AN ILLUSTRATED KEY TO THE IDENTIFICATION OF CENTIPEDES (CHILOPODA: SCOLOPENDROMORPHA) OF KERALA

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Abstract

An illustrated key and the systematic list for the identificaiton of 15 species of scolopendrid centipedes under eight genera so far reported from Kerala is provided.

Keywords

Centipedes, Chilopida, India, Kerala, key, Scolopendridae, Scolopendromorpha, systematic list

Introduction

Centipedes are an economically important group of arthropods playing valuable role in the control of noxious insect pests in the terrestrial ecosystem (Yadav, 1994). They are often treated as creatures of nuisance value owing to their poisonous nature and painful bite, particularly of the members of the family Scolopendridae. The microhabitat of all the centipedes is the wet and moist places and they inhabit the environs below rotten barks, dry foliage, stones, heap of cowdung etc. Being a tropical megadiversity country, India is gifted with a rich variety of centipede fauna. A perusal of the recent literature on the Indian fauna reveals that systematic studies on centipedes have so far been restricted mainly to Deccan Plateau, Western Ghats, Indian Desert, Western Himalaya, U.P, Delhi, Rajastan, and Gujarat (Jangi & Das, 1984; Yadav, 1993a,b,c; Khanna & Yadav, 1997; Khanna, 2001). Khanna (2001) checklisted 100 species of centipedes belonging to 11 genera under two families from India.

In the present communication 15 species of Scolopendrid centipedes arranged in eight genera and two subfamilies pertaining to Kerala have been inventoried and an illustrated key is provided. Though not reported from Kerala, *Scolopendra hardwickei* Newport has also been included in the key owing to its recent reports from localities bordering the states of Kerala and Tamil Nadu (Rathinasabapathy & Daniel, 1997; Rathinasabapathy & Yadav, 2000) .

Systematic list

Class: Chilopoda
Sub class: Epimorpha
Order: Scolopendromorpha

Family: Scolopendridae
Subfamily: Scolopendrinae
Tribe: Scolopendrini

***Arthrorhabdus jonesii* Verhoeff, 1937**
1937. *Arthrorhabdus (Trachycormocephalus) jonesii*, Verhoeff, Zool. Jahrb. (Syst.), 71: 384.

***Cormocephalus nigrificatus* Verhoeff, 1937**
1937, *Cormocephalus (Dehanonyx) nigrificatus,* Verhoeff, 1937. Zool. Anz. Leipzig, 120: 81.

***Scolopendra amazonica* Bucherl, 1946**
1946. *Scolopendra morsitans amazonica*, Bucherl, Mem. Inst. Butantan, 19: 135-137.

**** Scolopendra hardwickei* Newport, 1844**
1844. *Scolopendra hardwickei* Newport, Ann. Nat. Hist., 13: 96.

***Scolopendra morsitans* Linn., 1758**
1758. *Scolopendra morsitans* Linnaeus, Syst. Nat. Ed. 10: 638.

***Scolopendra subspinipes dehaani* Brandt, 1840**
1840, *Scolopendra subspinipes dehaani* Brandt. Bull. Ac., St. Petersburg, 5: 152.

Tribe Asanadini

***Asanada indica* Jangi & Dass, 1984**
1984. *Asanada indica*, Jangi & Dass, J. Scient. Indl. Res., 43(2): 38-39.

***Asanada socotrana* Pocock, 1899**
1899. *Asanada socotrana*, Pocock, Bull. Liverpool Mus., 2: 9

***Asanada sukhensis* Jangi & Dass, 1984**
1984. *Asanada indica*, Jangi & Dass, J. Scient. Indl. Res., 43(2): 38-39.

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Subfamily: Otostigminae
Tribe: Otostigmini

***Otostigmus politus politus* Karsch, 1881**
1881, *Otostigmus politum*, Karsh, Berlin ent. Z., 25: 219.

***Ethmostigmus platycephalus platycephalus* (Newport, 1845)**
1845, *Heterostoma platycephalus platycephalus* Newport, Trans Linn. Soc., 19: 415.

***Digitipes gravelyi* Jangi & Dass, 1984**
1984, *Digitipes gravelyi* Jangi & Dass, J. Scient. Indl. Res., 43(2): 41.

***Digitipes chhotanii* Jangi & Dass, 1984**
1984, *Digitipes chhotanii*, Jangi & Dass. J. Scient. Indl. Res., 43(2): 46.

