

MISCELLANEOUS PUBLICATION

OCCASIONAL PAPER NO. 24.

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STUDIES ON SOME ORB-WEAVING
SPIDERS OF THE GENERA
NEOSCONA SIMON AND *ARANEUS*
CLERCK OF THE FAMILY
ARANEIDAE (=ARGIOPIDAE)
FROM INDIA

by
B. K. TIKADER
and
ANIMESH BAL

Issued by The Director
Zoological Survey of India, Calcutta

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CLERCK OF THE FAMILY ARANEIDAE
(= ARGIOPIDAE) FROM INDIA.**

by

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Western Regional Station
POONA.

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Zoological Survey of India
CALCUTTA.



Edited by the Director, Zoological Survey of India

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**RECORDS
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STUDIES ON SOME ORB-WEAVING SPIDERS
OF THE GENERA *NEOSCONA* SIMON AND
ARANEUS CLERCK OF THE FAMILY
ARANEIDAE (=ARGIOPIDAE) FROM INDIA

By

B. K. TIKADER

and

ANIMESH BAL

Zoological Survey of India
Western Regional Station
POONA.

INTRODUCTION

The family Araneidae is one of the large families in the spider world. The members of this family are known as typical orb-weavers because they spin true orb webs, having geometrical precision and beauty. They prefer to construct their orb-webs in the garden foliages mainly in the rainy season. Some build a retreat at a distance from the webs, others remain at the centre and quietly awaiting their prey. Though the members of this family are abundant in our country but unfortunately scanty information is available on Indian forms provided by the previous workers like Stoliczka (1869), Simon (1889), Thorell (1895), Pocock (1900) Gravely (1921) and Dyal (1935). They recorded some species of the family Araneidae (=Argiopidae) from British India but majority of them had been placed under the genus *Araneus*. After thorough studies of this group of spiders from India, we came to know that many species were placed erroneously under the genus *Araneus* by the previous workers, which consisted of many genera namely *Neoscona*, *Cyrtophora*, *Leucauge*, *Singa*, *Chorizopes*. We have studied some genera of the family Araneidae in detail and placed them according to their respective position as far as possible. This paper deals with the systematic studies of the genera *Neoscona* and *Araneus*.

We are fortunate enough to have the opportunity to study the types of many orb-weaving spiders which were described by Simon, Pocock and Gravely and are deposited in the Museum National d'Histoire

Naturelle, Paris; British Museum (Natural History), London and National Collection of Zoological Survey of India, Calcutta, respectively.

The descriptions and illustrations of all known species have been made on the basis of types or authenticated identified female specimens in our collection.

The type specimens are deposited in the National Collection of Zoological Survey of India, Calcutta. Other named collection are deposited in the Western Regional Station, Zoological Survey of India, Poona.

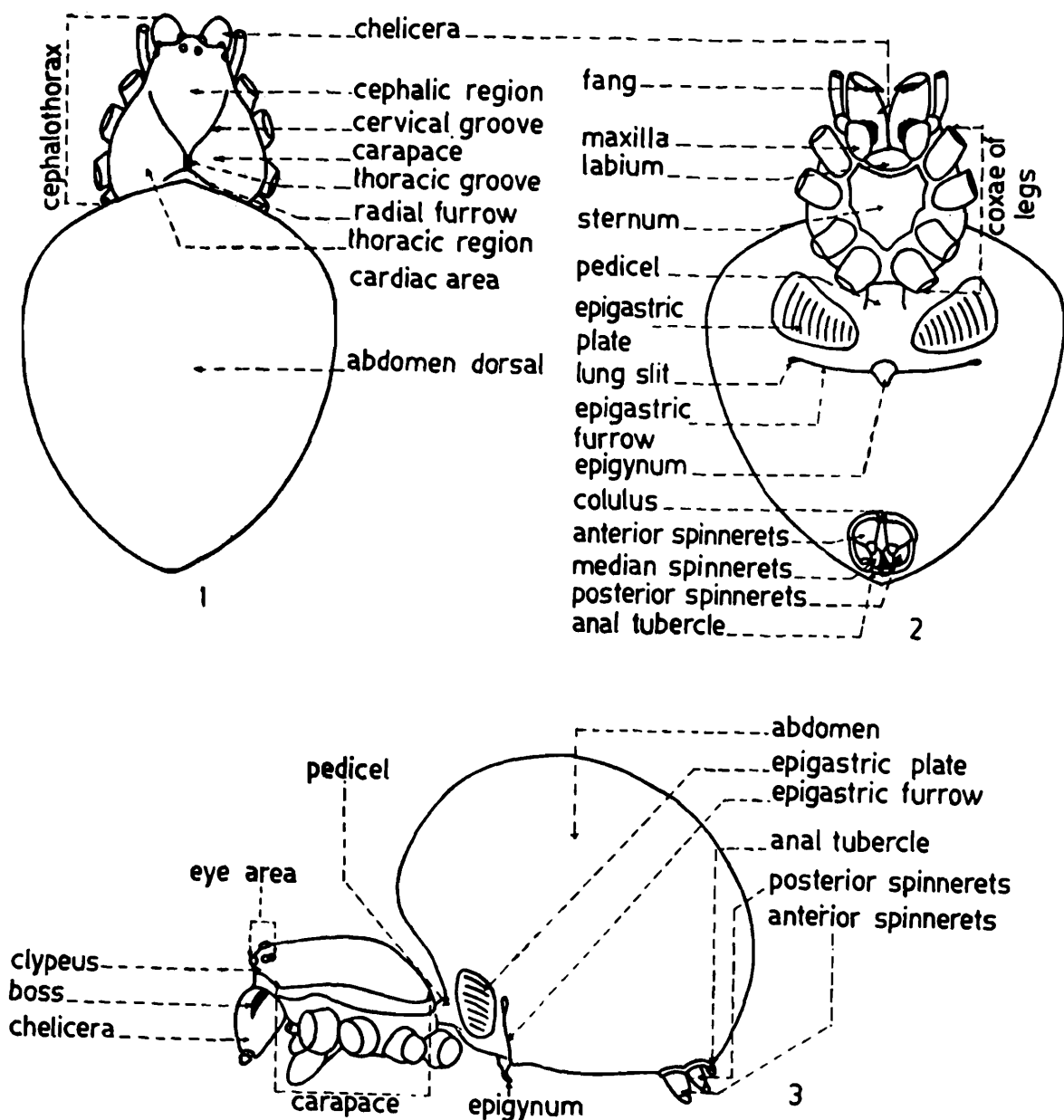
TAXONOMIC CHARACTERS OF SPIDERS WITH SPECIAL
REFERENCE TO THE FAMILY ARANEIDAE

(Figs. 1-13)

The body of the spider is divisible into a distinctive *cephalothorax* and *abdomen*, joined together by a narrow pedicel. The *cephalothorax* is covered dorsally by a hard sclerite, the *carapace*, and ventrally by the *sternum* as in text-figs. 1 & 2. The anterior margin of sternum articulates movably with the *labium*. With few exceptions there is a deep transverse groove, forming a kind of hinge, between the sternum and the labium. The legs are articulated in the pleural membrane between the lateral edges of the *carapace* and *sternum*.

On the cephalic region six to eight simple eyes are present. The eyes are generally of two kinds, *viz.*, black or *diurnal* and white or *nocturnal* eyes. When only one type is present, the condition is described as *homogeneous*, in contrast to the *heterogeneous*, when both the types are present. The eyes are usually arranged in a double row, *viz.*, the *anterior row* and the *posterior row* as in text-fig. 6. Each row usually contains four eyes. The rows of eyes are frequently curved. If the curvature is such that the lateral eyes are further forward than the median eyes the row is called *procurved*, and if further back, recurved as in text-fig. 9. According to their position, the eyes are described as the *anterior medians*, the *posterior medians*, the *anterior laterals* and the *posterior laterals*. The cephalic area, occupied by the eyes, is known as *ocular area*. The area margined by the four median eyes is termed as *ocular quad* as in text-fig. 9. The area between the anterior row of eyes and the anterior margin of carapace is *clypeus*. There is often a depression in the middle of the thorax, called *thoracic groove* or *fovea* as in text-fig. 1.

There are six pairs of appendages on the cephalothorax. The first pair of appendages are the chelicerae. Each chelicera bears a curved fang

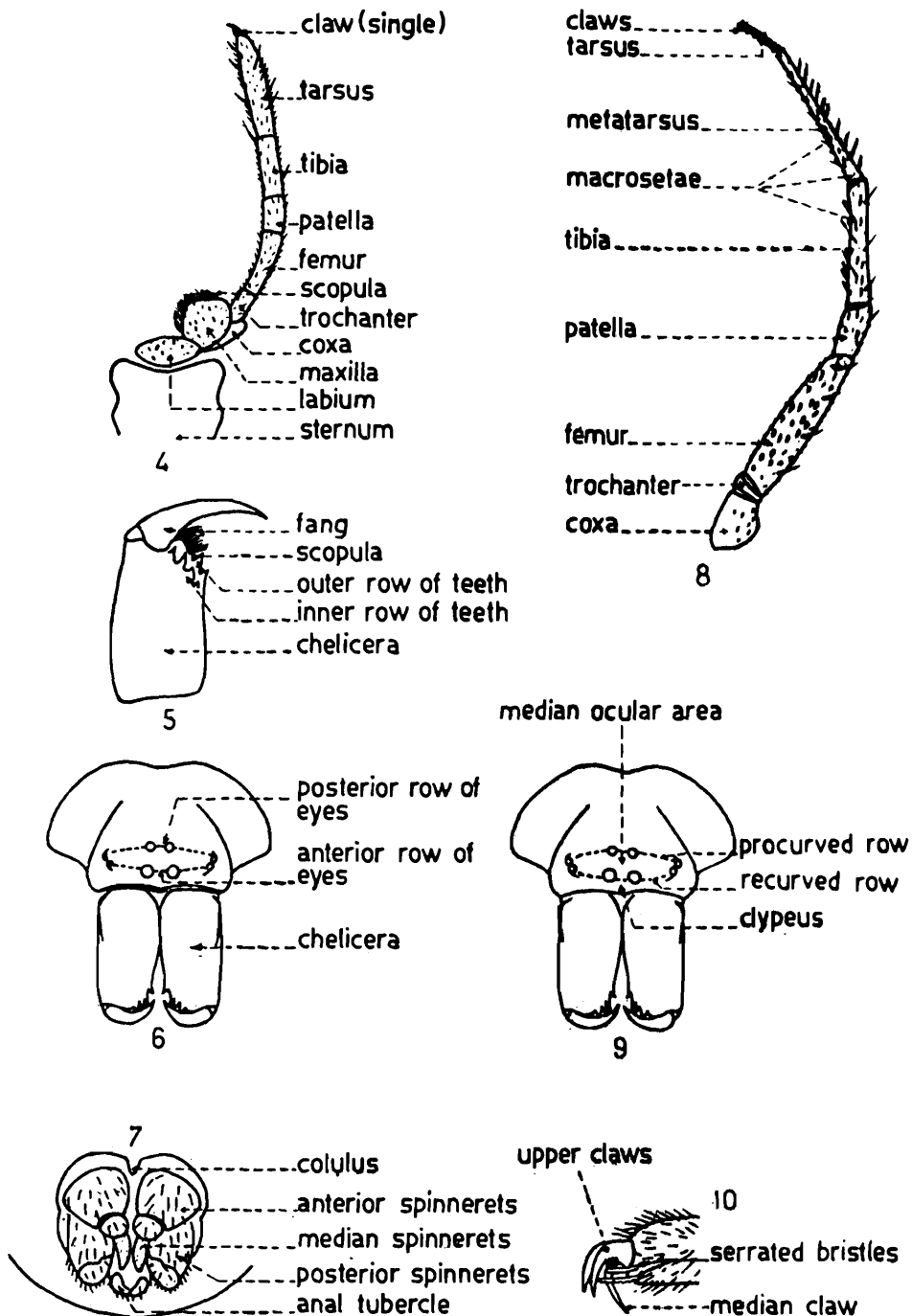


Figs. 1 — 3. Showing different body parts of a typical araneid spider.
 1. Dorsal view of a typical araneid spider, legs omitted.
 2. Ventral view of a typical araneid spider, legs omitted.
 3. Lateral view of a typical araneid spider, legs omitted.

at its apex. The inner surface of chelicera may be finely denticulate and may also have a groove, into which the fang can be closed when not in use. This groove may also be armed with tooth on each side; the outer margin of this groove is described as *promargin* and the inner margin as *retromargin*. There are sometimes long stout hairs on the promargin to constitute the so called *fang-scopulae*, as in text-fig. 5.

The pedipalps are the second pair of appendages. The palp proper is composed of six segments, viz., *coxa*, *trochanter*, *femur*, *patella*, *tibia* and *tarsus* as in text-fig. 4. In females the tarsus is simple and may or may not be with a single claw. The basal segment, the coxa of palp expands into a plate like structure called maxilla, each side of which is generally provided with thick tuft of hairs called scopulae as in text-fig. 4. In

mature males the tarsus of palp is modified to carry a complicated copulatory organ. Generally the tibia, sometimes also the patella constitute *apophysis* of the palp (which is of different shapes in different species) and is of very important taxonomic value. Generally the tarsus has a bowl-shaped cavity on its ventral surface and is called *cymbium*. In many groups mature males are provided with an appendage, the *paracymbium*.



Figs. 4 — 10. Showing different parts of araneid spider.
 4. Labium, maxilla and pedipalp of female.
 5. Inner view of chelicera.
 6 & 9 Face, front view of a typical araneid spider, showing eyes and their position.
 7. Ventral view of spinnerets.
 8. Lateral view of leg, showing different parts.
 10. Distal end of tarsus showing claw.

The complex structure of mature male palp is very important for generic or specific identification of spiders. The complicated palpal organ consists of many parts as in text-fig. 13.

There are four pairs of legs designated as I, II, III and IV respectively. Each leg is composed of seven segments, viz., *coxa*, *trochanter*, *femur*, *patella*, *tibia*, *metatarsus* and *tarsus* as in text-fig. 8. The legs are variously clothed with spines, spinules, bristles and hairs of various types. The distal ends of tarsi are provided with two or three claws. A characteristic tuft of hair called *claw-tuft* is sometimes found just above the claw. Spines on the dorsal sides of legs are distinguished as *dorsal spines* and those on the ventral side as *ventral spines*, as in text-fig. 8. Spiders usually have at least two claws at the end of each tarsus. In many families a single median ventral third claw is present as in text-fig. 10. The paired claws may be provided with a few teeth.

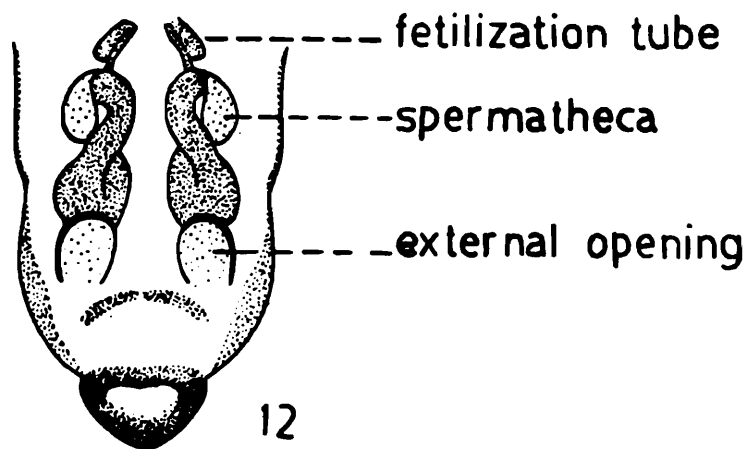
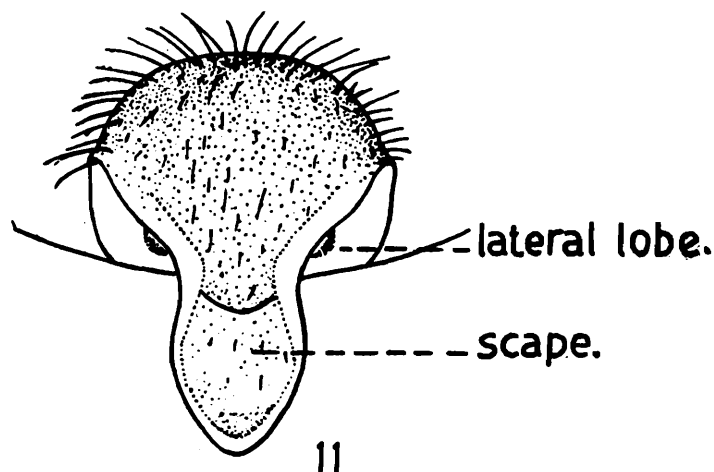
The abdomen is produced posteriorly into a conical *anal tubercle* and bears three pairs of spinnerets ventrally, viz., the first or the *anterior pair*, the second or the *median* and the third or the *posterior pair* of spinnerets as in text-fig. 7. In a number of families there is present in front of the anterior (ventral) spinnerets a seive-like plate, called the *cribellum*. The special type of silk is omitted from this organ and is combed by a series of curved bristles comprising the *calamistrum* borne on metatarsus IV. In many families of spiders which do not possess the *cribellum*, a conical appendage called the *colulus*, lies between the bases of the anterior spinnerets.

The ventral surface of abdomen is provided with one or two pairs of *lung-books*, followed by one or two paired spiracles. The female genital organ is the epigyne or epigynum, is situated just anterior to a transverse fold, known as *epigastric furrow* as in text-fig. 2. In many cases the epigyne is provided with a tongue like sclerotic projection called *scape* often having paired lateral lobes (as in *Neoscona*) as in text-fig. 11. Epigyne having two external openings which lead to the *spermathecae* inside and a pair of narrow curved tubes called *fertilization tubes* originate from the posterior median margin of spermathecae as in text-fig. 12.

The tarsi of spider are often armed with hairs of the type known as *tenent hairs*, i.e., hairs dilated at their tips. In some families, spiders have very fine hairs called as *pubescence*. Sometimes the hairs are modified as *spiny-hairs* or *macrosetae*.

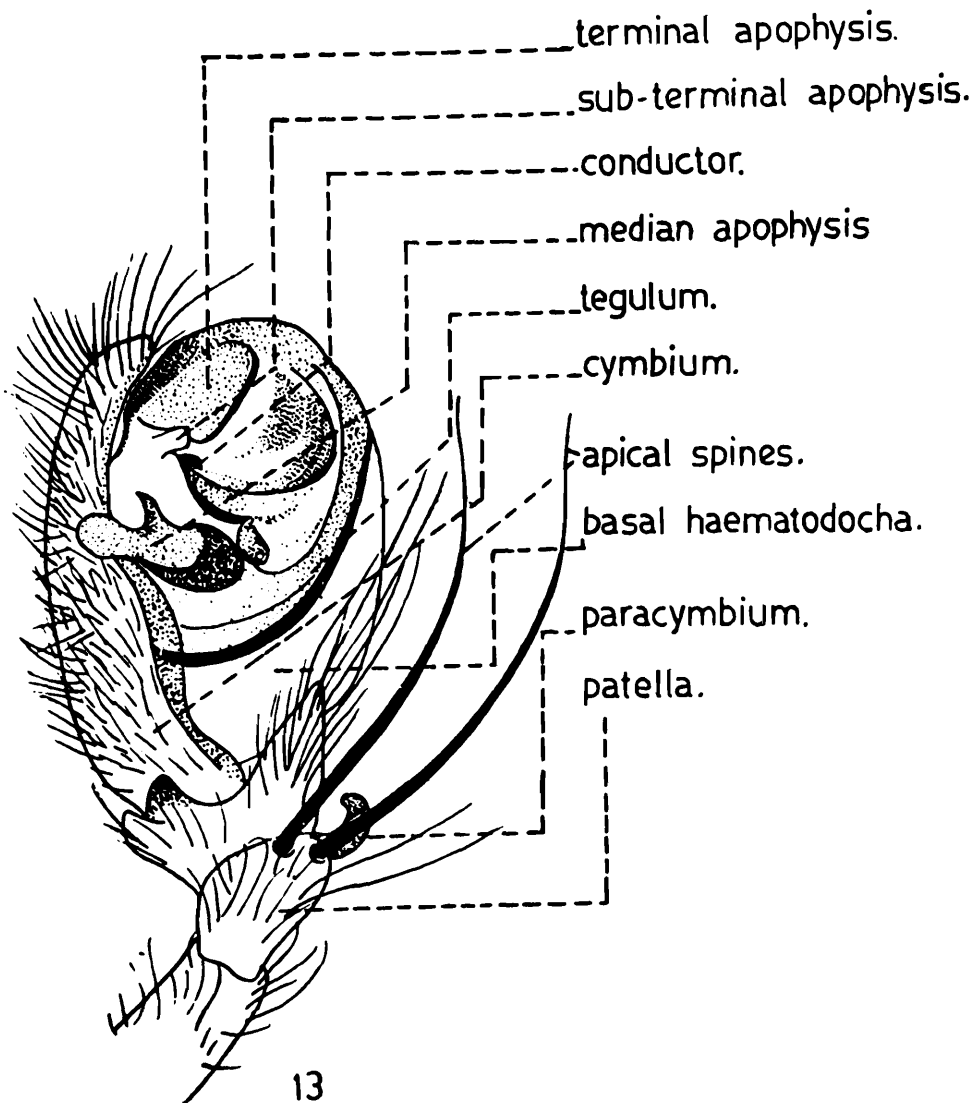
Palpal organ of male araneid spider is highly complicated and variable from genus to genus, species to species. In *Araneus* and *Neoscona* the cymbium is a concave plate like structure and the paracymbium is

only a prominent hook shaped structure arising vertically from the axis of the base of the cymbium and not articulated with the cymbium as in text-fig. 13. There are three special kind of hooks or apophysis, just below another sclerite sub-terminal apophysis and a transverse, wider than high plate like median apophysis, provided with a large spur on the upper corner as in text-fig. 13, varied extremely in different genera. Sometimes the spur is bifurcated or a lesser spur may present. The embolus is long and winding and supported by conductor as in text-fig. 13. Tegulum and subtegulum are ring like sclerites bearing the terminal apophysis, often modified to vertical knob as in text-fig. 13. There is one striking feature—haematodocha which is a sac like structure and in most araneids, divided into two as their position—basal haematodocha and distal haematodocha. The wall of the haematodocha consists of elastic connective tissue and during mating it is distended. Palpal patellae of male *Araneus* and *Neoscona* bear two long and strong curving spine like hairs as in text-fig. 13.



Figs. 11 — 12. Epigyne of *Neoscona mukerjei* Tikader, showing different parts.
 11. Ventral view of epigyne.
 12. Posterior view of internal genitalia.

Abdomen of araneid spiders is extremely variable, shape may be oval, suboval, triangular, subtriangular, elliptical, elongated, barrel shaped, etc; often provided with humps and tubercles; no hump is found in Indian *Neoscona*. Shape of the abdomen is generally specific in many genera and species. Colour variation is a common phenomenon among araneids, it varies from individual to individual; some tropical *Argiope*, *Cyclosa*, *Leucauge* acquire silvery colouration on their abdomen, perhaps an adaptation to open sunny areas for their diurnal habit. In general the middle pairs of spinnerets of araneid spiders are much smaller and remain hidden in between more larger anterior and posterior pairs. In *Gasteracantha* the spinnerets are situated on an elevation surrounded by a thick flange in the form of a ring. No cribellum or calamistrum present among araneids.



