A key and annotated list of the Scolopendra species of the Old World with a reappraisal of Arthrorhabdus (Chilopoda: Scolopendromorpha: Scolopendridae)

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Abstract
In order to avoid any confusion with species of Scolopendra, the genus Arthrorhabdus is reviewed. For the Old World species at least, the length of the coxosternal tooth plates is the most useful distinguishing feature. Arthrorhabdus somalus Manfredi, 1933 is transferred to Scolopendra becoming S. somala (Manfredi, 1933). A. jonesii Verhoeff, 1938 is removed from that genus as a species of uncertain status. A key to the species of Arthrorhabdus is provided. A diagnosis of Scolopendra and key to the 42 species and 7 subspecies of the Old World are provided together with an annotated list of species. Scolopendra gastroforeata Muralewič, 1913 is a junior subjective synonym of S. s. subspinipes Leach, 1815 and Scolopendra nuda (Jangi & Dass, 1980) is a junior subjective synonym of S. mirabilis (Porat, 1876). Scolopendra teretipes (Porat, 1893) is removed from synonymy under S. mirabilis (Porat, 1876) and returned to full specific status. It is suggested that S. attenisi Lewis, Minelli & Shelley, 2006, and S. jangi Khanna & Yadav 1997, may be specimens of S. morsitans L., 1758, and S. andhrensis Jangi & Dass, 1984 may be S. s. subspinipes. Scolopendra subspinipes punensis Jangi & Dass, 1984 may be an immature S. s. dehaani Brandt, 1840. The presence of S. gigantea L., 1758 in India is considered improbable. Several Scolopendra species are very similar and require further investigation; thus male S. canidens Newport, 1844 and S. cretica Attems, 1902 are indistinguishable. Scolopendra arenicola (Lawrence, 1975) and S. monticola (Lawrence, 1975) may be conspecific, S. pinguis Pocock, 1891 and S. gracillima Attems, 1898 are also very similar. The relationship between S. cingulata Latreille, 1829 and S. subspinipes cingulatooides Attems, 1938 should be examined as should S. valida hallowi Pocock, 1896 currently synonymised under S. valida. Scolopendra langi (Attems, 1928) exhibits some unusual characters and should be reassessed. Scolopendra madagascariensis Attems, 1910 is known only from a single inadequately described specimen. Also discussed is S. amazonica Bücherl, 1946 currently regarded as a junior synonym of S. morsitans, as are the characters separating S. morsitans and S. laeta Haase, 1887. Non Australian records of S. laeta may be disregarded.
Key words
Chilopoda, Scolopendromorpha, Scolopendridae, taxonomy, Arthrorhabdus, Scolopendra, keys

Introduction
No comprehensive key to the genus *Scolopendra* has appeared since Attems (1930) produced his monograph of the Scolopendromorpha. Subsequently, a number of new species have been described and the genus *Trachycormocephalus* synonymised under *Scolopendra* by Lewis (1986a). The Old World species of *Scolopendra* are here updated. All currently valid species are listed and brief synonymies given. Full synonymies may be found in Minelli (2006). Some new synonymies are proposed but type material has not been examined and such new synonymies are only proposed where it has been felt that they are not in doubt. Colour differences alone are not regarded as adequate to distinguish subspecies.

Zalesskaya & Schileyko (1992) noted that Lewis (1986a) had synonymised *Trachycormocephalus* under *Scolopendra*. They suggested that the former deserved the rank of a subgenus of *Scolopendra* as it showed the following distinguishing characters: the hind border of the head capsule sunk into a transverse groove in the first tergite combined with paramedian and basal sutures on the head capsule as opposed to a head capsule with its hind border overlying the anterior edge of the first tergite or overlain by it. Lewis et al. (2006) noted, however, that in some *Scolopendra* species previously assigned to *Trachycormocephalus*, the head capsule may be overlain by the first tergite or just touch it and cephalic paramedian sutures and basal plates are absent in some of these species and present in some *Scolopendra* species. They concluded that subgenera were not presently warranted for *Scolopendra*, although they may prove to be necessary after generic revision. The genus is, indeed, very heterogeneous and merits a detailed analysis: American species, with only one, or possibly two, exceptions have an anterior transverse suture on tergite 1 whereas only one Old World species (*S. valida*) does so.

The key below to 42 species and 7 subspecies, based on Attems (1930), is far from perfect but it is hoped that it will further facilitate taxonomic enquiries into the species in this genus, the status, and separation of which, is not always clear.

The closely related genus *Arthrorhabdus* is first appraised in order to avoid confusion between its species and those assigned to *Scolopendra*.

**Arthrorhabdus** Pocock, 1891


The similarity between *Arthrorhabdus* and *Scolopendra* is such that Lewis (1986a) suggested that the former might be a synonym of the latter. Koch & Colless (1986) noted
that *A. mjöbergi* linked closely with *Scolopendra* and “further taxonomic investigation may result in its transference to *Scolopendra* or a related valid or new genus.” Shelley & Chagas (2004) having transferred *A. spinifer* (Kraepelin, 1903) to *Rhoda* Meinert, 1886, wrote “Although 6 component species are presently assigned to *Arthrorhabdus*, true congeneric status has not been demonstrated and the sporadic distribution pattern … suggests that the genus is polyphyletic.” (See their paper for a full discussion of this). It essential however, for the purposes of this paper, that at least the Old World species of *Arthrorhabdus* are clearly distinguished from *Scolopendra*.

It may be deduced from Attems (1930) that he regarded the main features distinguishing *Arthrorhabdus* from *Scolopendra* as 1) the head not overlapping the first tergite, 2) the posterior edge of the labrum fimbriate and its surface setose, 3) the spiracular valves undivided i.e. valves without bristled cones (‘zerfaserte Kegel’) and the peritrema edge with irregular lobes, and 4) the ultimate legs without pretarsal accessory spurs. However, Lewis (1986a) noted that some *Scolopendra* species showed characters 1 and 2 and there are also some species that lack pretarsal accessory spurs on the ultimate legs. Lawrence (1955) stated that the head plate overlies the first tergite in *A. formosus*. Moreover, the ultimate leg pretarsi sometimes (rarely) have two small spurs or one minute spur in *A. mjöbergi*, and two short spurs in *A. paucispinus*. Details given of spiracular features (character 3) were for *A. formosus*. The only other species for which there are data is *A. somalus* where bristled cones are present (Manfredi, 1933). Manfredi stated that the peritrema edge had irregular lobes as shown in Attems (1930) figure 74 page 58 perhaps implying that this is a character of *Arthrorhabdus* but this character is also seen in *Scolopendra* (Lewis et al. 1996).