***Digitipes indicus* Jangi & Dass, 1984**
1984, *Digitipes indicus*, Jangi & Dass. J. Scient. Indl. Res., 43(2): 46-47.

***Rhysida nuda subnuda* Jangi, 1955**
1955. *Rhysida nuda subnuda* Jangi, Ann. Mag. Nat. Hist., Ser.12, 8: 69-80.

*Not so far reported from Kerala; reported from localities bordering Kerala and Tamil Nadu, included persuming possible occurrence in Kerala .

Discussion

Topography, bioclimate and two monsoon seasons in Kerala provide optimal niches for centipedes. The centipedes form an important faunal element in the soils of Kerala. The present study deals with 15 species of Scolopendrid centipedes under eight genera pertaining to Kerala. Among the members of the subfamily Scolopendrinae, species from the genera *Scolopendra* Linn., *Cormocephalus* Newport, *Asanada* Meinet and *Arthrorhabdus* Pocock are reported. *Scolopendra amazonica* Bucherl and *Scolopendra morsitans* Linn. are cosmopolitan sympatric species of which the former is most dominant. The genus *Arthrorhabdus* is a rare genus in Asia and is represented in Kerala by the endemic species, *A. jonesii* Verhoff. The genus is known by only five species at global level.

Though *Cormocephalus* is a common genus in India, with eight species, it is represented by a single species *C. nigrificatus* from Kerala. Tribe Asanadini of Scolopendrinae containing smaller and slender centipedes that generally inhabit termite mounts is fairly represented in Kerala. ln the subfamily Otostigminae having species with rounded spiracles, members of the genera *Otostigmus* Porat, *Digitipes* Attems, *Rhysida* Wood and *Ethmostigmus* Pocock are reported from Kerala, of which the former two have 9 pairs and the remaining with 10 pairs of oval spiracles. The genus *Digitipes* is fairly well known and *Otostigmus* is of rare occurrence in Kerala. The members of the gneus *Ethmostigmus* though can be collected in the rainy season, is of rare occurrence (Yadav, 1993b).

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References

Jangi, B.S. and C.M.S. Dass (1984). Scolopendridae of the Deccan. *Journal of Scientific and Industrial Research* 43: 27-54.

Khanna,V. (2001). A checklist of the Indian species of the centipedes (Chilopoda: Scolopendromorpha). *Annals of Forestry* 9(2): 199-219.

Khanna, V. and B.E. Yadav (1997). Indian species of the centipede genus *Scolopendra* with key to their identification (Chilopoda: Scolopendridae). *Records of the Zoological Survey of India* 96(1-4). 211-220.

Rathinasabapathy, B. and B.A. Daniel (1997). Note on tiger centipede (*Scolopendra hardwickei* (Newport) from Coimbatore Zoological Park site, Anaikatty, Western Ghats. *Zoos' Print* 12(8): 1.

Rathinasabapathy, B. and B.E. Yadav (2000). Centiptedes (Scolopendridae) of Coimbatore Zoological park Area, Anaikaty, Western Ghats. *Zoos' Print* 15(19): 327-328.

Yadav, B.E. (1993a). On a collection of centipedes (Myriapoda: Chilopoda) from Pune, Maharashtra. *Records of the Zoological Survey of India* 93(1-2): 165-174.

Yadav, B.E. (1993b). A report on some species of the genera *Digitipes* and *Ethmostigmus* (Chilopoda: Scolopendromorpha: Otostigmini) from Maharashtra. *Records of the Zoological Survey of India.* 93(3-4): 313-315.

Yadav, B.E. (1993c). Scolopendridae (Chilopoda) of Western Ghats with some first records from the state of Maharashtra. *Records of the Zoological Survey of India* 93(3-4): 321-328.

Yadav, B.E. (1994). The Scolopendrid centipedes. *Science and Culture* 60(6-12): 77-79.