Figs. 13. Lateral view of left male palp of *Neoscona theis* (Walck.) showing different parts.

Epigyne is the most specific characters and it is authentically known that the differences in the structure of both external and internal are the best way for separating females from species to species. Many genera

viz., *Araneus Neoscona*, *Cyclosa*, *Gasteracantha*, *Poltys*, etc. having more or less a distinct projectile sclerites from the base of the epigyne called scap, others are either plate like or with a median septum instead of scape. In *Neoscona*, scape is provided with one or two pairs of lateral lobe. Scape of *Araneus* is often wrinkled and winding. External openings of epigyne are underneath the scape in *Neoscona* but in *Araneus* they are in the grooves at the base.

In most species of the family Araneidae, there is remarkable sexual dimorphism; the males are much smaller than females and having special clasping spines or spurs on the legs. In some, shape of the carapace as well as abdomen are different. The male araneids are very rare and are not as commonly seen as the females on their webs.

FAMILY ARANEIDAE (A-rane'-dae)

(Typical Orb-weavers)

- 1806. Araneides Latreille, *Genera Crustaceorum et Insectorum*, 1 : 82.
- 1815. Araneides : Leach, *Zoological Miscellany*, 2 : 134-137.
- 1833. Epeirides : Sundevall, *Conspectus Arachnidum*, : 13.
- 1890. Argiopidae : Simon, *Ann. Soc. ent. France*, (6)10 : 81.
- 1900. Argyopidae : Pocock, *Fauna Brit. India, Arachn.*, : 213.
- 1921. Argiopidae : Gravely, *Rec. Indian Mus.*, 22 : 111.
- 1935. Argiopidae : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 173
- 1951. Argiopidae : Sinha, *Rec. Indian Mus.*, 49 : 67.
- 1953. Argiopidae : Locket & Millidge, *British Spiders*, 2 : 111.
- 1960. Argiopidae : Yaginuma, *Spiders of Japan, in colour*, : 49-69.
- 1968. Araneidae : Levi, *Bull. Mus. Comp. Zool.*, 136(9) : 320.
- 1970. Argiopidae : Tikader, *Rec. zool. Surv. India*, 64 (1-4) : 26.
- 1972. Araneidae : Kaston, *How to know the spiders*, : 135.

Characters: Carapace variable, thoracic region separated from cephalic region by oblique depressions. Eyes less variable in size in different genera, eight in number and arranged usually in two rows; median eyes forming a quadrangle, either a square or a trapezium; lateral eyes usually close and often projecting or angular tubercles. Sternum heart-shaped or triangular, narrowing behind, thus coxae IV nearly contiguous; labium with swollen distal edge; maxillae widest distally and generally not longer than wide. Chelicerae strong, vertical and not divergent, provided with a boss on each fang furrow armed with two sets of strong teeth. Legs long and strong, clothed with hairs and spines; three tarsal claws and auxilliary foot claws; not provided with trichobothria on femora or tarsi. Pedipalp with a single claw in female; paracymbium of male palpus attached to proximal end of cymbium. Abdo-

men variable in size and shape; epigastric furrow nearly straight; six spinnerets. Most of the spiders construct orb-webs; spiders hang in the web head down.

Type-genus: Araneus Clerck.

Distribution: Cosmopolitan.

Genus 1. *Neoscona* Simon

- 1864, *Neoscona* Simon, *Hist. nat. des. Araign.*, 1 : 261.
 1924. *Chinestela* : Chamberlin, *Proc. U. S. Natl. Mus.*, 63(13) : 20.
 1940. *Neoscona* : Comstock, *The Spider Book*, : 509.
 1951. *Friovixia* : Archer, *Amer. Mus. Nov.*, 1487 : 34.
 1960. *Neoscona* : Yaginuma, *Spiders of Japan, in colour*, : 56-57.
 1971, *Neoscona* : Berman & Levi, *Bull. Mus. Comp. Zool.*, 141(8) : 465,
 1980. *Neoscona* : Tikader, *Proc. Indian Acad. Sci.*, 89(3) : 247.

Characters: Presence of longitudinal thoracic groove in female separates *Neoscona* from all members of the genus *Araneus*. Ocular quad forming a trapezium and slightly longer than wide; anterior medians largest or subequal to the posterior medians; lateral eyes close and not situated on prominent tubercles, posterior laterals smallest; both rows of eyes recurved. In male, coxa I ventrally provided with a hook on the distal rim; tibia II having macrosetae (spines) on prolateral surface. Abdomen may be oval, suboval, triangular or sub-triangular in shape. Epigyne is a simple tongue like; scape completely fused to the base and provided with one or two pairs of lateral lobes; epigynal openings situated on the underneath of scape. Palpal patella of male provided with two strong, curved and long spines; cymbium of male palp broad but it is rather narrow strip like in *Araneus*.

Type-species: Neoscona anabesca (Walckenaer)

Distribution: Species of *Neoscona* distributed all over the world, but many species of this genus have been erroneously placed under the genus *Araneus*.

Key to the species of the genus NEOSCONA Simon

- | | | | |
|--|-----|-----|------------------|
| 1. Abdomen triangular or sub-triangular. | . | . | 2 |
| Abdomen no triangular or sub-triangular | . | . | 7 |
| 2. Abdomen triangular (Fig. 14); epigynal | . | . | |
| scape short, broad and triangular (Fig. 15). | . | . | <i>nautica</i> . |
| Abdomen sub-triangular, epigynal scape | . | . | |
| long, narrow. | ... | ... | 3 |

3. Epigynal scape without constriction at the bending point. 4
 Epigynal scape with constriction either at the bending point or at the middle of scape. 5
4. Epigynal scape not at right angle to the base (Fig. 20); lateral lobes conspicuous and rounded (Figs. 19 & 21). *chrysanthusi*.
 Epigynal scape right angle to the base (Fig. 24); lateral lobes inconspicuous (Figs. 23 & 24). *bengalensis*.
5. Cephalic region provided with a conspicuous dark brown "V" shaped patch (Fig. 26); epigynal scape with a deep constriction (Fig. 27 & 28). *mukerjei*.
 Cephalic region not having any 'V' shaped patch; epigynal scape without a deep constriction. 6
6. Lateral lobes of epigyne very distinct and horn like and visible from ventral side of abdomen (Fig. 32). *rumpfi*.
 Lateral lobes of epigyne indistinct and blunt and not visible from ventral side of abdomen (Fig. 37). *lugubris*.
7. Abdomen elliptical or otherwise, provided with a median caudal hump; epigynal scape triangular or tongue like with no lateral lobes. 8
 Abdomen oval, suboval or barrel shaped; no caudal hump; epigynal scape not triangular or tongue like; and provided with prominent lateral lobes. 12
8. Abdomen elliptical; epigynal scape triangular with lateral lobes. 9
 Abdomen otherwise and provided with median caudal hump; epigynal scape tongue like with no lateral lobes. 10
9. Abdomen rather tapering at both anterior and posterior ends (Fig. 40); femora, patella and tibiae of the legs I, II & III provided with longitudinal lines on ventral and lateral sides; epigynal scape thin and having indistinct narrow rim (Figs. 41 & 42); genital openings laterally placed, not underneath the scape (Fig. 42). *molemensis*.
 Abdomen roundish at both anterior and posterior ends (Fig. 45); distal ends of tarsi having brown bands; epigynal scape rather thick with distinct rim (Figs. 46 & 47); genital openings placed underneath the scape (Fig. 48). *elliptica*.

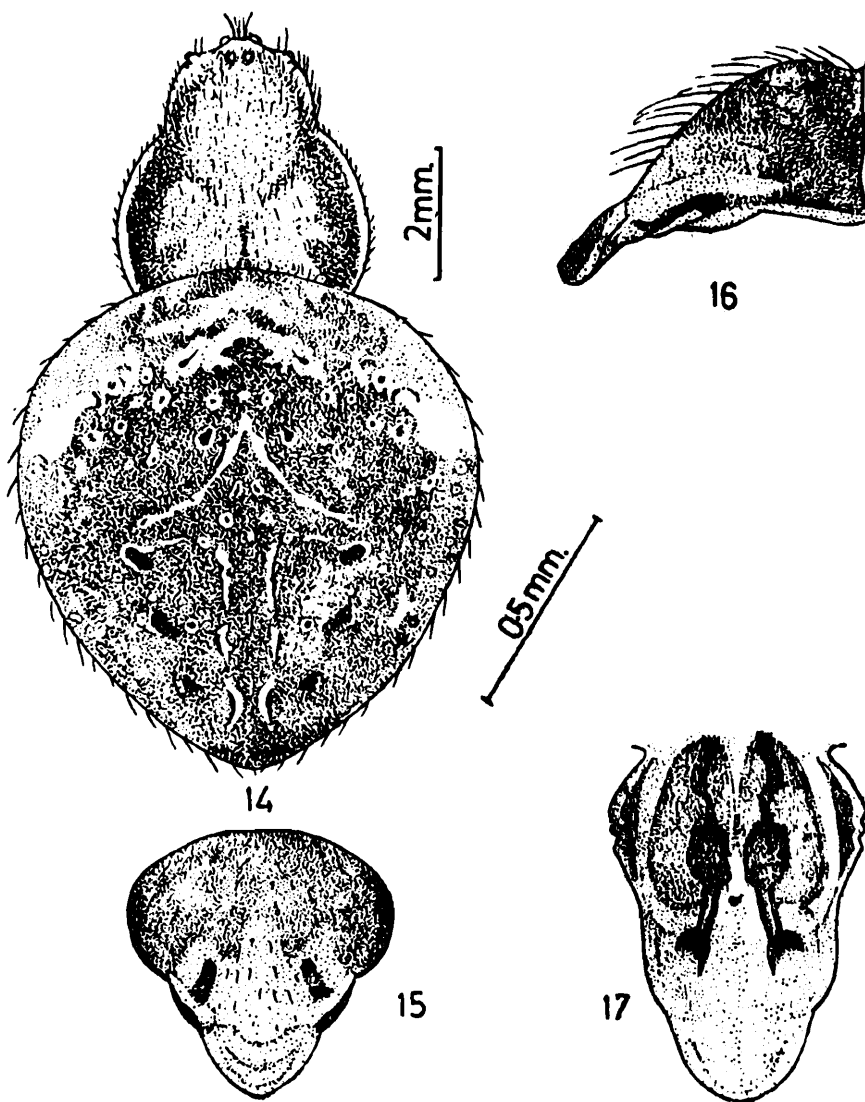
10. Four pairs of sigillae on the dorsum of abdomen (Fig. 50); caudal hump with a large black spot (Fig. 50). *excelsus.*
 Three pairs of sigillae on the dorsum of abdomen; caudal hump without black spot. ... 11
11. Abdomen cone shaped posteriorly (Fig. 55); caudal hump much elongated and extended beyond the spinnerets; anterior chamber of spermatheca large and overlapping on the posterior chamber (Fig. 58). *laglaizei.*
 Abdomen nearly pentangular (Fig. 59); caudal hump short (Fig. 59); anterior chamber of spermatheca small and not overlapping on the posterior chamber (Fig. 61).... *poonaensis.*
12. Epigynal scape with one pair of lateral lobes. 13
 Epigynal scape with two pairs of lateral lobes. 14
13. Sternum uniformly black; epigynal scape provided with prominent, wide rim and without constriction (Figs. 64 & 65). ... *singhagensis.*
 Sternum dark brown with longitudinal white band; epigynal scape with no prominent rim, constriction present behind the lateral lobe (Figs. 69 & 70). *theis.*
14. Dorsal side of abdomen provided with mid-longitudinal pale patch. 15
 Dorsal side of abdomen not provided with mid-longitudinal pale patch. 16
15. Carapace provided with two lateral and one median longitudinal brown patches (Fig. 73); first pair of lateral lobes of epigyne conspicuous and second pair of lateral lobes truncated anteriorly (Fig. 74). *shillongensis.*
 Carapace without any longitudinal patch (Fig. 77); first pair of lateral lobes of epigyne inconspicuous and second pair of lateral lobes not truncated anteriorly (Figs. 78 & 79). *odites.*
16. Carapace provided with a conspicuous 'V' shaped brown mark (Fig. 81); epigynal scape bent at right angle to the base (Fig. 83); lateral lobes inconspicuous (Fig. 82). *pavida.*
 Carapace without 'V' shaped mark but with two longitudinal rows of irregular pale patches (Fig. 86); epigynal scape not bent at right angle to the base (Fig. 88); lateral lobes conspicuous (Fig. 87). *achine.*

1. *Neoscona nautica* (L. Koch)

(Figs. 14-17)

1875. *Epeira nautica* Koch, *Aegypt. Abyssin Arachn. Jickeli*, : 17.
 1877. *Epeira pullata* : Thorell, *Ann. Mus. Civ. Genova*, 10 : 385.
 1885. *Epeira volucripes* : Keyserling, *Verh. Zool. Bot. Ges. wien*, 34 : 528:
 1900. *Araneus nauticus* : Pocock, *Fauna Brit. India, Arachn.*, : 228.
 1904. *Neoscona volucripes* : Cambridge, *Biol. Centre. Amer. Aran.*, 2 : 473.
 1907. *Araneus nauticus* : Simon, *Ann. Mus. Civ. Genova*, 43 : 290.
 1930. *Neoscona nautica* : Petrunkevitch, *Trans. Connect. Acad. Sci.*, 30 : 320.
 1971. *Neoscona nautica* : Berman & Levi. *Bull. Mus. Comp. Zool.*, 141(8) : 498.

General: Cephalothorax and legs yellowish brown, abdomen greenish brown. Total length 11.00 mm. Carapace 4.50 mm. long, 3.80 mm. wide; abdomen 7.60 mm. long, 7.00 mm. wide.



Figs. 14 — 17. *Neoscona nautica* (L. Koch).
 14. Dorsal view of female, legs omitted,
 15. Epigyne ventral view.
 16. Epigyne lateral view.
 17. Internal genitalia, posterior view.

Cephalothorax: Longer than wide, narrower in front, clothed with grey pubescence and hairs; provided with mid-longitudinal light band extending from posterior end to the base of the ocular quad; lateral side of cephalic region having a row of fringed hairs as in text-fig. 14. thoracic region provided with a distinct longitudinal groove. Ocular quad longer than wide and wider in front than behind as in text-fig 14; anterior median eyes larger than posterior medians and posterior medians encircled by black rings; laterals close and each situated on a tubercle; both rows of eyes recurved but anterior row more recurved than the posterior row as in text-fig. 14. Sternum heart-shaped, pointed behind, dark brown in colour, clothed with fine pubescence and provided with a median longitudinal chalk white band. Labium wider than long, dark brown in colour with pale distal margin. Maxillae broad, roundish, dark brown with pale outer margin with distinct scopulae. Chelicerae strong, dark brown, provided with moderate boss. Legs long and strong, with pale transverse bands, clothed with pubescence, hairs and spines.

Abdomen: Nearly triangular, posteriorly narrow; clothed with pubescence and hairs, overlapping on the carapace. Dorsum greenish brown in colour, provided with many scattered black spots and chalk white patches forming an indistinct pattern as in text-fig. 14. Six pairs of sigillae arranged mid-longitudinally, ventral side with a broad longitudinal greenish brown patch guarded laterally by a pair of conspicuous dumb-bell shaped chalk white bars. Epigyne with a short, broad and triangular scape as in text-figs. 15 & 16; scape provided with a pair of inconspicuous lateral lobes and without any constriction. Internal genitalia as in text-fig. 17.

Distribution: India: Poona, East Khandesh, Maharashtra; Darjeeling, West Bengal; Rajkot, Gujarat; Rilbong, Shillong, Meghalaya. Burma: Rangoon, Tharrawaddy, Bhamo. Pakistan: Karachi. North America.

Remarks: Description and illustrations are based on one specimen identified by us and confirmed by Dr. H. W. Levi, Harvard University, U. S. A., and this specimen was collected from Jasdan, Rajkot, Gujarat.

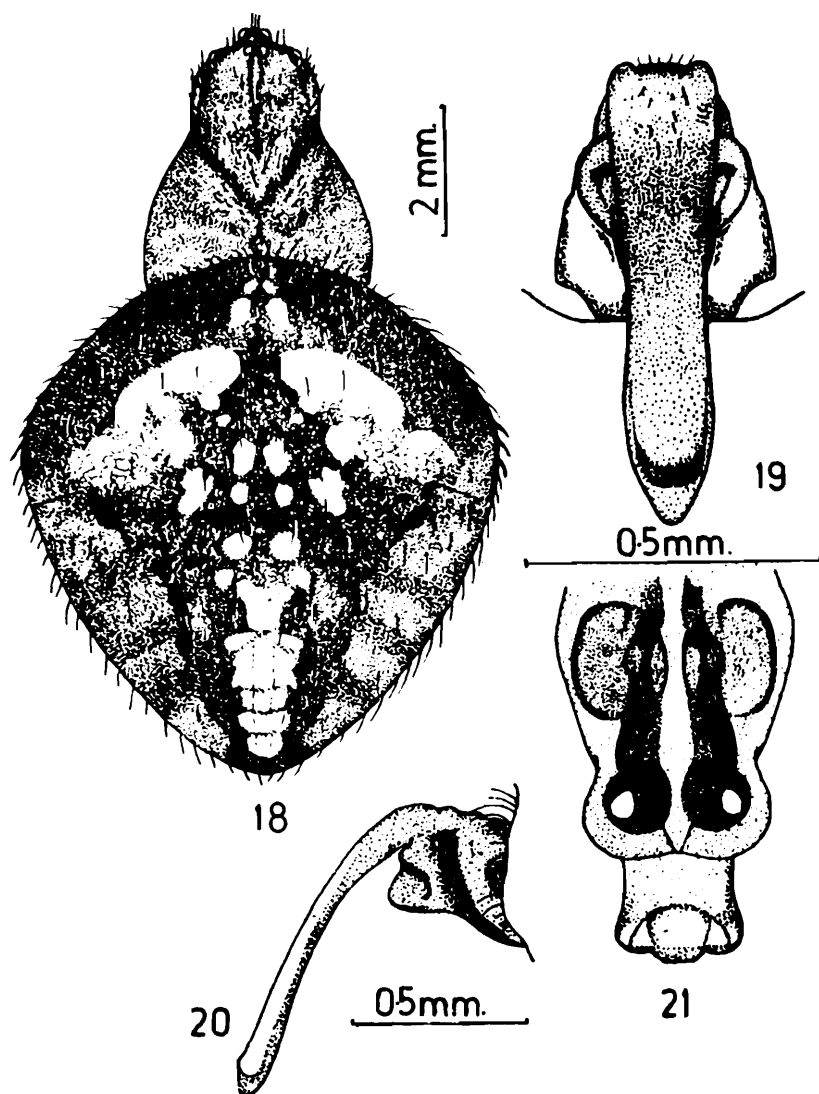
2. *Neoscona chrysanthusi* sp. nov.*

(Figs. 18-21)

General: Cephalothorax and legs light brown in colour, abdomen greyish with chalk white patches. Total length 11.60 mm. Carapace 4.70 mm. long, 3.80 mm. wide; abdomen 8.20 mm. long, 7.40 mm. wide.

* This species is named after late Dr. Fr. Chrysanthus of Netherland, a well known Arachnologist in token of high regard which the present authors have for him.

Cephalothorax: Longer than wide, narrower in front, clothed with pubescence and hairs; thoracic region provided with a longitudinal groove. Ocular quad slightly longer than wide and wider in front than behind as in text-fig. 18; anterior median eyes larger than posterior medians; posterior medians encircled by black ring; laterals close and each situated on a black tubercle; both rows of eyes recurved as in text-fig. 18. Sternum heart-shaped, pointed behind, clothed with pubescence and hairs, light brown in colour, provided with a median longitudinal pale patch. Labium nearly as long as wide, light brown and distal margin pale. Maxillae light brown with pale outer border, provided with distinct scopulae. Chelicerae moderately strong, light brown, provided with indistinct boss. Legs long and moderately strong, clothed with pubescence and spines; femora light coloured; tarsi and metatarsi with indistinct transverse brown bands.



Figs. 18 — 21. *Neoscona chrysanthusi* sp. nov.
 18. Dorsal view of female, legs omitted.
 19. Epigyne, ventral view.
 20. Epigyne, lateral view.
 21. Internal genitalia, posterior view.

Abdomen: Sub-triangular, longer than wide, clothed with pubescence and hairs. Dorsum of abdomen provided with some chalk-white patches and black oblique marks as in text-fig. 18. Six pairs of sigillae arranged mid-longitudinally on the dorsum. Ventral side greyish yellow in colour; a pair of chalk white spots present in between the epigastric furrow and the spinnerets. Epigynal scape long, thin and narrow, provided with a pair of rounded lateral lobes as in text-figs. 19 & 20. Internal genitalia as in text-fig. 21.

Holotype: Female in spirit, deposited at ZSI Calcutta Regd. No. 4952/18.

Type-locality: Mangan, near Singhik, Bhutan, INDIA. Coll. G. Ramakrishna, 8.5.1962.

Discussion: This species is closely related to *Neoscona rumpfi* (Thorell) but it is separated as follows: (i) Cephalothorax narrower in front than that of *rumpfi*. (ii) Abdominal markings on the dorsum also different in both the species. (iii) Scape of epigyne thin, long and narrow but in *rumpfi* it is short and broad. (iv) Lateral lobes of scape large and rounded but in *rumpfi* pointed horn like.

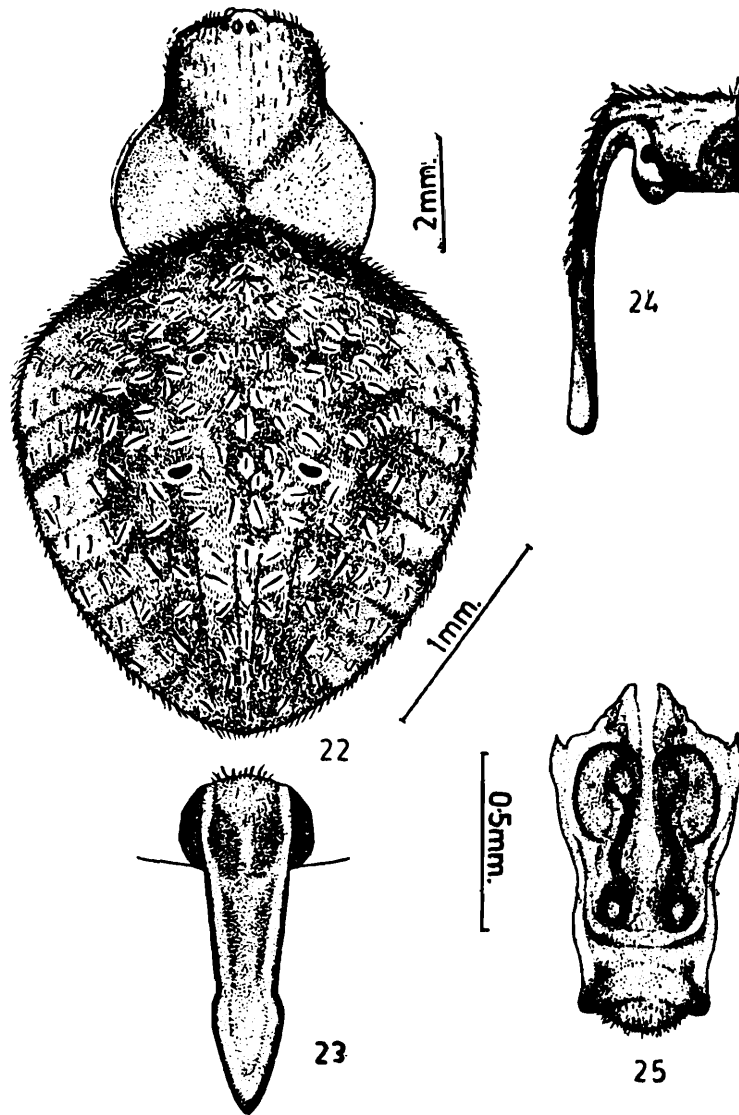
3. *Neoscona bengalensis* sp. nov.