Koch (1984) distinguished the two Australian species from the Australian species of *Scolopendra* by the tooth plates being long rather than short (Fig. 1). Shelley (2002) gave the following diagnosis for the genus: cephalic plate and first tergite entirely separate, the latter without an anterior transverse suture, forcipular coxosternal tooth plates relatively long and narrow, extending beyond the distal extremities of the forcipular trochanteroprefemoral process and tarsal spurs weak. These characters will separate *A. pygmaeus* (Pocock, 1895) from the American species of *Scolopendra* and *Hemiscolopendra* but, as noted above, the relationship of head plate and tergite 1 and the nature of tarsal spurs will not separate Old World *Arthrorhabdus* and *Scolopendra* species. The only character of value for non-American species is that of the coxosternal tooth plates. Shelley’s (2002) figure 67 shows that these are not as long in *A. pygmaeus* as in the Old World species. In fact, *Arthrorhabdus pygmaeus* differs quite markedly from the other species of the genus (see key below) and should, perhaps, be reassessed. Shelley & Chagas (2004) point out that *Arthrorhabdinus* Verhoeff, 1907 is available for *A. pygmaeus*.

Shelley & Chagas (2004) observed that “The tooth plates of *A. somalus*, which are short and broad and compatible with *Scolopendra*, are markedly different from the long, narrow structures in *A. pygmaeus*.” (They do not extend as far as the forcipular trochanteroprefemoral process and each has four teeth, the inner three somewhat fused, the outer larger and well separated). Furthermore the tergites are marginate from 19 in *A. somalus* as opposed to only tergite 21 marginate in the other species (slight
indication on 20 in *A. formosus*) and the coxopleural process has a side spine (absent in the other species). This species is quite clearly a *Scolopendra* and is here transferred to that genus as *S. somala* (Manfredi, 1933).

The description of the Indian *Arthrorhabdus jonesii* lacks some detail and the species is of uncertain status. Presumably, having been assigned to the Scolopendrinae, it has 9 pairs of scolopendrine type spiracles. However, the characters listed for *A. jonesii* are almost identical to those of *Otostigmus ceylonicus* Haase, 1887 from Sri Lanka and Burma (Myanmar). *Arthrorhabdus jonesii* has coxosternal tooth plates each with 4 teeth (unfortunately no details were given), 17 antennomeres, the basal 3 glabrous, tergites margine from 9 or 10, sternite paramedian sutures absent, sternite 21 truncated, the coxopleural process with 2 apical spines and 1 presumably lateral ("hinten an der Seite"). There are 1 or 2 apical spines in *O. ceylonicus*. Ultimate prefemora with 3 ventrolateral and 1 or 2 ventromedial spines in *jonesii*, 2 and 1 in *ceylonicus*. Legs 1-4 with two tarsal spurs, 1-3(8) in *O. ceylonicus*. Such similarities suggest that Verhoeff misplaced *A. jonesii* and that it may well be an *Otostigmus* very closely related to *O. ceylonicus*. The geographical data support this. If and until this can be confirmed, *A. jonesii* is regarded as a species of uncertain genus.

The removal of *A. somalus* and *A. jonesii* leaves three of the Old World species. These show a characteristic structure of the coxosternal tooth plates: elongated with 4 (rarely 5) large divergent teeth extending beyond the forcipular trochanteroprefemoral process (Fig. 1). This would appear to be the most reliable external character that we have at present to separate them from *Scolopendra*, a new diagnosis of which is given below.

**Dichotomous key to the species of *Arthrorhabdus***

NB. *A. somalus* and *A. jonesii* excluded.

1. Antennae long, with 20-26 antennomeres. Tarsal spurs minute and on legs 1-15 only. Ultimate leg prefemur with about 22 spines. Texas and Mexico. ....

   .................................................................................................................*A. pygmaeus*

   – Antennae short, with 17 antennomeres (sometimes 18 in *A. paucispinus*). Tarsal spurs present on legs 2-20. Ultimate leg prefemur with 1 to 11 spines ..... 2

2. Ultimate leg prefemur short (1½ times as long as wide). Ultimate pretarsus (claw) longer than tarsus 2. South Africa ........................................ *A. formosus*

   – Ultimate leg prefemur long (2-4 times as long as wide). Ultimate pretarsus (claw) shorter than tarsus 2. Australia ................................. 3

3. Coxopleural process of moderate length with 3 or 4 spines. Ultimate leg prefemur with total of 5-11 spines ........................................ *A. mjobergi*

   – Coxopleural process small or absent without or with 2 usually minute spines. Ultimate leg prefemur with total of 1-2 spines .................. *A. paucispinus*

NB. In his key Koch (1984) gave anal-leg coxopleuron of *A. mjoberi* with 3 or 4 apical spines but in his description he gave apical spines 2 or 3, sometimes 1 or 4.
Scolopendra Linnaeus, 1758

Diagnosis. With 21 pairs of leg-bearing segments. The spiracles longitudinally elongated and triangular, the atria with three valves the edges of which have a dense layer of bristles (incorrectly termed setae by Lewis, et al. 1996). These bristles may or may not be borne on cones. The head plate often, but not invariably, overlaps the first tergite, the latter with or without an anterior transverse suture. The first tarsus is longer than the second and most legs have tarsal spurs. Coxosternal tooth plates not as in Arthrothorax i.e. not elongated, not extending beyond the forcipular trochantero-prefemoral process and their teeth not large and divergent.

Dichotomous key to the Old World species of Scolopendra

NB 1. The number of antennomeres, initially 17, increases during post-larval development in many Scolopendra species. Specimens of less than 40 mm with 17 antennomeres should be treated with circumspection. Regeneration after damage may also affect antennomere number.

NB 2. The number of marginate tergites may increase during post-larval development. This character should be treated with circumspection in specimens of less than 25 mm.

NB 3. Irregular arrangements of spines on the prefemora of ultimate legs may indicate that the legs have been lost and regenerated, the normal distribution pattern being lost.

NB 4. The term ventral as used here with respect to the spines of the ultimate leg prefemur refers to ventrolateral, ventral and ventromedial spines. Decisions as to whether, for example, particular spines are ventromedial or medial may lead to different descriptions from different workers. This is a matter that needs to be investigated further.

