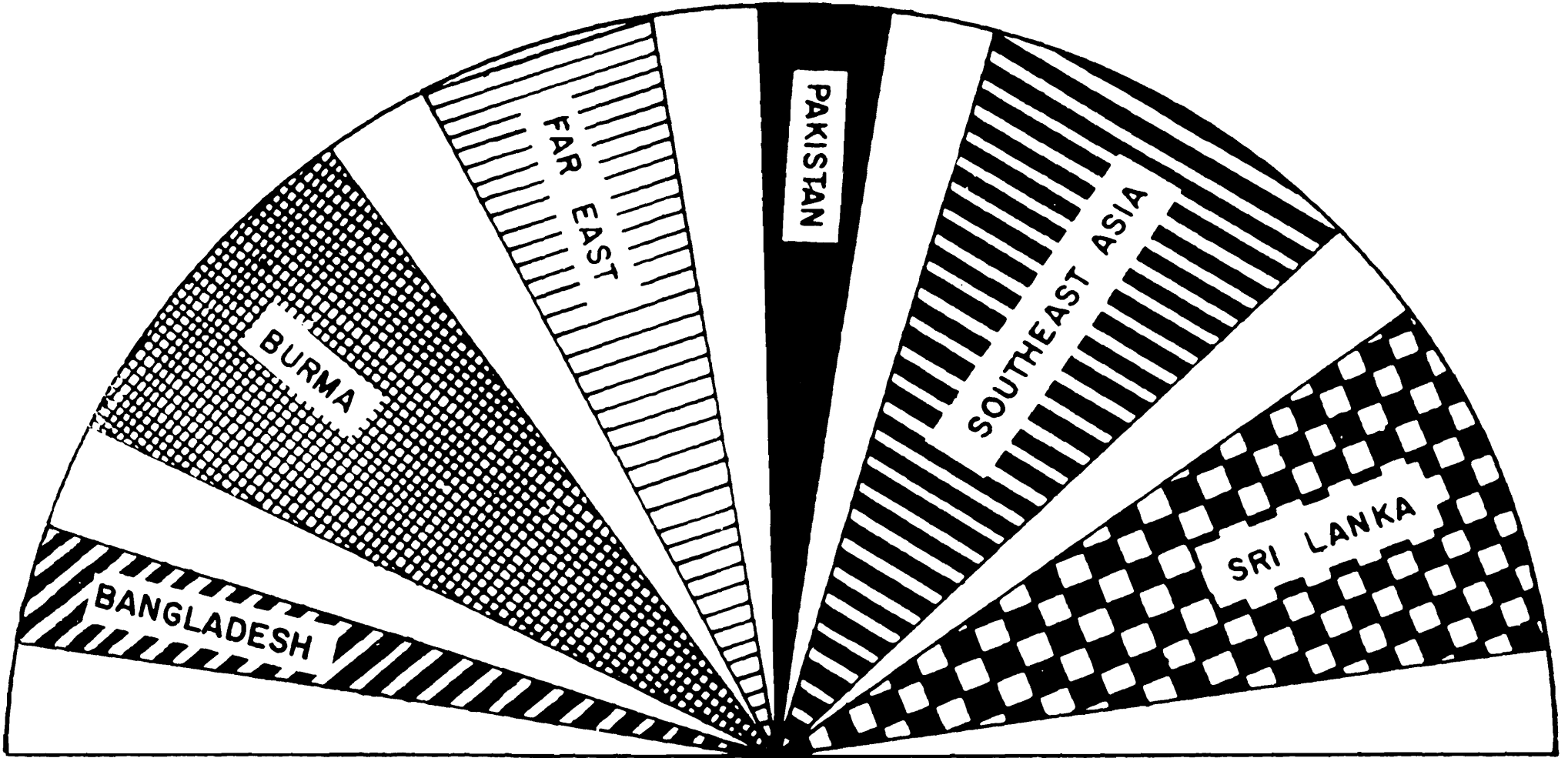


Fig. II : Percentage of Northeast Indian Gryllid genera common to Bangladesh, Burma, the Far East, Pakistan, Southeast Asia and Sri Lanka.

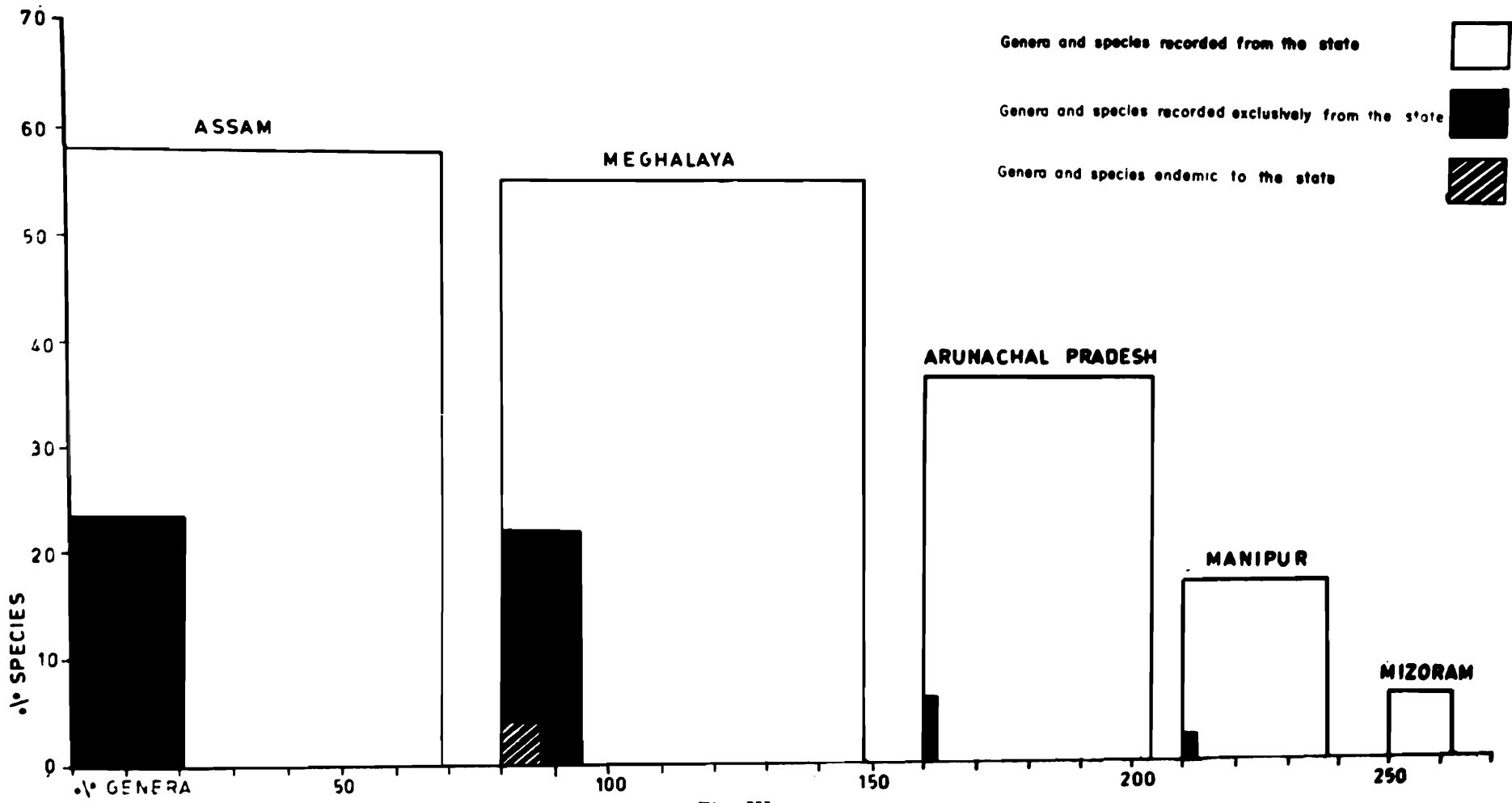


Fig. III

Fig. III : Numbers (in percentage) of genera and species recorded from 5 Northeast Indian states.

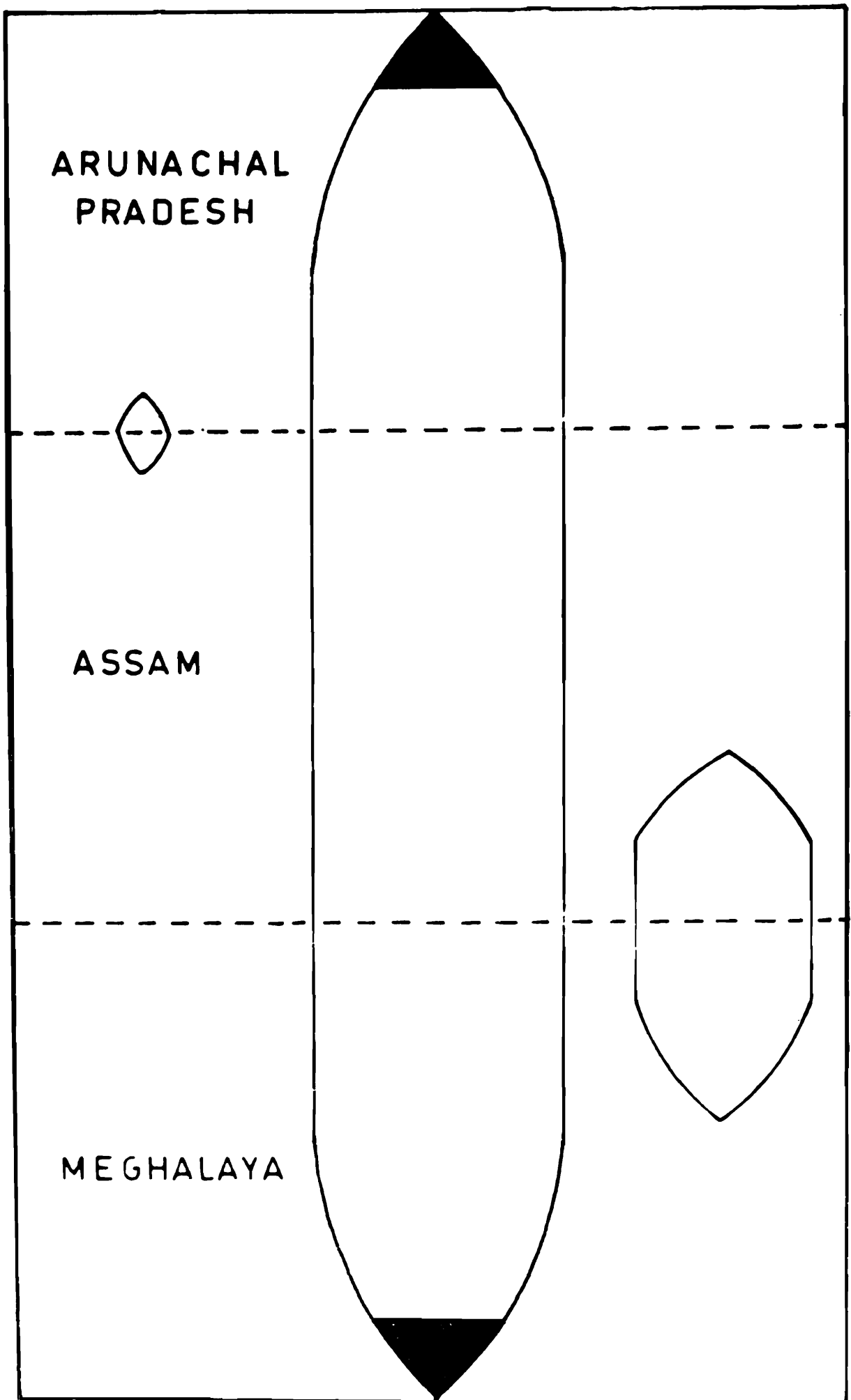
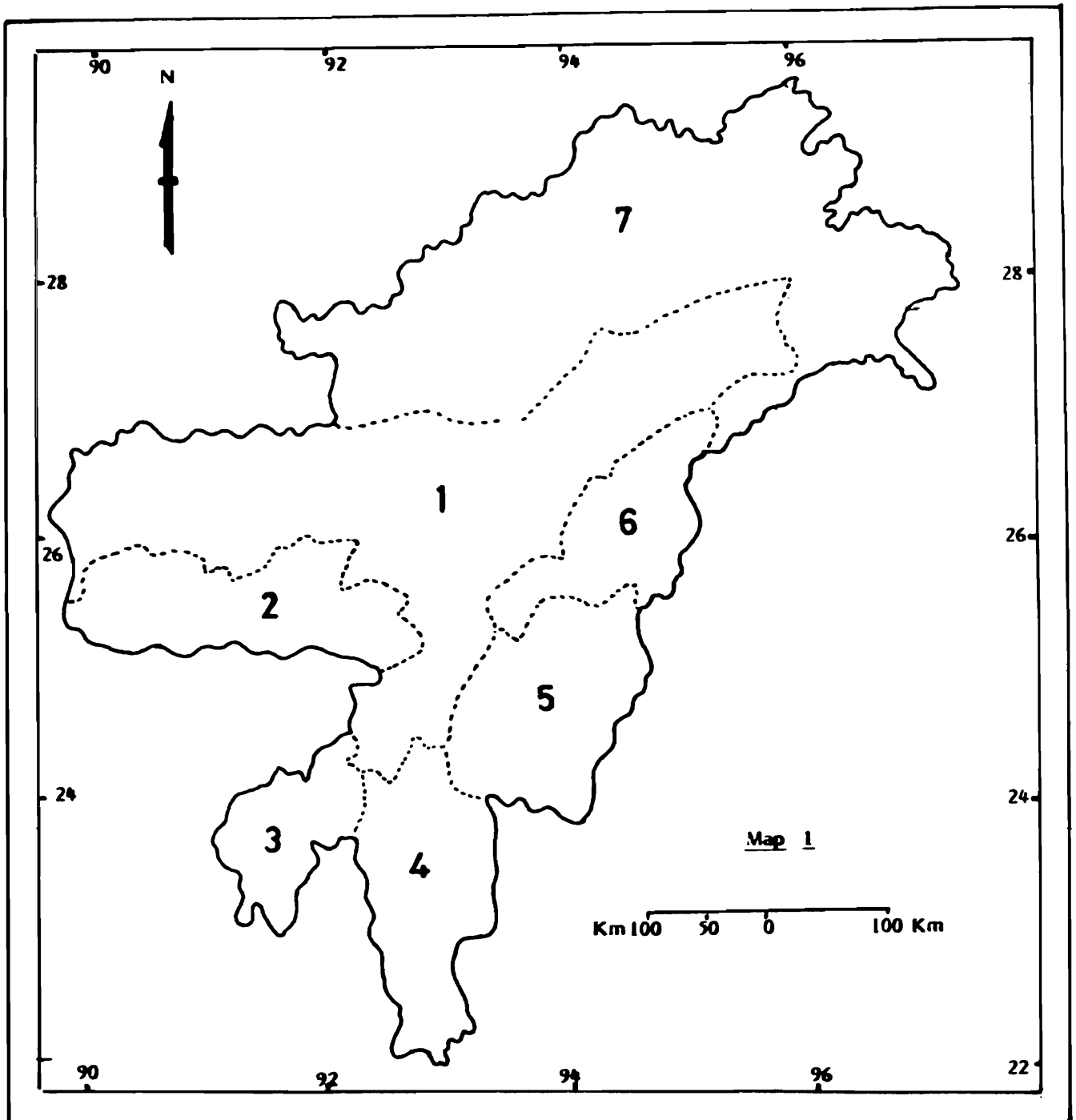
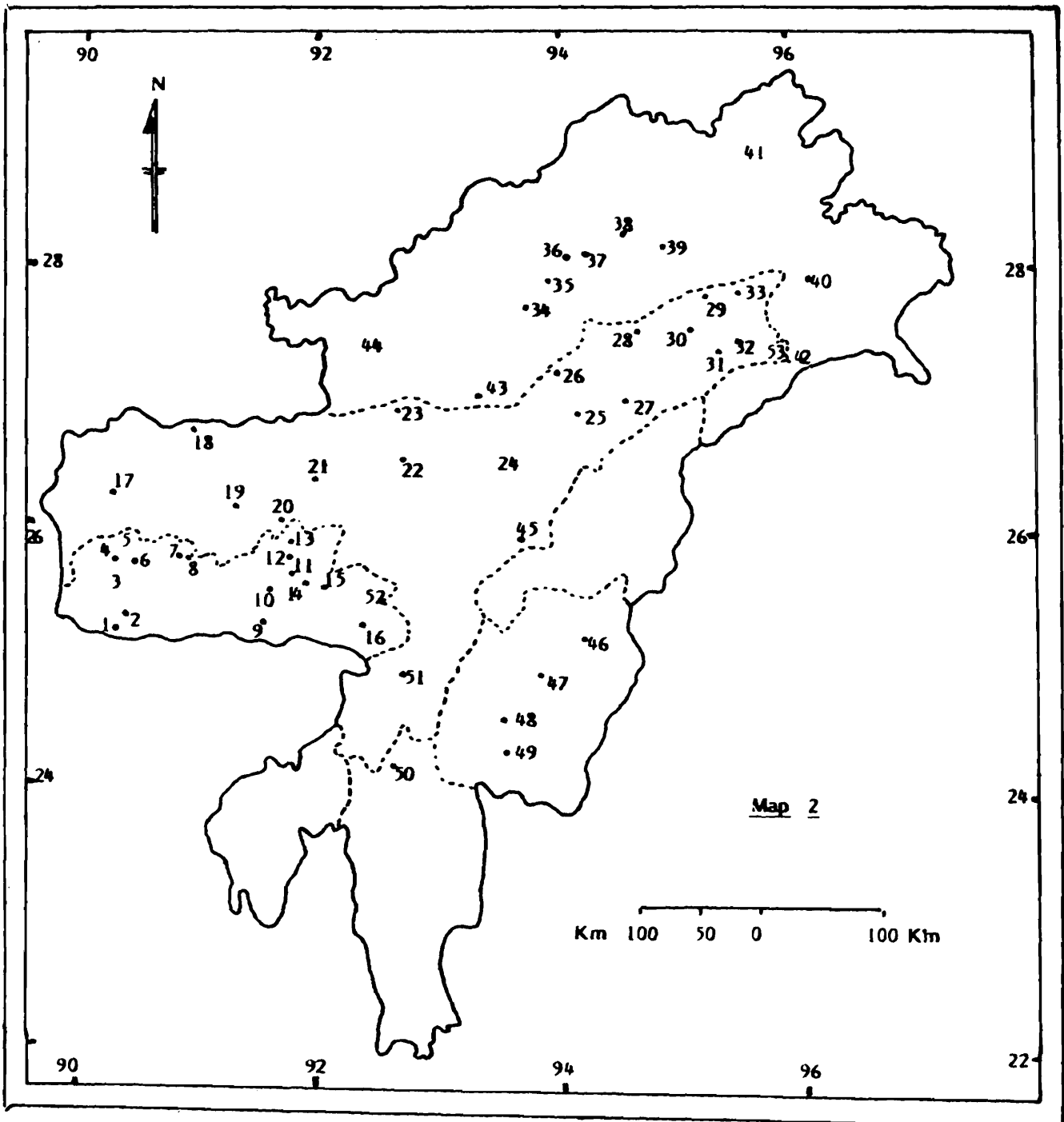


Fig. IV : Schematic representation of Gryllid genera common to 3 Northeast Indian states and to any two of them. (Shaded portion represents genera common to Arunachal Pradesh and Meghalaya).