Identification key

1. Four ocelli on each side of head below antennae (Figs. 1, 13, 15) . . . Family Scolopendridae 2
1A. No ocelli, blind centipedes . . . . . Family Cryptopidae (not reported from Kerala)

2. Spiracles triangular, longish, parallel to the long axis of the body (Fig. 2) . . . . . Subfamily Scolopendrinae 3
2A. Spiracles oval or round (Figs. 9, 10). Subfamily Otostigminae (single tribe Otostigmini) 11

3. Terminal leg segment with coxopleural process and pores (Figs.4, 14, 18) (Tribe Scolopendrini). 4
3A. Terminal leg segment without coxopleural process and pores (Fig. 23) (Tribe: Asanadini: Single genus *Asanada* Meinert: antennae extraordinarily short, not reaching backwards beyond the first segment of the body (Fig. 22) 9

4. All legs without tarsal spurs (Fig. 8); cephalic plate bears 2 incomplete paramedian longitudinal sutures posteriorly (Fig. 15). . . . . genus *Cormocephalus* Newport (Single species reported from Kerala: *C. nigrificatus* Verhoeff: 21st tergite without a longitudinal sulcus; lateral margination absent on tergites anterior to 21(Fig. 16); maxillepedes without prefemoral process)
4A. Legs mostly with tarsal spur (Fig. 3); cephalic plate without longitudinal sutures (Fig. 1). 5

5. 1st tergite anteriorly overlaid by cephalic plate (Fig. 1); a pair of spinules at the base of the claws of last leg (Fig. 5); colour green or yellow usually with a darker cross bar on each body segment or body deep black; the legs bright orange, large and robust centipedes: genus *Scolopendra* Linnaeus 6
5A. 1st tergite opposed to or overlaying cephalic plate; no spinules at the base of the claws of last legs; colour dull red with a blue or purplish tinge; small to moderate sized centipedes . . . . . genus *Arthrorhabdus* Pockock (rare in Asia: only one species *A. jonesii* Verhoff: Cephalic plate without basal plate; antennae with 17 articles, three basal glabrous and rest pilose; maxillipede dental plate with four teeth each; coxopleural process conical and tipped with two spines; first four legs with two tarsal spurs, remaining with one; anal leg prefemur with 1-2 spines ventro medially and three ventrally; 21st tergite without median suture)

6. Anal leg prefemur ventrally with nine spines arranged in three rows of three each (Fig. 4) 7
6A. Anal leg prefemur ventrally with lesser number of spines 8

7. 20th pair of walking legs without tarsal spur (Fig.6) . . . . . *Scolopendra amazonica* Bucherl
7A. 20th pair of walking legs with tarsal spur (Fig. 3) . . . . . *Scolopendra morsitans* Linnaeus

8. Alternate dark green and brownish yellow tergal segments giving remarkably a banded apperarance to the trunk; anal leg prefemur without spines ventrally (Fig. 7). . . . . *Scolopendra hadwickei* Newport
8A. No such colour pattern on tergites; anal leg prefemur with spines ventrally . . . . . *Scolopendra subspinipes dehani* Brandt

9. Longitudinal median groove present on posterior half of anal leg prefemur and femur (Fig. 24) . . . . . *Asanada indica* Jangi & Das
9A. Longitudinal median groove present on anal leg femur only (Fig. 23) 10

10. Longitudinal median groove present throughout on anal leg femur . . . . . *Asanada sokotrana* (Pocock)
10A. Longitudinal median groove confined to posterior half of anal leg femur only (Fig. 25) . . . . . *Asanada sukhensis* Jangi & Dass

11. Nine pairs of spiracles , one each on leg bearing segments 3, 5, 8, 10, 12, 14, 16, 18 and 20. 12

11A. 10 pairs of spiracles,one each on leg bearing segments 3, 5, 7, 8, 10,12, 14, 16, 18 and 20 15

12. Claw of second maxillae without spur (Fig. 26); femur of anal leg in male with a posteriomedial process (Fig. 11) genus *Digitipes* Attems. 13

12A. Claw of second maxillae with a spur (Fig. 27); femur of anal leg in male without such a process. genus *Otostigmus* Porat (single species reported from Kerala: *Otostigmus politus politus* Karsh: first 5-6 legs with two tarsal spines and following legs up to 19th with a single tarsal spur; tergites smooth)

13. 20th leg without tarsal spur, coxopleural process tipped with four spines and bearing two lateral spines (Fig. 18, 19) . . . . . *Digitipes gravelyi* Jangi & Dass