NB 5. In Attems (1930) key couplet 3 contrasts coxopleural process long, slender and cylindrical, with conical and gradually narrowed and differences in number and arrangement of spines. This couplet has been retained in a modified form. The differences, however, are not always clear-cut. For this reason S. ellorensis is keyed out twice and S. madagascariensis, with a combination of characters which mean that it cannot be readily accommodated in the key, is entered in square brackets after couplet 3.

NB 6. The ratio of length to width of the prefemora of the ultimate legs may change with the size of specimens, as may the relative size of the prefemoral spines.

NB 7. S. media (Muralewicz, 1926) is a nomen dubium and not included in the key.

1. Tergite 1 with curved anterior transverse sulcus (furrow) (Fig. 2). With 19 to 21 antennomeres, the basal 4 to 6 glabrous, prefemora of leg pairs 18 to 20 with one to four dorsodistal spines (rarely 1 on 12 to 17) .................. S. valida
   (See note below on S. gigantea)
   – Tergite 1 without curved anterior transverse sulcus ........................................ 2
2. Tarsus of ultimate leg with spur ................................................................. S. calcarata
   – Tarsus of ultimate leg without spur ............................................................... 3
3. Coxopleural process long or of moderate length and with 6 or more spines and 1 or 2 side spines. (Fig. 3). (Right process with 5, left with 7 and both with a side spine in *S. ellorensis*) ................................................................. 4
   – Coxopleural process short or moderate length and 1 to 5 spines (very rarely 6 in *S. mirabilis*) and 1 side spine or none (Fig. 4). (Right process with 5, left with 7 and both with a side spine in *S. ellorensis*) .................................................. 11
   [Coxopleural process of ultimate leg segment long and slender with 3 or 4 apical and 1 dorsal spine. Ultimate prefemur with three rows of 3+3+4 or 3+4+4 ventral spines ............................................................... *S. madagascariensis*]
4. Tergite 21 without median longitudinal suture. Basal 3 or 4 antennomeres glabrous. First pair of legs with a single tarsal spur (Mauritius) ..... *S. abnormis*
   – Tergite 21 with a median longitudinal suture (Fig. 5), basal 5, 6 or more antennomeres glabrous. First pair of legs with 2 tarsal spurs, rarely with only 1 (1 in *S. ellorensis*) ................................................................. 5
5. Each forcipular coxosternal tooth plate with 5 teeth, the inner 3 somewhat fused (Fig. 6). Tarsi of first pair of legs each with a single spur. Coxopleural process with 5 or 7 spines. Prefemoral process of ultimate leg with 8 or 9 spines .. ................................................................. *S. ellorensis*
   – Each forcipular coxosternal tooth plate with 4 teeth, the lateral large and well separated, the medial 3 small and more or less fused (Fig. 7), sometimes forming a plate (Fig. 8). Tarsi of first pair of legs each with 2 spurs in most individuals. Prefemoral process of ultimate leg with 2 to 5 spines......................... 6
6. Forcipular trochanteroprefemoral process with 2 teeth or tubercles (occasionally 3) (Fig. 9). Tergite 1 with 2, mostly complete, anteriorly converging longitudinal sutures. Femur, tibia and tarsus of ultimate leg of male strongly clavate (Fig. 10). Prefemur with short deep groove distally in males and females. Setae of ultimate leg of male variable – mostly thick, at least tarsus 1 and 2 with long setae. Ultimate leg of female more clavate than in related species, glabrous........... *S. clavipes*
   – Forcipular trochanteroprefemoral process without teeth. Tergite 1 without longitudinal sutures (rarely fine sutures present in *S. dalmatica*). Ultimate leg of male very slightly clavate, with short setae or none. Ultimate leg of female slightly clavate ......................................................... 7
7. Median suture of tergite 21 incomplete reaching about two-fifths of tergite length. 17 antennomeres. Prefemoral process of ultimate legs mostly with 4 spines................................................................. 8
   – Median suture of tergite 21 complete or almost so. More than 17 antennomeres. Prefemoral process of ultimate legs mostly with 2 or 3 spines............. 9
8. Tibia and tarsus 1 and 2 of ultimate legs of male with long brush-like hairs. Twentieth pair of legs the same. Anterior median suture of tergite 21 reaching at least midway .............................................................. *S. dalmatica pantokratoris*
   – Ultimate legs of males glabrous in small specimens, with short brush-like setae in larger specimens. Twentieth pair of legs glabrous. Anterior median suture of tergite 21 reaches at most two fifths .. *S. dalmatica dalmatica*
A key to Old World Scolopendra species

9. The basal 5 or 6 antennomeres glabrous, the remainder setose. The transition abrupt. Prefemoral process of ultimate leg mostly with 2 (rarely 3) spines. .................................................. S. oraniensis

– The basal 10 to 12 antennomeres glabrous, the setae appearing gradually. Prefemoral process of ultimate leg mostly with more than 2 spines. .......................... 10

10. Ultimate legs of male and female glabrous .............................................. S. canidens

– Ultimate legs of male glabrous, dorsal surface of tarsus 1 and 2 in female with dense brush-like hairs. .................................................. S. cretica

11. Only tergite 21 or tergites 20 and 21 marginate ......................................... 12

– Some tergites anterior to tergites 20 and 21 marginate. ............................ 21

12. Antennae with 18 antennomeres. Head with basal plates and weak paramedian sulci. Tergite 21 with a median longitudinal suture .......................... S. indiae

– Antennae with 17 antennomeres .................................................................. 13

13. Prefemora of ultimate legs without ventral spines, coxopleural processes with a single apical spine and no side spine (Fig. 11) ............................................. 14

– Prefemora of ultimate legs with ventral spines, coxopleural processes with 2 to 5 spines ....................................................................................................... 15

14. Head capsule smooth, legs 1 to 19 with 1 tarsal spur. Coxosternal tooth plates each with 4 small teeth (Fig. 12) .................................................. S. arborea

– Head capsule rugose, legs 1 to 20 with 1 tarsal spur. Coxosternal tooth plates each with 5 teeth (Fig. 13) .............................................................. S. punensis

15. Coxopleural process with 2 spines, no side spine. Ultimate leg prefemur with total of 5 spines. First pair of legs with 2 tarsal spurs ........................................ 16

– Coxopleural process with 3 to 5 spines (rarely 2 in S. afer) and a side spine. Ultimate leg prefemur with 7 to 20 spines ventrally. First pair of legs with a single tarsal spur. ........................................ 17