(Figs. 22-25)

General: Cephalothorax reddish brown, legs light brown, abdomen dirty brown. Total length 12.70 mm. Carapace 5.00 mm. long, 4.40 mm. wide; abdomen 9.00 mm. long, 7.90 mm. wide.

Cephalothorax: Longer than wide, narrower in front, clothed with hairs; cephalic region slightly elevated; thoracic region provided with longitudinal groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 22. Anterior median eyes considerably larger than the posterior medians; posterior medians encircled by black ring; lateral eyes close and each situated on a black tubercle. Both rows of eyes recurved as in text-fig. 22. Sternum heart-shaped, pointed behind, brown, clothed with hairs and spines, provided with mid-longitudinal pale bar. Labium nearly as long as wide, brown, clothed with spine like hairs, distal end pale in colour and provided with prominent scopulae. Chelicerae very strong, clothed with thick hairs and spines.

Abdomen: Sub-triangular, longer than wide, much wider in front than behind, clothed with hairs. Five pairs of sigillae arranged mid-longitudinally on the dorsum. Dorsum of abdomen decorated with minute chalk-white spots, each with deep brown short line as in text-fig. 22. Ventral side of abdomen brown, but provided with a mid-ventral



Figs. 22 — 25. *Neoscona bengalensis* sp. nov.
 22. Dorsal view of female, legs omitted.
 23. Epigyne, ventral view.
 24. Epigyne, lateral view.
 25. Internal genitalia, posterior view.

dark brown broad longitudinal patch extending from epigastric furrow to the spinnerets. One pair of chalk white spots present anterior to the spinnerets. Epigynal scape thin, long and narrow and bent at right angle to the base of epigyne; one pair of inconspicuous lateral lobes as in text-figs. 23 & 24. Internal genitalia as in text-fig. 25.

Holotype: Female in spirit, deposited at ZSI, Calcutta, Regd. No. 4953/18.

Type-locality: Near Jadavpur Railway Station, Calcutta, West Bengal, India. Coll. Bijan Biswas, 12.12.1976.

Discussion: This species is close to *Neoscona chrysanthusi* sp. nov. but it differs as follows. (i) Abdominal pattern of markings are quite different in both the species. (ii) Scape of epigyne not bent at right angle.

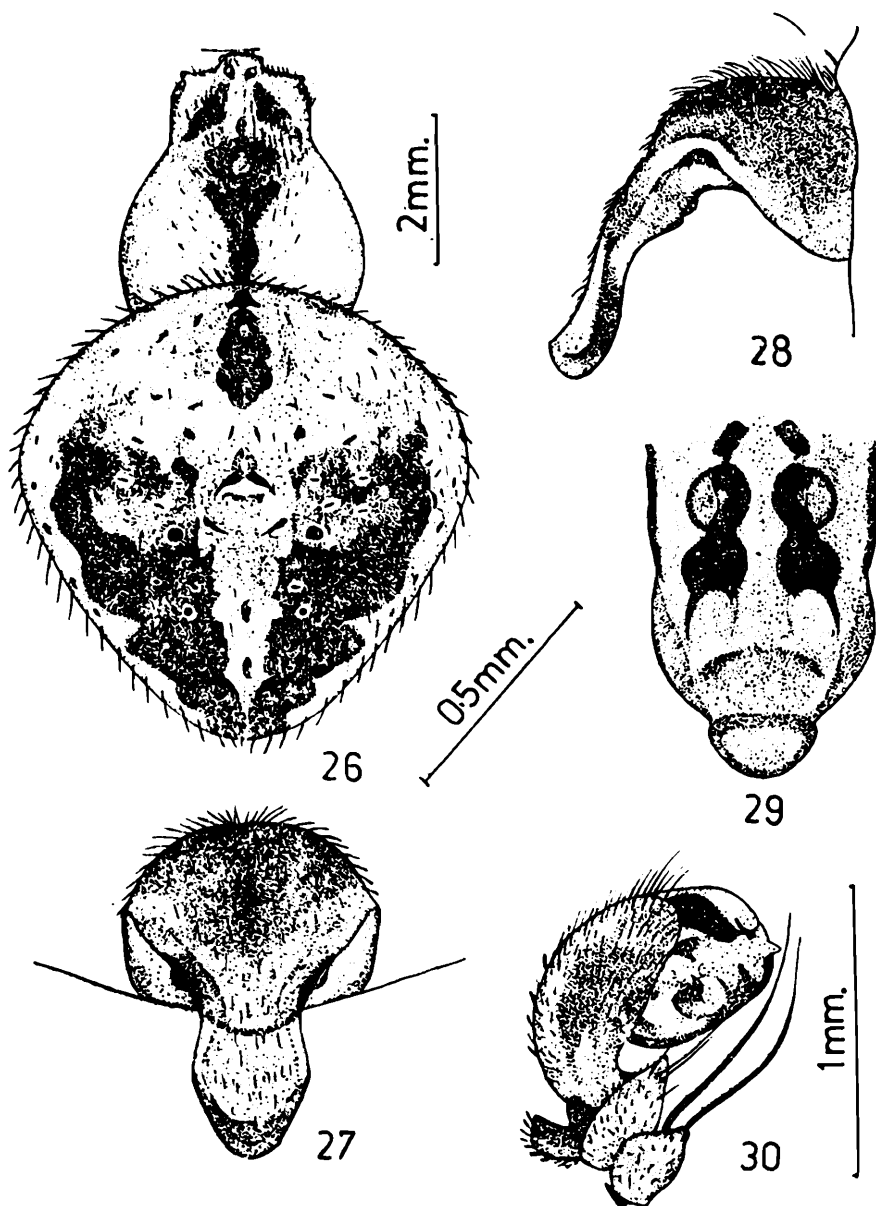
to the base in *chrysanthusi* but in *bengalensis* it is bent at right angle to the base (iii) Lateral lobes of the scape inconspicuous but in *chrysanthusi* lateral lobes are more prominent and larger. (iv) Internal genitalia also different in both.

4. *Neoscona mukerjei* Tikader

(Figs. 26-30)

1980. *Neoscona mukerjei* Tikader, *Proc. Indian Acad. Sci.*, 89(3) : 247.

General: Cephalothorax and legs yellowish, abdomen dark brown with greyish patches. Total length 9.20 mm. Carapace 4.00 mm. long, 3.30 mm. wide; abdomen 6.20 mm. long, 6.00 mm. wide.



Figs. 26 — 30. *Neoscona mukerjei* Tikader.
 26. Dorsal view of female, legs omitted.
 27. Epigyne, ventral view.
 28. Epigyne, lateral view.
 29. Internal genitalia, posterior view.
 30. Male palp.

Cephalothorax: Longer than wide and narrower in front, clothed with pubescences and hairs; cephalic region provided with conspicuous 'V' shaped dark brown patches as in text-fig. 26. Thoracic region provided with a deep longitudinal groove. Anterior median eyes slightly larger than posterior medians, posterior medians encircled by black ring. Lateral eyes close and each situated on a tubercle. Ocular quad wider in front than behind and both rows of eyes recurved as in text-fig. 26. Sternum heart-shaped, pointed behind, having a median longitudinal white band. Labium wider than long, dark brown, distal margin pale coloured. Maxillae broad and nearly roundish, yellowish with some dark brown patches at the proximal portion and provided with distinct scopulae. Chelicerae strong, yellowish and provided with moderate boss. Legs long and strong, clothed with pubescence and spines; distal ends of all segments except coxa and trochanter, provided with dark brown transverse bands. Male palp as in text-fig. 30.

Abdomen: Sub-triangular, slightly longer than wide, tapering posteriorly and clothed with grey pubescence and hairs. Dorsum of abdomen provided with a club-shaped greyish white patch, arranged longitudinally as in text-fig. 26. Five pairs of sigillae mid-longitudinally on the dorsum. Ventral side brownish-grey but having a broad mid-ventral dark brown patch in between the epigastric furrow and the spinnerets, and guarded laterally by a pair of dumb-bell shaped chalk white bars. Epigyne provided with a moderately long scape, scape provided with a deep constriction and a pair of indistinct lateral lobes as in text-figs. 27 & 28. Internal genitalia as in text-fig. 29.

Distribution: Poona, (Type-locality) Maharashtra, India.

Remarks: Description and illustrations prepared on the basis of type specimen.

5. *Neoscona rumpfi* (Thorell)

(Figs. 31-35)

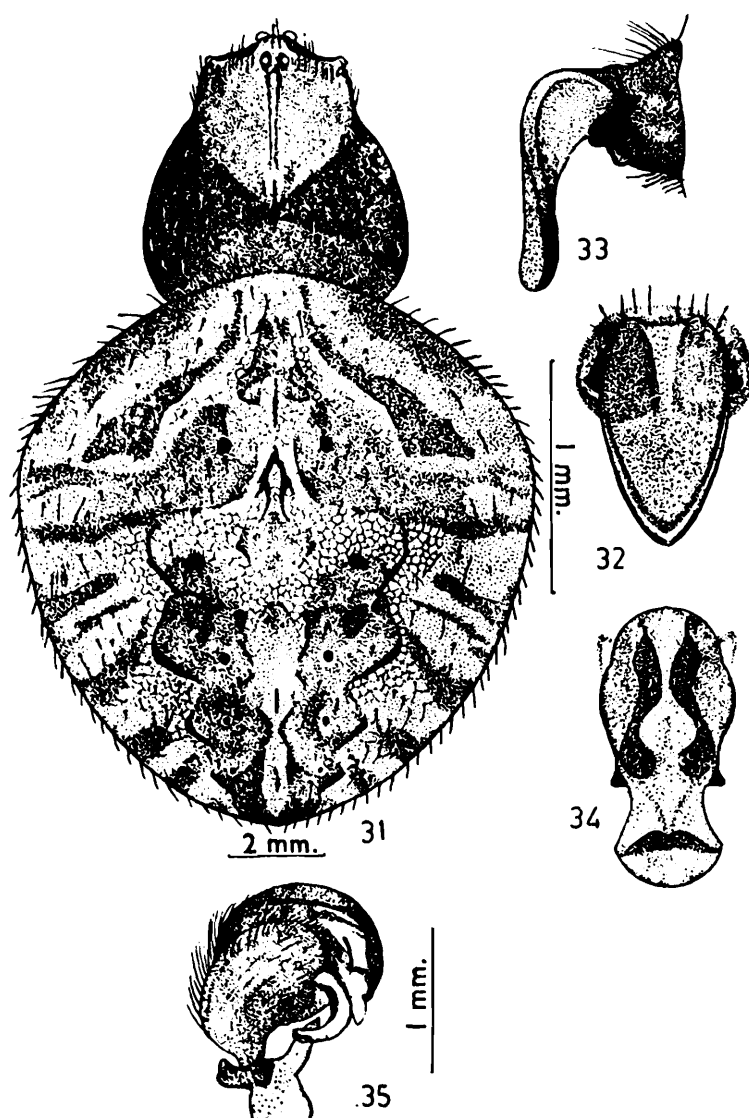
1878. *Araneus rumpfi* Thorell, *Ann. Mus. Civ. Genova*, 13 : 296.

1900. *Araneus rumpfi* : Pocock, *Fauna Brit. India, Arachn.*, : 228.

General: Cephalothorax dark brown, legs yellowish, abdomen greyish brown. Total length 17.00 mm. Carapace 6.30 mm. long, 5.80 mm. wide; abdomen 11.90 mm. long, 11.00 mm. wide.

Cephalothorax: Longer than wide, narrower in front clothed with pubescence and hairs; cephalic region slightly high and light brown colour; thoracic region dark brown and provided with a deep longi-

tudinal groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 31. Anterior median eyes larger than the posterior medians. Lateral eyes close and each situated on a tubercle. Both rows of eyes recurved as in text-fig. 31. Sternum heart-shaped, pointed behind, light brown in colour with mid-longitudinal white broad band, clothed with pubescence and hairs. Labium wider than long, brown with pale distal end. Maxillae broad, provided with distinct scopulae. Chelicerae strong, yellowish brown, provided with prominent boss. Legs long and very strong, yellowish in colour, distal ends of segments with distinct transverse bands; femora I, II reddish brown in colour. Male palp as in text-fig. 35.



Figs. 31 — 35. *Neoscona rumpfi* (Thorell)
 31. Dorsal view of female, legs omitted.
 32. Epigyne, ventral view.
 33. Epigyne, lateral view.
 34. Internal genitalia, posterior view.
 35. Male palp.

Abdomen: Sub-triangular, longer than wide, clothed with pubescence and some long grey hairs. Dorsum of abdomen provided with an

indistinct pattern, marked with white and greyish brown patches and oblique black markings as in text-fig. 31. Six pairs of sigillae arranged mid-longitudinally on the dorsum. Ventral side dirty-brown in colour with a broad mid-ventral black patch in between epigastric furrow and spinnerets; anterior and lateral sides of the black patch guarded by conspicuous chalk white patches. Epigynal scape with constriction at the bending point and provided with a pair of conspicuous horn like lateral lobes as in text-figs. 32 & 33; ventral side of the epigyne provided with a median bulge as in text-fig. 33. Internal genitalia as in text-fig. 34.

Distribution: India: Chingleput, Ootacamund, Tamil Nadu; Bangalore, Karnataka; Wagra Koroor, A. P.; Poona, Maharashtra; Orissa. Sri Lanka; Punduloya, Trincomali. Burma: Rangoon, Tharrawaddy, Bhamo. Pakistan: Karachi. Indo and Austro-Malaysia.

Remarks: Illustrations and description are based on type-specimens of female and male, deposited at B. M. (N. H.), London, Regd. No. 1899. 12.5.71.

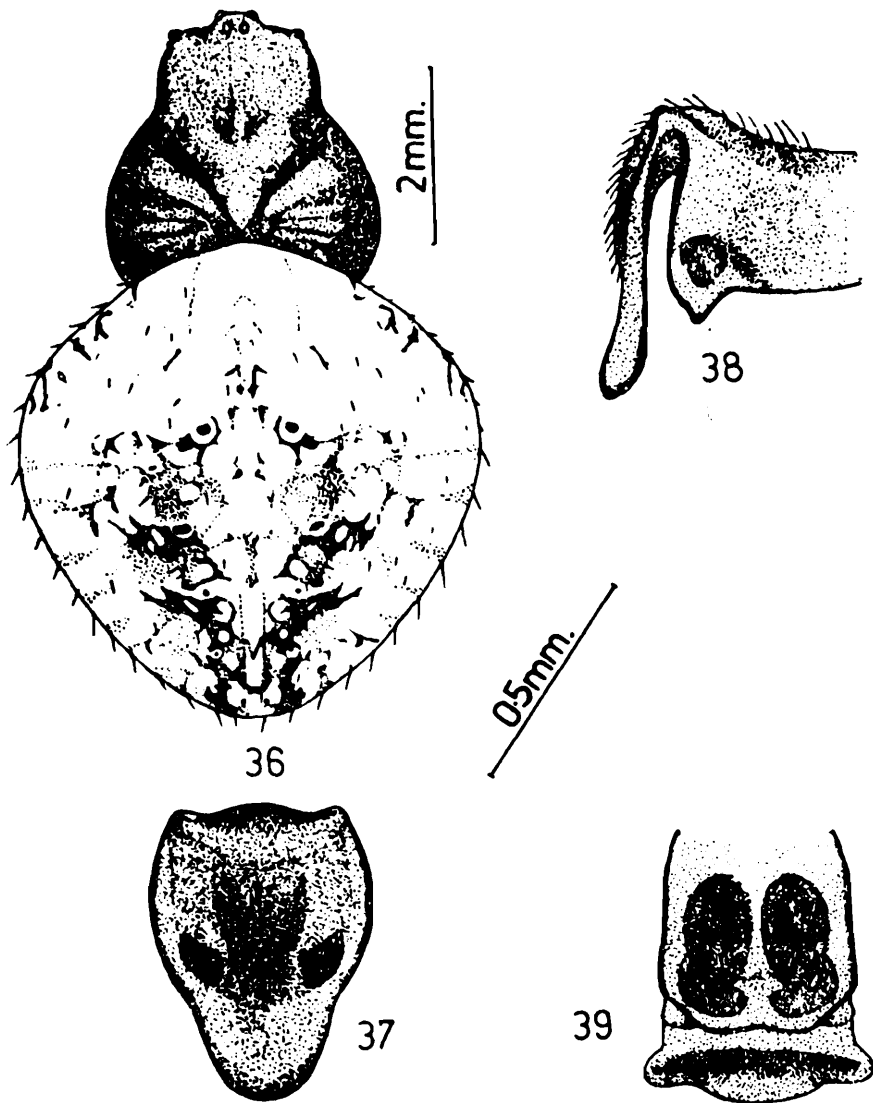
6. *Neoscona lugubris* (Walckenaer)

(Figs. 36-39)

1841. *Epeira lugubris* Walckenaer, *Hist. Nat. Ins. Apt.*, 1 : 34.
 1960. *Araneus lugubris* : Chrysanthus, *Nova Guinea (Zool.)*, 10(3) : 36.
 1975. *Araneus lugubris* : Patel, "*Vidya*", *J. Gujarat Univ.*, 18(1) : 160.

General: Cephalothorax and legs light yellowish brown, abdomen chalk white. Total length 9.90 mm. Carapace 4.00 mm. long, 3.90 mm. wide; abdomen 6.80 mm. long, 6.60 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, cephalic region clothed with pubescence and a few hairs; thoracic region provided with a distinct longitudinal groove. Ocular quad longer than wide, wider in front than behind as in text-fig. 36. Anterior median eyes larger than posterior medians, posterior median eyes encircled by black ring. Lateral eyes close and each situated on a tubercle. Both rows of eyes moderately recurved as in text-fig. 36. Sternum heart-shaped, pointed behind, clothed with pubescence and hairs, pale coloured, provided with a longitudinal median chalk white band. Labium nearly as long as wide, light yellowish brown in colour with pale distal margin. Maxillae broad and nearly roundish, light yellowish brown, provided with distinct scopulae. Chelicerae moderately strong, light yellowish brown with moderate boss. Legs long and moderately strong, clothed with pubescence and long hairs.



Figs. 36 — 39. *Neoscona lugubris* (Walckenaer).
 36. Dorsal view of female, legs omitted.
 37. Epigyne, ventral view.
 38. Epigyne, lateral view.
 39. Internal genitalia, posterior view.

Abdomen: Sub-triangular, slightly longer than wide, tapering behind, clothed with pubescence and grey hairs. Dorsum of abdomen provided with light greenish indistinct pattern as in text-fig. 36. Five pairs of sigillae arranged mid-longitudinally on the dorsum. Ventral side uniformly light coloured but having a mid-ventral broad chalk white band in between epigastric furrow and spinnerets. Epigynal scape very thin and broad, having a constriction at the bending point of the scape as in text-figs. 37 & 38; scape provided with a pair of lateral lobes, which are not seen from ventral view, and placed at the base of the epigyne; a median bulge present on the ventral side of the base as in text-fig. 38. Internal genitalia as in text-fig. 39.

Distribution: India: Poona, Maharashtra; Dangs, Gujarat; Austro-Malasia; South New Guinea; Japan, China.

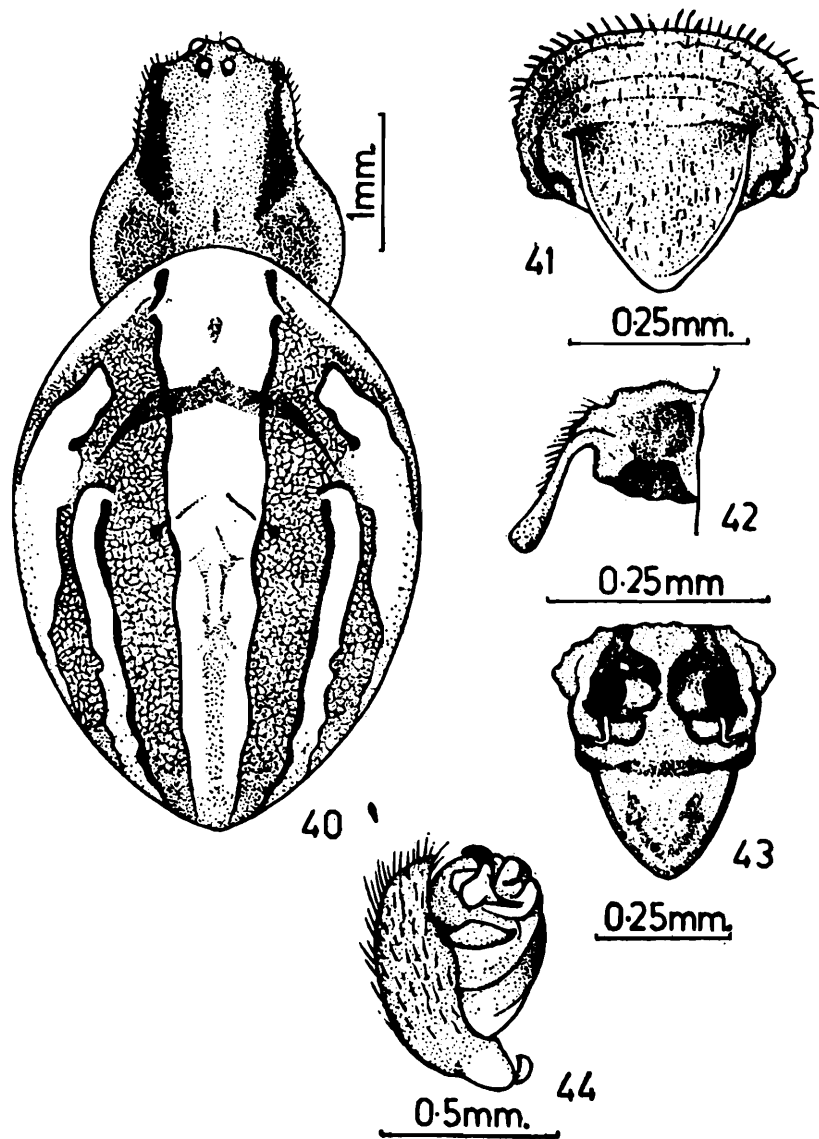
Remarks: As we could not get the type material, the description and illustrations have been made on the basis of one specimen collected from Satara, Maharashtra.

7. *Neoscona molemensis* sp. nov.