**Map 1** Map of N E India showing the various states

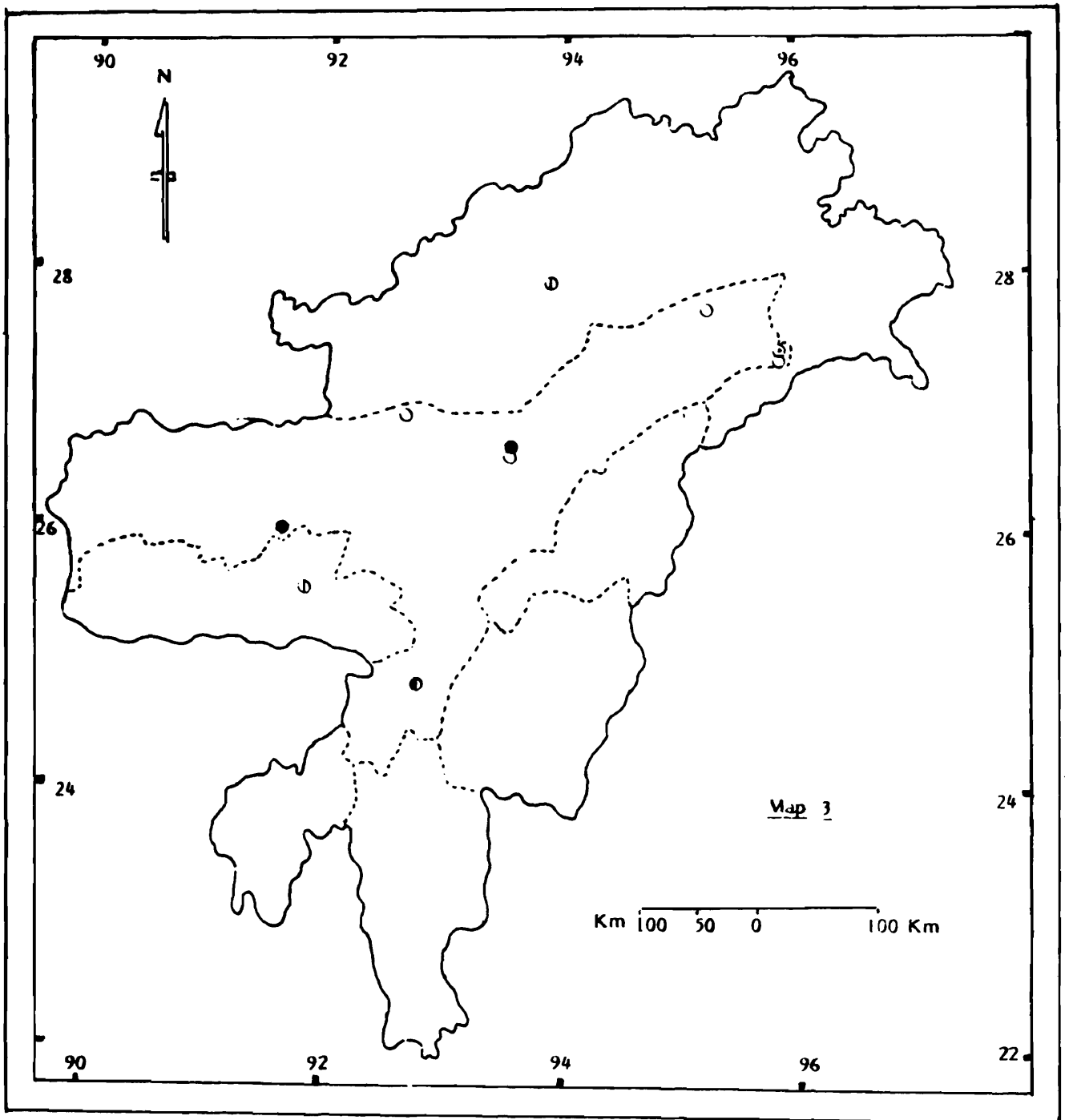
1. Assam; 2. Meghalaya; 3. Tripura; 4. Mizoram; 5. Manipur; 6. Nagaland;  
7. Arunachal Pradesh.



Map 2 Map of N E India showing various collection localities

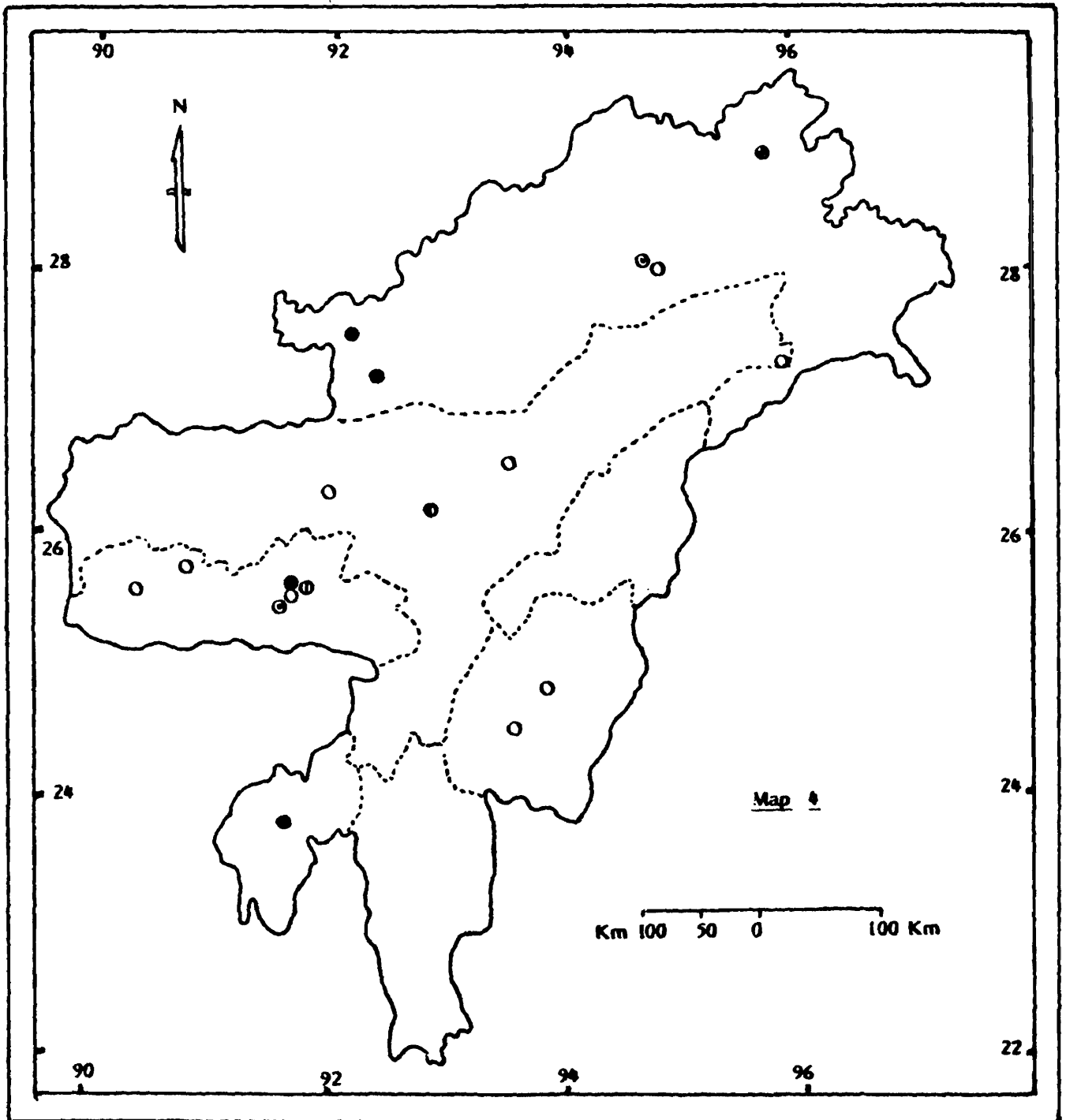
1. Baghmara; 2. Siju caves; 3. Arivila forest; 4. Rongram; 5. Darugiri forest;
6. Rongrengiri; 7. Songsok; 8. Rongjeng; 9. Cherrapunjee; 10. Mawphlang;
11. Shillong; 12. Umsning; 13. Nongpoh; 14. Mawryngkeng; 15. Thadlaskein;
16. Sonapurdi; 17. Goalpara; 18. Mothonguri; 19. Kahitama; 20. Guwahati;
21. Mangaldai; 22. Tezpur; 23. Missamari; \*24. Kaziranga National Park;
25. Jorhat; 26. North Lakhimpur; 27. Sibsagar; 28. Lekhabali; 29. Kobo;
30. Chabua; 31. Tinsukia; 32. Doom Dooma; 33. Sadiya; 34. Ziro;
35. Tamen; 36. Daporizo; 37. Taliha; 38. Kambang; 39. Basar; 40. Teju;
- \*41. Mishmi hills; \*42. Tirap District; 43. Kimin; \*44. Kameng District;
45. Dimapur; 46. Ukhrul; 47. Imphal 48. Moirang; 49. Churachandpur;
50. Kolasib; 51. Silchar; 52. Garampani; 53. Ledo.

(\* Precise localities not known)



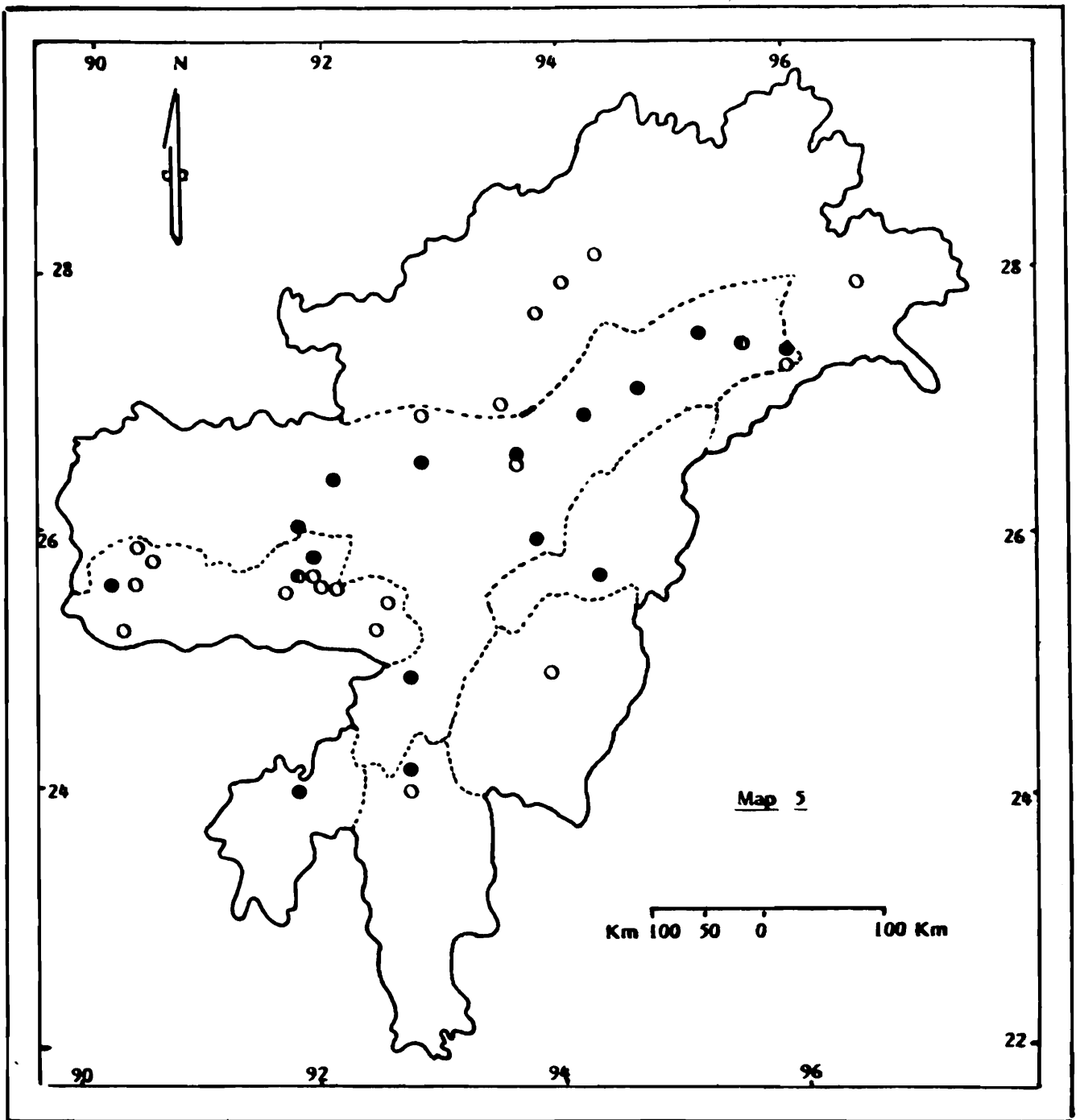
Map 3 Map of N E India showing distribution of

⊕ *Myrmecophilus* Berthold   ⊙ *Cycloptiloides* Sjostedt   ⊖ *Acanthoplistus*  
 Saussure   ○ *Scleropterus* Hann   ● *Cachoplistus* Saussure



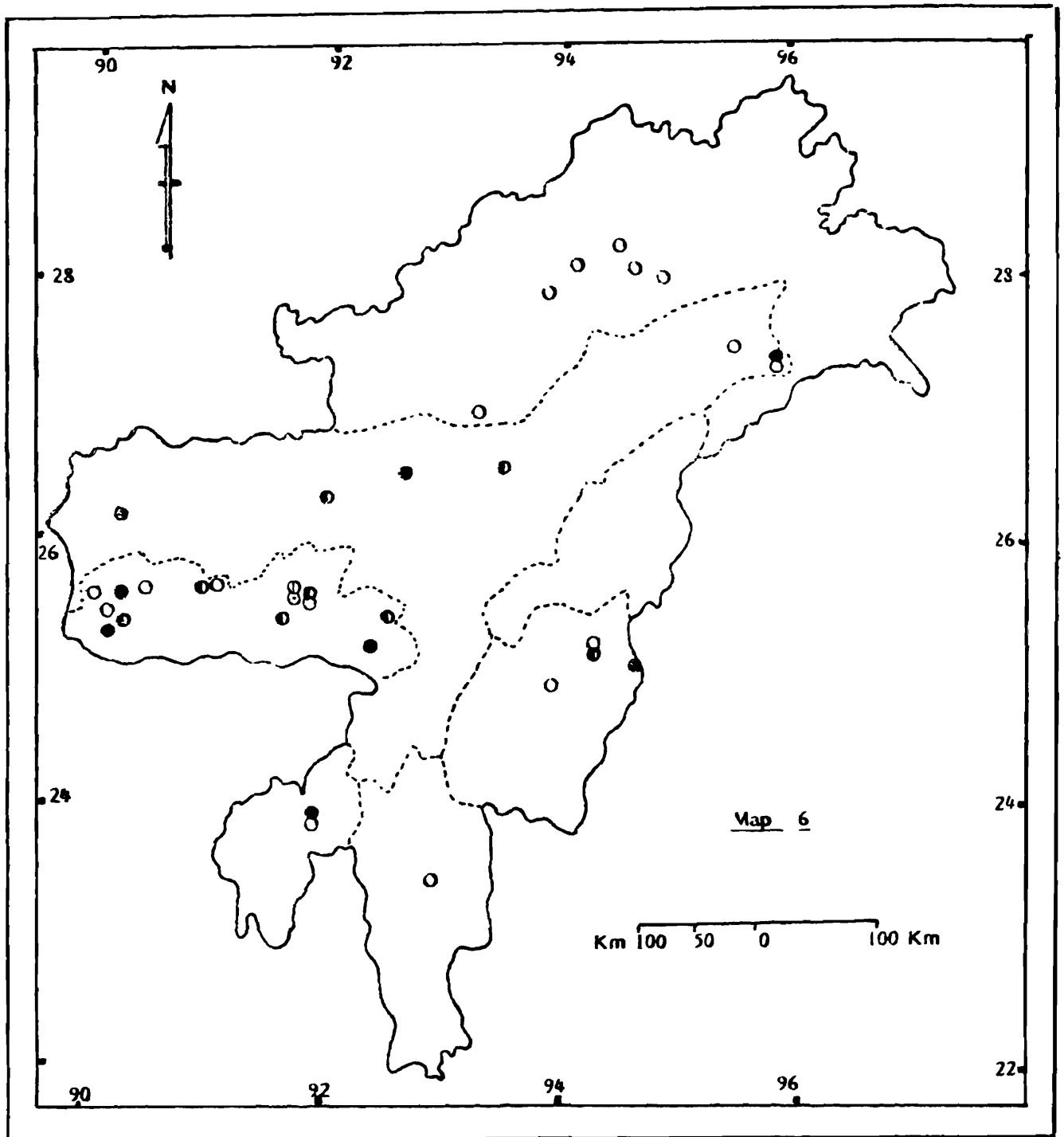
Map 4 : Map of N E India showing distribution of :