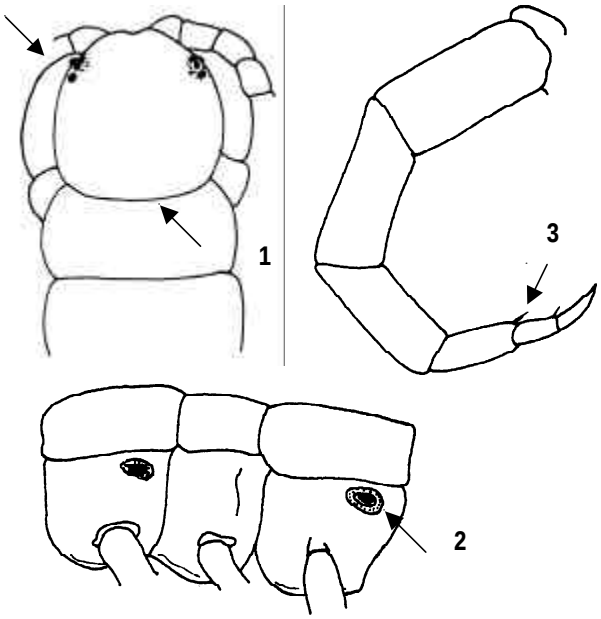
13A. 20th leg with a single tarsal spur; coxopleural process tipped with two spines and no lateral spines. . . . 14

14. Lateral tergital margination beginning on seventh segment; posterior margin of 21st sternite straight; first tarsus of anal leg nearly twice as long as second and second tarsus 3.5 times as long as claw (Fig. 21); prefemoral spines of anal leg comprising three ventro lateral and two ventro medial spines besides a dorso medial one; posteromedial femoral process of male short and stumpy . . . . . *Digitipes chhotanii* Jangi & Dass

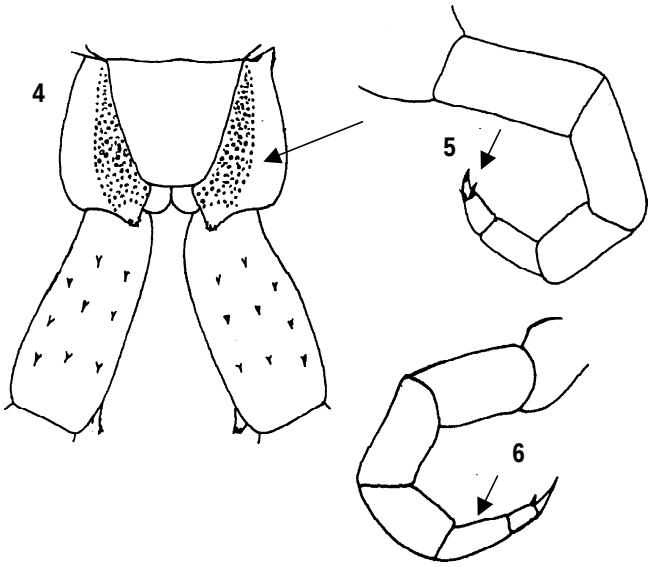
14A. Lateral tergital margination beginning on 11th leg bearing segment; posterior margin of 21st sternite concave; first tarsus of anal leg 1.5 times as long as second and second tarsus slightly more than twice as long as claw (Fig. 20); prefemoral spines of anal leg comprising a ventro lateral and ventro medial spine . . . . . *Digitipes indicus* Jangi & Dass

15. Prefemur of maxillepede with a medial dental process; first pair of spiracles not very large sieve like (Figs. 10, 17) . . . . . genus *Rhysida* Wood (only one species reported from Kerala: *R.nuda subnuda* Jangi: Tergites preceding 21st leg bearing segment ordinarily not marginate laterally and if at all hardly a couple of them involved and that too incompletely and weakly; 20th pair of legs bear tarsal spur (Fig. 14)

15A. Prefemur of maxillipede without a median dental proces; first pair of spiracles large and sieve like (Figs. 10, 17) . . . . . genus *Ethmostigmus* Pocock (only one species reported from Kerala: *E. platycephalus platycephalus* (Newport): median dental plate of maxillepede with three teeth (Fig. 17); four basal antennal segments glabrous; posterior medial spiny process of anal leg prefemur curved and of normal size; anal leg prefemur with three ventro lateral spines; coxopleural process tipped with two to four spines and bearing dorsally 0-1 spine)



Figures 1-3. **Scolopendra morsitans**
1 - cephalic end in dorsal view; 2 - body segments in lateral view showing triangular spiracles; 3 - 20th leg.