(Figs. 40-44)

General: Cephalothorax and legs yellowish brown, abdomen brownish white. Total length 5.80 mm. Carapace 2.20 mm. long, 1.80 mm. wide; abdomen 4.30 mm. long, 3.10 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs; cephalic region slightly high, provided



- Figs. 40 — 44. *Neoscona molemensis* sp. nov.
 40. Dorsal view of female, legs omitted.
 41. Epigyne, ventral view.
 42. Epigyne, lateral view.
 43. Internal genitalia; posterior view.
 44. Male palp.

with two lateral longitudinal brown patches; thoracic region provided with a deep longitudinal groove. Ocular quad nearly as long as wide and little wider in front than behind as in text-fig. 40; anterior median eyes slightly larger than posterior medians; posterior medians encircled by black ring; lateral eyes close; both rows of eyes recurved but anterior row more recurved than posterior row as in text-fig. 40. Sternum heart-shaped, pointed behind, dark brown, provided with a mid-longitudinal white band. Labium wider than long, dark brown and pale distal margin. Maxillae broad, nearly as long as wide, proximal end provided with scopulae. Chelicerae strong, dark brown, having moderate boss. Legs long and moderately strong, clothed with hairs and spines; ventral side of femora and tibiae of all legs except III, provided with conspicuous longitudinal black lines. Male palp as in text-fig. 44.

Abdomen: Nearly elliptical, longer than wide, clothed with pubescence and hairs, strongly overlapping on the cephalothorax as in text-fig. 40. On the dorsum of abdomen a conspicuous mid-longitudinal chalk white broad band extending as long as the length; also accompanied with two pairs of lateral chalk white bands, of which one pair placed a little away from the anterior end and the other pair from middle of the dorsum as in text-fig. 40. These bands are margined by reddish brown lines. Two pairs of sigillae present on the dorsum. Ventral side greyish brown, having indistinct white patches; mid-ventral region of abdomen provided with a broad dark bar, anteriorly and posteriorly guarded by chalk white patches. Scape of the epigyne thin and nearly triangular, one pair of lateral lobes situated at the base of the scape as in text-figs. 41 & 42. Internal genitalia as in text-fig. 43.

Holotype: Female, *paratype* two females, *allotype* one male in spirit, deposited at ZSI, Calcutta, Regd. No. 4957-9/18.

Type-locality: Molem, Goa, India. Coll. B. S. Lamba, 14.12.1973

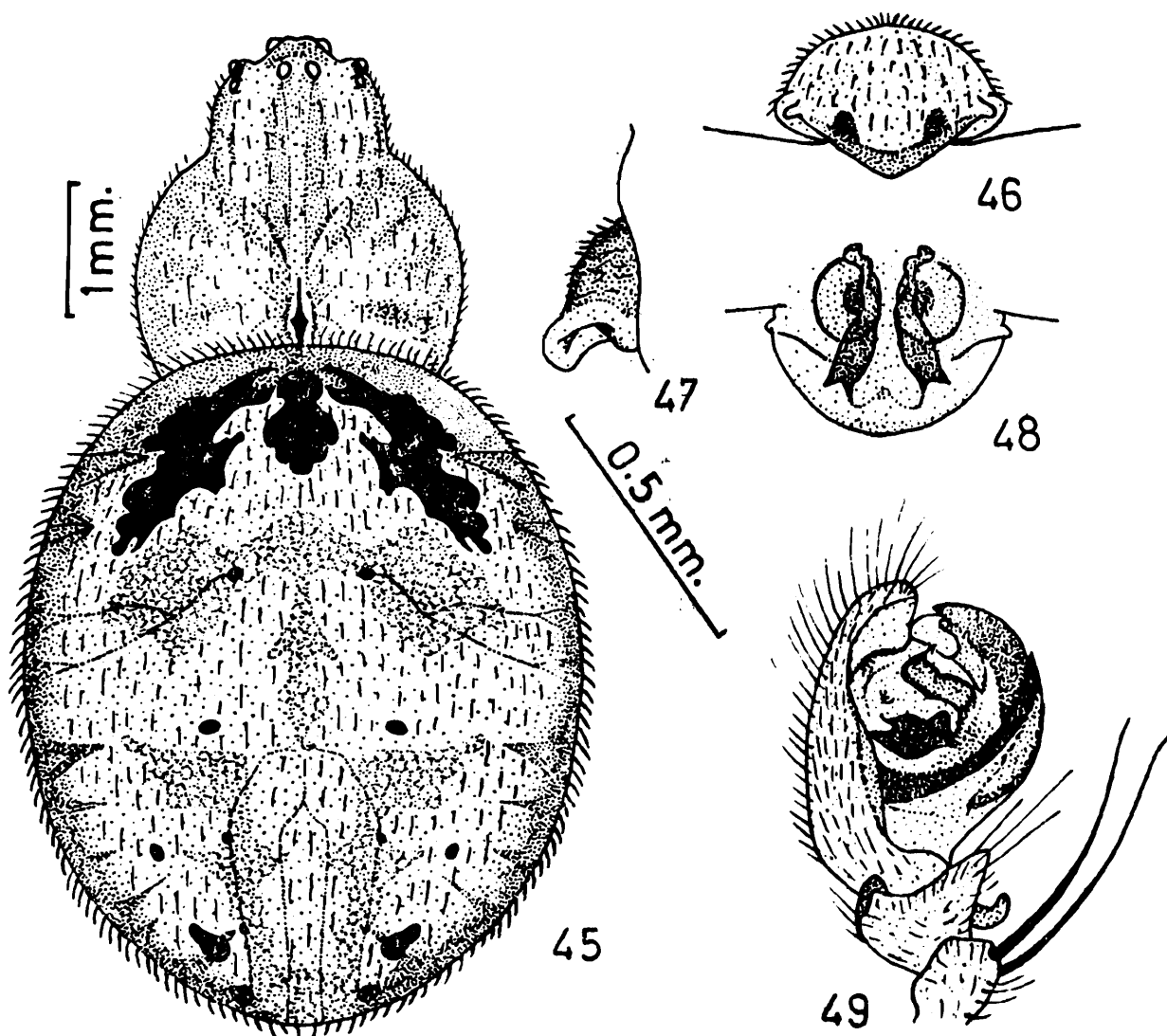
Discussion: This species is closely related to *Neoscona sinhagadensis* (Tikader) but differs as follows: (i) Cephalothorax provided with two longitudinal brown patches but in *sinhagadensis* cephalothorax provided with two lateral and one median longitudinal brown patches. (ii) Sternum provided with mid-longitudinal brown patches. (iii) Sternum provided with mid-longitudinal chalk white band but in *sinhagadensis* sternum is black with no white band. (iv) Abdominal markings are also different in both the species. (v) Scape of the epigyne is nearly triangular but in *sinhagadensis* it is tongue shaped. (vi) Lateral lobes of the scape situated at the base but in *sinhagadensis* they are at the middle.

8. *Neoscona elliptica* sp. nov.

(Figs. 45-49)

General: Cephalothorax and legs light yellowish, abdomen light brown. Total length 7.35 mm. Carapace 2.65 mm. long, 2.50 mm wide; abdomen 5.10 mm. long, 4.20 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs; thoracic region more lighter in colour and provided with a distinct longitudinal groove; mid-longitudinal portion of carapace rather darker as in text-fig. 45. Ocular quad slightly longer than wide as in front; wider in front than behind as in text-fig. 45; eyes pearly white, except the anterior medians; anterior median eyes slightly larger than posterior medians; posterior median eyes encircled by black ring; lateral eyes close and subequal in size; both rows of eyes recurved



- Figs. 45 — 49. *Neoscona elliptica* sp. nov.
 45. Dorsal view of female, legs omitted.
 46. Epigyne, ventral view.
 47. Epigyne, lateral view.
 48. Internal genitalia, posterior view.
 49. Male palp.

as in text-fig. 45. Sternum heart-shaped, pointed behind, light greenish, yellow with median pale area, clothed with hairs. Labium slightly wider than long, brownish in colour with pale distal margin. Maxillae broad yellowish, provided with distinct scopulae. Chelicerae strong, yellowish brown, provided with distinct boss. Legs moderately long and strong, clothed with hairs and spines, light yellowish in colour, only distal end of tarsi having brown bands. Male palp as in text-fig. 49.

Abdomen: Elliptical, roundish at both ends, longer than wide, clothed with pubescence and hairs as in text-fig. 45. Dorsum of abdomen with yellowish brown in the middle and a few blackish spots and patches as in text-fig. 45; lateral sides rather deep brownish with some brown inward lines and four pairs of distinct sigillae arranged mid-longitudinally as in text-fig. 45. Ventral side deep brown in colour with a median broad darker patch guarded by a pair of chalk white patches in between epigastric furrow and spinnerets. Epigyne having a very short, broad, triangular scape and one pair of indistinct lateral lobes as in text-figs. 46-47. Internal genitalia as in text-fig. 48.

Holotype: Female, *paratype* five females, *allotype* one male in spirit, deposited at ZSI. Calcutta, Regd. No. 4960-2/18.

Type-locality: Botanical Survey of India Compound, Poona, Maharashtra, India. Coll. B. K. Tikader, 3.3.1978.

Discussion: This species having much similarities with *Neoscona molemensis* sp. nov. but differs as follows: (i) Abdomen elliptical with roundish at both anterior and posterior ends, but in *molemensis* both ends are rather tapering. (ii) Scape of the epigyne shorter and broader than that of *molemensis*. (iii) Scape provided with a distinct broad rim, but in *molemensis* the rim of the scape is indistinct and thin. (iv) Genital openings not seen from ventral view and situated underneath the scape but in *molemensis* they are not underneath the scape and seen from, ventral side of abdomen, rather laterally placed.

9. *Neoscona excelsus* (Simon)

(Figs. 50-54)

1889. *Glyptogona excelsus* Simon, *J. Asiat. Soc. Bengal*, 58 : 337.

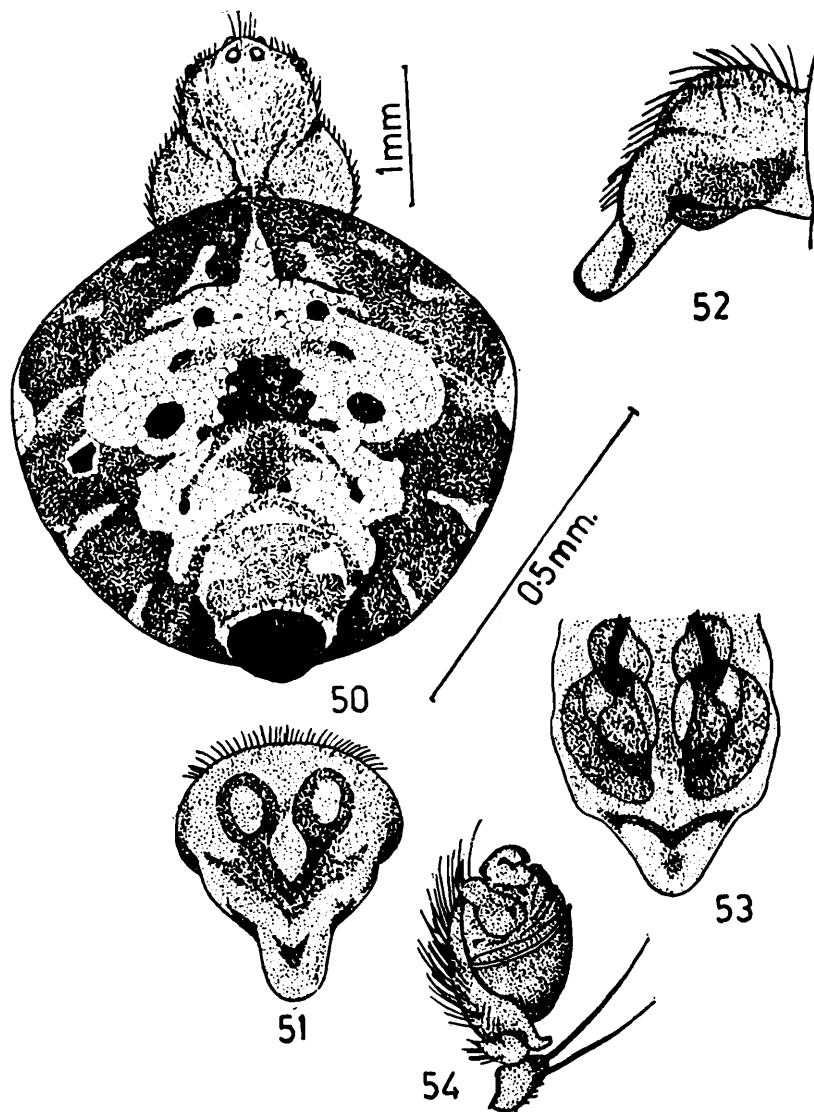
1896. *Epeira excelsa* : Bank, *J. N. Y. Ent. Soc.*, 4 : 90.

1906. *Araneus excelsus* : Simon, *Ann. Soc. ent. Fr.*, 75 : 283.

1936. *Araneus excelsus* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 179.

General: Cephalothorax and legs brownish, abdomen blackish brown. Total length 4.70 mm. Carapace 1.70 mm. long, 1.50 mm. wide; abdomen 3.50 mm. long, 3.70 mm. wide.

Cephalothorax: Slightly longer than wide, narrowing in front, clothed with white pubescence. Cephalic region distinctly elevated and light brown in colour. Thoracic region provided with an inconspicuous groove. Ocular quad slightly longer than wide forming a rectangular and situated on an elevation as in text-fig. 50. Anterior median eyes slightly smaller than the posterior median eyes. Posterior median eyes encircled by black ring. Lateral eyes close and each situated on a tubercle. Both rows of eyes strongly recurved. Sternum heart-shaped brownish in colour, pointed behind, clothed with white pubescence and hair. Labium wider than long, crescent shaped, brown in colour with pale distal border. Maxillae strong and nearly square shaped, brown with pale outer margin, provided with distinct scopulae. Chelicerae moderately



Figs. 50 — 54. *Neoscona excelsus* (Simon).

- 50. Dorsal view of female, legs omitted.
- 51. Epigyne, ventral view.
- 52. Epigyne, lateral view.
- 53. Internal genitalia, posterior view.
- 54. Male palp.

strong and yellowish brown, provided with moderate boss. Legs moderately long and thin, clothed with pubescence, hairs and spines, femora of all legs dark brown, patellae and tibiae yellowish on the dorsal side. Male palp as in text-fig. 54.

Abdomen: Slightly wider than long, globular, clothed with white pubescence. Abdomen provided with a tail like hump with black tip at the posterior end as in text-fig. 50. Dorsum provided with a chalk white patch forming a folium as in text-fig. 50. Four pairs of sigillae arranged mid-longitudinally on the dorsal side. Ventral side blackish brown provided with a pair of large conspicuous chalk white spot in between the epigastric furrow and the spinnerets. Epigyne provided with a short and broad scape as in text-figs. 51 & 52. Internal genitalia as in text-fig. 53.

Distribution: India: Poona, Mahableshwar, Maharashtra, Rajkot, Gujarat; Berkuda Islands; Chhota Nagpur, Bihar; Eastern Himalaya, Kalimpong, West Bengal; Pakistan : Rawalpindi.

Remarks: Description and illustrations has been made from the specimen deposited in the Museum National d' Histoire Naturelle, Paris. Regd. No. 1146.

10. *Neoscona laglaizei* (Simon)

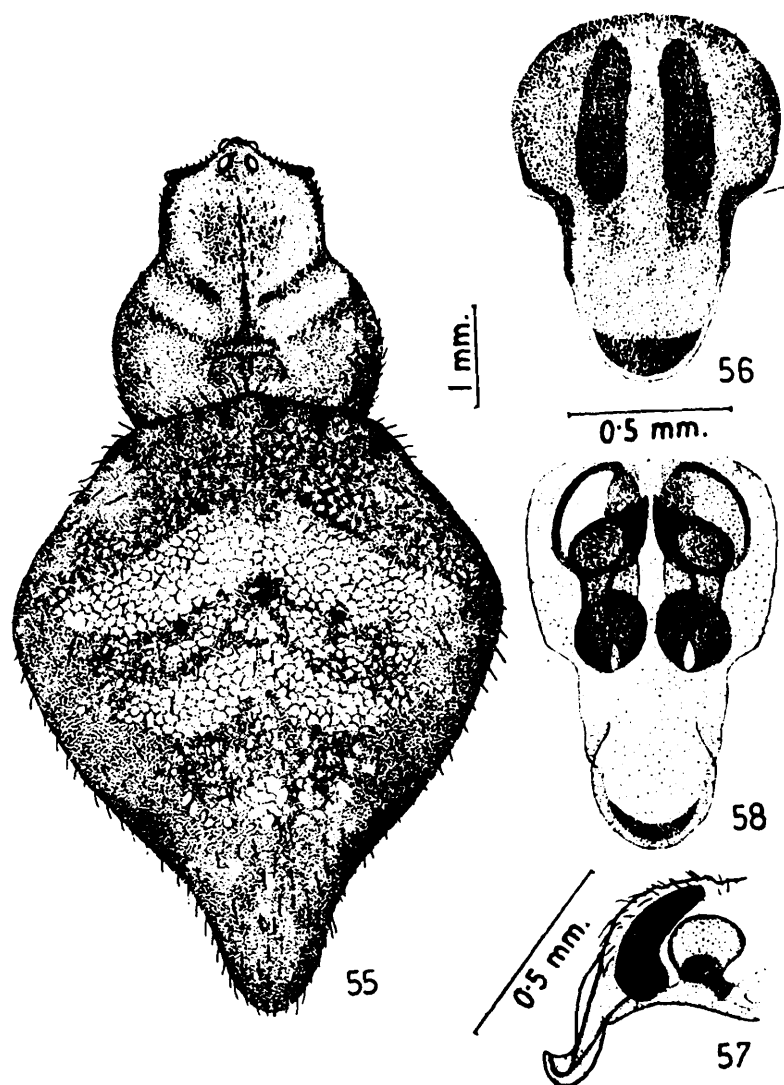
(Figs. 55-58)

1877. *Epeira laglaizei* Simon, *Ann. Soc. ent. Fr.*, (5) 7 : 77.
 1890. *Epeira laglaizei* : Thorell, *Ann. Mus. civ. Genova*, 28 : 167.
 1896. *Epeira laglaizei* : Workman, *Malaysian Spiders*, 1 : 41.
 1900. *Araneus laglaizei* : Pocock, *Fauna Brit. India, Arachn.*, : 224.
 1935. *Araneus laglaizei* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 181.
 1960. *Araneus laglaizei* : Chrysanthus, *Nova Guinea (Zool.)*, 10(3) : 39.
 1975. *Araneus laglaizei* : Patel, 'Vidya'. *J. Gujarat Univ.*, 18 (1) : 158.

General: Cephalothorax and legs yellowish, abdomen yellowish grey. Total length 8.60 mm. Carapace 3.20 mm. long, 2.70 mm. wide; abdomen 6.10 mm. long, 4.80 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, yellowish with very light brown patches as in text-fig. 55, clothed with pubescence and hairs. Ocular quad as long as wide and provided with an elevation as in text-fig. 55. Both the median eyes nearly same in size. Lateral eyes close and each situated on a tubercle. Both the rows of eyes recurved. Sternum heart-shaped, pointed behind, yellowish brown in colour, clothed with hairs. Labium wider than long, crescent shaped, yellowish

brown with pale distal border. Maxillae almost square, strong, yellowish brown with pale outer margin, provided with distinct scopulae. Chelicerae moderately strong, yellowish brown and provided with medium boss. Legs long and moderately strong, covered with pubescence and hairs, distal portion of femora brownish.



Figs. 55 — 58. *Neoscona laglaizei* (Simon).
 55. Dorsal view of female, legs omitted.
 56. Epigyne, ventral view.
 57. Epigyne, lateral view.
 58. Internal genitalia, posterior view.

Abdomen: Posteriorly cone shaped, yellowish grey with chalk white patches, clothed with pubescence. Dorsum of abdomen provided with a distinct long tail like hump at the posterior end and three pairs of sigillae arranged mid-longitudinally as in text-fig. 55. Ventral side provided with a large dark brown patch, and two pairs of chalk white patches, one pair near the epigastric furrow and other pair near the spinnerets. Epigyne with a broad scape as in text-fig. 56, tip of the scape bent and directed upward as in text-fig. 57. Internal genitalia as in text-fig. 58.

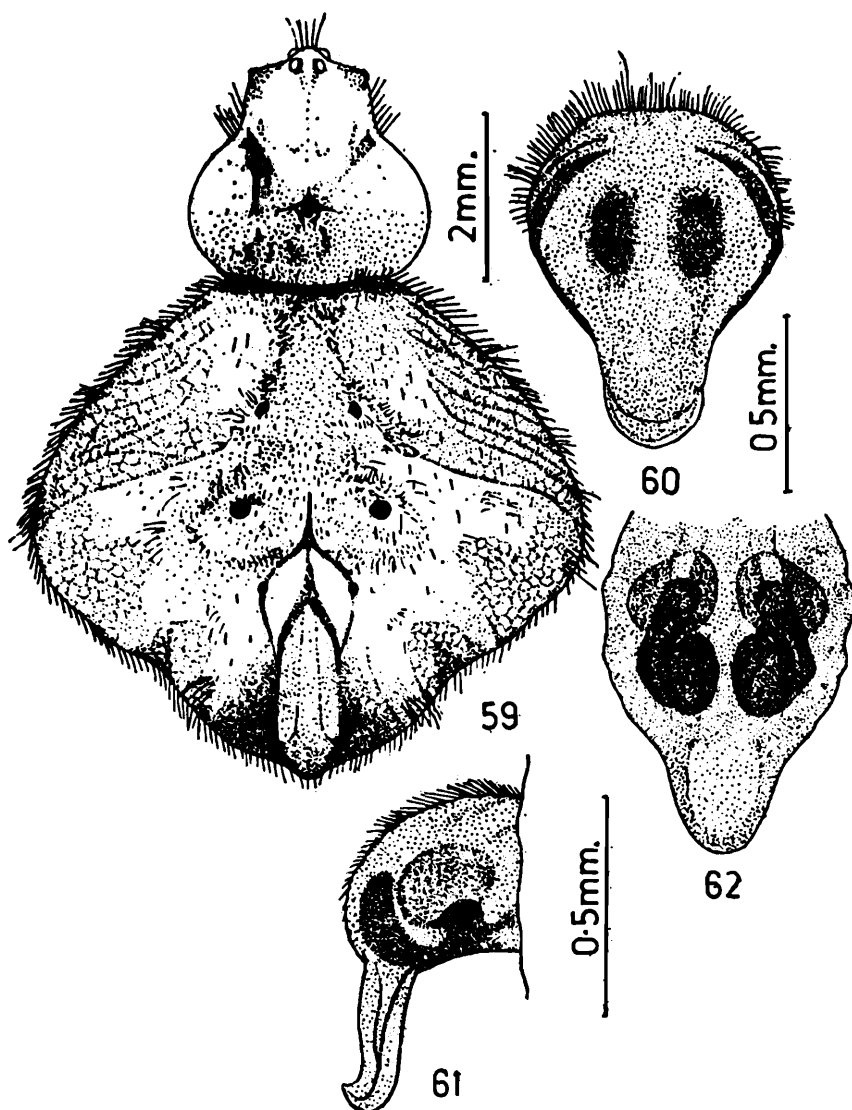
Distribution: India: Ootacamund Jaunsar, Thadyar 2500 ft. Sri Lanka: Perandeniya, Thincomali, Burma: Toungnoo, Tharrawady, Rangoon, Tenaserim. Java. Indo and Austro-Malayasia.

Remarks: The description and illustrations have been made on the basis of one of the type specimens deposited in the Museum National d' Histoire Naturelle, Paris Regd. No. 3138.

11. *Neoscona poonaensis* sp. nov.