- ⊙ *Landreva Walker*    ⊕ *Sopinogryllus gen. nov.*    ● *Gryllus Linnaeus*  
 ⊖ *Lenigryllus Chopard*    ⊕ *Cophogryllus Saussure*    ○ *Modicogryllus Chopard*



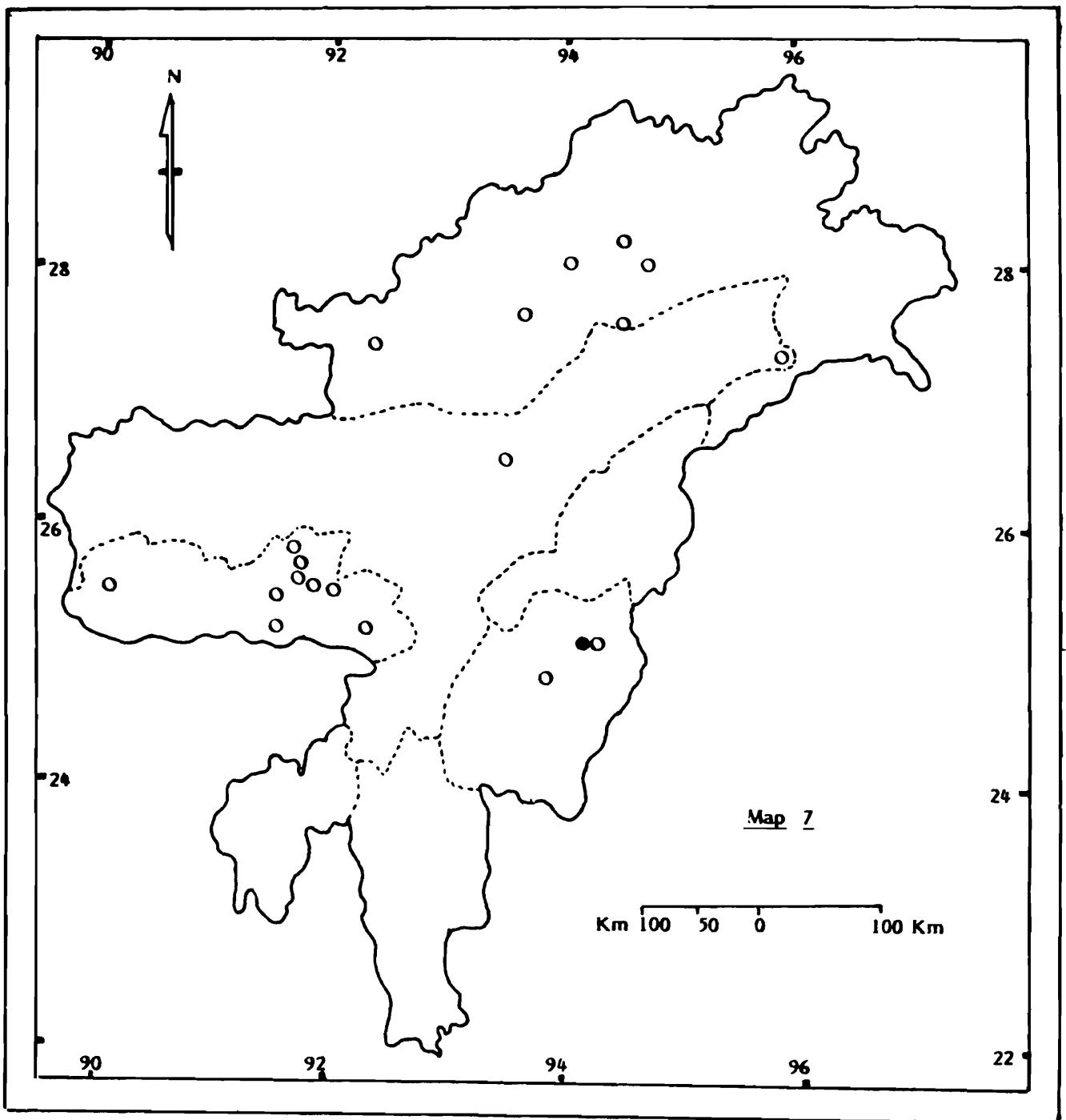
**Map 5** Map of N E India showing distribution of

● *Brachytrupes* Serville ● *Gymnogryllus* Saussure ○ *Velarifictorus* Randell

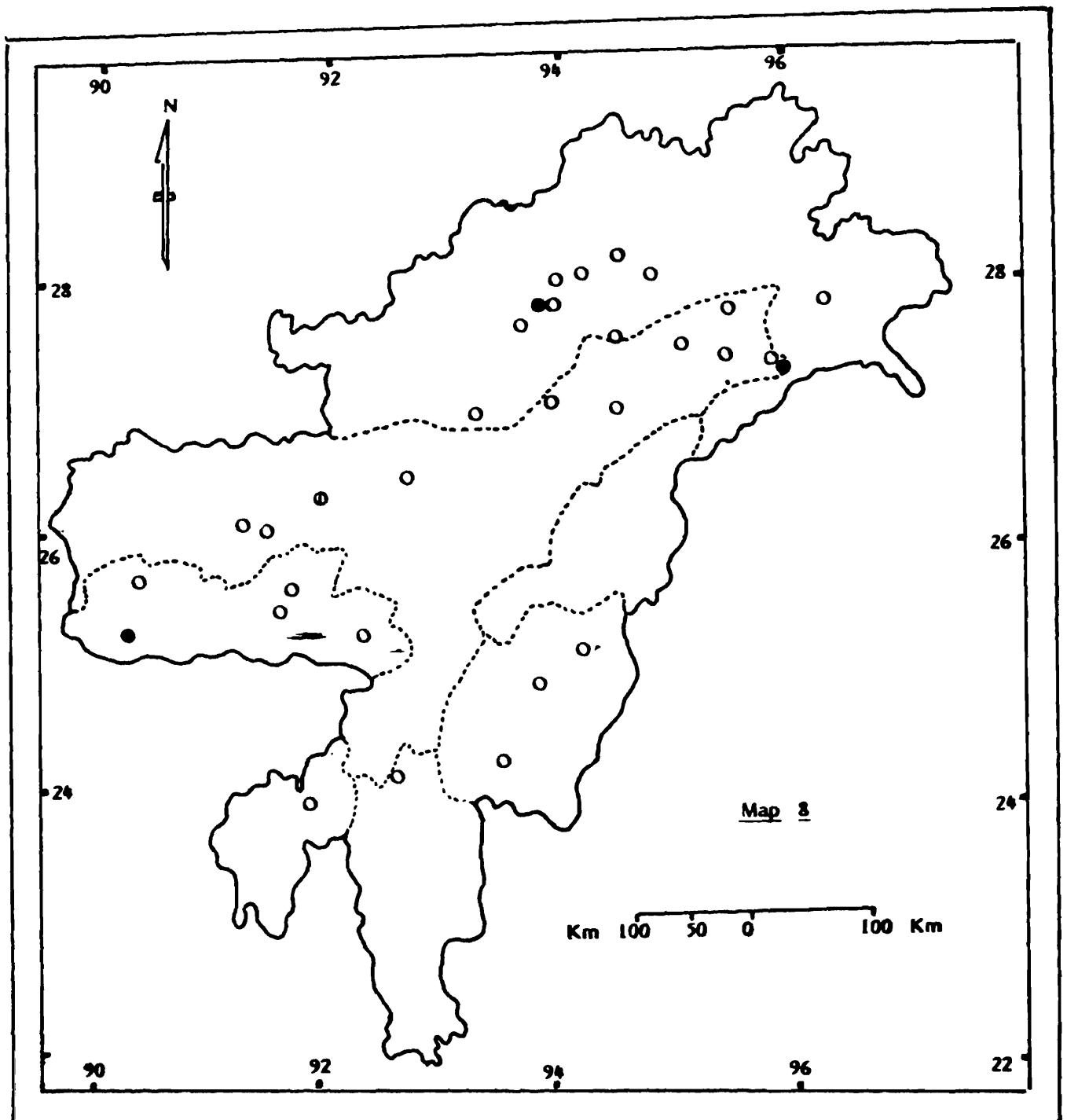


Map 6 Map of N E India showing distribution of

- *Grylloides* Saussure ● *Turanogryllus* Tarbinskii ○ *Loxoblemmus* Saussure  
 ⊕ *Stephoblemmus* Saussure ⊖ *Parasciobia* Chopard

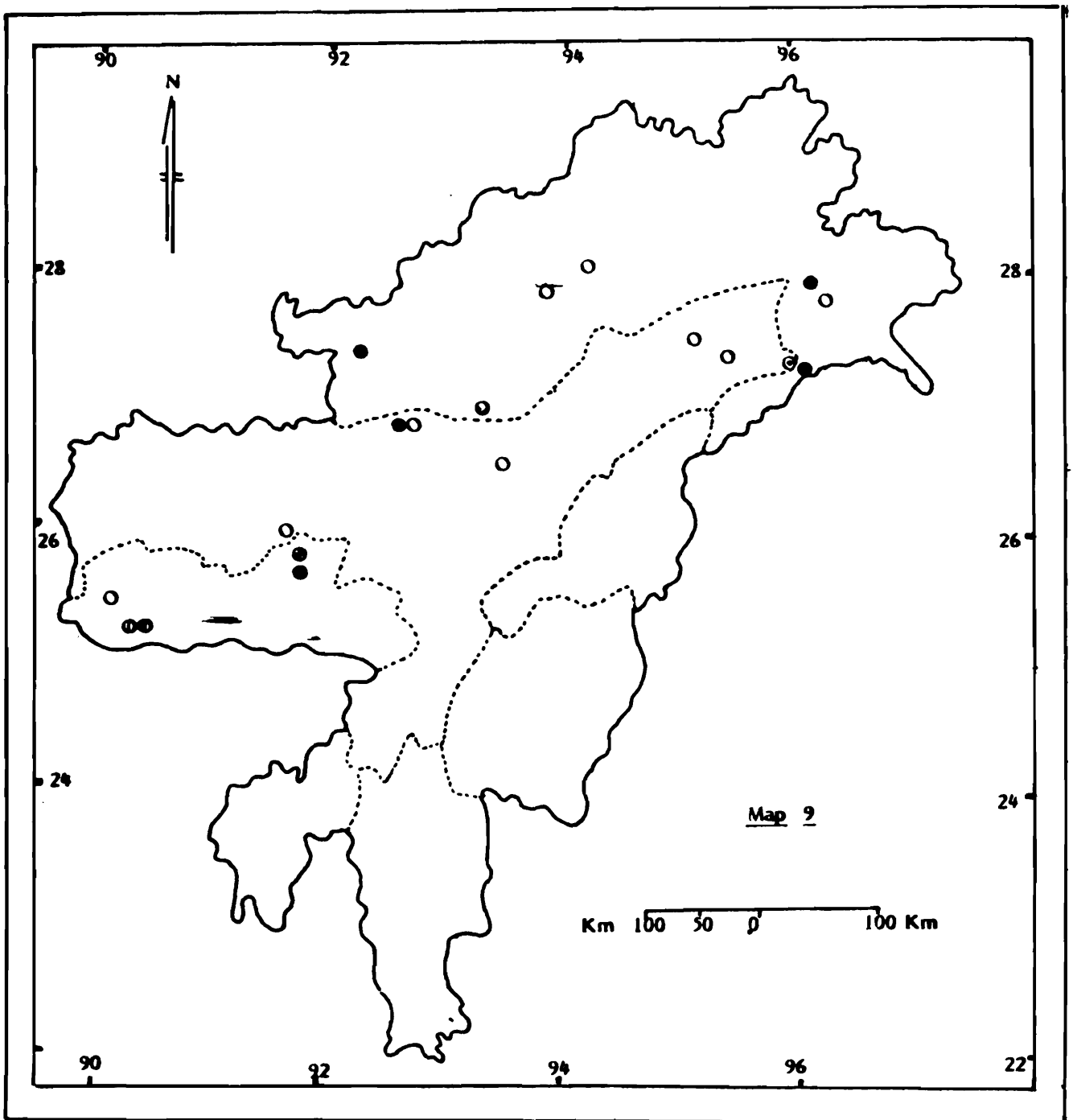


Map 7 Map of N E India showing distribution of  
● *Plebeigryllus* Randell ○ *Teleogryllus* Chopard



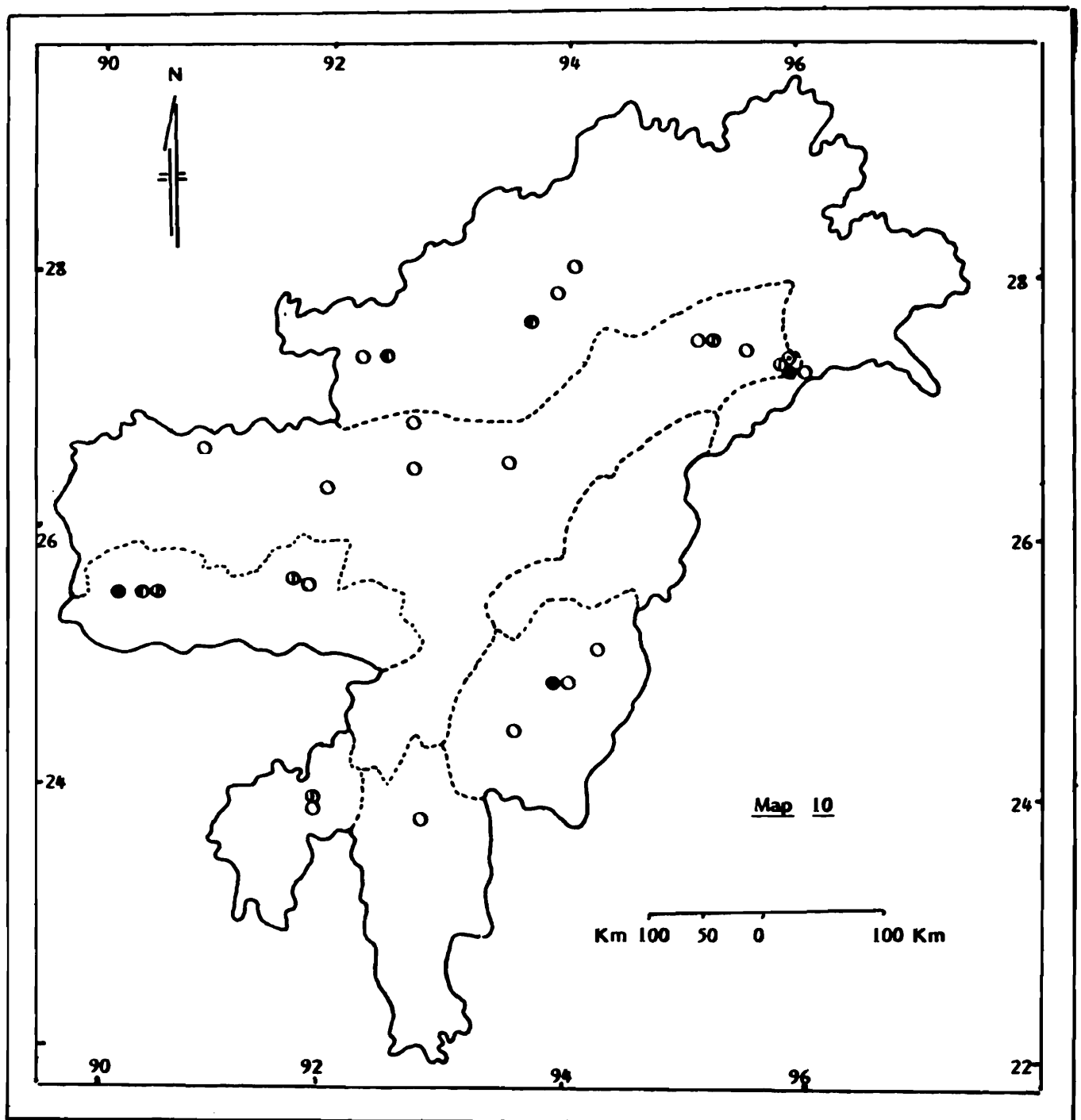
Map 8 Map of N E India showing distribution of :