Figures 4-6. **Scolopendra amazonica**
4 - Cuadal end in ventral view showing 21st sternite, coxopleural process and anal leg prefemur; 5 - anal leg; 6 - 20th leg

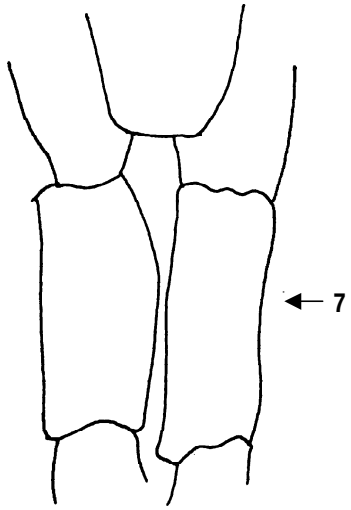
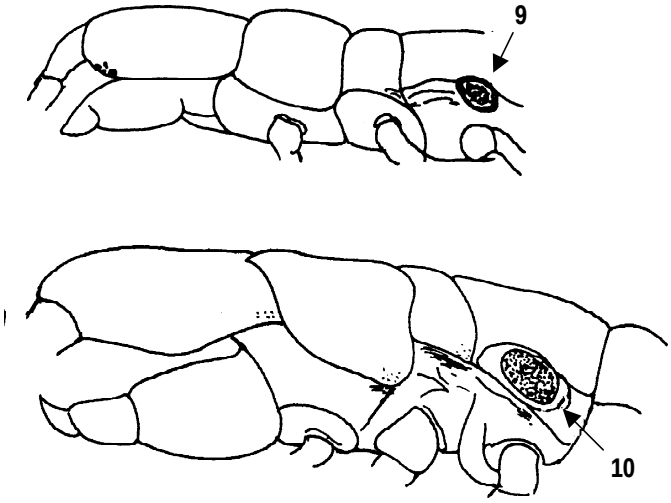


Figure 7. **Scolopendra hardwickei**
Caudal end (part) in ventral view showing anal leg prefemur



Figures 9-10. Anterior part of body segments in lateral view showing oval spiracles
9 **- Rhysida nuda subnuda*; 10* - Ethmostigmus platycephalus platycephalus**

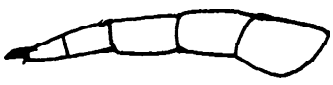
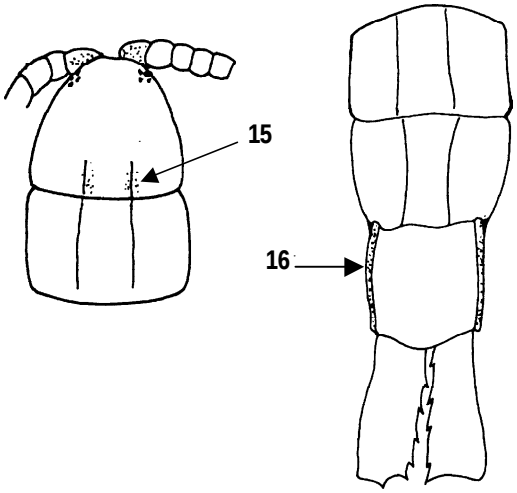
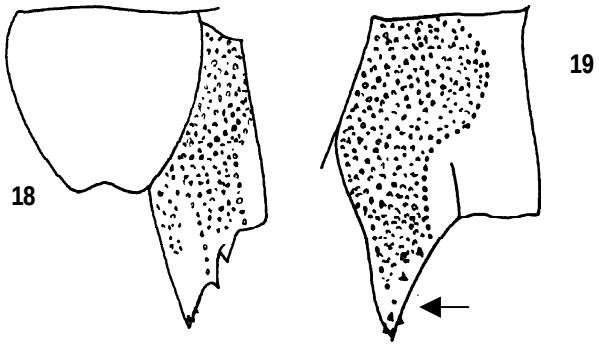


Figure 8. Cormocephalus nigrificatus
Leg

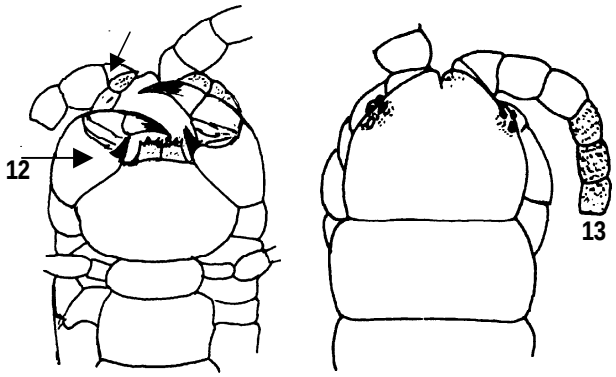
Figure 11. **Digitipes *sp.***
Anal leg femur of male