(Figs. 59-62)

General: Cephalothorax and legs yellowish, abdomen yellowish grey. Total length 8.70 mm. Carapace 3.00 mm. long, 2.80 mm. wide; abdomen 6.00 mm. long, 6.60 mm. wide.



Figs. 59 — 62. *Neoscona poonaensis* sp. nov.
 59. Dorsal view of female, legs omitted.
 60. Epigyne, ventral view.
 61. Epigyne, lateral view.
 62. Internal genitalia, posterior view.

Cephalothorax: Slightly longer than wide, narrowing in front, yellowish with brown patches as in text fig. 59. clothed with pubescence and hairs. Thoracic region provided with an indistinct groove. Ocular quad as long as wide and situated on an elevation as in text-fig. 59. Both the median eyes nearly same in size. Lateral eyes close and each situated on a tubercle. Both rows of eyes recurved. Sternum heart-shaped, pointed behind, dark brown in colour, clothed with hairs. Labium wider than long, crescent shaped, dark brown with pale distal border. Maxillae almost square, strong, dark brown with pale outer margin, provided with distinct scopulae. Chelicerae moderately strong, yellowish and provided with medium boss. Legs long and moderately strong, covered with pubescence and hairs, distal ends of femora with distinct dark brown transverse bands, tibiae with indistinct dark brown patches on the ventral side.

Abdomen: Nearly pentangular in shape, yellowish grey with chalk white patches and dark brown lines, clothed with pubescence and irregular tufts of hairs present on the dorsum of abdomen as in text-fig. 59. Dorsum of abdomen provided with a distinct elongated tail like hump at the posterior end and three pairs of sigillae arranged mid-longitudinally as in text-fig. 59. Ventral side provided with a large star shaped black patch, and one pair of chalk white dumb-bell shaped patches in between the epigastric furrow and the spinnerets. Epigyne with a broad scape as in text-fig. 60, tip of the scape directed slightly upward as in text-fig. 61. Internal genitalia as in text-fig. 62.

Holotype: Female, *paratype* three females in spirit, deposited at ZSI. Calcutta.

Type-locality: Poona University compound, Poona, Maharashtra, India. Coll. B. K. Tikader, 12.10.1975.

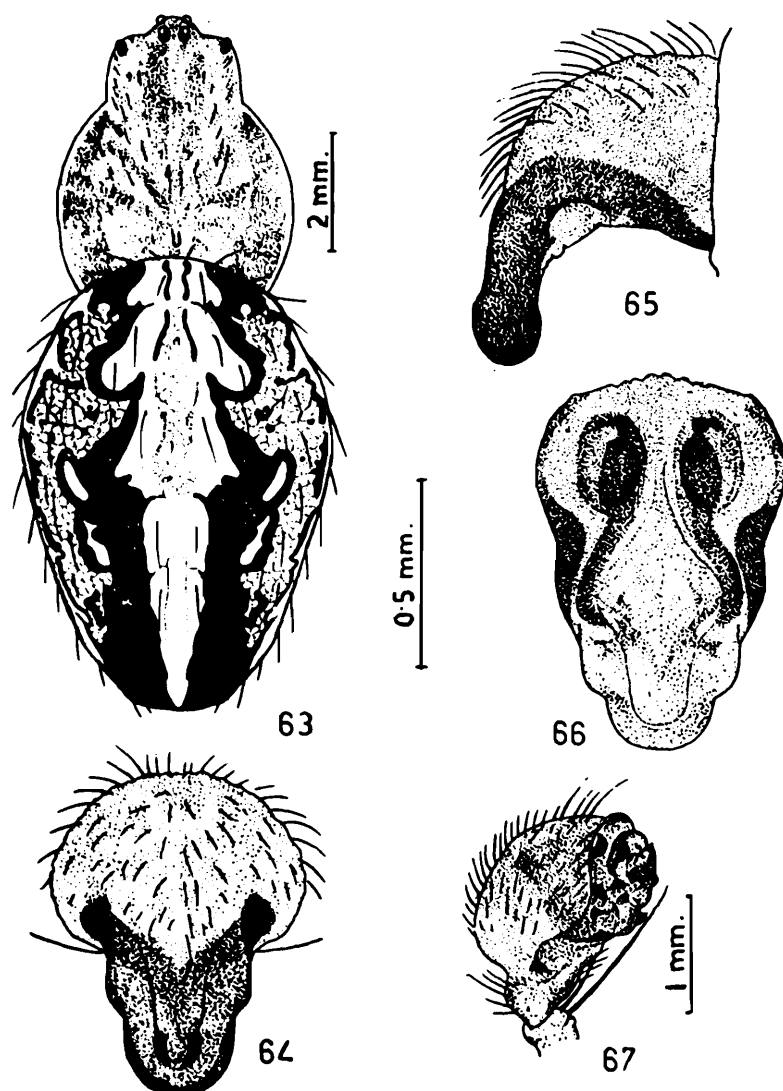
Discussion: This species is closely related to *Neoscona laglaizei* (Simon) but differs as follows: (i) Shape of abdomen is different. (ii) Abdomen nearly as long as wide but in *laglaizei* abdomen much longer than wide. (iii) Abdominal tail hump very short but in *laglaizei* it is very long. (iv) Anterior chamber of spermatheca is small and not overlapped on the posterior chamber but in *laglaizei* anterior chamber of spermatheca is large and overlapped on the posterior chamber.

12. *Neoscona sinhagadensis* (Tikader)

(Figs. 63-67)

General: Cephalothorax and legs yellowish brown, abdomen yellowish white. Total length 12.00 mm. Carapace 5.50 mm. long, 4.30 mm. wide; abdomen 8.00 mm. long, 5.40 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with grey pubescence and hairs; provided with two lateral and one median longitudinal dark brown streaks on the carapace; thoracic region provided with a deep longitudinal groove. Ocular quad slightly longer than wide and a little wider in front than behind as in text-fig. 63. Both the median eyes subequal in size, posterior medians encircled by black ring as in text-fig. 63; lateral eyes close and each situated on a black tubercle; both rows of eyes recurved but anterior row strongly recurved. Sternum heart-shaped, pointed behind, black in colour, clothed with



Figs. 63 — 67. *Neoscona sinhagadensis* (Tikader).
 63. Dorsal view of female, legs omitted.
 64. Epigyne, ventral view.
 65. Epigyne, lateral view.
 66. Internal genitalia; posterior view.
 67. Male palp.

pubescence and hairs. Labium wider than long, dark brown with pale distal border. Maxillae nearly round in shape, dark brown with pale outer margin, provided with distinct scopulae. Chelicerae strong, brownish yellow, provided with moderate boss. Legs long and strong, clothed with fine hairs and spines. Male palp as in text-fig. 67.

Abdomen: Nearly barrel shaped, longer than wide, narrowing behind, clothed with fine hairs; anteriorly overlapping on the carapace. Dorsum of abdomen decorated with chalk white, black and yellowish brown patches and mid-longitudinally provided with a conspicuous chalk white band margined with black markings as in text-fig. 63. Ventral side of abdomen decorated with chalk white and deep brown patches; mid-longitudinally having a dark brown broad patch in between the epigastric furrow and the spinnerets, which is guarded laterally by chalk white patches, one on each side. Scape of the epigyne tongue like, short, thick, strong and without constriction and provided with prominent rim and a pair of distinct lateral lobes as in text-figs. 64 & 65. Internal genitalia as in text-fig. 66.

Distribution: India: Sinhad Fort, (*Type-locality*) Poona, Maharashtra.

Remarks: Description and illustrations are based on one paratype female and one allotype male. This species was placed in the genus *Araneus* but we found it is of the genus *Neoscona* since the characters have tallied with the genus *Neoscona*.

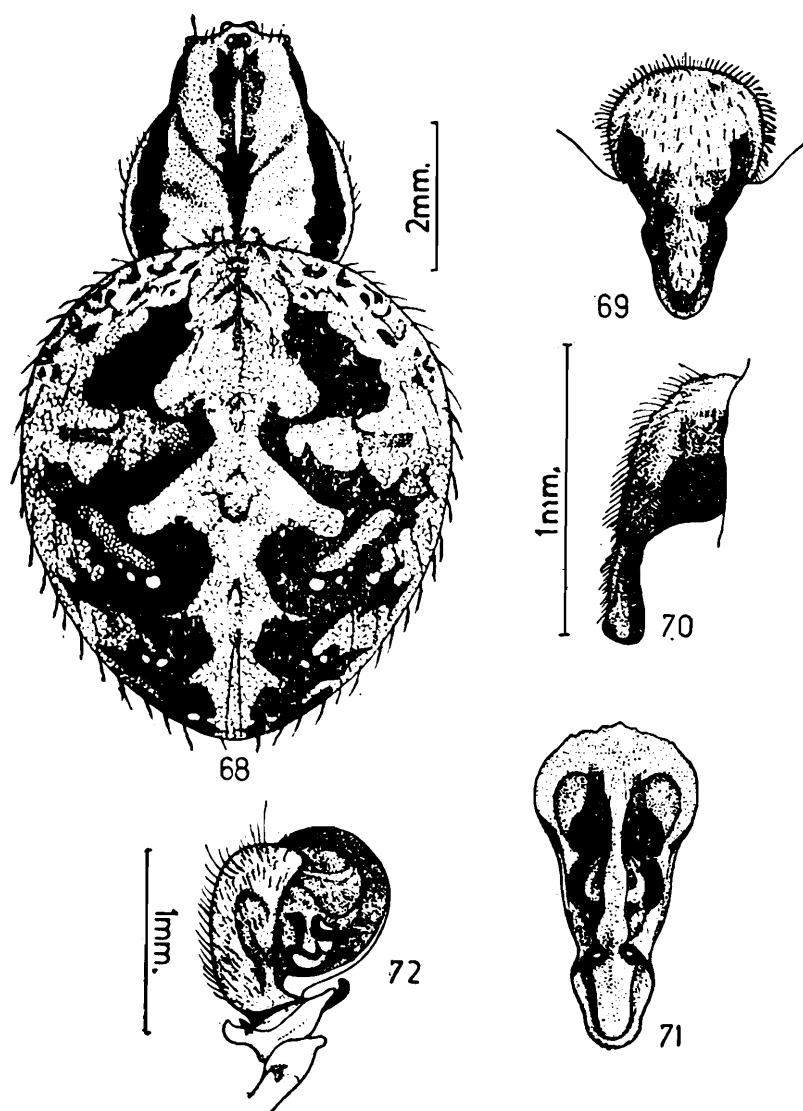
13 *Neoscona theis* (Walckenaer)

(Figs, 68-72)

- 1841. *Epeira theis* Walckenaer, *Hist. Nat. Ins. Apt.*, 2 : 53.
- 1847. *Epeira mangareva* : Walckenaer, *Hist. Nat. Ins. Apt.*, 4 : 469.
- 1869. *Epeira braminica* : Stoliczka, *J. Asiat. Soc. Bengal*, 33 : 238.
- 1877. *Epeira theisi* : Thorell, *Ann. Mus. Civ. Genova*, 10 : 390.
- 1897. *Araneus mangarevus* : Pocock, *Abh. Senckenbg. Ges.*, 23(4); 601,
- 1897. *Epeira obscura* : Rainbow, *Mem. Austral. Mus.*, 3(2) : 116.
- 1904. *Neoscona theisi* : Cambridge, *Bio Centr. Amer. Aran.*, 2 : 470.
- 1911. *Araneus theisi* : Merian, *Zool. Jahrb. Syst.*, 31(2) : 213.
- 1960. *Araneus theisi* : Chrysanthus, *Nova Guinea (Zool.)*, 10 : 39.
- 1975. *Araneus theisi* : Patel Vidya, *J. Gujarat Univ.*, 18(1): 158.

General: Cephalothorax and legs yellowish brown, abdomen brownish white. Total length 9.80 mm. Carapace 3.90 mm. long, 3.20 mm. wide; abdomen 6.80 mm. long, 5.70 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs, provided with two laterals and one median longitudinal dark brown bands; thoracic region provided with distinct longitudinal groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 68. Anterior median eyes larger than posterior medians; lateral eyes close, both rows of eyes slightly recurved as in text-fig. 68. Sternum heart-shaped, pointed behind, clothed with pubescence and hairs, dark brown, provided with a conspicuous mid-longitudinal bar. Labium wider than long, dark brown. Maxillae longer than wide, dark brown in colour but anterior border pale, distal end provided with scopulae. Chelicerae strong, light brown with prominent boss. Legs long and strong, clothed with hairs and spines, provided with transverse black bands. Male palp as in text-fig. 72.



Figs. 68 — 72. *Neoscona theis* (Walckenaer)
 68. Dorsal view of female, legs omitted.
 69. Epigyne, ventral view.
 70. Epigyne, lateral view.
 71. Internal genitalia, posterior view.
 72. Male palp.

Abdomen: Sub-oval, longer than wide, anterior wider than posterior end, clothed with pubescence and hairs, overlapping on the cephalothorax. Dorsum of abdomen provided with a conspicuous mid-longitudinal chalk white bar having four pairs of lateral projections as in text fig. 68, lateral sides of this bar guarded by deep brown or black patches as in text-fig. 68. Four pairs of sigillae present on the dorsum, arranged mid-longitudinally. Ventral side light brownish, mid-ventrally having a deep brown broad patch in between epigastric furrow and the spinnerets, lateral sides of this patch guarded by chalk white patches. Scape of the epigyne provided with prominent rim and a constriction at the middle; one pair of lateral lobes present as in text-figs. 69 & 70. Internal genitalia as in text-fig. 71.

Distribution: India: Poona, Maharashtra; Orissa; Gujarat; West Bengal. (Type-locality) Guam, Mariana Island, South New Guinea.

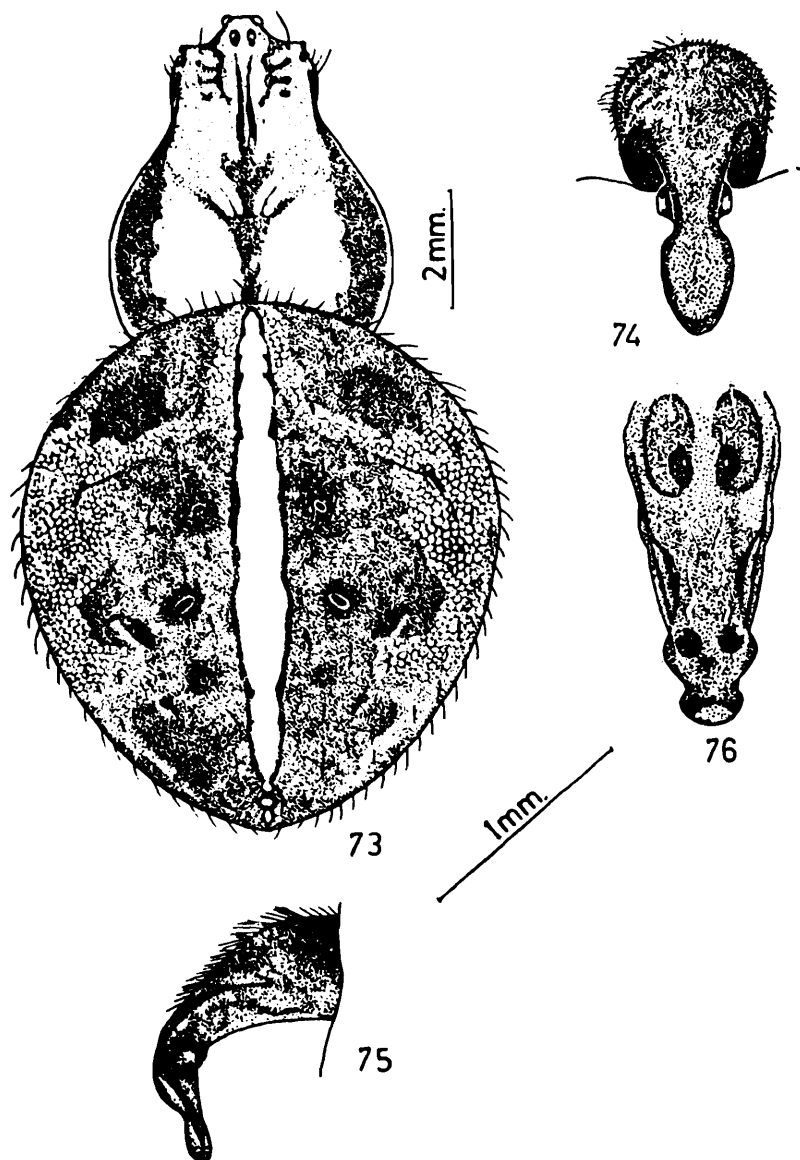
Remarks: Since we could not get the type-specimen the description and illustrations are based on female and male specimens collected from Cuttack, Orissa.

14. *Neoscona shillongensis* sp. nov.

(Figs. 73-76)

General: Cephalothorax, legs and abdomen brown. Total length 13.70 mm. Carapace 5.90 mm. long, 4.80 mm. wide; abdomen 9.00 mm. long, 8.20 mm. wide.

Cephalothorax: Longer than wide, narrowing in front and clothed with pubescence and hairs; cephalic region slightly high and thoracic region provided with a longitudinal groove; carapace provided with two lateral and one median longitudinal dark brown patches as in text-fig. 73. Ocular quad longer than wide and much wider in front than behind as in text-fig. 73; anterior median eyes much larger than posterior medians, posterior medians encircled by black ring; lateral eyes close and each situated on a tubercle; both rows of eyes recurved but anterior row strongly recurved as in text-fig. 73. Sternum heart-shaped, pointed behind, deep brown, clothed with pubescence and hairs, provided with an inconspicuous mid-longitudinal pale band. Labium wider than long and dark brown. Maxillae broad, nearly as long as wide, distal border provided with distinct scopulae. Chelicerae strong, brownish yellow, provided with moderate boss. Legs long and strong, clothed with hairs and spines; distal end of femora and tibiae of all legs provided with transverse dark brown bands.



Figs. 73 — 76. *Neoscona shillongensis* sp. nov.
 73. Dorsal view of female, legs omitted.
 74. Epigyne, ventral view.
 75. Epigyne, lateral view.
 76. Internal genitalia, posterior view.

Abdomen: Nearly oval, longer than wide, wider in front than behind and clothed with pubescence and hairs; mid-dorsally provided with a very conspicuous longitudinal chalk white bar extending all along the length, lateral sides of this bar margined by dark brown lines as in text-fig. 73. Anterior and lateral sides of dorsum provided with dirty chalk white irregular patches; five pairs of sigillae arranged mid-longitudinally on the dorsum. Ventral side brownish, mid-ventral region provided with a broad dark brown patch guarded laterally by chalk white dumb-bell shaped markings in between epigastric furrow and spinnerets. Scape of the epigyne long and stout, provided with a constriction and bent downwards, having two pairs of lateral lobes, second pair of lobes truncated anteriorly as in text-figs. 74 & 75. Internal genitalia as in text-fig. 76.

Holotype: Female, *paratype* five females in spirit, deposited at ZSI, Calcutta. Regd. No. 4963-4/18.

Type-locality: Shillong, Meghalaya, India. Coll. *J K Sen*, 13.9.1962.

Discussion: This species is close to *Neoscona odites* (Simon) but it differs as follows: (i) Cephalothorax narrower in front than that of *odites* (ii) Abdomen mid-dorsally provided with a very conspicuous chalk white longitudinal bar, lateral sides of which margined with dark brown lines but in *odites* abdomen mid-dorsally provided with a chalk white dagger shaped bar not margined by dark brown lines (iii) Tip of the scape of epigyne broader than that of *odites*. (iv) First pair of lateral lobes of scape large and truncated anteriorly but in *odites* first pair of lateral lobes small and not truncated.

15. *Neoscona odites* (Simon)

(Figs. 77-80)

1906. *Araneus odites* Simon, *Ann. Soc. ent. Fr.*, 75 : 308

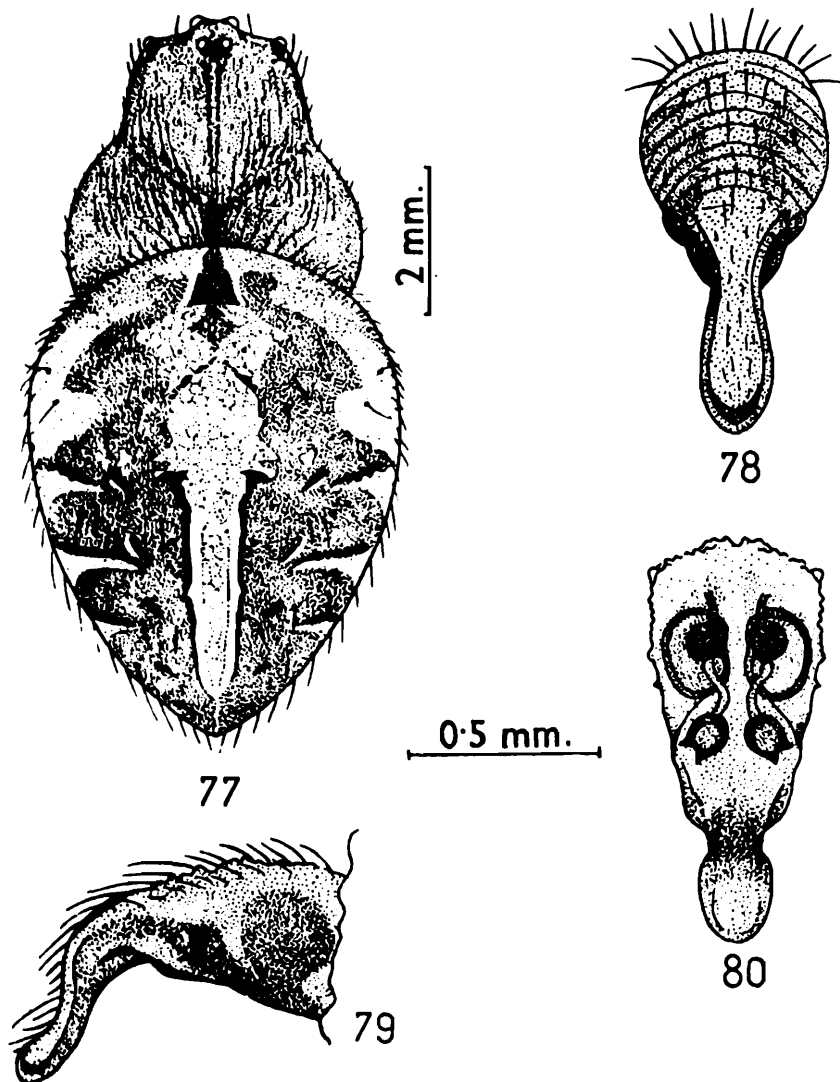
1942. *Araneus odites* : Roewer, *Katalog der Araneae*, 1:819

General: Cephalothorax and legs reddish brown, abdomen light brown in colour. Total length 9.75 mm. Carapace 4.50 mm. long, 4.00 mm. wide; abdomen 6.70 mm. long, 5.10 mm. wide.

Cephalothorax: Longer than wide, narrower in front, clothed with grey pubescence and hairs; thoracic region provided with a deep longitudinal groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 77; median eyes subequal; eyes encircled by conspicuous black ring except the anterior medians as in text-fig. 77; lateral eyes close and each situated on a tubercle; both rows of eyes recurved but anterior row more recurved than posterior row. Sternum heart-shaped, pointed behind, clothed with pubescence and hairs, middle provided with a longitudinal chalk white bar. Labium broad, dark brown, having a yellowish distal broader. Maxillae dark brown with pale outer border and provided with distinct scopulae. Chelicerae moderately strong, yellowish brown and provided with boss. Legs long and strong, clothed with fine hairs and spines; distal ends of all segments, except coxa and trochanter, provided with brown transverse bands.