⊙ *Scottiella Uvarov* ○ *Pteronemobius Jacobson and Bianchi* ● *Speonemobius Chopard*



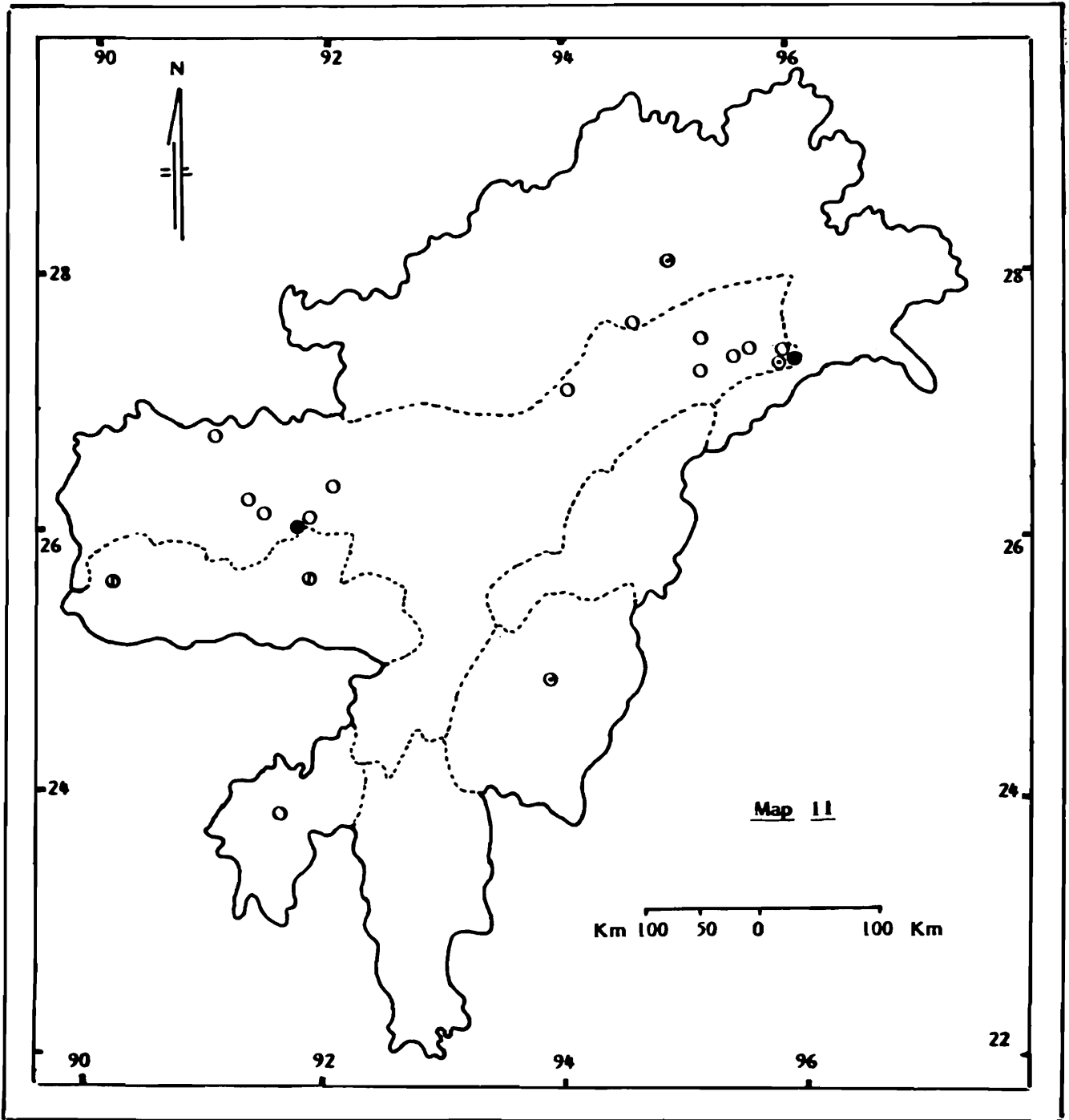
Map 9 Map of N E India showing distribution of

- *Oecanthus* Serville    ⊕ *Larandopsis* Chopard    ⊕ *Homoeogryllus* Guerin
- ⊖ *Kempiola* Uvarov    ○ *Homoeoxipha* Saussure    ⊙ *Paratrigonidium* Brunner



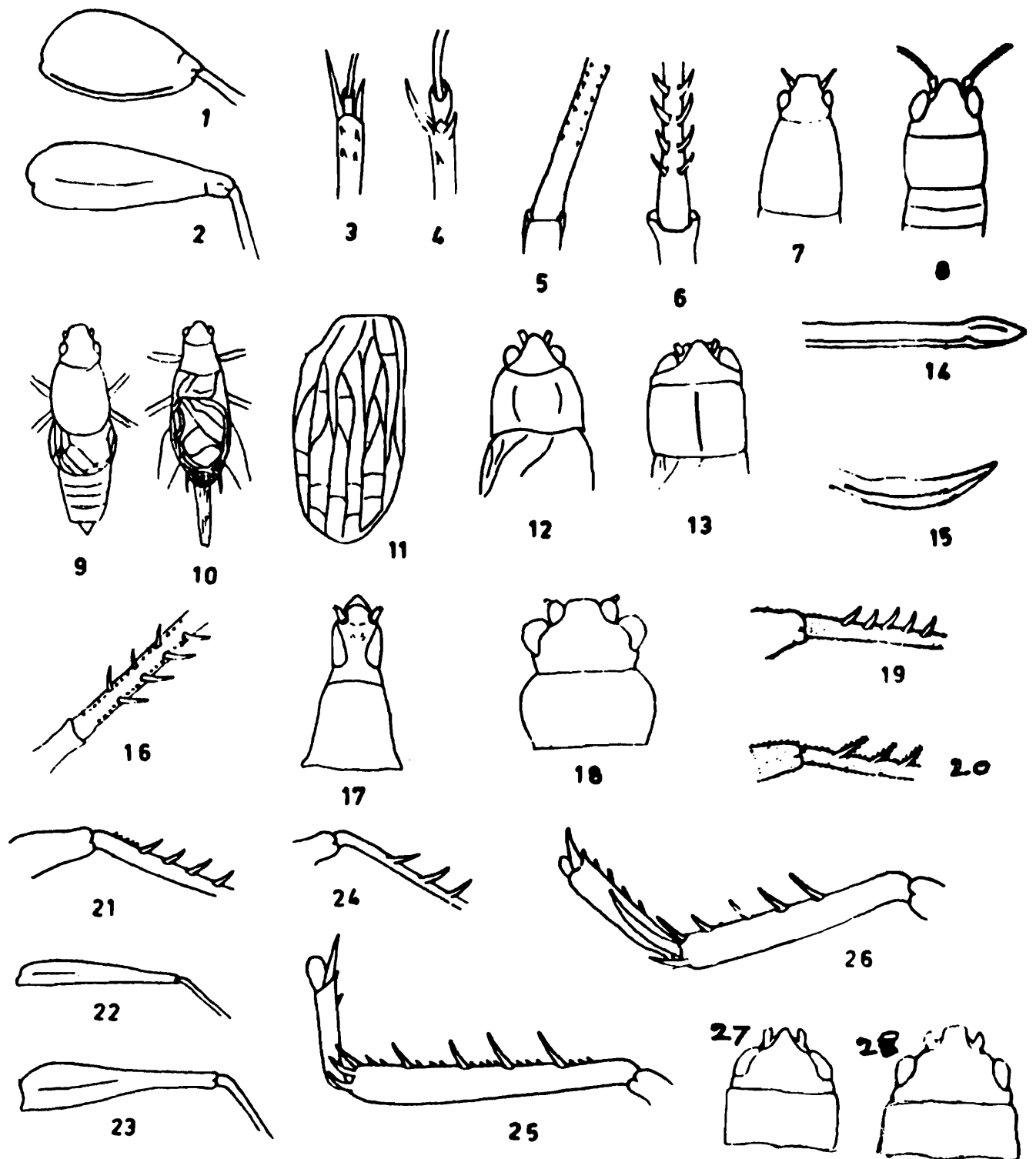
Map 10 Map of N E India showing distribution of

● *Anaxipha* Saussure ○ *Trigonidium* Rambur ⊙ *Metioche* Stål ● *Calyptotrypus* Saussure ⊕ *Madasumma* Walker

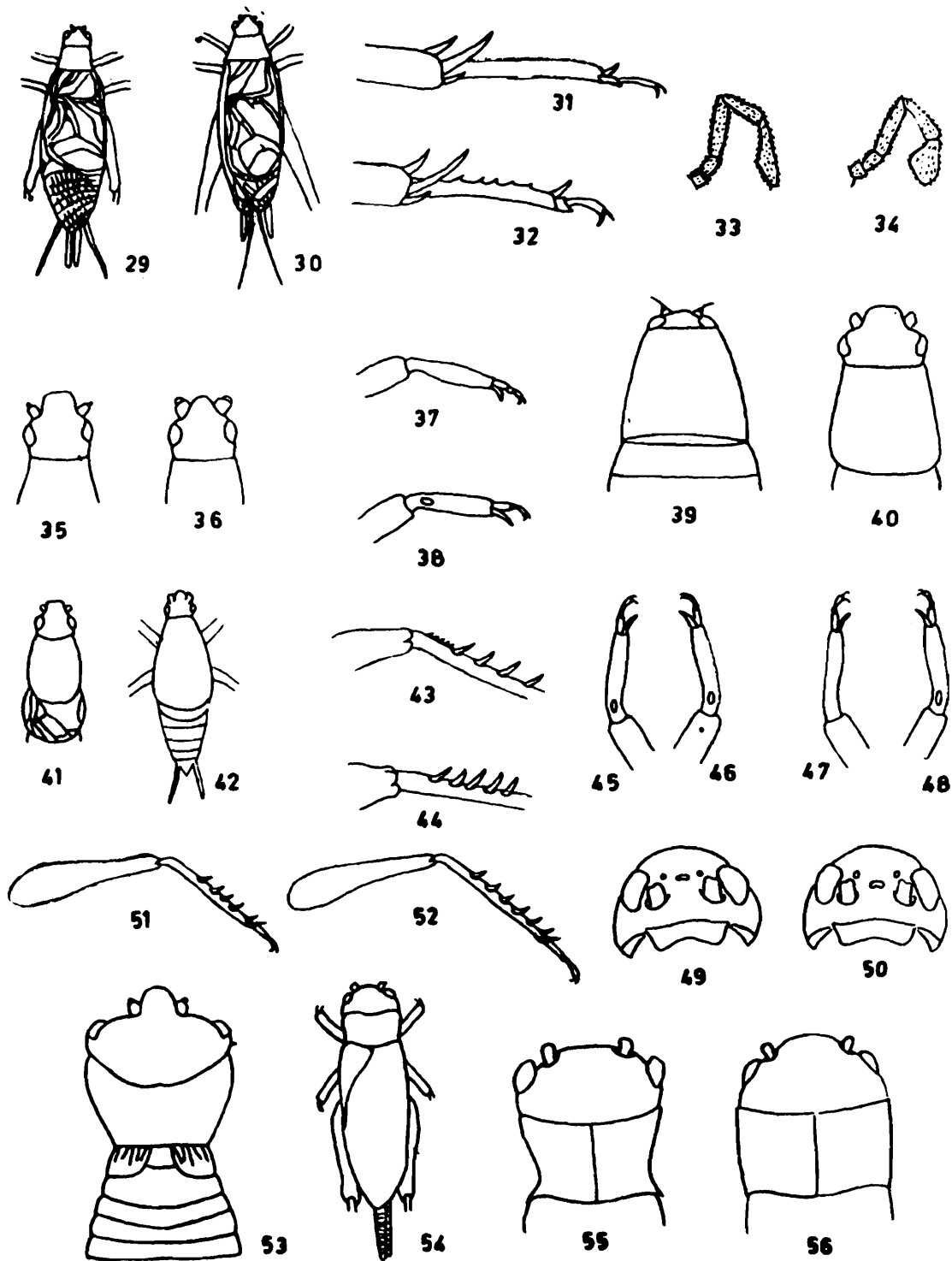


Map 11 Map of N E India showing distribution of

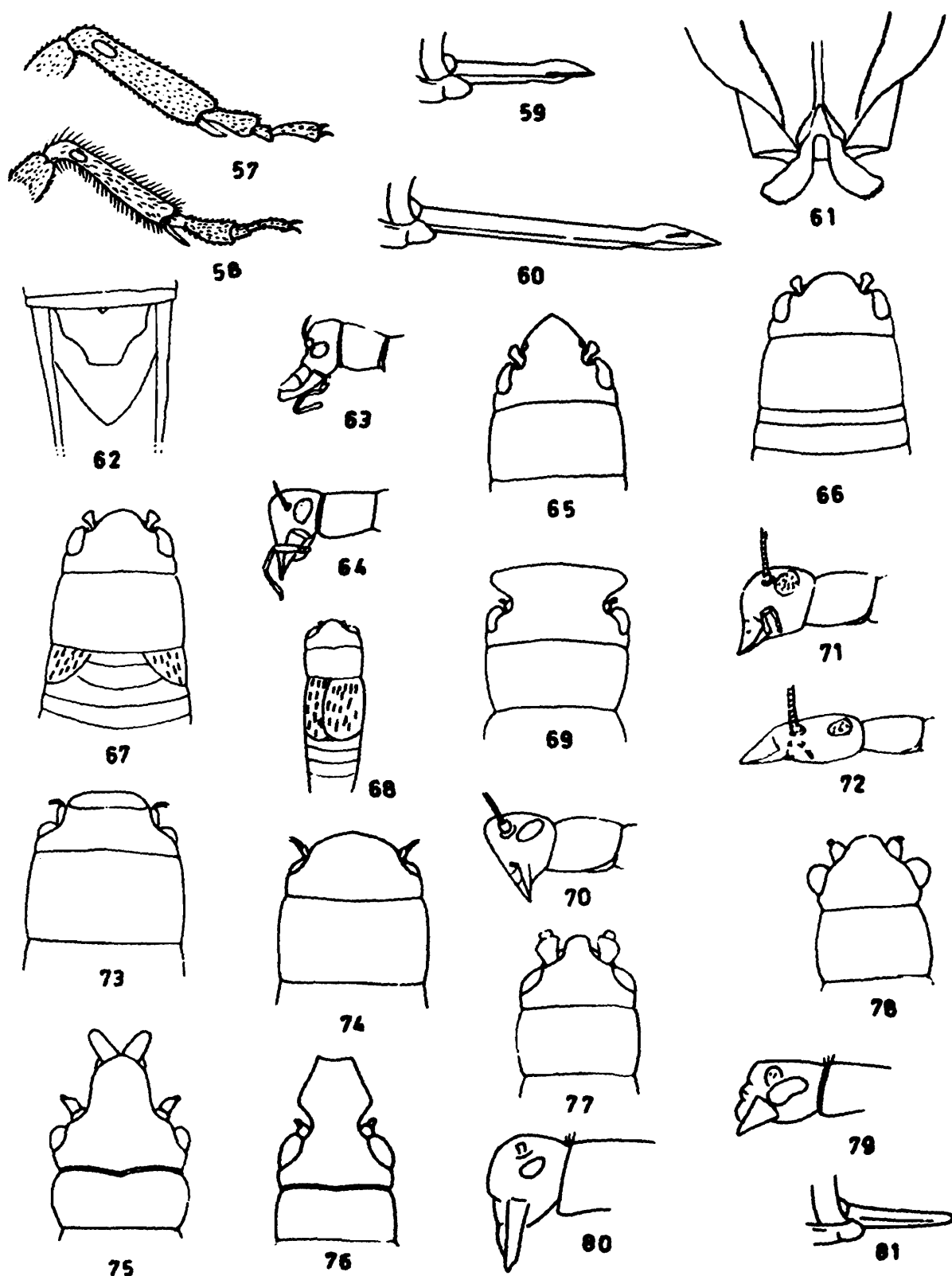
⊙ *Xenogryllus Bolivar* ⊕ *Itara Walker* ● *Patiscus Stål* ○ *Euscyrtus Guerin*