16. Each coxosternal tooth plate with 4 teeth. Weak median longitudinal suture on head plate complete .................................................. S. arenicola

– Each coxosternal tooth plate with 5 teeth. Weak median longitudinal suture occupying posterior half of head plate only ........................................ S. monticola

17. Forcipular coxosternal tooth plates longer than, or as long as wide, each with 4 clear teeth. Those of S. zuluana as in S. afer (Fig. 14) ............................. 18

– Forcipular coxosternal tooth plates wider than long (Fig. 17) ..................... 19

18. Tergite 21 with a median suture. Ultimate prefemur with 14-16 irregularly arranged spines ventrally (Fig. 15) .................................................. S. zuluana

– Tergite 21 without a median suture. Ultimate prefemur with 7-10 spines in 3 or 4 rows (Fig. 16) ................................................................. S. afer

19. Teeth of forcipular coxosternal tooth plates not clearly demarcated, 3 basal antennomeres glabrous .................................................. S. pinguis

– Forcipular coxosternal tooth plates each with 4 or 5 small to minute tubercles (Fig. 17). Five or 6 basal antennomeres glabrous .......................... 20

20. With very short sternite paramedian sutures on anterior edge of sternites ...... .......................................................... S. gracillima gracillima
A key to Old World Scolopendra species

– Anterior third of trunk with complete sternite paramedian sutures, the remaining two-thirds only with very short indistinct paramedian sutures on anterior edge................................................................. S. gracillima sternostriata

21. Prefemora of ultimate legs with 2 or 3 ventrolateral, 1 or 2 ventromedial, 1 medial and 2 dorsomedical “spines”. These would appear to be extremely long narrow processes tipped with a spine. Prefemoral process a very long single “spine” (Fig. 18). Sternite paramedian sutures absent.............. S. spinosissima
– Prefemora of ultimate legs with spines not on elongated processes but sometimes on a swollen base (Figs 19, 20). Mostly with sternite paramedian sutures although these may be weak and incomplete.................................22

22. Prefemora of ultimate legs without, or with up to 3 (rarely 4) spines ventrally. (Fig. 21)............................................................................................................................................23
– Prefemora of ultimate legs with 5 to many spines ventrally (Fig. 22)..................30

23. Coxopleural processes extremely short single-spined cones, scarcely protruding beyond the posterior borders of the coxopleuron (Fig. 23). Head and tergites 2, 4, 6, 9, 11, 13, 15, 17 and 19 dark brown, contrasting strongly with the other pale brownish-yellow tergites. Prefemora of ultimate legs without ventral spines.................................................................S. hardwickei
– Coxopleural processes of ultimate legs protruding beyond the posterior borders of the coxopleura. If very short then at least two-spined, if one-spined, then long. Tergites uniformly pigmented or with only a dark-coloured transverse band on hind border of each ...............................................24

24. Prefemora of ultimate legs relatively thick, 1.5 to 2.25 times as long as wide (Figs 24 & 36) ............................................................................................................................................25
– Prefemora of ultimate legs relatively slender, two and a half to several times as long as wide (Figs. 21) ..................................................................................................................27

25. Head plate with paramedian longitudinal sutures in posterior half and branching transverse sutures at posterior corners (Fig. 25). Tergite 21 with median longitudinal suture................................................................. S. teretipes
– Head plate and tergite 21 without sutures..........................................................26

26. Sternite paramedian sutures complete....................................................... S. cingulata
– Sternite paramedian sutures absent, spines of ultimate leg prefemora much stronger than in cingulata (Fig. 24) .........................S. subspinipes cingulatoides

27. Ultimate leg prefemur without ventral spines, medially and dorsomedially without or up to 3 ................................................................. S. subspinipes dehaani
– Ultimate leg prefemur with 1 to 3 ventral spines (absent in one case of S. subspinipes piceoflava from Sulawesi).................................................................28

28. Twentieth pair of legs mostly with a tarsal spur. Coxopleural process typically with 2 spines (rarely 1 or 3) .................................S. subspinipes subspinipes, S. s. piceoflava, ? S. andhrensis
– Twentieth pair of legs without a tarsal spur. Coxopleural process with 3 spines (rarely 2 on one side) .................................................................29
29. Genital appendages present on the first genital segment in males (Fig. 26). 
   - Head plate with small puncti .................................................................. **S. subspinipes japonica**
   - Genital appendages absent. Head plate with large puncti .................. **S. multidens**

30. Tergite 21 without a median longitudinal suture ........................................ 31
   - Tergite 21 with a median longitudinal suture .............................................. 36

31. Forcipular coxosternal tooth plates much wider than long, each with 12 or more small teeth (Fig. 27) .......................................................... **S. metuenda**
   - Forcipular coxosternal tooth plates at most only a little wider than long, each with 4 to 7 teeth (Fig. 28) .......................................................... 32

32. With 17 antennomeres ............................................................................... 33
   - With 18 to 20 antennomeres ................................................................... 34

33. Basal 5 antennomeres glabrous, coxopleural process with a single apical spine. (Fig. 19) .......................................................... **S. mazbii**
   - Basal 2 to 2.5 antennomeres glabrous, coxopleural process with 3 apical and 1 side spine .................................................................................. **S. koreana**

34. Basal 4 antennomeres glabrous, 4+4 coxosternal teeth, sternite 21 narrowed posteriorly, posterior border with median embayment. Coxopleural process with 2 apical, 1 lateral and 1 dorsal spine .......................................................... **S. langi**
   - Basal 6 antennomeres glabrous, each coxosternal tooth plate with 5 to 7 teeth .......................................................... 35

35. Margination commences on tergite 17. Coxopleural process with 2 apical spines (sometimes 1 apical and 2 lateral). Ultimate leg prefemora with 3 ventrolateral and 2 ventromedial spines, prefemoral process “often” with 1 apical and 2 minute dorsal spines .................................................. **S. negrocapitis**
   - Margination on tergites 3 and 5-21. Coxopleural process with 4 apical spines, no side spine. Ultimate leg prefemora with 3 ventrolateral, 3 ventral and 2 ventromedial spines, prefemoral process with 4 to 6 spines ........ **S. subcrustalis**