Abdomen: Oval, tapering posteriorly, clothed with pubescence and hairs, anteriorly overlapping the cephalothorax. Dorsum of abdomen provided with a mid-dorsal conspicuous chalk white longitudinal dagger shaped bar extending from anterior to posterior ends as in text-fig. 77.

Four pairs of sigillae arranged mid-longitudinally on the dorsum. Ventral side of abdomen provided with a large dark brown patch which is guarded laterally by a pair of dumb-bell shaped white markings, one on each side; one pair of small chalk white spots present near the base of the spinnerets. Epigyne provided with a scape having a narrow tip, two pairs of lateral lobes as in text-figs. 78, 79. Internal genitalia as in text-fig. 80.



Figs. 77 — 80. *Neoscona odites* (Simon).
 77. Dorsal view of female, legs omitted.
 78. Epigyne, ventral view.
 79. Epigyne, lateral view.
 80. Internal genitalia, posterior view.

Distribution: India: Himalaya (Simon); Linsoka, Sikkim; Assam.

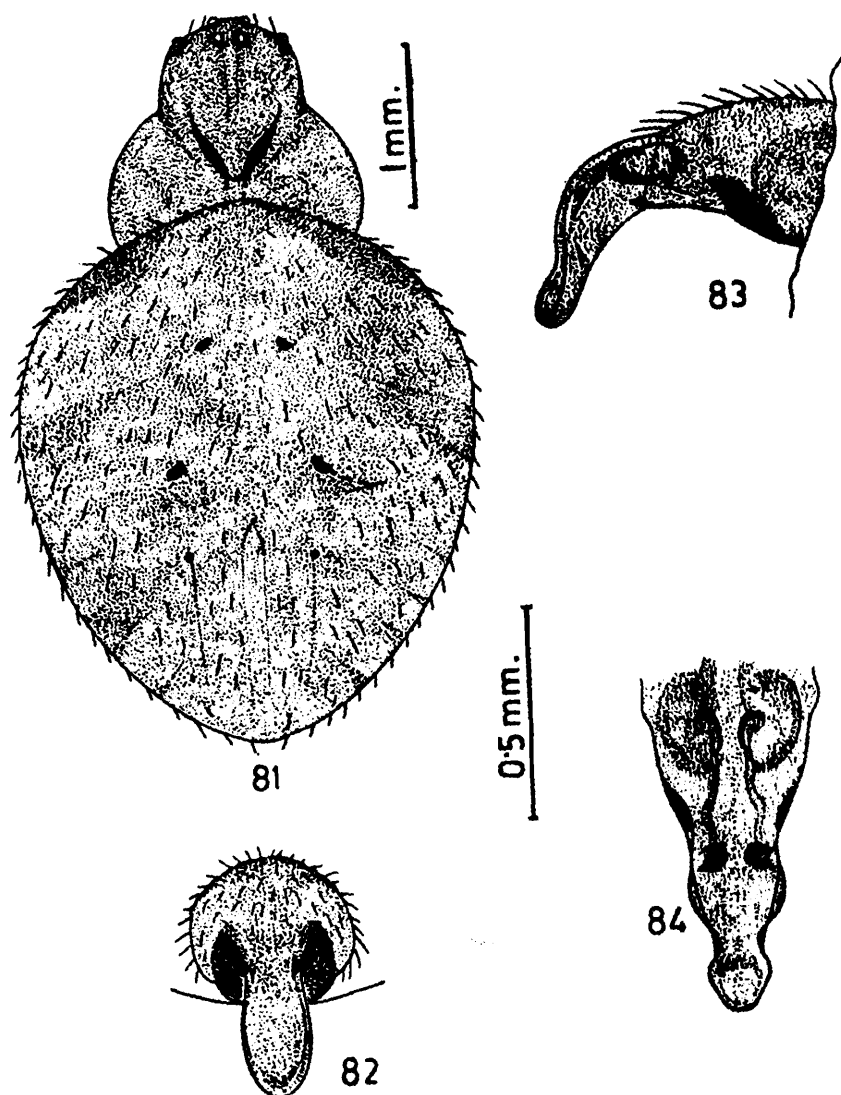
Remarks: Description and illustrations are based on type-specimen of Simon, deposited at M.N.H.N., Paris, Regd. No. 6499 B. 2551. Previously it was placed in the genus *Araneus* but we found it should be placed in the genus *Neoscona*.

16. *Neoscona pavida* (Simon)

(Figs. 81-84)

1906. *Araneus pavida* Simon, *Ann. Soc. ent. Fr.*, 75 : 309.1935. *Araneus pavidus* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 184,

General: Cephalothorax and legs brownish yellow, abdomen brown. Total length 9.20 mm. Carapace 3.40 mm. long, 3.20 mm. wide; abdomen 6.90 mm. long, 5.80 mm. wide.



Figs. 81 — 84. *Neoscona pavida* (Simon)
 81. Dorsal view of female, legs omitted.
 82. Epigyne, ventral view.
 83. Epigyne, lateral view.
 84. Internal genitalia, posterior view.

Cephalothorax: Longer than wide, narrowing in front, clothed with fine hairs; cephalic and thoracic region provided with longitudinal deep groove; base of cephalic region provided with a 'V' shaped brown marking as in text-fig. 81. Ocular quad longer than wide and wider

in front than behind as in text-fig. 81; anterior median eyes slightly larger than posterior medians; lateral eyes close and each situated on a minute tubercle; both rows of eyes recurved but posterior row less recurved than the anterior row. Sternum heart-shaped, pointed behind, light brown, clothed with hairs. Labium nearly pentangular, anterior margin pale in colour. Maxillae nearly as long as wide, clothed with spine like hairs, distal end pale and provided with distinct scopulae. Legs long and strong, clothed with hairs and spines, provided with transverse brown bands.

Abdomen: Nearly oval, clothed with black and grey hairs, anterior portion wider than behind as in text-fig. 81. Dorsum of abdomen provided with four pairs of sigillae arranged mid-longitudinally. Ventral side brown in colour, mid-ventrally having a longitudinal brown patch, laterally guarded by a pair of dumbbell shaped bar. Epigyne with a scape, and the scape provided with a constriction nearly at the middle and two pairs of lateral lobes as in text-figs. 82 & 83. Internal genitalia as in text fig. 84.

Distribution: India: Darjeeling, Pashok (Simon), West Bengal. Pakistan: Lahore.

Remarks: Illustrations and description are based on type-specimen of Simon, deposited at M.N.H.N., Paris, Regd. No. 11562 B 2551. This species was included in the genus *Araneus* but we found it is of the genus *Neoscona* as it tallies the characters of the said genus.

17. *Neoscona achine* (Simon)

(Figs. 85-90)

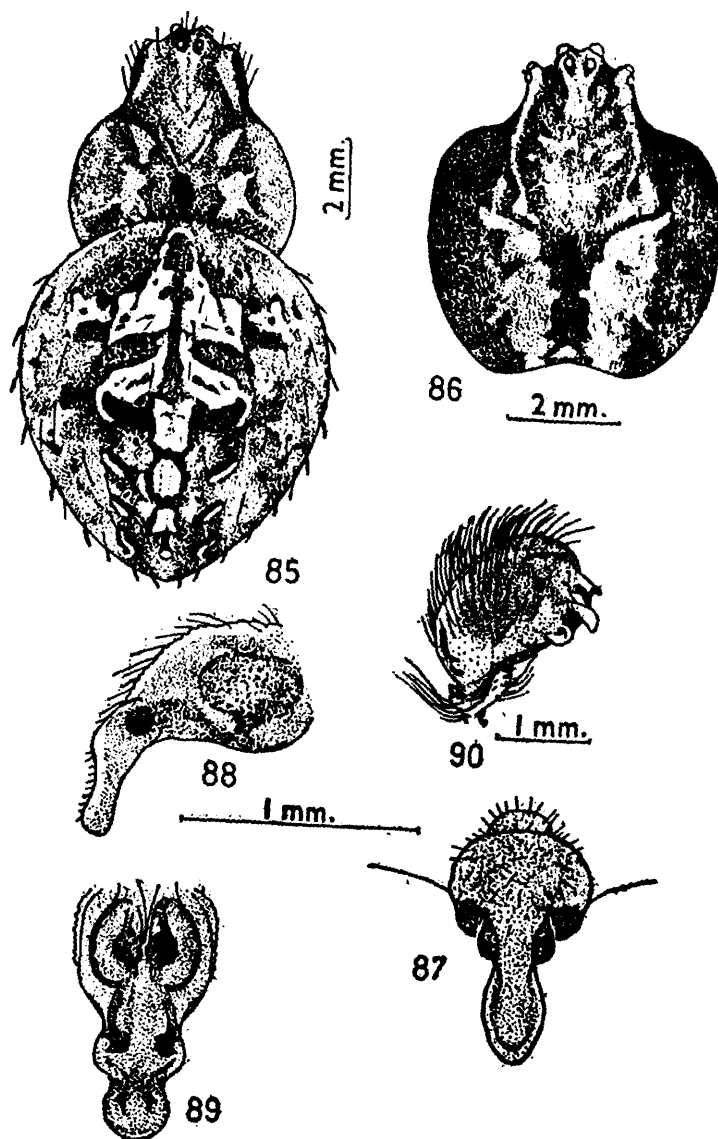
1906. *Araneus achine* Simon, *Ann. Soc. ent. Fr.*, 75 : 309.

1942. *Araneus achine* : Roewer, *Katalog der Araneae*, 1 : 815,

General: Cephalothorax dark brown, legs yellowish brown, abdomen dark brown. Total length 14.00 mm. Carapace 6.70 mm. long, 5.80 mm. wide; abdomen 9.20 mm. long, 7.80 mm. wide.

Cephalothorax: Longer than wide narrower in front clothed with pubescence and hairs; cephalothorax provided with two rows of longitudinally arranged light yellowish irregular patches as in text-fig. 85. Ocular quad longer than wide and wider in front than behind as in text-fig. 85; anterior median eyes larger than posterior medians; lateral eyes close and each situated on a tubercle; both rows of eyes recurved but anterior row strongly recurved than posterior row as in text-fig. 86. Sternum heart-shaped, pointed behind, dark brown in colour, provided

with a median longitudinal white band. Labium wider than long, dark brown and distal end pale yellowish. Maxillae broad, dark brown with pale yellowish outer margin and provided with distinct scopulae. Chelicerae strong, dark brown provided with moderate boss. Legs long and strong; clothed with fine hairs and spines, provided with dark brown transverse bands. Male palp as in text-fig. 90.



Figs. 85— 90. *Neoscona achine* (Simon).
 85. Dorsal view of female, leg. omitted.
 86. Dorsal view of carapace of male, legs omitted.
 87. Epigyne, ventral view.
 88. Epigyne, lateral view,
 89. Internal genitalia, posterior view.
 90. Male palp.

Abdomen: Nearly oval, longer than wide, clothed with fine pubescence and hairs, overlapping the cephalothorax anteriorly. Dorsum of abdomen dark brown, provided with light yellowish conspicuous longitudinal patches forming a pattern which is extending from anterior

to posterior end of abdomen as in text-fig. 85. Ventral side dark brown or black and provided with a pair of transversely arranged conspicuous white spots. Epigyne with a scape, having distinct constriction and two pairs of lateral lobes, of which first pair of lateral lobe large with rounded margin as in text-figs. 87 & 88. Internal genitalia as in text-fig 89.

Distribution: India: Himalaya (Simon); Tenmaila Camp, Sikkim; Assam.

Remarks: Description and illustrations have been made on the basis of type specimen of Simon, deposited at M.N.H.N., Paris, Regd. No. 21732 B 2551. This species was misplaced in the genus *Araneus* but it should be in the genus *Neoscona* since it tallies with the characters of the said genus.

Genus 2. *Araneus* Clerck

1757. *Araneus* Clerck, *Svenska Spindlar*, : 15.
 1758. *Aranea* : Linnaeus, *Systema Naturae*, 10th, : 619.
 1805. *Epeira* : Walckenaer, *Tableau des Araneides*, : 53.
 1864. *Neopora* : Simon, *Hist. Nat. des Araign*, I : 261.
 1895. *Araneus* : Simon, *Hist. Nat. Araign.*, 1(4) : 829.
 1894. *Burgessia* : McCook, *Amer. Spid.*, 3 : 182.
 1900. *Araneus* : Pocock, *Fauna Brit. India, Arachn.*, : 227.
 1921. *Araneus* : Gravely, *Rec. Indian Mus.*, 22 : 414.
 1935. *Araneus* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 177.
 1951. *Conepeira* : Archer, *Amer. Mus. Nov.*, 1502 : 12.
 1960. *Araneus* : Yaginuma, *Spiders of Japan, in colour*, : 51.
 1960. *Araneus* : Chrysanthus, *Nova Guina (Zool.)*, 10(3) : 30.
 1970. *Araneus* : Tikader, *Rec. Zool. Surv. India*, 64(1-4) : 30.
 1971. *Araneus* : Levi, *Bull. Mus. Comp. Zool.*, 141(4) : 131.
 1973. *Araneus* : Levi, *Bull. Mus. Comp. Zool.*, 145(9) : 473.

Characters: Carapace moderately convex with no horny outgrowths; thoracic groove transverse in female, but in male longitudinal often having lateral prolongations. Ocular quad forming a trapezium, not much longer than wide; median eyes slightly unequal in size; laterals close and usually situated on prominent tubercles; both rows of eyes recurved. Males with a hook on coxa I and a groove on femur II; tibia II armed with spines on prolateral side and often bent. Epigyne with a prominent scape which may be long, wrinkle and winding or in some straight and short; epigynal openings situated into the grooves at the base. Palpus of male with a large terminal apophysis, palpal patella with two strong, long and curved spines.

Type-species: *Araneus angulatus* Clerck.

Distribution: Cosmopolitan.

Key to the species of the genus ARANEUS Clerck.

- | | | | |
|----|---|--------|------------------------|
| 1. | Abdomen provided with one pair of shoulder humps. | ... | 2 |
| | Abdomen not provided with any shoulder humps. | | 7 |
| 2. | Shoulder humps very low and small (Fig. 91); one pair of chalk white large spots surrounded by black ring on the dorsum (Fig. 91). | .. | <i>bilunifer.</i> |
| | Shoulder humps otherwise; no paired chalk white spots on the dorsum. | | 3 |
| 3. | Abdomen globular; epigyne with long wrinkled scape. | | 4 |
| | Abdomen not globular; epigyne with long wrinkled or short unwrinkled scape. | . | 5 |
| 4. | Shoulder humps broad and blunt (Fig. 95); epigynal scape not distinctly bent outwards at the middle (Fig. 97). | | <i>pahalgaoensis.</i> |
| | Shoulder humps pointed (Fig. 99); epigynal scape conspicuously bent outwards at the middle (Fig. 100). | | <i>anantnagensis.</i> |
| 5. | Abdomen with a white transverse band between the shoulder humps; shoulder humps less distinct; epigyne without any horn like projections. | .. | 6 |
| | Abdomen with no white transverse band between the shoulder humps; shoulder humps very prominent and high (Fig. 103); epigyne with one pair of horn like projections (Figs. 104 & 105). | | <i>panchganiensis.</i> |
| 6. | Epigyne with long, slender, wrinkled scape (Figs. 108 & 109); carapace densely clothed with hairs (Fig. 107). | ... | <i>himalayaensis.</i> |
| | Epigyne with short, thick, unwrinkled scape (Figs. 112 & 113); carapace less hairy (Fig. 111). | ... | <i>bituberculatus.</i> |
| 7. | Abdomen oval or sub-oval with no tubercles at the posterior end; epigynal scape short, wrinkled and thin. | .. | 8 |
| | Abdomen not oval, or sub-oval but narrower anteriorly than posteriorly, two pairs of small black tubercles at the posterior end (Fig. 115); epigynal scape short but unwrinkled and thick (Figs. 118 & 119). | .. | <i>.mitifica</i> |
| 8. | Abdomen oval (Fig. 121); epigynal scape bent outwards (Fig. 123). | ... | <i>...nympha.</i> |
| | Abdomen sub-oval (Fig. 125); epigynal scape not bent outwards (Fig. 127). | | <i>cucurbitinus.</i> |

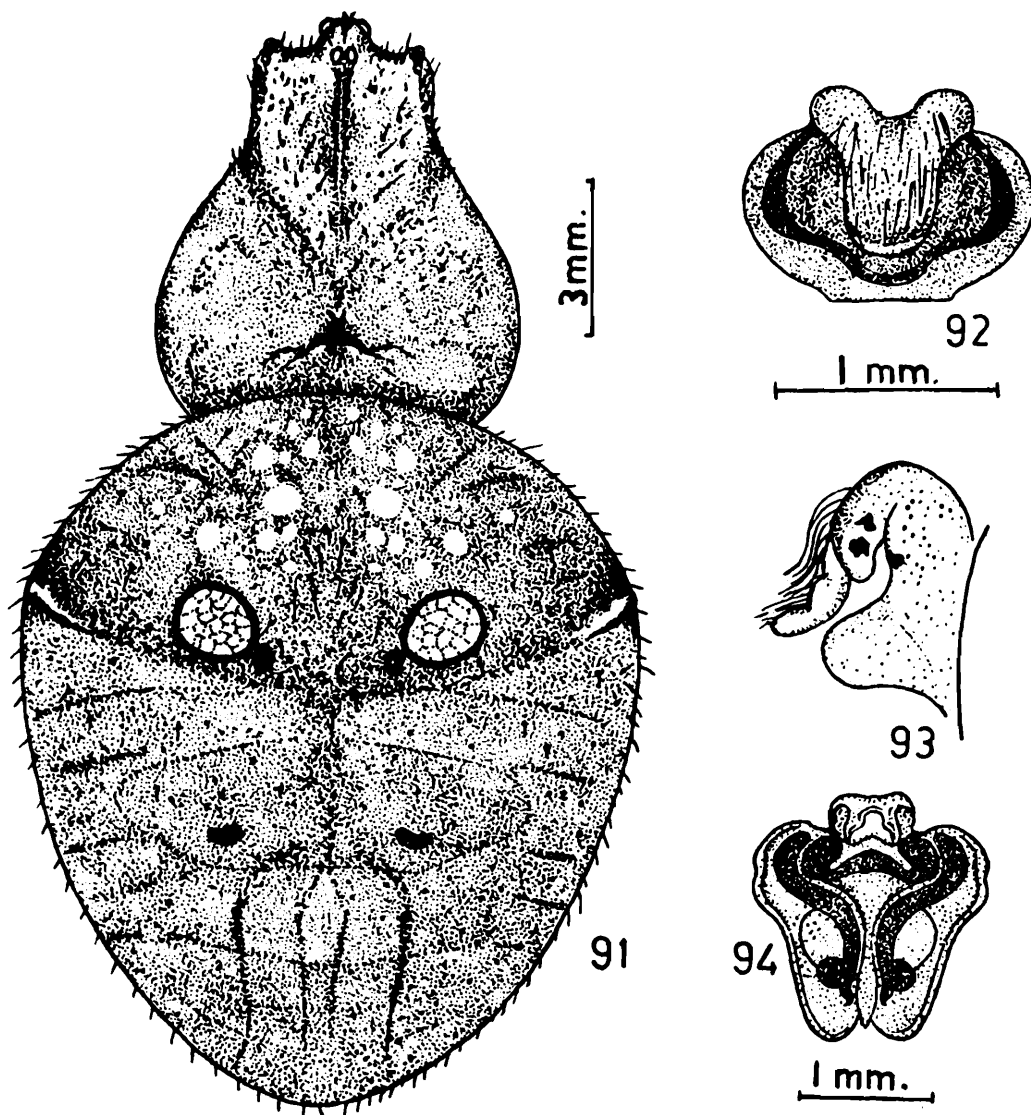
18. *Araneus bilunifer* Pocock

(Figs. 91-94)

1903. *Araneus bilunifer* Pocock, *Fauna Brit. India, Arachn.*, : 227.1975. *Araneus bilunifer* : Patel, *Vidya, J. Gujarat Univ.*, 18(1) : 162.

General: Carapace and legs light brownish, abdomen yellowish grey. Total length 21.50 mm. Carapace 8.50 mm. long, 7.20 mm. wide; abdomen 14.00 mm. long, 12.00 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs. Thoracic region provided with a conspicuous transverse groove. Ocular quad longer than wide and much wider in



Figs. 91—94. *Araneus bilunifer* Pocock.
 91. Dorsal view of female, legs omitted.
 92. Epigyne, ventral view.
 93. Epigyne, lateral view,
 94. Internal genitalia, posterior view,

front than behind as in text-fig. 91. Anterior median eyes larger than the posterior medians. Lateral eyes close and each situated on a tubercle. Both the rows of eyes recurved but anterior row strongly recurved as in text-fig. 91. Sternum heart-shaped, pointed behind, dark brown, clothed with pubescence and hairs, mid-longitudinally provided with a broad black band. Labium wider than long, brown with pale distal border. Maxillae nearly pentangular, brown with pale outer margin, provided with distinct scopulae. Chelicerae strong, brown, provided with medium boss. Legs long and strong, distal ends of all segments having dark brown bands, clothed with pubescence, hairs and spines.

Abdomen: Sub-oval, longer than wide, clothed with pubescence and hairs, provided with two small, low shoulder humps and one pair of conspicuous chalk white large spots, margined by black rings on the dorsum as in text-fig. 91. Three pairs of sigillae arranged mid-longitudinally on the dorsum. A few chalk white patches present anteriorly on the dorsum of the abdomen. Ventral side provided with a large brown, patch guarded laterally by a pair of chalk white dumb-bell shaped patches in between the epigastric furrow and the spinnerets. Epigyne provided with a short, broad and bent scape as in text-figs. 92 & 93. Internal genitalia as in text-fig. 94.

Distribution: India: Chingleput, Tamil Nadu; Vallabh Vidhyanagar, Napad, Gujarat.

Remarks: Description and illustrations are based on the type-specimen of Pocock, deposited at B. M. (N. H.), London Regd. No. 1899 1.11.12.