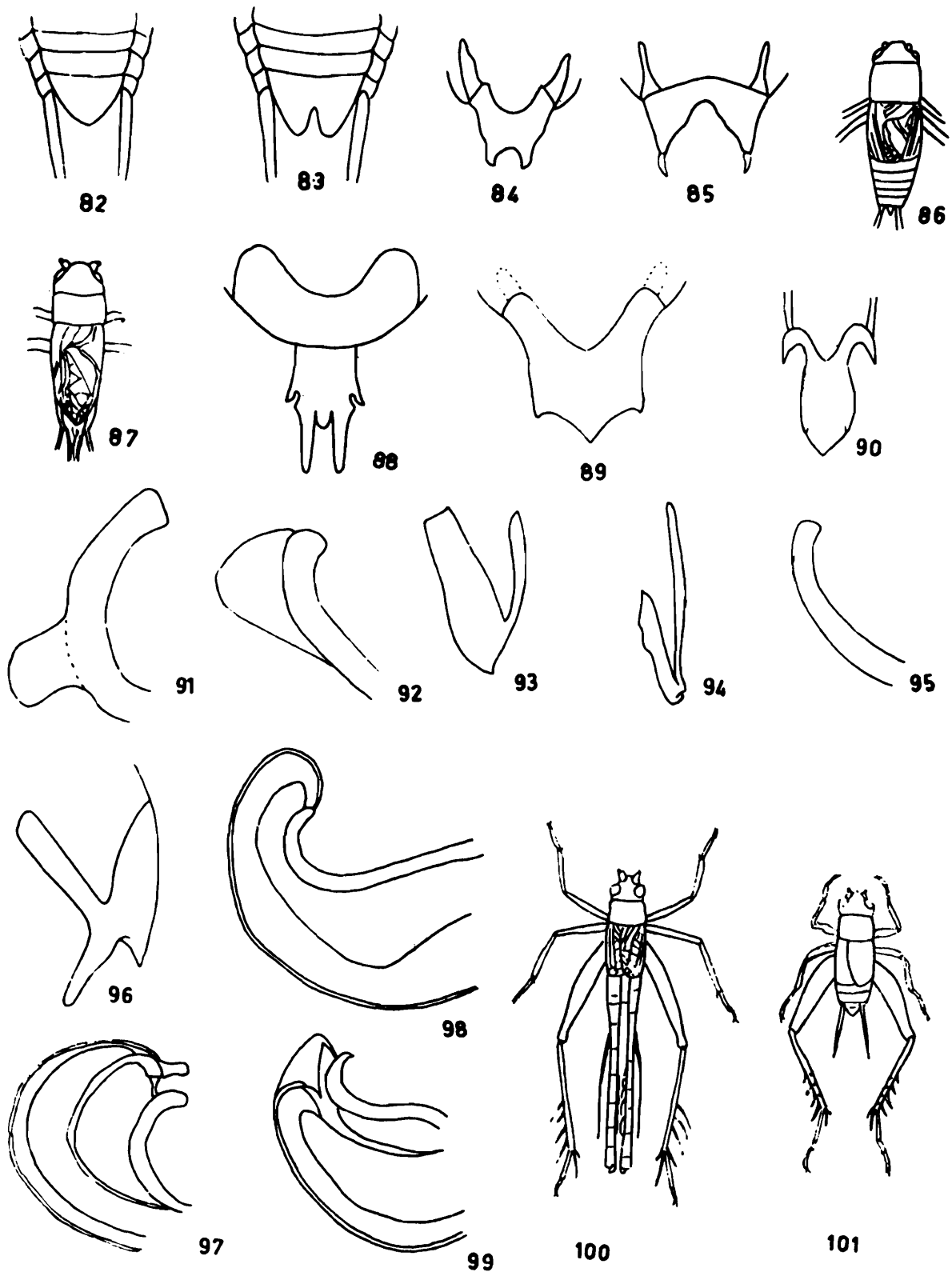
Figs. 1-28 : Generalised figures. 1,2 : Posterior femur - broad and slender, respectively; 3,4 : Second tarsal segment of posterior leg - compressed and depressed, respectively ; 5 : Posterior tibia with denticles ; 6 : Posterior tibiae with spines ; 7 : Frontal rostrum wide ; 8 : Frontal rostrum narrow ; anterior abdominal segments ; 9 : Male with short tegmina ; 10 : Male with fully developed tegmina ; 11 : Male tegmina without mirror ; 12 : Pronotum - carinated edges ; 13 : Pronotum rounded edges ; 14, 15 : Ovipositor differentiated and undifferentiated apical valves, respectively ; 16 : Posterior tibia with spines and denticles ; 17 : Head and pronotum elongated ; 18 : Head and pronotum - rounded ; 19, 20, 21 : Posterior tibia with hairless spines, hairy spines, and spines and basal denticles, respectively ; 22, 23 : Posterior femur - feebly swollen basally and strongly swollen basally, respectively ; 24 : Posterior tibia with 3 spines on each margin ; 25 : Posterior tibia with subequal apical spurs, short posterior metatarsus ; 26 : Posterior tibia with unequal apical spurs, long metatarsus ; 27 : Frontal rostrum narrowing in front ; eyes projecting forward ; 28 : Frontal rostrum parallel ; eyes projecting laterally.



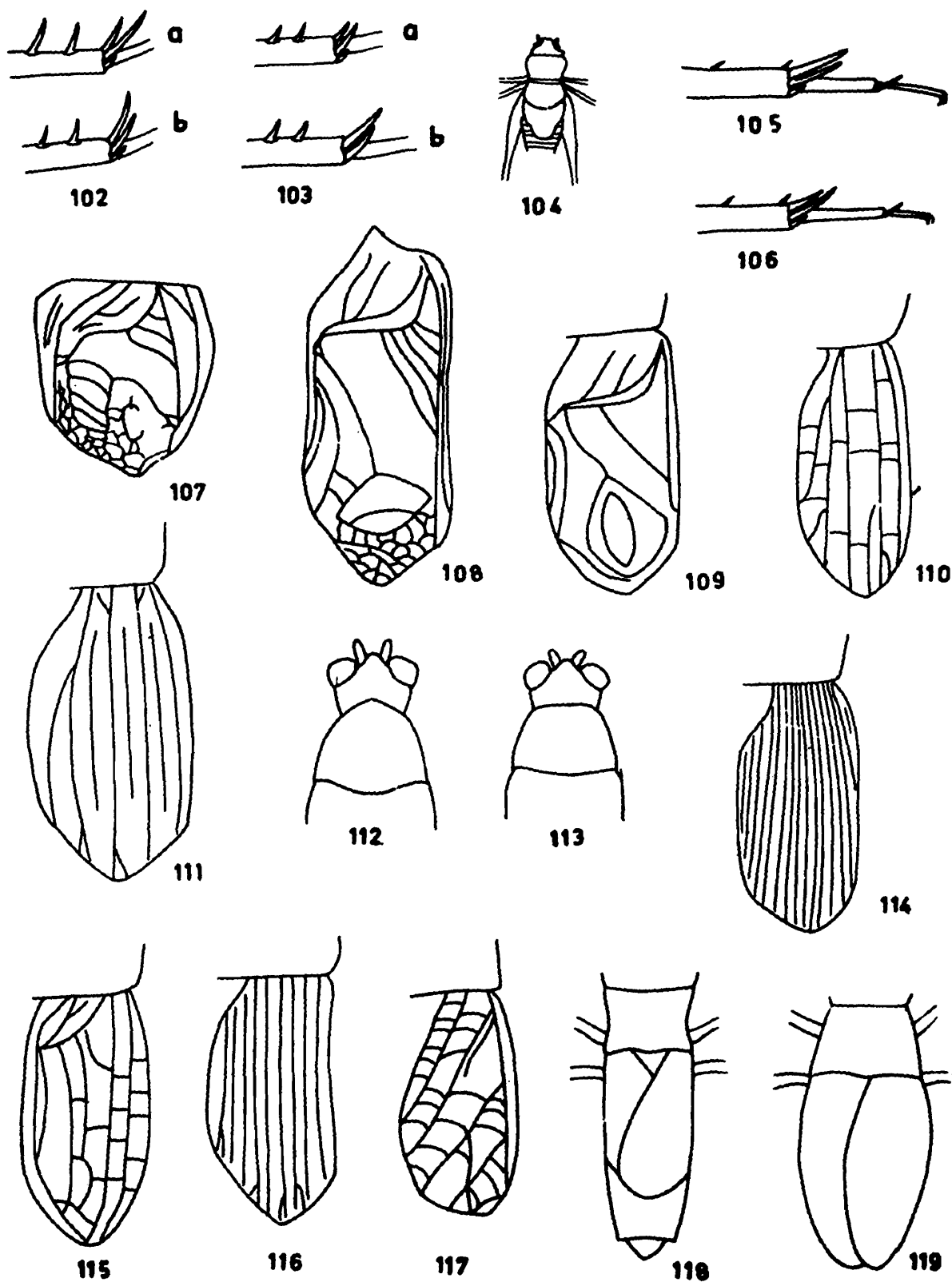
Figs. 29-56 : Generalised figures. 29,30 : Male tegmina with several and 2 oblique , veins, respectively ; 31, 32 : Posterior metatarsus- feebly and strongly denticulated above, respectively ; 33 : Maxillary palpus 5th segment widened, short ; 34 : Maxillary palpus 5th segment narrow, long ; 35,36 : Frontal rostrum wide and narrow, respectively ; 37,38 : Anterior tibia unperforated and perforated, respectively ; 39, 40 : Pronotum strongly narrowing anteriorly and very feebly narrowing anteriorly, respectively ; 41,42 : Male tegmina- largely exposed and concealed, respectively ; 43, 44 : Posterior tibia with serrulation at base and without serrulation, respectively ; 45,46: Anterior tibia with tympanum on each face ; 47,48 : Anterior tibia with external tympanum only ; 49,50 : Head with ocelli in a straight line and in a triangle, respectively ; 51 : Posterior femur = posterior tibia + metatarsus ; 52: Posterior femur < posterior tibia + metatarsus; 53 : Pronotum strongly widening and concave anteriorly ; abdomen basally narrow ; short tegmina ; 54 : Pronotum weakly widening and concave anteriorly ; abdomen basally not narrow ; well developed tegmina and wings ; 55,56: Pronotum strongly widening, and weakly widening anteriorly, respectively.



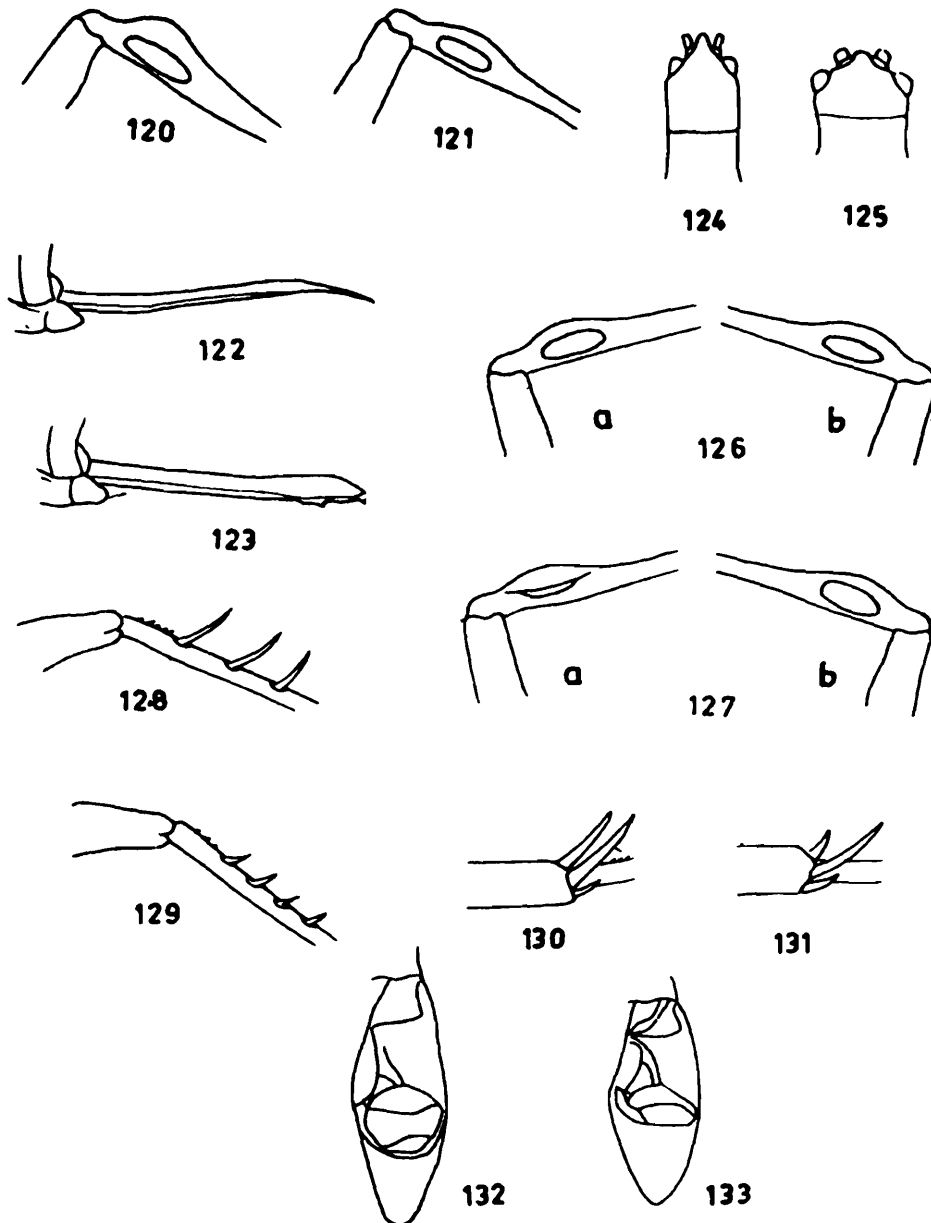
Figs. 57-81 : Generalised figures. 57,58 : Anterior, middle tibia without long hairs and with long hairs, respectively ; 59,60 : Ovipositor- short and long, respectively ; 61 : Supra-anal plate with sclerotised structure ; 62 : Supra-anal plate normal ; 63,64 : Face concave and convex, respectively ; 65,66 : Frontal rostrum with and without prolongation, respectively ; 67,68 : Tegmina - very short and a little longer, respectively ; 69 : Frontal rostrum with process ; 70 : Face strongly flattened ; 71 : Face slightly concave ; antennae inserted above middle of face ; 72 : Antennae inserted beneath middle of face ; 73,74 : Frontal rostrum with and without apical depression, respectively ; 75,76 : Process of frontal rostrum divided and entire, respectively ; 77,78 : Frontal rostrum narrow and wide, respectively ; 79, 80: Head - dorsally flattened and rounded, respectively ; 81 : Ovipositor rudimentary.



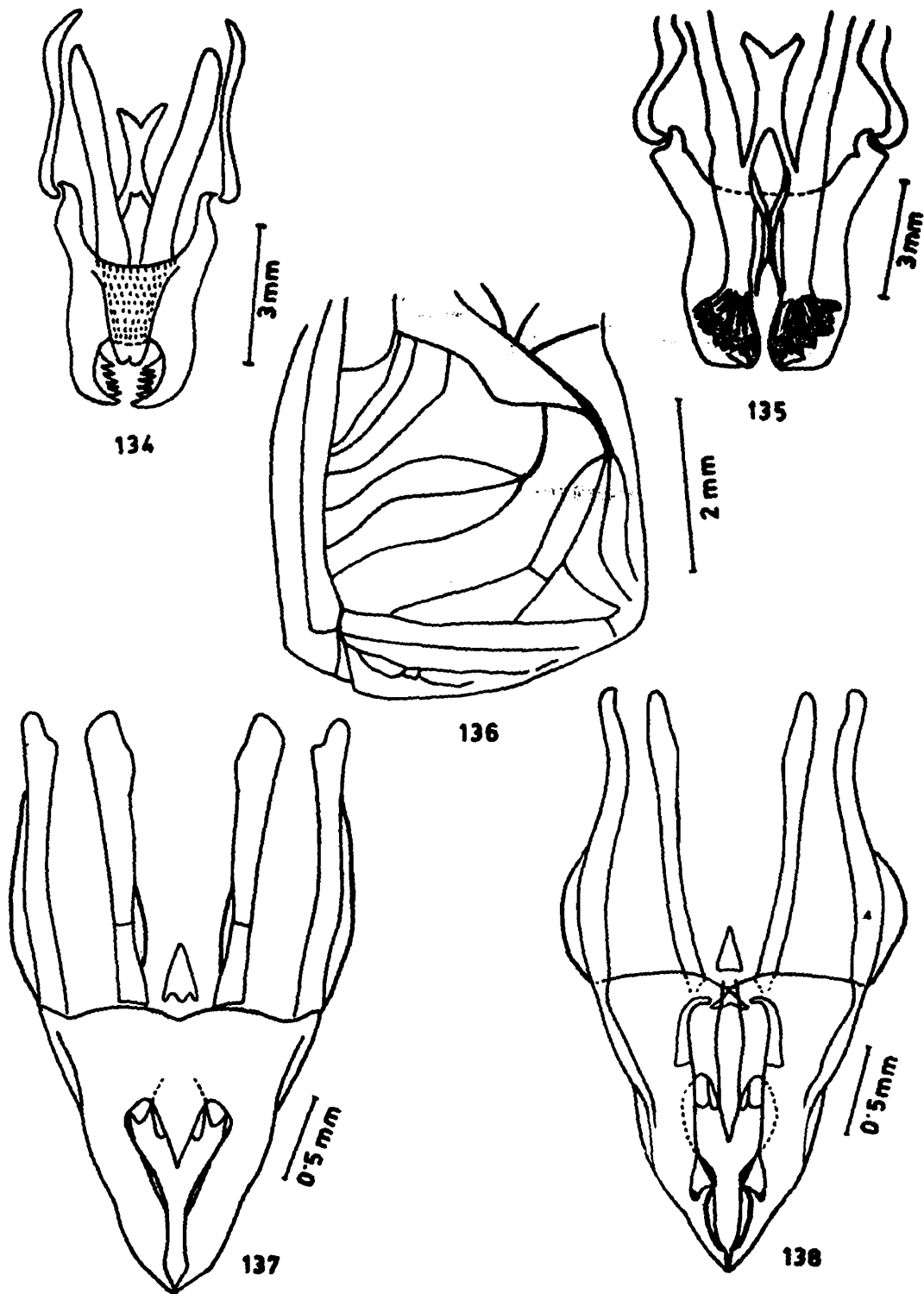
Figs. 82-101 : Generalised figures. 82,83 : subgenital plate unnotched and notched, respectively ; 84,85 : Epiphallus without and with styli, respectively, 86 : Male tegmina with confused mirror and reduced apical field ; 87 : Male tegmina with distinct mirror and apical field; 88 : Epiphallus not H-shaped ; 89 : Epiphallus not H-shaped ; trilobed ; 90 : Epiphallus not H-shaped ; 91 : Endoparamere with transverse parameral muscle apodeme; 92 : Endoparamere with parameral muscle insertion ; 93 : Subequal anterior projections of ectoparamere ; 94: Unequal anterior projections of ectoparamere ; 95 : Endoparamere without transverse parameral muscle apodeme ; 96 : Ectoparamere apex digitiform ; 97,98 : Virga with and without transverse parameral muscle insertion crest, respectively ; 99 : Virga with basal sclerotised structure ; 100 : Legs long ; 101 : Legs short.