36. Posterior half of head plate with anteriorly diverging paramedian sutures and posterior transverse sutures delimiting basal plates (Fig. 29). Forcipular coxosternum with ramifying sutures laterally (Fig. 30). The latter very rarely absent... **S. mirabilis**
   - Head plate without anterior diverging paramedian sutures and basal plates. Forcipular coxosternum without ramifying sutures. NB Head plate with incomplete posterior lateral sutures (incomplete basal plates?) in S. paranuda and traces of short paramedian sutures in S. jangii .................................................. 37

37. Head plate with incomplete median suture. Basal 4 antennomeres glabrous. Leg 1 with 2 tarsal spurs. Coxopleuron without a side spine and coxopleural process with 2 apical spines. Pretarsus (claw) of ultimate leg longer than second tarsus and ventrally serrate .......................................................... **S. lutea**.
   - Head plate lacking a median suture. Basal 5-10 antennomeres glabrous. Leg 1 with a single tarsal spur. Coxopleuron with a side spine and coxopleural process with 3-5(7), mostly 4 apical spines. Pretarsus (claw) of ultimate leg shorter than second tarsus and not serrate ventrally .................................................. 38

38. Ultimate leg prefemur with 12-18 irregularly arranged ventral spines (Fig. 31) .............................................................................................................. 39
– Ultimate leg prefemur with 7-10 ventral spines, typically in 3 rows of 3 (Fig. 4). (possibly 4 rows in S. attensi) ........................................................................................................40

39. Coxopleuron with a side spine and coxopleural process with 5 to 7 apical spines. Ultimate leg prefemoral process with 8 or 9 spines. India ... S. ellorensis
– Coxopleuron with a side spine and coxopleural process with 3 apical and 1 lateral spine. Ultimate leg prefemoral process with 2 to 4 spines. Somalia and Yemen.................................................................................................................. S. somala

40. Ultimate leg prefemur with 2 dorsomedial spines ........................................41
– Ultimate leg prefemur with 4 to 6 dorsomedial spines in two rows (? one row in S. jangii) ........................................................................................................................................42

41. Head plate with incomplete basal plate sutures. Basal 8 antennomeres glabrous. Each coxosternal tooth plate with 4 teeth.........................................................S. paranuda
– Head plate without basal plates. Basal 5 or 6 antennomeres glabrous. Each coxosternal tooth plate with 5 teeth .................................................................S. attensi

42. Porose area extending to posterior edge of coxopleuron (Fig. 33). Prefemur, tibia and often tarsus of ultimate leg of male dorsally flattened with swollen edges (Fig. 34). Africa, Asia, Australia, the Pacific Islands, the Americas.............S. morsitans, S. jangii
– Porose area with well-defined boundaries which clearly do not reach median ridge of the coxopleural process or the posterior edge of coxopleuron (Fig. 35). Prefemur and tibia of ultimate leg of male rounded dorsally without swollen edges. Australia ........................................................................................................ S. laeta

Annotated list of species

S. abnormis Lewis & Daszak, 1996


Distribution: Only found on Round and Serpent Islands off the coast of Mauritius.

S. afer (Meinert, 1886)
Figs 14, 16

Trachycormocephalus afer: Attems 1930 Das Tierreich 54: 57.

A key to Old World Scolopendra species

Remarks: In his key to the four South African species of what was then *Trachy-cormocephalus* Lawrence (1958) gave “tergites 17-19 with lateral emargination as well as 20 and 21” this conflicts with Attems (1930) statement that only tergite 21 is margin-ate and is an error. In his 1953 paper Lawrence wrote, “*T. afer* is easily distinguishable from *T. mirabilis* in having only the last tergite emarginate and the first 5 or 6 antennal segments hairless. These characters are very definite in all the specimens examined.…”

*S. andhrensis* Jangi & Dass, 1984


**Distribution:** Andhra Pradesh and Maharashtra, India.

Remarks: Described on the basis of a single juvenile specimen only 26 mm in length, with densely punctate head plate, 17 antennomeres, the basal 6 glabrous, coxo-pleural process with 2 spines and leg 20 lacking a tarsal spur. Ultimate leg prefemur with 2 dorsomedial, 2 ventromedial and 2 ventrolateral spines; prefemoral process two-spined. *S. andhrensis* shows the characters of a juvenile *S. subspinipes* but remarkably has cephalic basal plates. It is possible that this is an overlooked juvenile character but for this reason has not been synonymised under *S. subspinipes* here. Two further specimens were briefly described by Jadav (1993). Details: 19 antennomeres, 6 glabrous, coxosternal teeth 6+6, tergites marginate from 15, ultimate leg prefemur with 1-6 ventral spines. No mention was made of the cephalic basal plates.

*S. arborea* Lewis, 1982

Figs 11, 12


Remarks: Known from a single specimens from Sarawak. Similar to *S. subspinipes de-haani* and the Indian *S. punensis*.

*S. arenicola* (Lawrence, 1975)

*Trachycormocephalus arenicolus* Lawrence 1975 Cimbebasia (A) 5: 41.

*S. arenicola*: Lewis et al. 2006 Zootaxa 1155: 36.

**Distribution:** Namibia

Remarks: Known from a single subadult specimen, length 40 mm, *S. arenicola* is very similar to *S. monticola* which is also known from a single specimen, length 70 mm. The specimens differ in colour: *S. monticola* light yellow-brown tergites bordered pos-
teriorly by a narrow dark green band, tergites uniformly light green in *S. arenicola* but colour is variable in *Scolopendra*. The other differences: the faint incomplete cephalic median sulcus in *S. monticola*, complete in *S. arenicola*; basal 5 antennomeres glabrous in *S. monticola*, 5 or 6 in *S. arenicola*. Each forcipular coxosternal tooth plate with 5 teeth in *S. monticola*, 4 in *S. arenicola*, and tergite 20 weakly and 21 marginate in *S. monticola*, only 21 marginate in *S. arenicola*. These differences are mostly trivial and some may be age related. Examination of further material may indicate that the species are conspecific (they are both from Namibia). They are very similar to *S. lutea*, which is also recorded from Namibia.