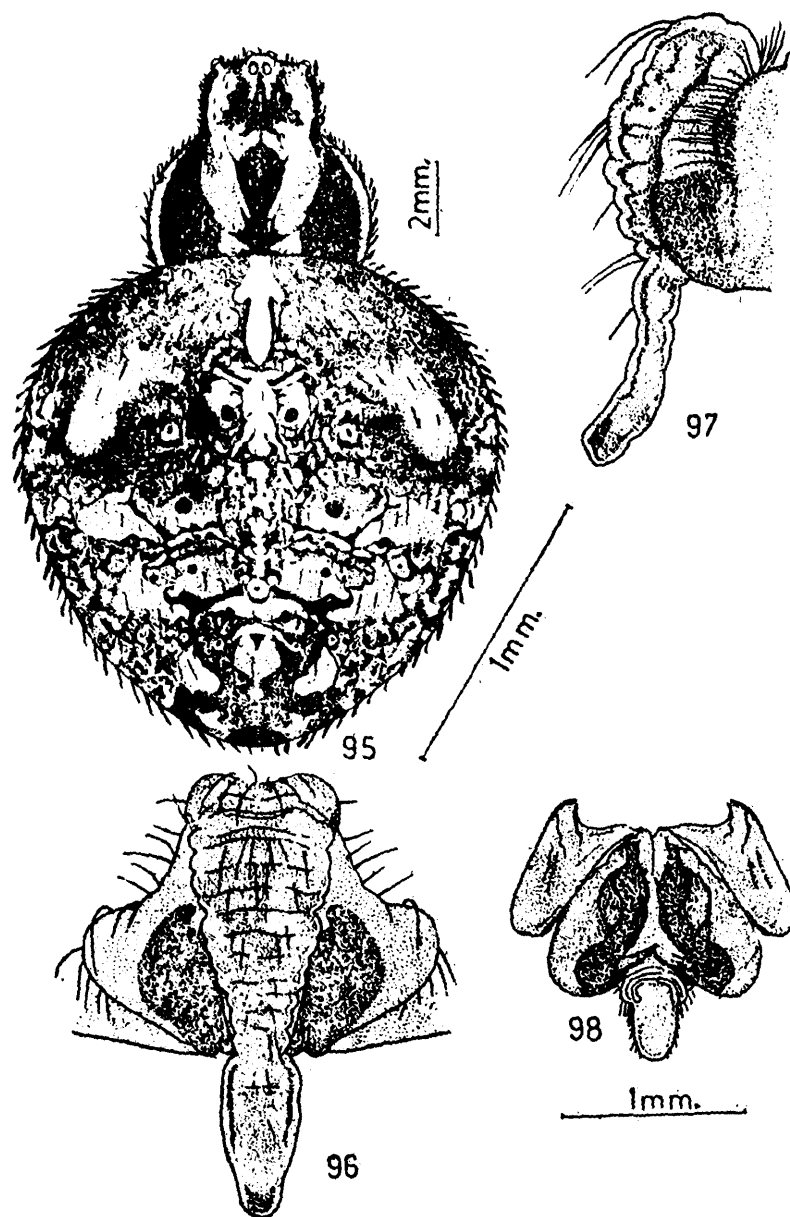
19. *Araneus pahalgaonensis* sp. nov.

(Figs. 95-98)

General: Cephalothorax and legs yellowish brown, abdomen olive yellowish. Total length 19.70 mm. Carapace 7.30 mm. long, 6.00 mm. wide; abdomen 13.30 mm. long, 13.00 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs, provided with a median and two lateral longitudinal black patches extending all along the length as in text-fig. 95. Thoracic region having a distinct transverse groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 95. Median eyes subequal in size. Posterior median eyes encircled by black ring. Lateral eyes close and each situated on tubercle. Both rows of eyes recurved but posterior row less recurved than anterior row as in text-fig. 95.

Sternum heart-shaped, pointed behind, black in colour, clothed with hairs. Labium nearly as long as wide, black with yellowish distal border. Maxillae nearly pentangular, black with yellowish outer margin, provided with distinct scopulae. Chelicerae strong, yellowish with black patches, provided with inconspicuous boss. Legs long and strong, yellowish provided with distinct transverse black bands, distal ends of femora of all legs brownish with longitudinal blackish lines dorsally, patellae of all legs light brown with blackish patches, clothed with pubescence, hairs and spines.



Figs. 95—98. *Araneus pahalgaonensis* sp. nov.,
 95. Dorsal view of female, legs omitted.
 96. Epigyne, ventral view.
 97. Epigyne, lateral view,
 98. Internal genitalia, posterior view,

Abdomen: Globular, slightly longer than wide, clothed with pubescence and hairs, provided with two blunt shoulder humps as in text-

fig. 95. Mid-dorsum provided with six pairs of sigillae arranged longitudinally. Dorsum provided with olive green and chalk white patches as in text-fig. 95. Ventral side of abdomen having a large black patch extending from epigastric furrow to spinnerets, guarded laterally by one dumb-bell shaped chalk white patch on each side. Epigyne provided with a long wrinkled scape and a pair of large basal lamellae as in text-figs. 96 & 97. Internal genitalia as in text-fig. 98.

Holotype : Female in spirit, deposited at ZSI, Calcutta. Regd. No. 4989/18.

Type-locality: Pahalgaoon, Jammu & Kashmir, India. Coll. S. K Gupta, 31. 10. 1976.

Discussion: This species is close to *Araneus anantnagensis* sp. nov but differs as follows: (i) The shape of the shoulder humps blunt and broad, but in *anantnagensis* it is pointed. (ii) Scape of the epigyne nearly straight but in *anantnagensis* it is bent at the middle part. (iii) Shape of the basal lamellae and tip of the scape are different. (iv) Internal genitalia also different in both.

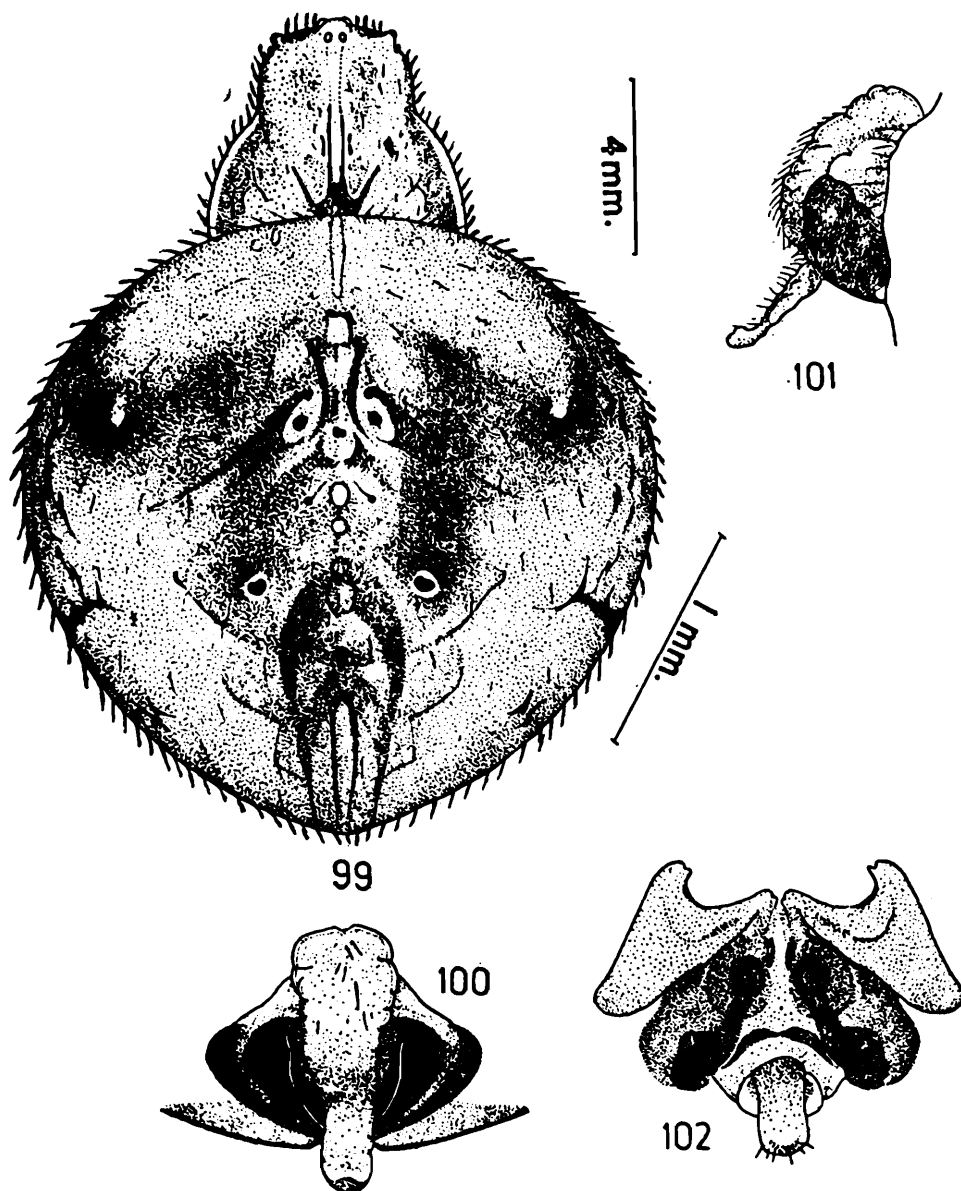
20. *Araneus anantnagensis* sp. nov.

(Figs. 99-102)

General: Cephalothorax and abdomen light brown, legs yellowish brown. Total length 18.40 mm. Carapace 6.30 mm. long, 5.80 mm. wide; abdomen 13.70 mm. long, 14.30 mm. wide.

Cephalothorax: Longer than width narrowing in front, clothed with pubescence and hairs, provided with one median and two lateral longitudinal dark brown patches, extending from the base to the anterior margin of the carapace as in text-fig. 99. Thoracic region provided with transverse groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 99. Anterior median eyes smaller than the posterior medians. Posterior medians encircled by black ring. Lateral eyes close and each situated on a tubercle. Both rows of eyes recurved but posterior row less recurved than the anterior row. Sternum heart-shaped, pointed behind, black in colour, clothed with hairs. Labium wider than long, black with white distal margin. Maxillae roughly pentangular in shape, dark brown with pale outer margin, provided with distinct scopulae. Chelicerae strong, yellowish brown in colour with inconspicuous boss. Legs long and strong, yellowish brown, provided with indistinct transverse brown bands, patellae of all legs light brown in colour, clothed with thick pubescence, hairs and spines.

Abdomen: Globular, slightly wider than long, clothed with pubescence and hairs, provided with two shoulder humps with pointed tips as in text-fig. 99. Six pairs of sigillae arranged mid-longitudinally on the dorsum. Dorsum having some dirty chalk white and light brown patches as in text-fig. 99. Ventral side of abdomen provided with dark brown spots, but mid-ventral with a black broad longitudinal patch extending from epigastric furrow to the base of the spinnerets, laterally guarded by one dumbbell shaped chalkwhite patch on each side. Epigyne provided with a long and wrinkled scape, but at the middle portion and a pair of basal lamellae as in text-figs. 100 & 101. Internal genitalia as in text-fig. 102.



Figs. 99—102. *Araneus anatnagensis* sp. nov.
 99. Dorsal view of female, legs omitted.
 100. Epigyne, ventral view.
 101. Epigyne, lateral view.
 102. Internal genitalia, posterior view.

Holotype: Female in spirit, deposited at ZSI, Calcutta, Regd. No. 4949/18.

Type-locality: Batkut, Anantnag, Jammu & Kashmir, India. Coll. S. K. Gupta, 3.11.1976.

Discussion: This species having similarities with *Araneus bilunifer* Pocock but differs as follows: (i) Shoulder humps of the abdomen prominent and pointed but in *bilunifer* it is very low and rather blunt. (ii) Scape of the epigyne long and narrow but in *bilunifer* it is very short and broad. (iii) Shape of the basal lamellae also different.

21. *Araneus panchganiensis* sp. nov.

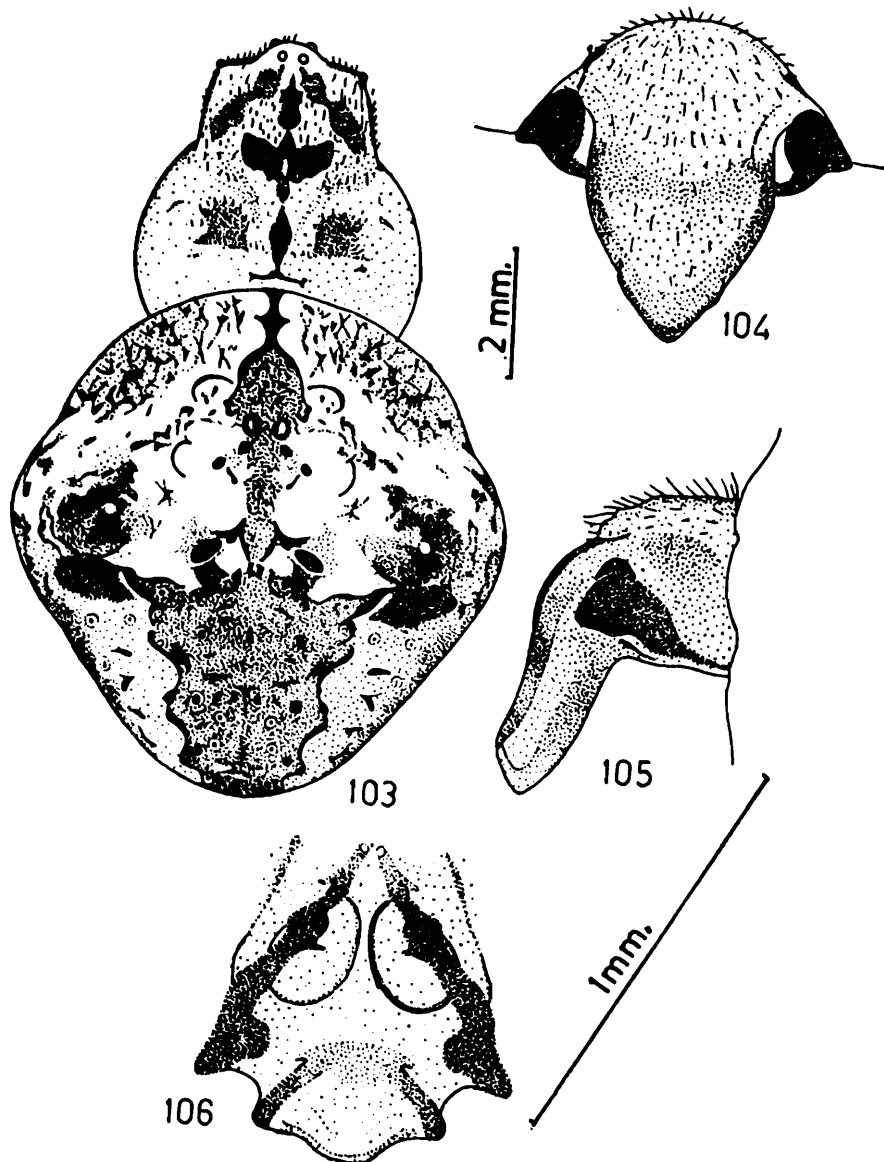
(Figs. 103-106)

General: Cephalothorax and legs yellowish, abdomen brownish yellow. Total length 11.60 mm. Carapace 5.00 mm. long, 4.40 mm. wide; abdomen 7.80 mm. long, 7.70 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, provided with blackish brown patches as in text-fig. 103, clothed with pubescence and hairs. Cephalic region darker in colour. Thoracic region yellowish and provided with a distinct transverse groove. Ocular quad as in text-fig. 103. Anterior median eyes larger than the posterior medians. Posterior median eyes encircled by black ring. Lateral eyes close and each situated on a tubercle. Both the rows of eyes strongly recurved, sternum heart-shaped, pointed behind clothed with pubescence and hairs, brown, provided with a broad yellowish patch in the middle. Labium wider than long, deep brown with pale distal border. Maxillae strong, roundish, brown with pale outer margin, provided with distinct scopulae. Chelicerae strong dark brown, provided with inconspicuous boss. Legs long and strong, clothed with pubescence, hairs and spines, yellowish with distinct transverse bands, femora of all legs having with two dark brown transverse bands.

Abdomen: Nearly sub-triangular, slightly longer than wide, clothed with pubescence and hairs. Dorsum provided with two very conspicuous shoulder humps and dark brown patches forming a folium as in text-fig. 103. Six pairs of sigillae arranged mid-longitudinally on the dorsum. On the ventral side a large black patch in between the epigastric furrow and the spinnerets. One pair of chalk white bars arranged transversely just adjacent to the epigastric fold and one pair of chalk white spots towards the spinnerets. Epigyne provided with very strong triangular scape with narrow tip, and one pair of pointed horn-like projections

at the openings as in text-figs. 104 & 105, scape provided with distinct dorsal depression. Internal genitalia as in text-fig. 106.



Figs. 103—106. *Araneus panchganiensis* sp. nov.
 103. Dorsal view of female, legs omitted.
 104. Epigyne, ventral view.
 105. Epigyne, lateral view.
 106. Internal genitalia, posterior view.

Holotype: Female, *paratype* one female in spirit, deposited at ZSI. Calcutta. Regd. No. 4950-1/18.

Type-locality: Panchgani, Dist. Satara, Maharashtra, India. Coll. B. K. Tikader, 24.8.1977.

Discussion: This species having similarities with *Araneus bituberculatus* (Walckenaer) but differs as follows: (i) The paired shoulder humps are more larger and conspicuous than those of *bituberculatus*.

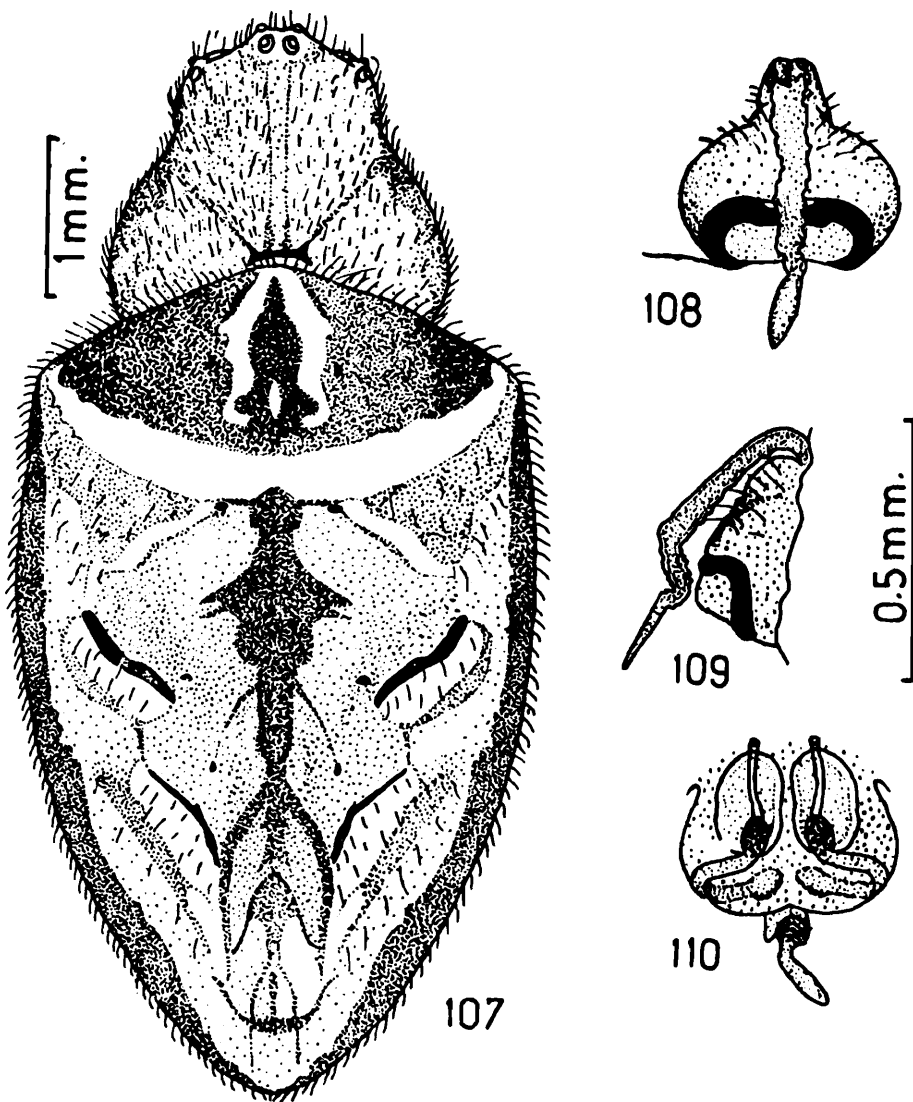
(ii) Epigyne is provided with one pair of horn-like projection from the base, no such projection is found in the epigyne of *bituberculatus* but two conspicuous lateral ridges are present. (iii) Internal anatomy of epigyne is quite different in both the species.

22. *Araneus himalayaensis* Tikader

(Figs. 107-110)

1975. *Araneus himalayaensis* Tikader, *Proc. Indian Acad. Sci.*, 81(4) : 145.

General: Cephalothorax light yellowish brown, legs yellowish brown with dark patches and shades, abdomen greyish white with black patches. Total length 6.60 mm. Carapace 2.10 mm. long, 2.20 mm. wide; abdomen 5.20 mm. long, 3.25 mm. wide.



- Figs. 107— 110. *Araneus himalayaensis* Tikader.
 107. Dorsal view of female, legs omitted.
 108. Epigyne, ventral view.
 109. Epigyne, lateral view.
 110. Internal genitalia, posterior view.

Cephalothorax: Longer than wide, narrowing in front, thickly clothed with white pubescence and hairs as in text-fig. 107, laterally provided with dark shades; thoracic region having a transverse groove. Ocular quad forming a trapezium, wider in front than long and narrower behind, as in text-fig. 107, posterior median eyes larger than anterior medians; posterior medians subequal in size, close and situated on moderately prominent tubercles; both rows of eyes recurved but anterior row strongly recurved as in text-fig. 107. Sternum heart-shaped, pointed behind, black, clothed with white hairs. Labium wider than long, black with pale distal borders. Maxillae broad, dark brown with yellowish patches, provided with distinct scopulae. Chelicerae deep brown, strong and provided with distinct boss. Legs moderately long and strong, clothed with hairs and spines, provided with indistinct dark patches and shades.

Abdomen: Elongated triangular, provided with a pair of shoulder humps as in text-fig. 107, longer than wide, provided with an indistinct pattern composed of black, grey white and brownish patches and lines as in text-fig. 107, laterally blackish, having five pairs of sigillae arranged mid-longitudinally. Ventral side greyish brown, provided with a broad larger black patch in between epigastric furrow and spinnerets, guarded by an inverted U-shaped chalk white marking; three pairs of chalk white spots around the spinnerets; a chalk white line extending from behind the spinnerets to the posterior end of abdomen. Epigyne provided with a bulb like base and a long, narrow, wrinkle scape which bends at the middle as in text-figs. 108 & 109. Internal genitalia as in text-fig. 110.

Distribution: India: Darjeeling, (*Type-locality*) West Bengal.

Remarks: Description and illustrations are made on the basis of one of the paratypes of *Araneus himalayaensis* Tikader, which are deposited in the National Collection of Z.S.I., Calcutta.