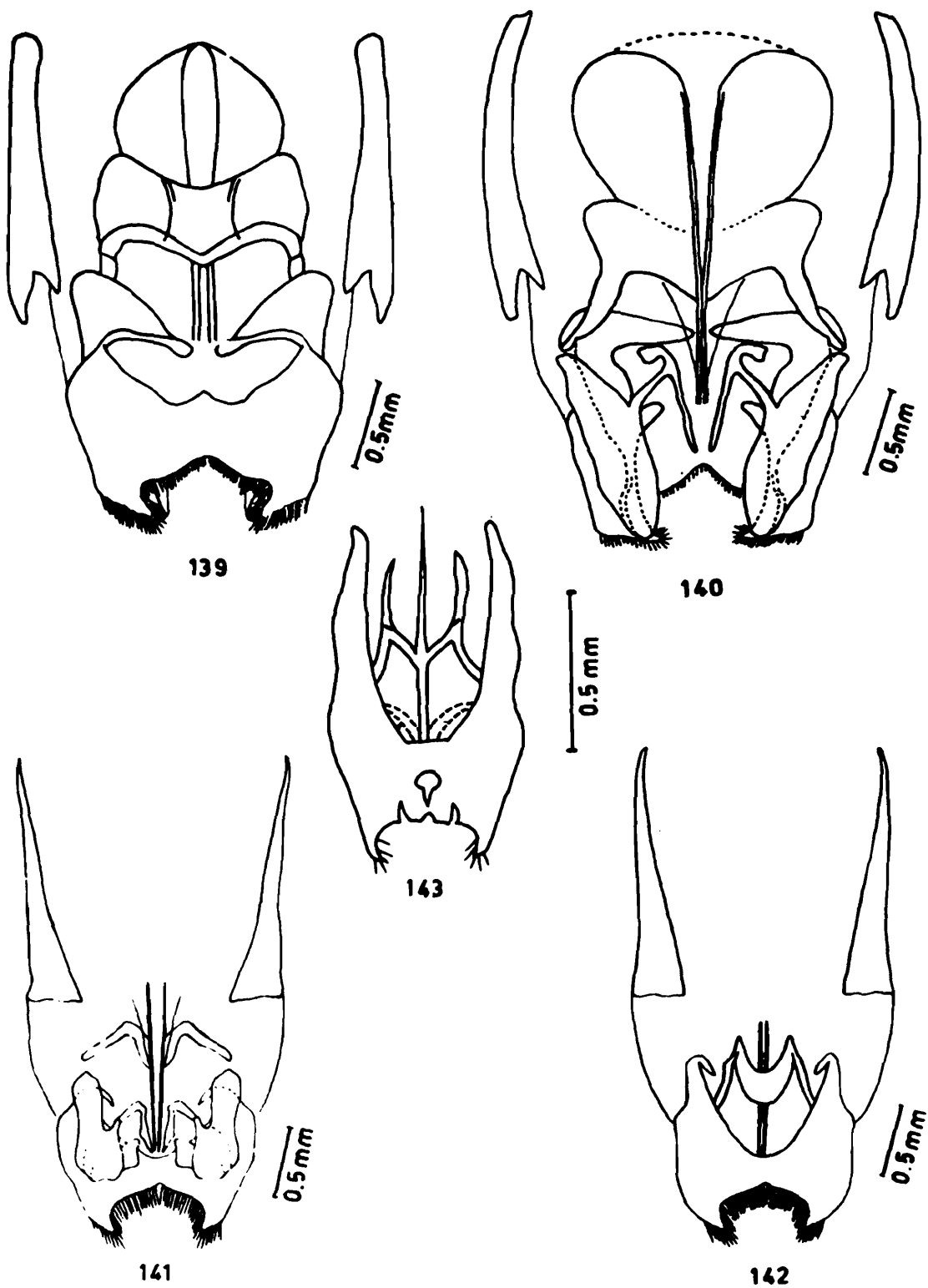
Figs. 102-119 : Generalised figures. 102a,b : Posterior tibia apical spurs 3 on each side; 103a,b : Posterior tibia apical spurs - 3 external, 2 internal ; 104 : First abdominal tergite shaped like triangular shield ; 105,106 : Posterior tibia supero-internal apical spur longer than and shorter than median, respectively ; 107 : Male tegmina with triangular and partly reticulated mirror ; 108 : Male tegmina without triangular and posteriorly reticulated mirror; 109 ; Male tegmina with anal field and mirror ; 110,111 : Tegmina without and with false veins, respectively ; 112,113 : Pronotum-rounded anteriorly and a little convex anteriorly, respectively ; 114 : Tegmina with numerous false veins ; 115 : Tegmina without clear-cut mirror ; 116 : Tegminal veins parallel, longitudinal ; 117 : Tegminal veins anastomosed ; 118,119: Body parallel-sided and convex-sided, respectively.



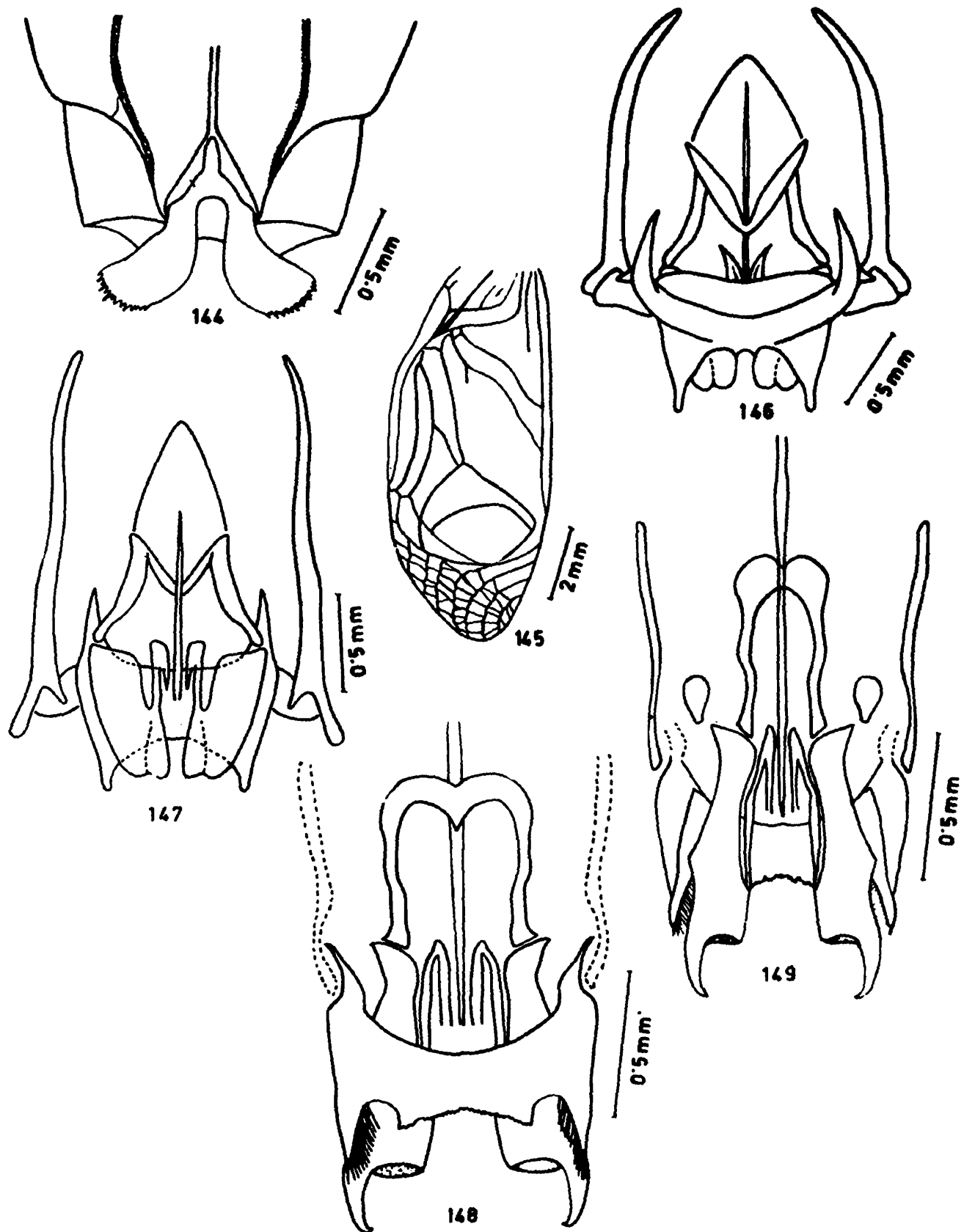
Figs. 120-133 : Generalised figures. 120,121 : Anterior tibia with strong and weak basal dilatation, respectively ; 122,123 : Ovipositor without and with distinct apical valves, respectively ; 124,125 : Head length to breadth ratio greater than 1 and less than 1, respectively; 126 a,b : Anterior tibia with oval tympanum on each face ; 127a, b : Anterior tibia with slit-like internal and oval external tympana ; 128,129: Posterior tibia with long and short spines, respectively ; 130,131 : Posterior tibia with long and short supero-internal apical spur, respectively; 132,133 : Male tegmina mirror with 1-3 and 1 dividing veins, respectively.



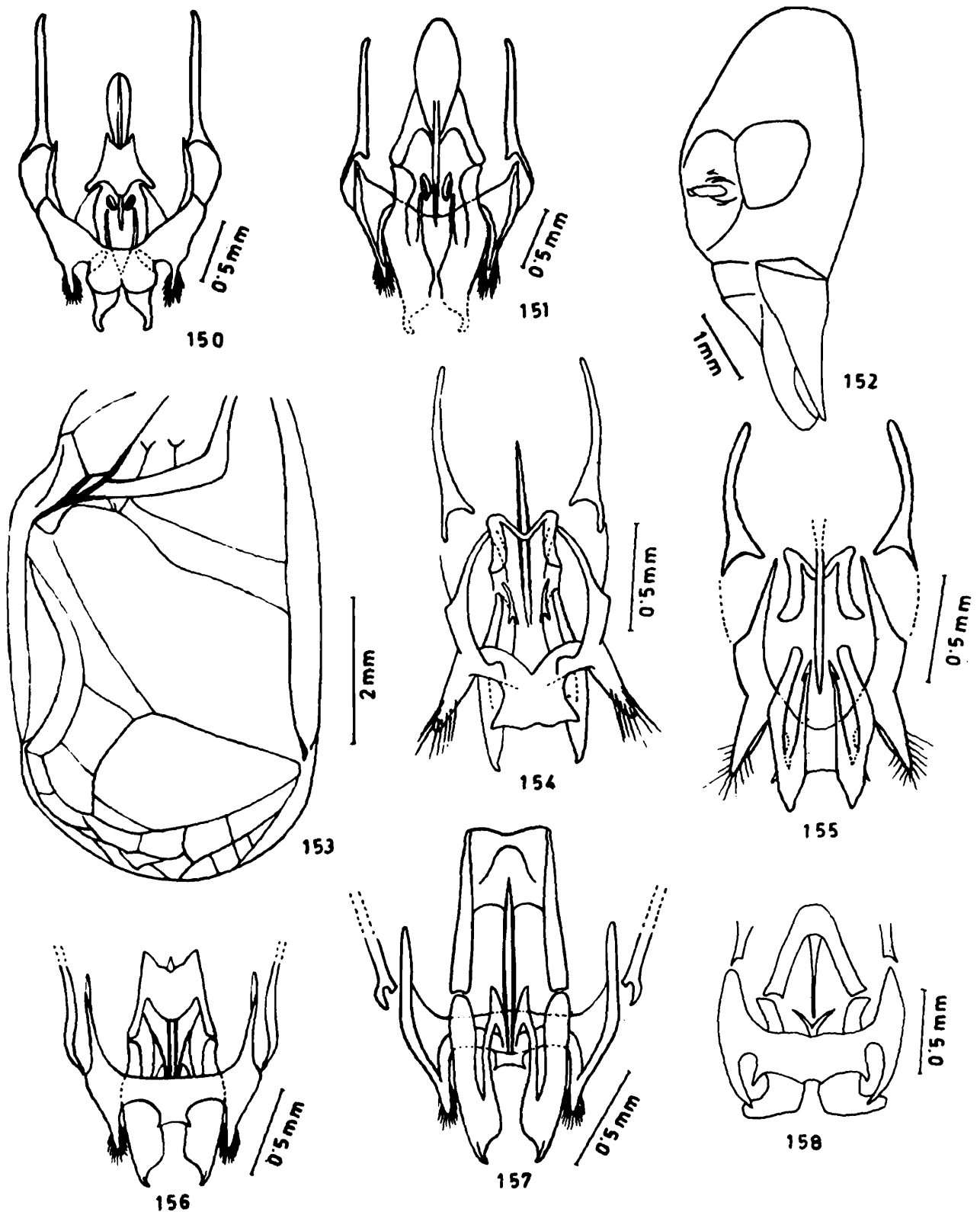
Figs. 134-138 ; 134,135 : Male genitalia of *Cachoplistus rogenhoferi* Saussure - dorsal view and ventral view, respectively ; 136 : Left male tegmen of *Landreva indica* sp. nov. ; 137,138 : Male genitalia of *L. indica* sp. nov.- dorsal and ventral view, respectively.



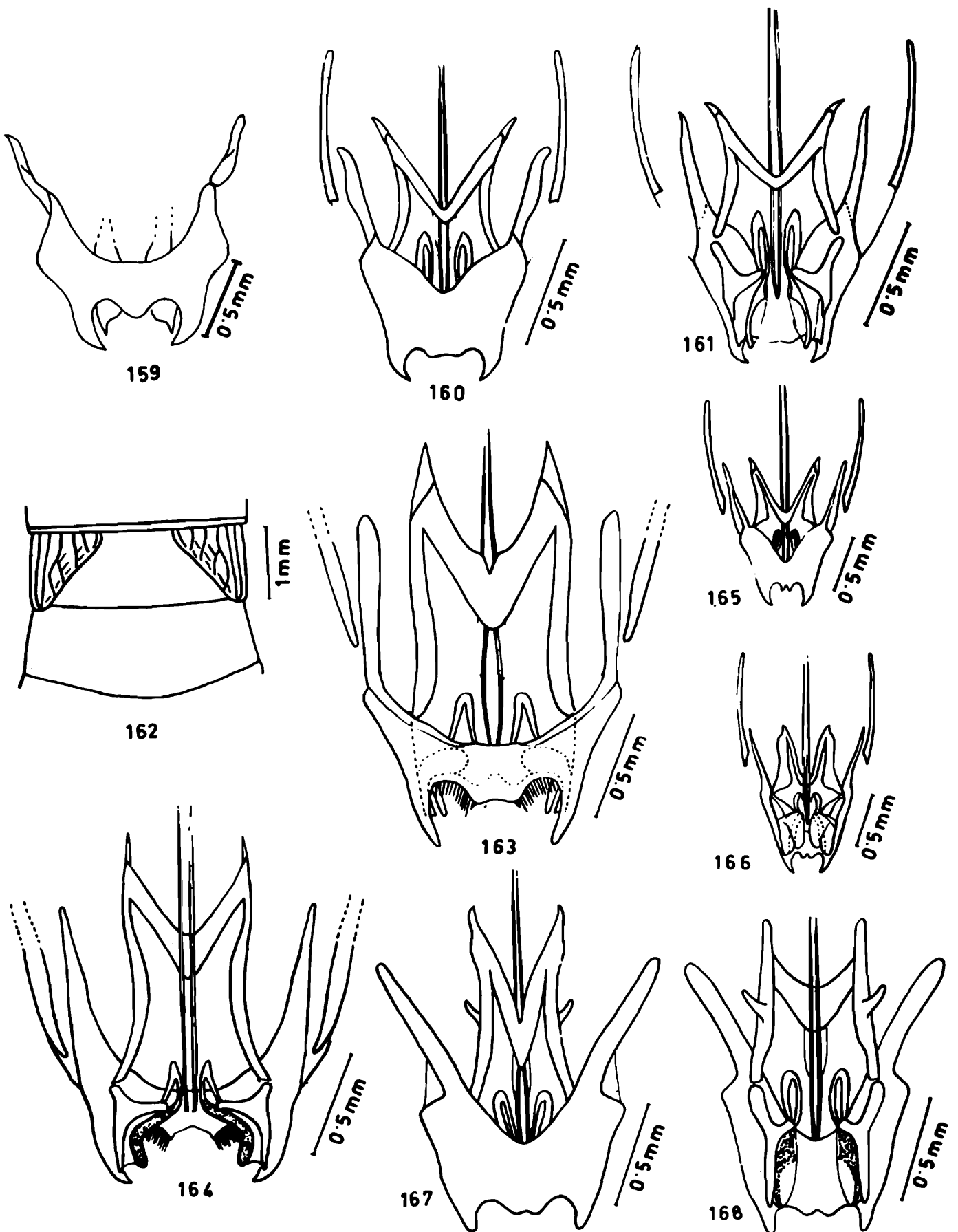
Figs. 139-143 ; 139,140 : Male genitalia of *Brachytrupes portentosus* (Lichtenstein)-dorsal and ventral view, respectively, 141,142: Male genitalia of *B. orientalis* (Burmeister) -ventral and dorsal view respectively ; 143 : Male genitalia of *Gymnogryllus kashmirensis* Bhowmik dorsal view.