*S. attemsi* Lewis, Minelli & Shelley, 2006

Fig. 32

*T. intermedius*: Attems 1930 Das Tierreich 54: 56. (nec *S. intermedia* Porat, 1871)
*S. attemsi* Lewis et al. 2006 Zootaxa 1155: 36

**Distribution**: Salisbury, S. Rhodesia (now Harare, Zimbabwe).

**Remarks**: Apparently known only from a single specimen, possibly differentiated from *S. morsitans* by the distribution of spines on the ultimate leg prefemur described as “ventral-aussen 2 Längsreihen von je 3 Dornen, ventral-innen, innen und oben-innen je 2 Dornen.” Attems figure 16 (Fig. 32 here), however, does not tally with this. It shows a ventral view of the ultimate legs and the arrangement of prefemoral spines that resembles that of *S. morsitans*, which occurs throughout the sub-region with the exception of the Cape Peninsula. Attems reported legs 1-19 with a tarsal spur, 20 and 21 without. Legs 1-13 with 1, legs 14-21 with 2 pretarsal accessory spurs. This is probably unique and seems improbable. Possibly *S. morsitans*; the specimen needs to be reassessed.

*S. calcarata* Porat, 1876

*S. calcarata* Porat 1876 Bih. Svenska Ak. 4: 10.
*S. calcarata*: Attems 1930 Das Tierreich 54: 33.

**Distribution**: China, Laos, Vietnam.

**Remarks**: Schileyko (1995) gives a full description of the species. Other defining characters in addition to the unique tarsal spur on the ultimate leg are antennomeres 17, last 4 to 6 tergites clearly marginate (Attems gives last 7-9), tergite 21 without a median suture, no sternite paramedian sutures. Ultimate leg prefemur with 9-12 ventrolateral, 11-12 ventromedial and 2-3 spines both medially and dorsomedially. Attems (1930) gives ventral with 9, medial and dorsal with 5-14 spines. These may be geographical differences.
NB Kronmüller (2009) recorded a specimen of *S. subcrustalis* from the Philippines with a tarsal spur on one ultimate leg.

**S. canidens** Newport, 1844
Figs 3, 3a, 7

*S. canidens canidens*: Attems 1930 Das Tierreich 54: 36.

*Distribution*: Italy (Lampedusa I. only) Morocco, Algeria, Tunisia, Libya, Egypt, SE Turkey, Syria, Palestine, Israel, Jordan, Iraq, Iran, Saudi Arabia, Yemen, Armenia, Azerbaijan, Turkmenistan, Uzbekistan, Tajikistan, Afghanistan.

*Remarks*: Male *S. canidens* and *S. cretica* are apparently indistinguishable. See remarks under *S. cretica* below.

**S. cingulata** Latreille, 1829
Figs 20, 26

*S. cingulata* Latreille 1829 in Cuvier, Règne Animal ed. 2, 4: 339
*S. cingulata*: Attem 1930 Das Tierreich 54: 27.

*Distribution*: Portugal, Spain, France, Slovenia, Croatia, Bosnia-Herzegovina, Serbia, Montenegro, FYR Macedonia, Hungary, Romania, Bulgaria, Albania, Greece, Turkey, Sicily, Corsica, Sardinia, Crete, Cyprus, (absent in Balearics), Ukraine, S. European Russia (Crimea, Caucasus), Tajikistan, Lebanon, Palestine, Israel, Jordan, Egypt, Syria, Iraq, Iran. Also recorded doubtfully from Madagascar and the Andaman & Nicobar Islands. Wang & Mauriès (1996) list it for China referring to Haase (1887) but China does not appear to be cited in Haase’s paper.

**S. clavipes** C. L. Koch, 1847
Figs 9, 10

*S. clavipes* C. L. Koch 1847 Syst. Myr. 3: 169.
*S. clavipes*: Attems 1930 Das Tierreich 54: 33.

*Distribution*: Insular Greece (Dodekanisa), southwest Turkey, Lebanon.

*Remarks*: Turk’s (1955) record of *S. clavipes* from Tunisia is, according to Würmli (1980), *S. canidens*. 

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**S. cretica** Lucas, 1853

*S. canidens cretica* Attems 1930 Das Tierreich 54: 37.

**Distribution:** Crete. Records from Turkey, Cyrenaica and western Libya (Würml, 1980) are possibly *S. canidens* (Simaiakis et al 2004).

**Remarks:** Attems (1930), who regarded *S. cretica* as a subspecies of *S. canidens*, gave for *cretica*: ultimate legs of male slender, tarsi with dense sort setae and for *canidens*: ultimate legs more or less thickened without, or at most, sparsely setose. However, according to Würml (1980) Attems was incorrect, female *S. cretica* being characterised by dense brush-like hairs on the dorsal surface of tarsus I and II of ultimate legs. Male *S. canidens* and *S. cretica* are, apparently, indistinguishable. Stylianos Simaiakis (personal communication) has confirmed that there is no morphological character to easily distinguish male *cretica* and *canidens*. Clearly the two forms are very similar and whether they merit specific status is debatable.

**S. dalmatica dalmatica** C. L. Koch, 1847

Fig. 8

*S. dalmatica* C. L. Koch 1847 Syst. Myr. 3: 168.
*S. dalmatica dalmatica*: Attems 1930 Das Tierreich 54: 34.

**Distribution:** Croatia, Bosnia-Herzegovina, Montenegro, Albania, Greece, Crete.

**Remarks:** Zapparoli (2002) noted that records from mainland Greece need confirmation and may represent introduced specimens. Turk (1952), in a paper overlooked by subsequent workers, described a specimen from Cyprus which he identified as *S. dalmatica*. Length 82 mm, with 18 antennomeres of which the basal 6 were glabrous, each coxosternal tooth plate with 4 teeth partially fused into 2 pairs. This last character, he suggested, may characterize an island race in Cyprus. The median suture if tergite 21 was greatly reduced, the coxopleural process had 3 terminal and 4 lateral spines. The tarsi of the ultimate legs had a fairly dense covering of “bristles”. He considered that the specimen shared the characters of both *S. dalmatica* and *S. canidens* in addition one or two of its own. It was not possible to say whether it was a hybrid between the two species or an ancestral form to both. He expressed doubts as to whether *S. dalmatica* and *S. canidens* should be considered as separate species. This specimen and more material from Cyprus need to be examined.
S. dalmatica pantokratoris Attems, 1930

S. dalmatica var. pantocratoris [sic!]: Attems 1930 Das Tierreich 54: 35.

Distribution: Greece (Corfu)

Remarks: Attems (1902) regarded dalmatica as a subspecies of oraniensis and pantokratoris as a variety. As it is an infrasubspecific name it is unavailable (Minelli, 2006). In his (1930) monograph Attems (1930) considered it as a variety (subspecies) of dalmatica. It was listed under S. dalmatica by Zapparoli (2002, p. 64) who, however, stated that the identity of this taxon (pantokratoris) has been confirmed by Würmli (1980). It is very similar to S. d. dalmatica. Original spelling Pantokratoris subsequent authors have given pantocratoris

S. ellorensis Jangi & Dass, 1984
Figs 6, 31


Distribution: Maharashtra, India.