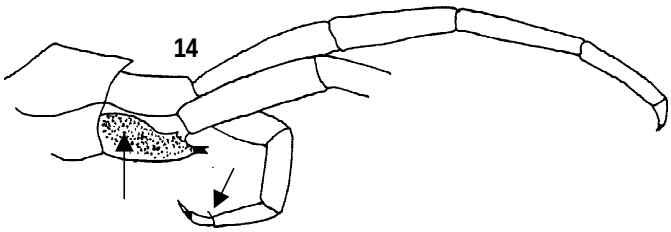


Figures 15-16. Cormocephalus nigrificatus
15 - Cephalic end in dorsal view; 16 - caudal end in drosal view showing last tergites and anal leg prefemur



Figures 18-19. **Digitipes gravelyi**
18 - Part of caudal end in ventral view showing 21st sternite and left coxopleuron; 19 - left coxopleuron in lateral view;





Figures 12-14. **Rhysida nuda subnuda**
12 - Cephalic end in ventral view showing maxillipedes and second maxillae; 13 - Cephalic end in dorsal view;
14 - caudal end in lateral view showing coxopleural process of anal leg and 20th leg

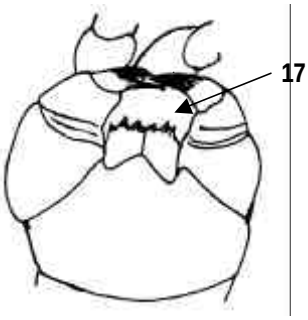


Figure 17. **Ethmostigmus platycephalus platycephalus**
Cephalic end in ventral view showing maxillipedes

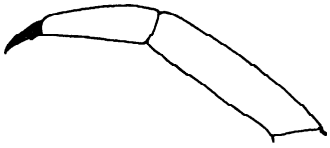


Figure 20. **Digitipes indicus**
Distal part of anal leg

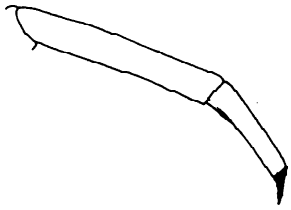


Figure 21. **Digitipes chhotanii**
Distal part of anal leg

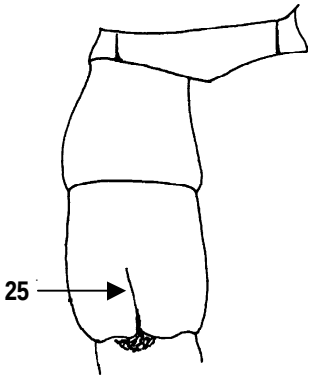
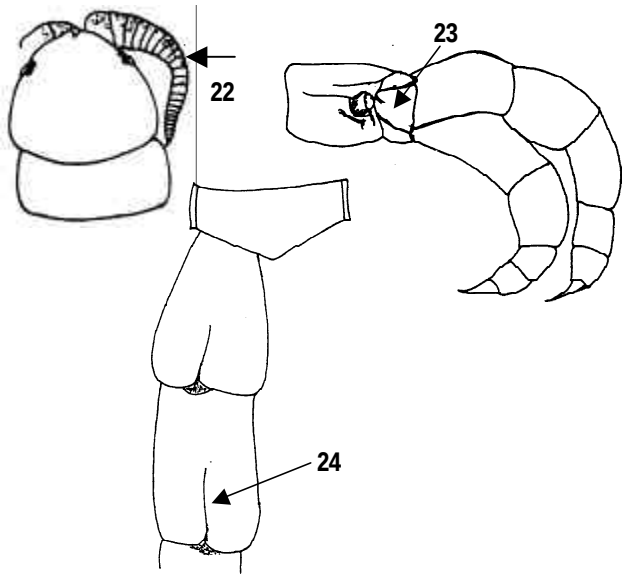


Figure 25. **Asanada sukhensis**
Caudal end in dorsal view showing 21st tergite and proximal part of anal leg



Figures 22-24. **Asanada indica**
22 - Cephalic end in dorsal view;
23 - caudal end in lateral view showing coxopleuron and anal legs; 24 - caudal end in dorsal view showing 21st tergite and proximal part of anal leg

Figures 26-27. Distal end of 2nd maxillae
26 - **Digitipes gravelyi*; 27 -* Otostigmus *sp.***