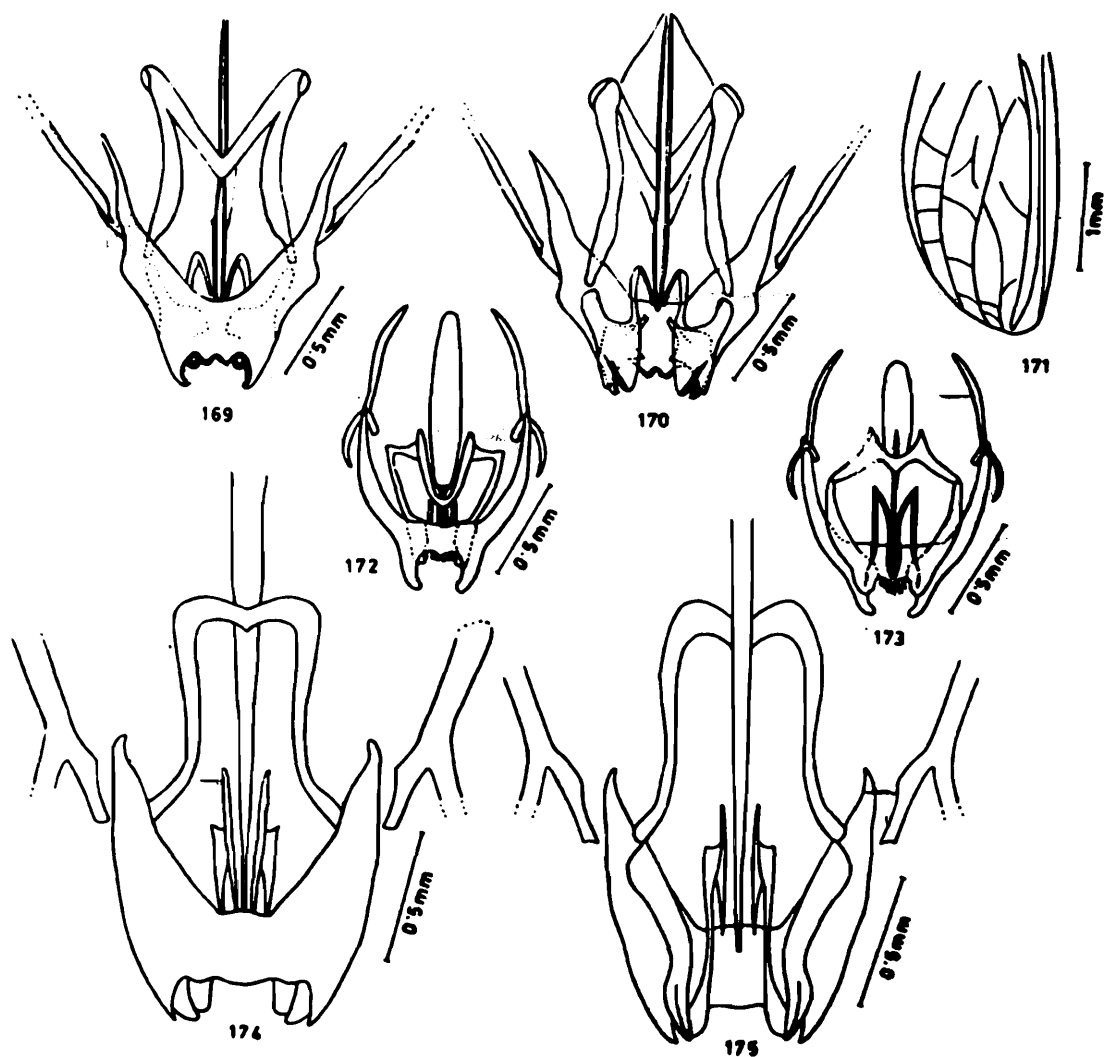
Figs 144,149 ; 144 : Abdominal extremity of *Spinogryllus meghalayanus* gen. et. sp. nov. showing sclerotised structure dorsal view: 145 : Male tegmen (right) of *S. meghalayanus* gen. et. sp. nov.. ; 146,147 : Male genitalia of *S. meghalayanus* gen. et. sp. nov. -dorsal and ventral view ; respectively ; 148,149 : Male genitalia of *Velarifictorus aspersus* (Walker) - dorsal and ventral view, respectively.



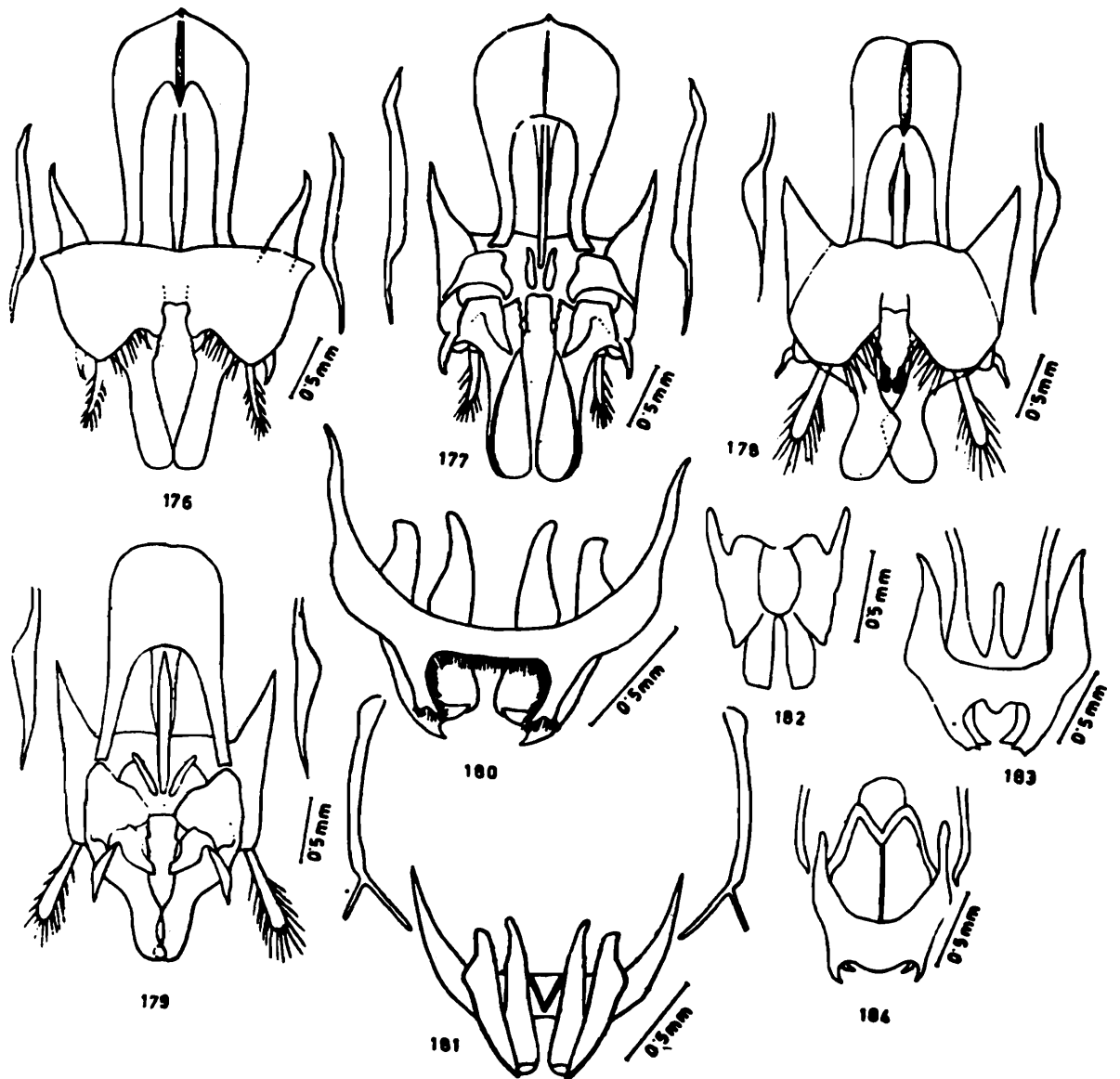
Figs. 150-158 ; 150,151 : Male genitalia of *Velarifictorus sikkimensis* (Bhowmik) dorsal and ventral view, respectively ; 152 : Profile of head of *V. shillongensis* sp. nov. ; 153 : Male tegmina (right) of *V. shillongensis* sp. nov. ; 154,155 : Male genitalia of *V. shillongensis* sp. nov. dorsal and ventral view, respectively ; 156,157 : Male genitalia of *V. raychaudhurii* (Bhowmik) dorsal and ventral view, respectively ; 158 : Male genitalia of *V. jharna*e (Bhowmik)- dorsal view.



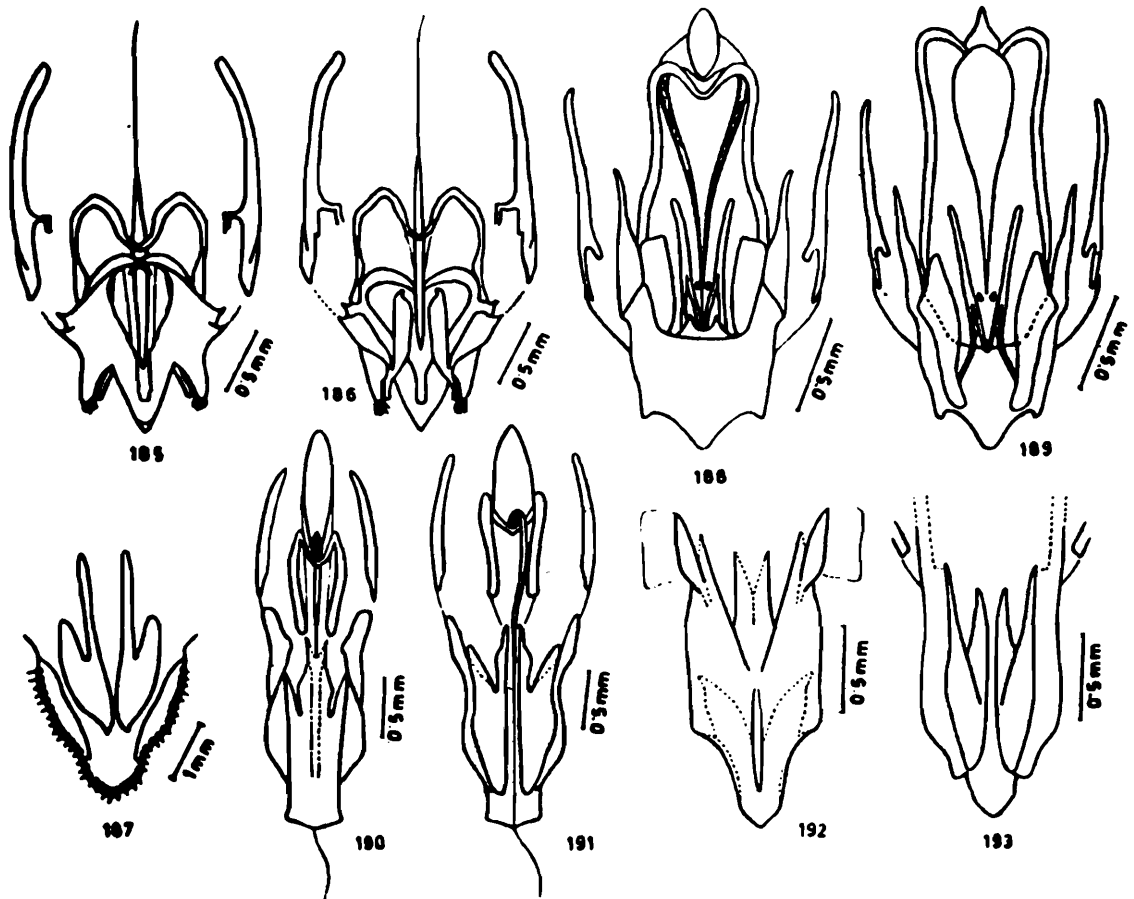
Figs. 159,168 ; 159 : Male genitalia of *Loxoblemmus macrocephalus* Chopard dorsal view (endoparameres omitted) ; 160,161 : Male genitalia of *L. fletcheri* Chopard dorsal and ventral view, respectively ; 162 : Female tegmina of *L. fletcheri* Chopard ; 163,164 : Male genitalia of *L. equestris* Saussure dorsal and ventral view, respectively ; 165,166 : Male genitalia of *L. detectus* (Serville) dorsal and ventral view, respectively ; 167,168 : Male genitalia of *L. jacobsoni* Chopard - dorsal and ventral view, respectively.



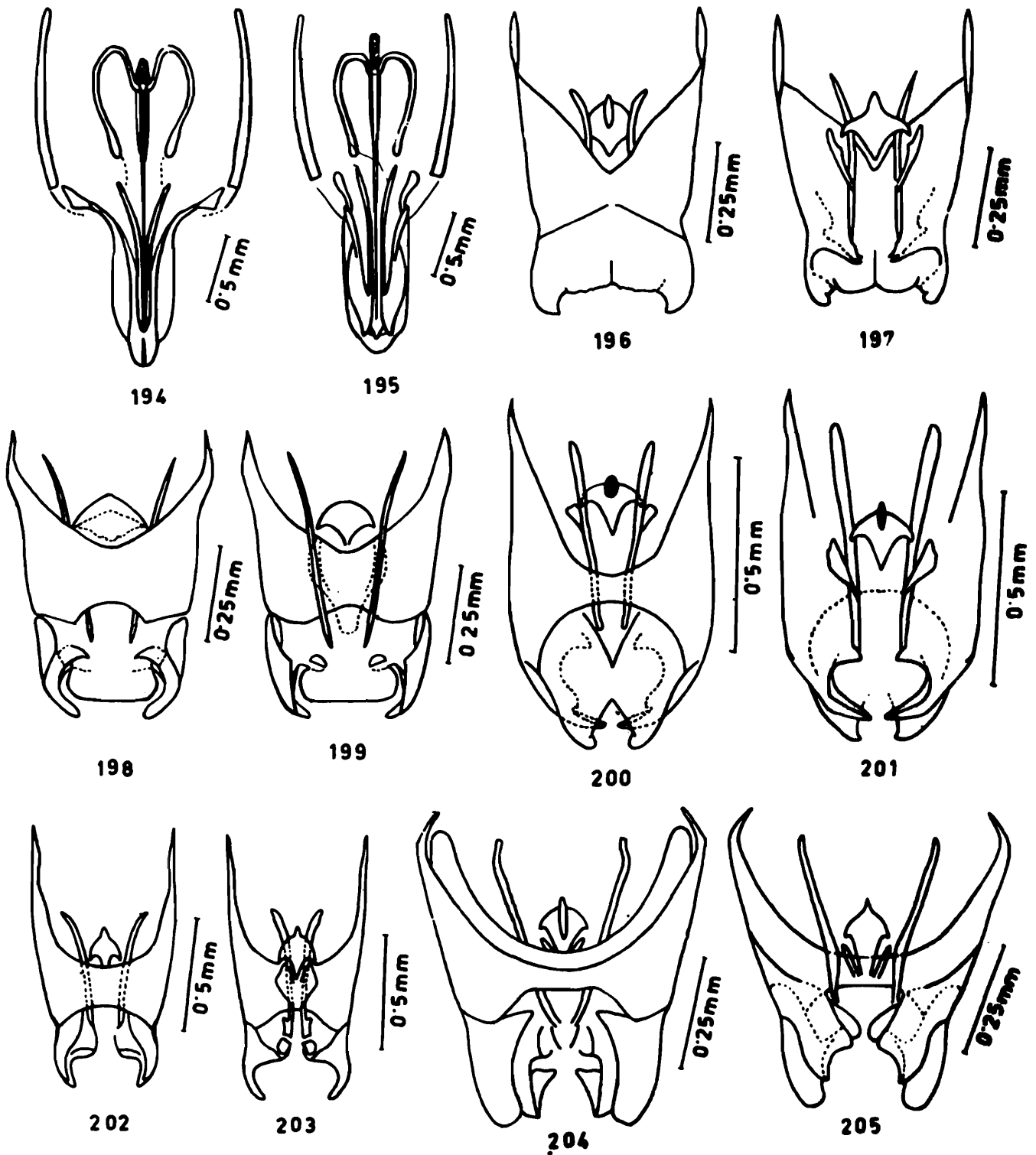
Figs. 169-175 : 169,170 : Male genitalia of *Loxoblemmus intermedius* Chopard dorsal and ventral view, respectively ; 171 : Female tegmen (left) of *Stephoblemmus humbertiellus* Saussure ; 172,173 : Male genitalia of *S. humbertiellus* Saussure dorsal and ventral view, respectively ; 174,175 : Male genitalia of *Gryllodes sigillatus* (Walker) dorsal and ventral view, respectively.