Remarks: Apparently distinct but based solely on a small (31 mm) single dismembered specimen with most legs detached or missing. Further material required.

S. gigantea L., 1758

S. gigantea L. 1758 Systema Naturae 1: 638.

Distribution: Central and South America. (India?).

Remarks: Yadav (1997) recorded S. gigantea Linnaeus, 1758 from Maharashtra State, India. The presence of this neotropical species in India seems highly improbable. The single specimen collected in 1973 was black and about 20 cm long. The identification was confirmed by Khanna (2005) but the specimen was not described, the author giving Attems (1930) general description so it is not possible to confirm this with confidence. The characters that would differentiate S. gigantea from S. valida are 17 antennomeres with the basal 7 to 12 glabrous, the prefemora of most legs with 1 or more dorsodistal spines and the femora of the ultimate legs sometimes with dorsodistal spines. [S. valida has 19 to 21 antennomeres, the basal 4 to 6 glabrous, prefemora of legs 18 to 20 with 1 to 4 dorsodistal spines (rarely 1 on legs 12 to 17)]. Further material is required in order to decide whether a second species similar to S. valida is present in India.
S. gracillima gracillima Attems, 1898

Fig. 17


Distribution: Indonesia (Java, Seram), Malaysia (Sarawak), Vietnam.

Remarks: S. gracillima is similar to S. pinguis. Both occur in Java and further data are required to elucidate their relationship. Kraepelin’s (1903) Fig. 159, showing coxosternal tooth plates, is of S. metuenda, not S. gracillima.

S. gracillima sternostriata Schileyko, 1995


Distribution: Vietnam.

Remarks: Schileyko 1995 notes that Attems (1938) description of S. gracillima from Vietnam seems to be intermediate between S. g. sternostriata and the nominate subspecies. The differences between these subspecies are trivial and may not merit subspecific distinction.

S. hardwickei Newport, 1844

Fig. 23

S. hardwickei: Attems 1930 Das Tierreich 54: 32.

Distribution: India, Nicobar and Andaman Islands, Sri Lanka, Indonesia (Java, Sumatra).

Remarks: The colour pattern, namely head and tergites 2, 4, 6, 9, 11, 13, 15, 17 and 19 dark brown, contrasting strongly with the other pale brownish-yellow tergites, is very characteristic. It is not clear from the literature whether this coloration is retained in preserved species.

S. indiae (Chamberlin, 1914)

Trachycormocephalus indiae Chamberlin 1914 Ent. News 25: 390, figs.8-10.
T. indiae: Attems 1930 Das Tierreich 54: 56.

Distribution: India
Remarks: The type material comprises two specimens of 22 and 23 mm. Yadav (1993) examined two more and gave length 50 mm. It would appear to be an uncommon species.

**S. jangii** Khanna & Yadav, 1997


**Distribution:** near Pune, Maharashtra State, India.

**Remarks:** Based on a single specimen. Khanna & Yadav (1997) state that the species resembles *S. amazonica* (= *S. morsitans*) in the absence of a tarsal spur on the 20th pair of legs and “to some extent in the arrangement of spines on the anal leg prefemurs” that is “ventrally with 3, 3, 2 spines on the left leg and 1, 3, 4, 1 spines on the right leg with 4 dorsal spines.” (The irregular arrangement on the right leg may well be the result of regeneration.). The authors state that it differs in having paramedian longitudinal sutures posteriorly on the cephalic plate, irregular sutures on the first tergite and the absence of tarsal spurs on the first pair of legs. The diagrammatic figures show very weak sutures, possibly artefacts? The absence of spurs on the first pair of legs is unusual. This individual certainly very closely resembles *S. morsitans*, which is widely distributed in India and the ultimate legs also exhibit characters seen elsewhere only in male *S. morsitans*. Clearly closely related to, if not, *S. morsitans*.

**S. koreana** (Verhoeff, 1934)


*S. koreana*: Lewis et al. 2006 Zootaxa 1155: 36.

**Distribution:** Korea, China (Manchuria).

**S. laeta** Haase, 1887

Fig. 35


*S. l. viridis* Kraepelin 1908 Fauna S. W.-Austral. 2: 126.

*S. l. fasciata* Kraepelin 1908 Fauna S. W.-Austral. 2: 126.

*S. l. flavipes* Kraepelin 1908 Fauna S. W.-Austral. 2: 126.

*S. laeta*: Attems 1930 Das Tierreich 54: 25.

**Distribution:** Australia.

**Remarks:** Kraepelin (1908) recognised three colour varieties of *S. laeta*. Of these, *Scolopendra l. viridis* is listed in Minelli (2006) as a synonym of *S. laeta*, and *S. l. fas-
ciata and S. l. flavipes as subspecies. L. E. Koch (1982) distinguished 5 intraspecific forms (A-E) by their colour patterns and mapped their distributions; 3 of these correspond to Kraepelin’s varieties, which Koch stated were forms of the same species and not subspecies.

Attems (1930) separated laeta from morsitans using the characters of the ultimate legs in males with the dorsal surface of the prefemur, femur and sometimes the tibia flattened and with raised edges in the latter species, rounded in the former. His key did not separate the females. Koch (1982) did not use the ultimate leg characters but provided a key that allows S. laeta to be distinguished from Australian S. morsitans. Characters given for S. laeta (Australian S. morsitans in parentheses) are: tergite margination not before 17, often only distinct on tergites 19-21 (starting before, occasionally on 18), porose area of coxopleuron of ultimate legs with well-defined boundaries which clearly do not reach median ridge of process or posterior edge of coxopleuron (Fig. 35) (porose area extending on each side of the median ridge to the posterior edge of the coxopleuron). Antennae with 17 to 19, rarely 20 or 21 antennomeres (20 or 21, sometimes 19, rarely 17, 18, 22 or 23) and prefemora of ultimate legs short to moderate, length mostly 2.0 to 2.5 times width (2.5-3.0 times). Adult size small to moderate i.e. 31 to 65mm (moderate to large in S. morsitans i.e. 85-127 mm).