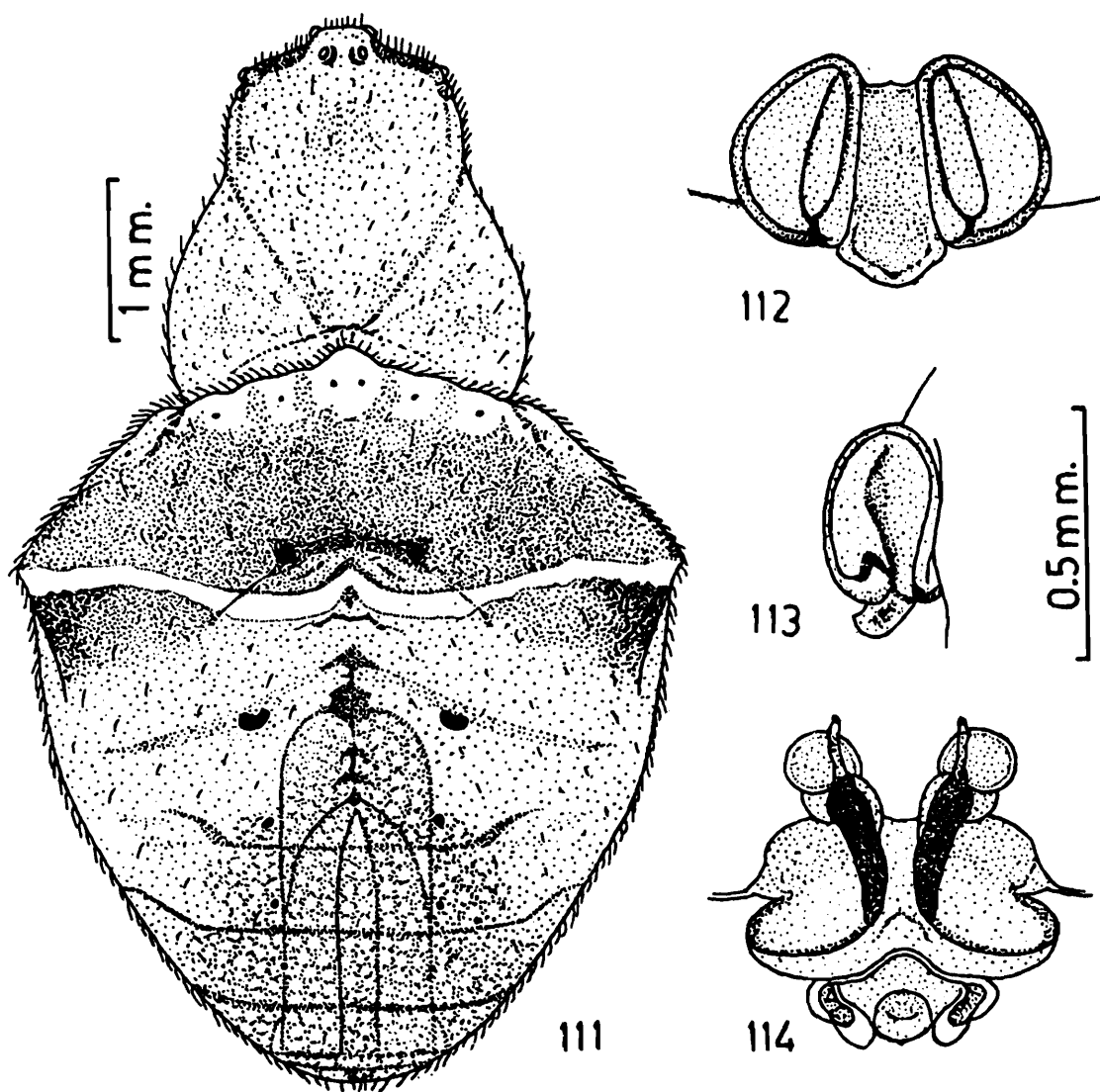
23. *Araneus bituberculatus* (Walckenaer)

(Figs. 111-114)

- 1802. *Aranea bituberculata* Walckenaer, *Faun. Paris*, 2 : 191.
- 1804. *Aranea alboarcuata* : Panzer, *Synt. Nomencl.*, 2 : 244.
- 1845. *Epeira dromedaria* : Koch, *Die Arachniden*, 11 : 98.
- 1866. *Epeira bicornis* : Menge, *Schrift. Nat. Ges. Danzig* (N. F.) 1 : 66.
- 1901. *Epeira ullrich* : Bosenberg, *Zoologica*, 13(1) : 28.
- 1909. *Araneus dromedarius* : Jackson, *Trans. Nat. Hist. Soc.*, 3(2) : 424.
- 1929. *Araneus bituberculatus* : Simon, *Arachn. de France*, 6(3) : 699.
- 1931. *Araneus bituberculatus* : Wichle, *Tierw, Deutschl.*, 23 : 61.
- 1951. *Araneus bituberculatus* : Locket & Millidge, *British Spiders*, 2 : 123.

General: Carapace light yellowish brown, legs greyish yellow, abdomen greyish brown. Total length 6.60 mm. Carapace 2.45 mm. long, 2.25 mm. wide; abdomen 4.60 mm. long, 4.00 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with greyish pubescence and hairs; thoracic region provided with a conspicuous transverse groove and darker in colour than cephalic region. Ocular quad wider in front than behind as in text-fig. 111 and slightly longer than wide; median eyes subequal in size; lateral eyes also subequal in size, close and situated on black tubercles; posterior median eyes encircled by black ring; both rows of eyes recurved as in text-fig. 111. Sternum heart-shaped, pointed behind, greyish yellow with some indistinct pale patches, clothed with pubescence and hairs. Labium slightly longer than wide, yellowish with pale outer distal margin. Maxillae



Figs. 111—114. *Araneus bituberculatus* (Walck.).

111: Dorsal view of female, legs omitted.

112. Epigyne, ventral view.

113. Epigyne, lateral view.

114. Internal genitalia, posterior view.

broad, yellowish with distinct scopulae. Chelicerae moderately strong, yellowish brown, having median boss. Legs long and strong, greyish yellow, clothed with hairs and spines.

Abdomen: Triangular, longer than wide, clothed with pubescence and hairs as in text-fig. 111. Dorsum provided with two prominent pointed shoulder humps and a transverse chalk white band in between the humps as in text-fig. 111. Five pairs of distinct sigillae, arranged mid-longitudinally on the dorsum and some mid-dorsal lines as in text-fig. 111. Ventral side of abdomen greyish brown with a broad median chalk white patch in between epigastric furrow and spinnerets. Epigyne provided with a small and thin scape having two conspicuous ridges as in text-figs. 112 & 113. Internal genitalia as in text-fig. 114.

Distribution: India: Siripur, Salen, West Bengal; Manali, Himachal Pradesh; Great Britain: Burnham Beeches, Buckinghamshire.

Remarks: Since we could not get the type-specimen, the description and illustrations were made on the basis of one of the identified specimens collected by Dr. B. H. Patel from Manali, Himachal Pradesh.

24 *Araneus mitifica* (Simon)

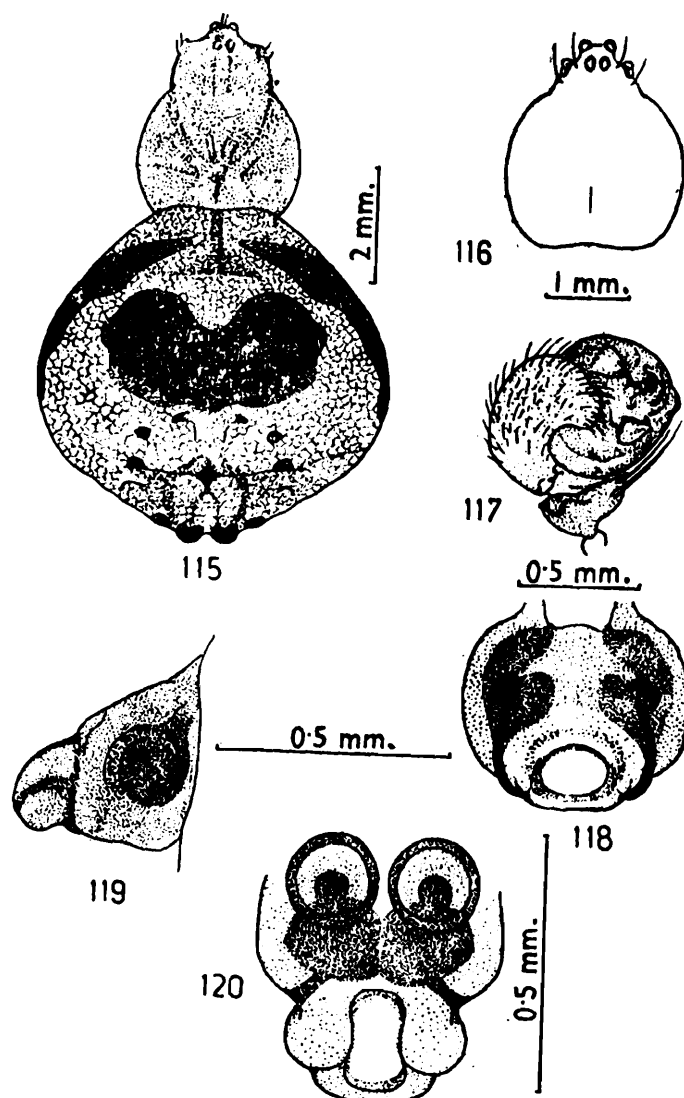
(Figs. 115-120)

1886. *Epeira mitifica* Simon, *Act. Soc. Linn. Bord.*, 40 : 150.
 1887. *Epeira mitifica* : Thorell, *Ragni Birmani*, : 187.
 1896. *Epeira mitifica* : Workman, *Malaysian Spiders.*, 1 : 39.
 1935. *Zilla nawazi* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 186.
 1963. *Araneus mitifica* : Tikader, *J. Univ. Poona, Sci. & Tech.*, 24 : 43.

General: Cephalothorax and legs yellowish; abdomen silver white dorsally and greenish ventrally. Total length 9.00 mm. Carapace 3.60 mm. long, 2.80 mm wide; abdomen 5.80 mm. long, 6.00 mm. wide.

Cephalothorax: Longer than wide narrowing in front clothed with pubescence and hairs. Thoracic region provided with an indistinct transverse groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 115. Anterior median eyes larger than the posterior median eyes. Posterior median eyes encircled by black ring. Lateral eyes close and each situated on black tubercle. Both rows of eyes recurved but anterior row more recurved than the posterior row as in text-fig. 116. Sternum heart-shaped, pointed behind, yellowish, clothed with black spine like long hairs. Labium wider than long, yellowish. Maxillae strong, nearly square in shape, yellowish, provided with distinct scopulae. Chelicerae strong, yellowish, provided with moderate boss. Legs long and moderately strong, yellowish, distal ends of metatarsi

with dark brown transverse bands; clothed with pubescence, hairs and black spines. Male palp as in text-fig. 117.



- Figs. 115—120. *Araneus mitifica* (Thorell)
 115. Dorsal view of female, legs omitted.
 116. Dorsal view of carapace of male, legs omitted.
 117. Male palp.
 118. Epigyne, ventral view.
 119. Epigyne, lateral view.
 120. Internal genitalia, posterior view.

Abdomen: Nearly globular but slightly narrow anteriorly, wider than long, clothed with pubescence as in text-fig. 115. Dorsum provided with a pair of wing shaped large median black patch and two lateral black patches as in text-fig. 115 also having an abrupt slopping at the two third region towards posterior end. Two pairs of small but distinct tubercles at the posterior end of the abdomen as in text-fig. 115. Ventral side of abdomen greenish with no white or black patch. Epigyne provided with very short, thick and unwrinkled scape as in text-figs. 118 & 119, lateral groove present as in text-fig. 118. Internal genitalia as in text-fig. 120.

Distribution: India: Poona, Maharashtra; Karnataka; West Bengal; Pakistan: Lahore, Bangladesh; Burma; Malaysia.

Remarks: Description and illustrations have been made on the basis of female and male specimens collected from Poona, Maharashtra.

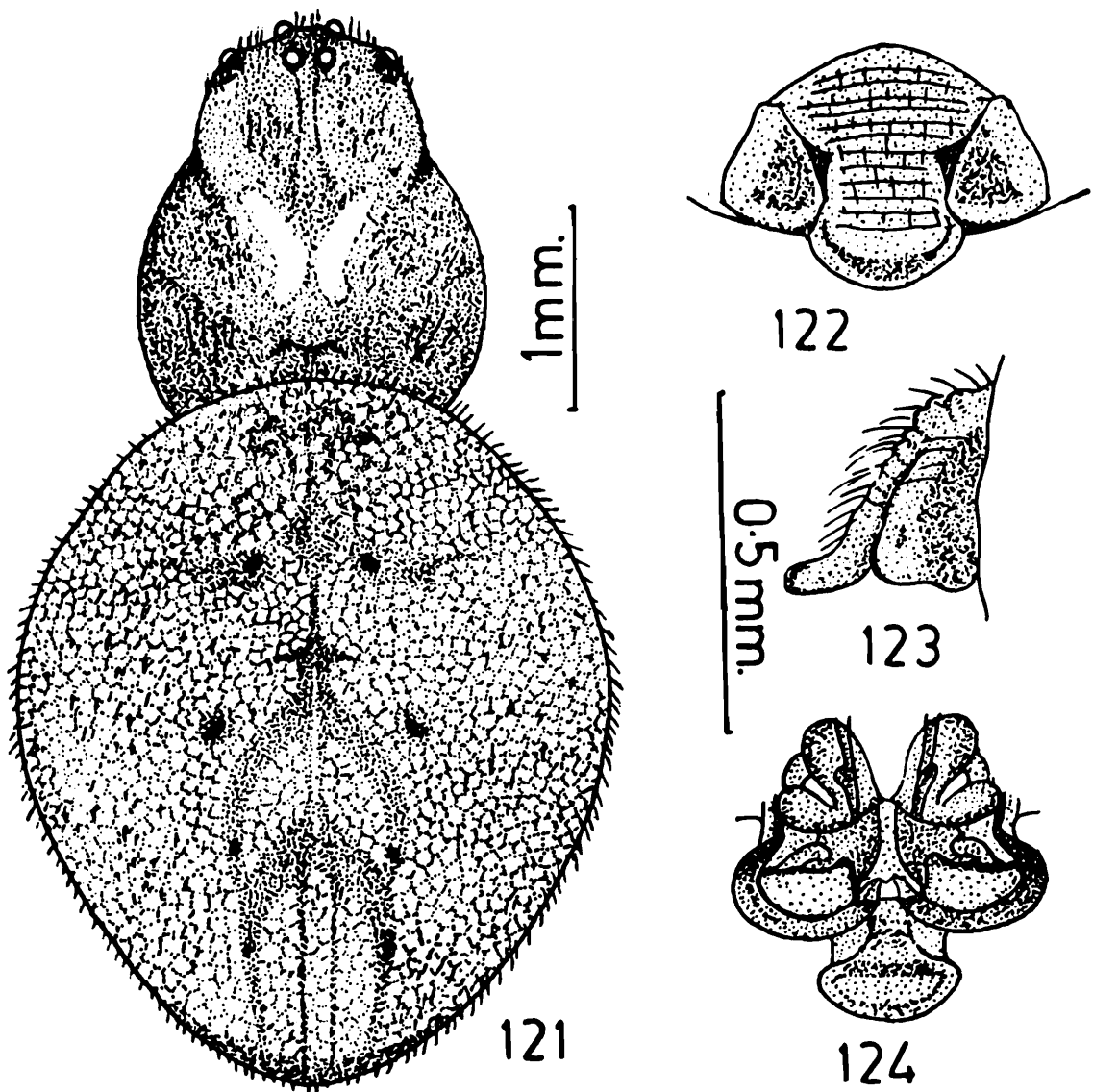
25. *Araneus nympha* Simon

(Figs. 121-124)

1889. *Araneus nympha* Simon, *J. Asiat. Soc. Bengal*, 58 : 339.

1935. *Araneus nympha* : Dyal, *Bull. Zool. Punjab Univ.*, 1 : 182.

General: Cephalothorax and legs brownish yellow, abdomen chalk white. Total length 5.20 mm. Carapace 2.20 mm. long, 1.70 mm. wide; abdomen 3.50 mm. long, 2.90 mm. wide.



Figs. 121—124. *Araneus nympha* Simon.
 121. Dorsal view of female, legs omitted.
 122. Epigyne, ventral view.
 123. Epigyne, lateral view.
 124. Internal genitalia, posterior view.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs. Cephalic region provided with a white X-shaped patch as in text-fig. 121. Thoracic region provided with indistinct transverse groove. Ocular quad longer than wide and wider in front than behind as in text-fig. 121. Anterior median eyes slightly smaller than the posterior medians. Posterior medians encircled by deep brown ring. Lateral eyes close and each situated on a tubercle. Both the rows of eyes recurved as in text-fig. 121. Sternum heart-shaped, pointed behind, brown in colour, clothed with pubescence and hairs. Labium as long as wide, brown with pale outer margin, provided with distinct scopulae. Chelicerae moderately strong, yellowish, provided with medium boss. Legs moderately long and thin, brownish yellow with indistinct bands, clothed with pubescence, hairs and spines.

Abdomen: Oval, longer than wide, clothed with pubescence and hairs. Dorsum chalk white with some greyish lines, provided with four pairs of sigillae arranged mid-longitudinally as in text-fig. 121. Ventral side of abdomen greyish with a pair of chalk white longitudinal bars in between the epigastric furrow and the spinnerets. Epigyne provided with a broad and wrinkled scape as in text-figs. 122 & 123, basal lamellae inconspicuous. Internal genitalia as in text-fig. 124.

Distribution: India: Himalaya, Pakistan: Gol Bagh, Lahore Punjab.

Remarks: Illustrations and description are based on type-specimen, deposited at M.N.H.N., Paris, Regd. No. 10649 B 2639.

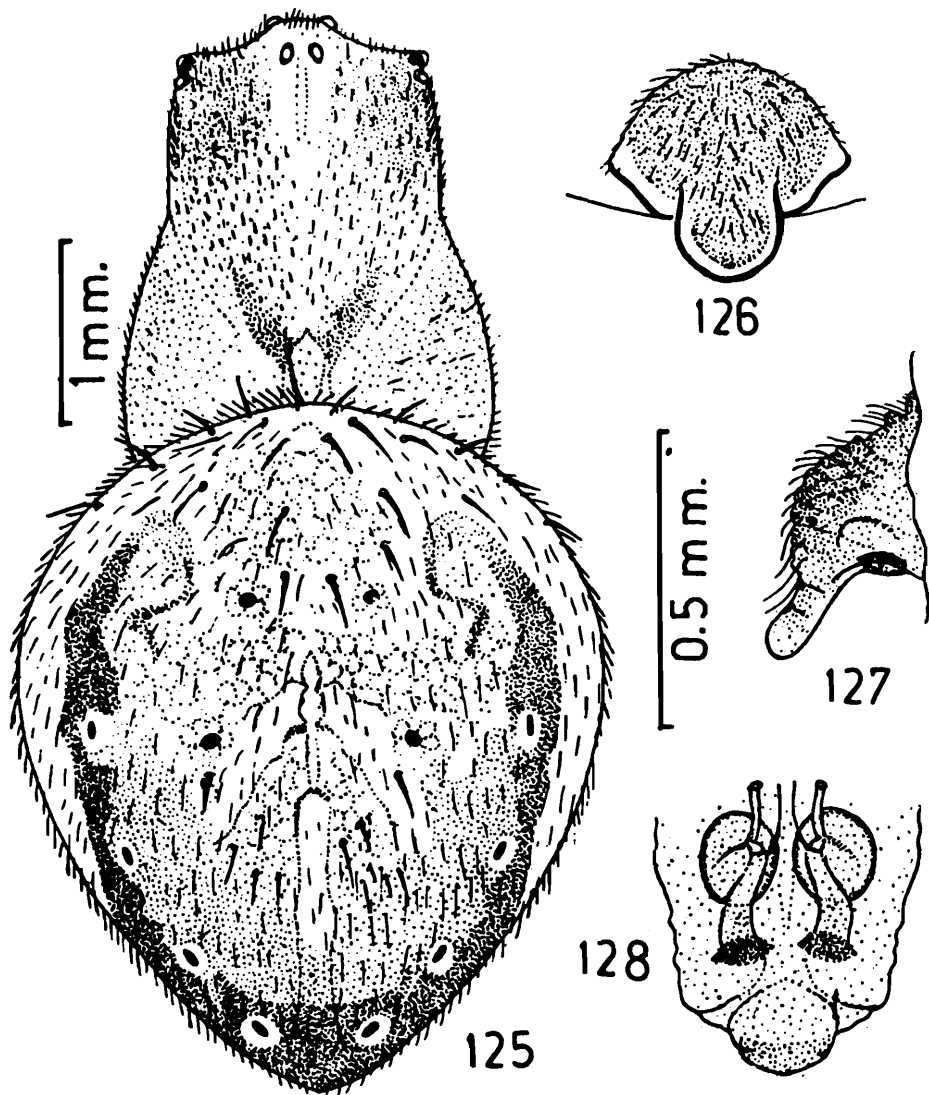
26. *Araneus cucurbitinus* Clerck

(Figs. 125-128)

- 1757. *Araneus cucurbitinus* Clerck, *Svenska spindlar*, : 44.
- 1758. *Aranea cucurbitina* : Linnaeus, *Syst. Nat.*, 10 : 620.
- 1864. *Epeira cucurbitina* : Blackwall, *A history of the spiders of Great Britain and Ireland*. 2 (1) : 342.
- 1881. *Epeira cucurbitina* : Cambridge, *Proc. Dorset. Nat. Hist.*, 2 : 259.
- 1891. *Epeira cucurbitina* : Chyzer & Kulezynski, *Araneau Hungariae*, 1 : 131.
- 1929. *Araneus cucurbitinus* : Simon, *Arachn. de France*. 6(3) : 695.
- 1952. *Araneus cucurbitinus* : Millidge & Locket, *Proc. Linn. Soc.* 163(1) : 65.
- 1953. *Araneus cucurbitinus* : Locket & Millidge, *British Spiders*, 2 : 144.

General: Carapace and legs yellowish, abdomen greyish with light greenish shades. Total length 5.80 mm. Carapace 2.55 mm. long, 2.10 mm. wide; abdomen 3.70 mm. long, 3.25 mm. wide.

Cephalothorax: Longer than wide, narrowing in front, clothed with pubescence and hairs; cephalic region elevated than thoracic region and posteriorly having a faint greenish patch; thoracic region provided with a distinct transverse groove. Ocular quad nearly as long as wide and wider in front than behind as in text-fig. 125; eyes situated on black spots; both median eyes subequal in size; posterior medians pearly white; lateral eyes subequal in size; both rows of eyes recurved as in text-fig. 125. Sternum heart-shaped, pointed behind, brownish with pale median area, clothed with pubescence and hairs. Labium slightly wider than long, brownish in colour with pale distal margin. Maxillae broad, yellowish, provided with distinct scopulae. Chelicerae strong, yellowish, having distinct boss. Legs moderately long and stout, clothed with hairs and spines.



Figs. 125—128. *Araneus cucurbitinus* Clerck.
 125. Dorsal view of female, legs omitted.
 126. Epigyne, ventral view.
 127. Epigyne, lateral view.
 128. Internal genitalia, posterior view.

Abdomen: Oval, longer than wide, clothed with pubescence and strong spines as in text-fig. 125. Dorsum of abdomen having light greenish shades, two pairs of distinct sigillae mid-dorsally and four pairs of black spots arranged laterally as in text-fig. 125. Ventral side with a median uniform light greenish area in between the epigastric fold and the spinnerets. Epigyne provided with a wrinkled body and small scape as in text-figs. 126 & 127. Internal genitalia as in text-fig. 128.

Distribution: India: Risha Colony, Shillong, Meghalaya. Great Britain: all over the British Islands.

Remarks: Due to lack of type-material the description and illustrations are based on one of the specimens collected from Risha Colony, Shillong, Meghalaya.

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SUMMARY

Twenty six species of spiders of the family Araneidae (=Argiopidae) are described in this paper. Of these, 17 are known and 9 are new to

science. The new species belong to the genera *Neoscona* and *Araneus* in the family Araneidae (=Argiopidae). In addition to descriptions and illustrations, we have added, as far as possible, keys, notes on affinities, synonymies, distribution and main taxonomic characters of the family Araneidae and also provided with type information of studied materials.

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