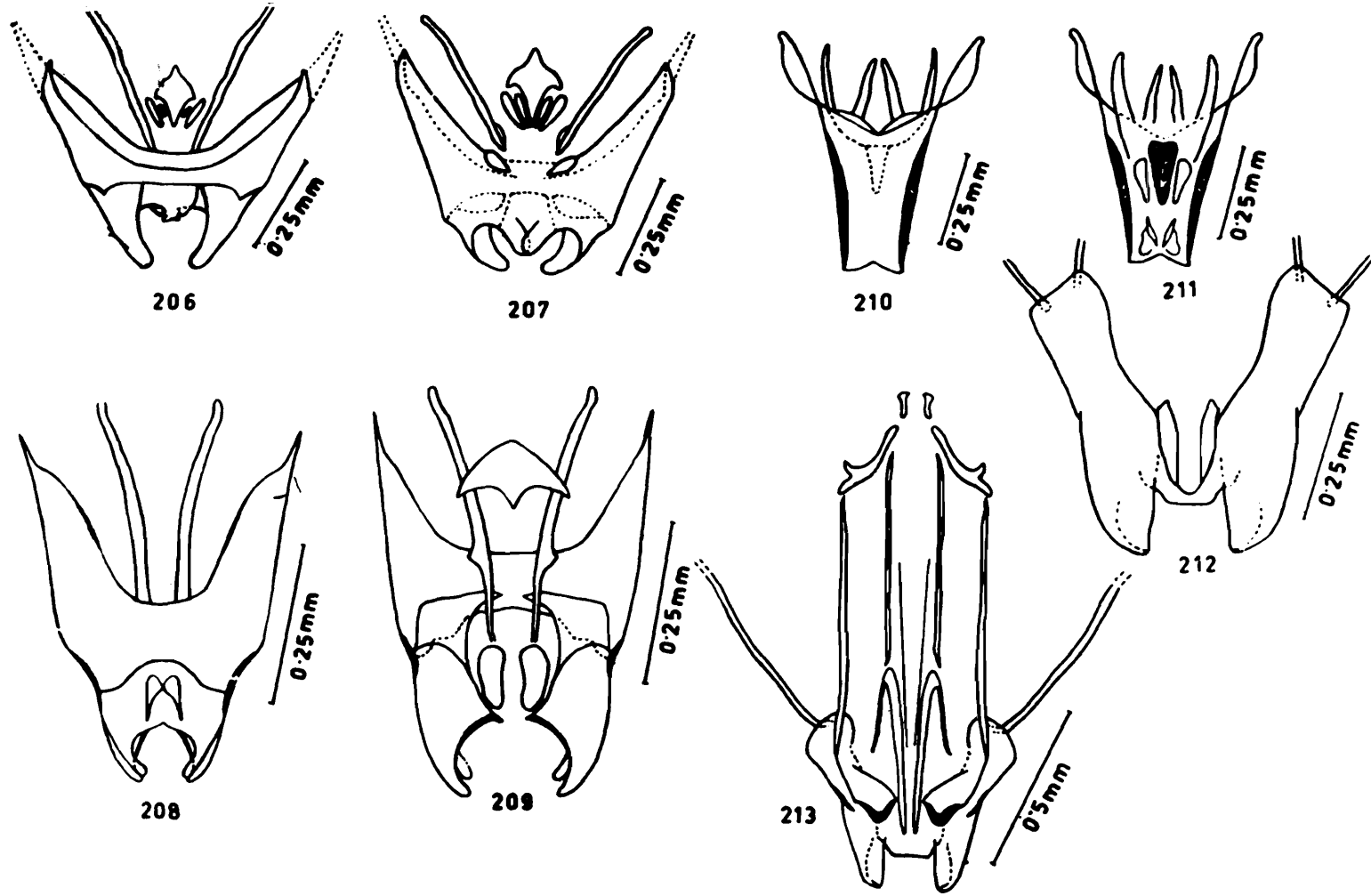
Figs. 176-184 ; 176,177 : Male genitalia of *Turanogryllus histrio* (Saussure) - dorsal and ventral view, respectively ; 178,179 : Male genitalia of *T. rufoniger* (Chopard) dorsal and ventral view, respectively ; 180,181 : Male genitalia (apical portion) of *Modicogryllus confirmatus* (Walker) dorsal and ventral view, respectively ; 182 : Male genitalia (epiphallus) of *M. ehsani* (Chopard) dorsal view ; 183 : Male genitalia of *M. blennus* (Saussure) - dorsal view ; 184 : Male genitalia of *M. minimus* (Chopard) - dorsal view.



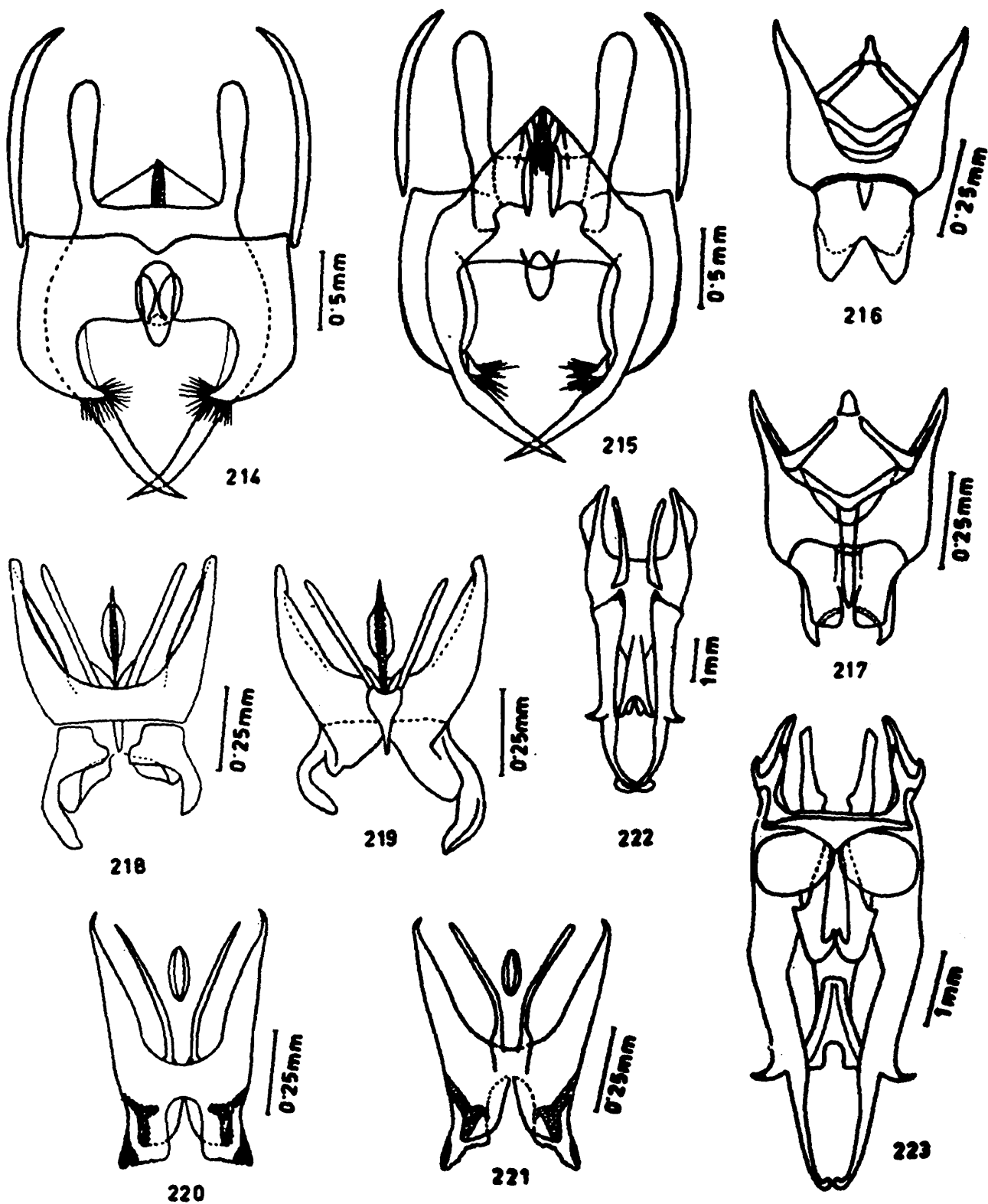
Figs. 185-193 ; 185,186 : Male genitalia of *Gryllus bimaculatus* De Geer - dorsal and ventral view, respectively ; 187 : Male genitalia (apical portion) of *Lenigryllus quadrimaculatus* (Saussure) - ventral view ; 188,189 : Male genitalia of *Plebeiogryllus guttiventris* (Walker)-dorsal and ventral view , respectively ; 190,191 : Male genitalia of *Teleogryllus occipitalis* (Serville) dorsal and ventral view, respectively: 192,193 : Male genitalia (apical portion) of *T. mitratus* (Burmeister) dorsal and ventral view, respectively.



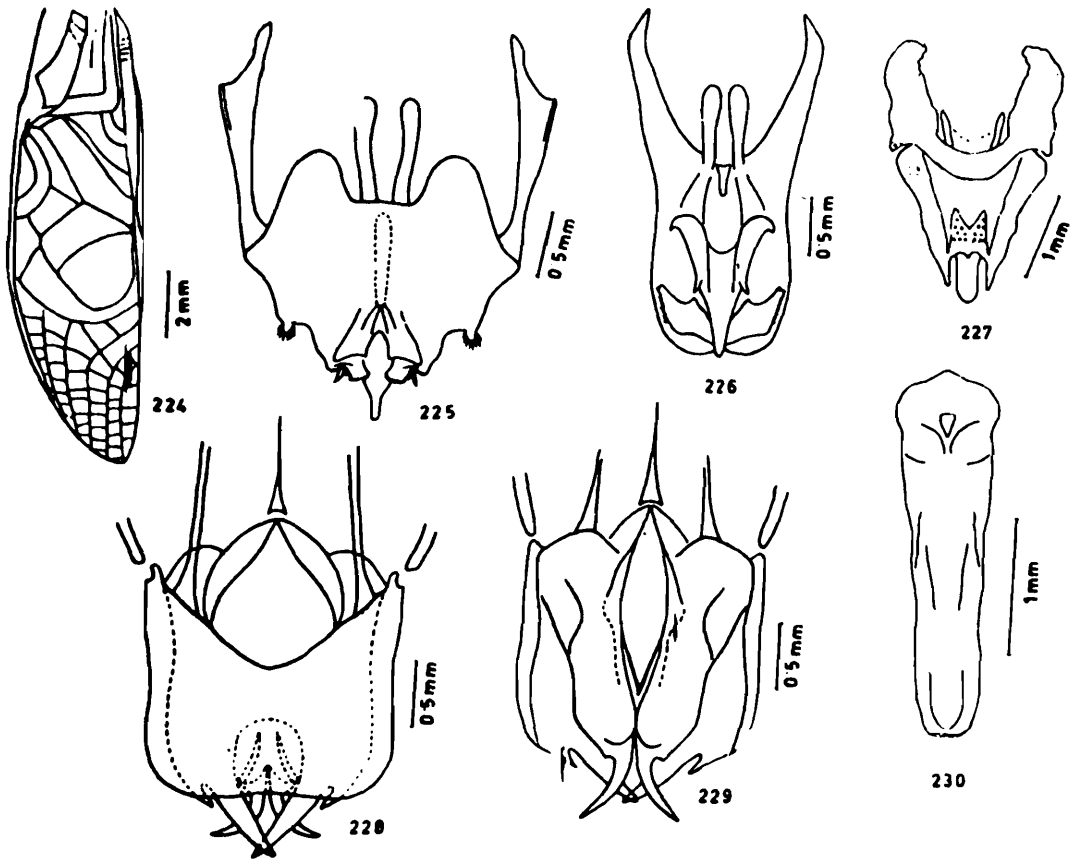
Figs 194-205 ; 194,195 : Male genitalia of *Teleogryllus bicoloripes* (Chopard) dorsal and ventral view, respectively ; 196,197 : Male genitalia of *Pteronemobius strigipennis* (Chopard) dorsal and ventral view, respectively ; 198,199 : Male genitalia of *P. fascipes* (Walker)- dorsal and ventral view, respectively ; 200,201 : Male genitalia of *P. csikii* (Bolivar)-dorsal and ventral view, respectively ; 202,203 : Male genitalia of *P. indicus* (Walker) dorsal and ventral view, respectively. ; 204,205: Male genitalia of *P. pantelianus* Chopard dorsal and ventral view, respectively.



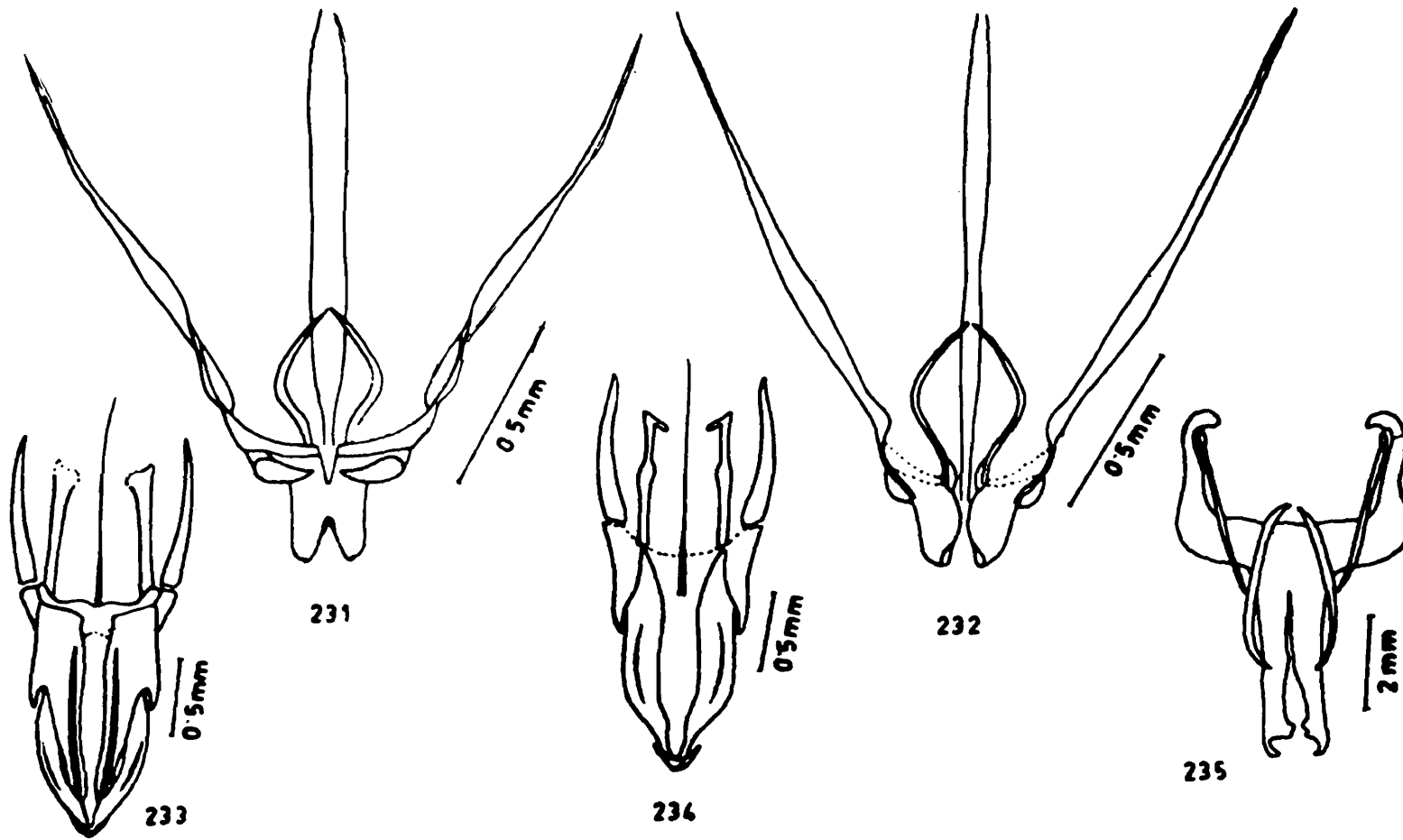
Figs. 206-213 ; 206,207 : Male genitalia of *Pteronemobius montanus* Chopard dorsal and ventral view, respectively ; 208,209 : Male genitalia of *P. concolor* (Walker) dorsal and ventral view, respectively 210,211 : Male genitalia of *Speonemobius decolyi* Chopard - dorsal and ventral view, respectively ; 212,213 : Male genitalia of *Oecanthus indicus* Saussure - dorsal view (apical portion) and ventral view, respectively.



Figs. 214-223 ; 214,215 : Male genitalia of *Homoeogryllus cincticornis* (Walker) - dorsal and ventral view, respectively ; 216,217 : Male genitalia of *Homoeoxipha lycoides* (Walke - dorsal and ventral view, respectively; 218,219 : Male genitalia of *Anaxipha longipennis* (Serville) dorsal and ventral view, respectively 220, 221 : Male genitalia of *Trigonidium cicindeloides* Ramuer dorsal and ventral view, respectively; 222, 223 : Male genitalia of *Calyptotrypus hofmanni* Saussure dorsal and ventral view, respectively.



Figs. 224-230; 224: Male tegmen (right) of *Madasumma biswasi* sp. nov. ; 225, 226 : Male genitalia of *M. biswasi* sp. nov. dorsal and ventral view respectively ; 227 : Male genitalia of *M. melanonotum* Chopard \_ dorsal and ventral view, respectively ; 228, 229; Male genitalia of *M. darjilingensis* Chopard-dorsal and ventral view, respectively; 230 ; male genitalia (epiphallus ) of *Patiscus brevipennis* Chopard dorsal view.



Figs. 231-235; 231,232 : Male genitalia of *Euscyrtus concinnus* (Haan) dorsal and ventral view, respectively; 233,234 : Male genitalia of *Itara minor* Chopard dorsal and ventral view, respectively; 235 : male genitalia of *Xenogryllus transversus* (Walker).