There is clearly overlap in some of these characters but the coxopleural pore fields seem to distinguish the species. See under S. morsitans for further discussion. Scolopendra laeta has been recorded from the Philippines (Wang, 1951) and doubtfully from Martinique (Demange, 1981). Bearing in mind the very close similarity between S. laeta and S. morsitans the records from Martinique and the Philippines are highly suspect. The Philippines specimen was immature (18mm long) and since Attems (1930) key used adult male characters solely to separate the species, there is no way that this specimen could have been assigned to S. laeta. The specimen from Martinique lacked coxopleural processes, these being replaced by a large tooth and Demange (1981) was uncertain as to its identity. The evidence for the occurrence of S. laeta outside Australia is so weak that non Australian records can be disregarded.

S. langi (Chamberlin, 1927)


Distribution: Democratic Republic of Congo.

Remarks: Known from a single individual, length 57 mm. The specimen exhibits unusual characters for a Scolopendra, namely: basal 4 antennomeres glabrous, each coxosternal tooth plate with 4 teeth, sternite 21 narrowed posteriorly, posterior border with a median embayment. Ultimate leg coxopleural process with 2 apical, 1 ventroectal (=subapical?) and 1 dorsal spine. These are characters seen in some Rhysida species. Scolopendra langi should be reassessed.
**S. lutea** (Attems, 1928)

*Trachycormocephalus occidentalis*: Attems 1930 Das Tierreich 54: 54.  
*S. lutea*: Lewis et al. 2006 Zootaxa 1155: 36.

*Distribution*: Namibia, India.  
*Remarks*: The distribution is odd but Attems’ (1909, 1928) descriptions differ in only a few minor details.

**S. madagascariensis** Attems, 1910

*S. madagascariensis* Attems 1910 Voeltzkow Reise O斯塔frika 3: 84.  
*S. madagascariensis*: Attems 1930 Das Tierreich 54: 33.

*Distribution*: Madagascar.  
*Remarks*: Known only from a single inadequately described specimen.

**S. mazbii** Gravely, 1912

Figs 19, 28

*S. mazbii* Gravely 1912 Rec. Indian Mus. 8: 72.  

*Distribution*: India (Assam), China.  
*Remarks*: Not listed in Attems (1930).

**S. media** (Muralewicz, 1926)

*T. medius*: Attems 1930 Das Tierreich 54: 55.  

*Distribution*: Azerbaijan.  
*Remarks*: Described on the basis of a single specimen, Zalesskaya & Schileyko (1992) declared the name to be a *nomen dubium*. The holotype is in very poor condition and appears to be a *S. canidens*.
**S. metuenda** Pocock, 1895

Fig. 27


**Distribution**: Solomon Islands.

**S. mirabilis** (Porat, 1876)

Figs 5, 22, 29, 30

*Cormocephalus mirabilis* Porat 1876 Bih. Svenska Ak. 4:18.
*Trachycormocephalus mirabilis*: Attems 1930 Das Tierreich 54: 53.
  
  *syn. nov.*

**Distribution**: Egypt, Sudan, Somalia, Eritrea, Ethiopia, Tanzania (including Zanzibar), Israel, Palestine, Syria, Jordan, Saudi Arabia, Kuwait, UAE, Oman, Yemen (including Perim Island), Iraq, Iran, Turkmenistan, Tajikistan, Uzbekistan, Afghanistan, India, Vietnam. Some specimens from Oman and the United Arab Emirates have ramifying sutures on the first tergite such as are seen in *S. teretipes* (Fig. 25) (Lewis & Gallagher 1993).

**S. monticola** (Lawrence, 1975)

*Trachycormocephalus monticolus* Lawrence 1975 Cimbebasia 4: 41.
*S. monticola*: Lewis et al. 2006 Zootaxa 1155: 36.

**Distribution**: Namibia.

**Remarks**: Known from a single specimen length 70mm. *S. monticola* is very similar to *S. arenicola*. Examination of further material may indicate that they are conspecific and both are closely related to *S. lutea*, which is also recorded from Namibia (see remarks under *S. arenicola*).
**S. morsitans** L., 1758
Figs 4, 33, 34

*S. morsitans* L. 1758 Systema Naturae 1: 637.
*S. morsitans scopoliana* C. L. Koch 1841 M. Wagner, Reis Alger. 3: 222.
*S. morsitans*: Attems 1930 Das Tierreich 54: 23.
*S. m. scopoliana*: Attems 1930 Das Tierreich 54: 23.

**Distribution**: USA (Florida), Mexico, Central and South America, Caribbean, Africa, Asia, Australia, islands of Atlantic, Indian and western and central Pacific Oceans. Frequently introduced. European citations are dubious. See Shelley et al. (2005) for further data on distribution.

**Remarks**: Bücherl (1946) described a subspecies, *S. morsitans amazonica*, from Brazil. Later, Jangi (1955) described two sympatric forms of *S. morsitans* from Nagpur, India. He subsequently referred the smaller of his two forms to *S. m. amazonica* elevating it to specific rank (Jangi, 1959). The two species were distinguished by a number of characters the most important of which was the presence of a tarsal spur on the twentieth pair of legs in *S. morsitans*. The situation is, however, far from straightforward. African populations lack this spur but in other respects may resemble *S. morsitans* (Lewis, 1969). Würmli (1975) examined a series of oriental and Australian specimens; he concluded that *S. morsitans* is a polymorphic species and that *S. amazonica* should be relegated to synonymy. However, Jangi & Dass (1984) observed that the overlap that Würmli noticed between *S. amazonica* and *S. morsitans* seemed to result from independent geographical variation. They stated that the two forms in the Deccan, India, occur sympatrically without hybridisation and thus are distinct species. Würmli’s samples were from South and South-East Asia, Oceania and Australia and New Zealand and it is interesting to note that only the Australian material had a tarsal spur on the twentieth pair of legs, the remainder lacked this as did Lewis’ (1969) African material. Koch (1983) also noted that the tarsal spur on leg 20 was rarely absent in Australian *S. morsitans*. It is possible that there are two or more sibling species. The problem would reward further investigation.

*S. morsitans* is closely related to the Australian species *S. laeta*. Attems (1930) separated *laeta* from *morsitans* using the characters of the ultimate legs in males (see Remarks under *S. laeta* above). His key did not separate the females. Koch (1982) did not use the ultimate leg characters but provided a key, which allows *S. laeta* to be distinguished from Australian *S. morsitans*. Details of these differences are also given under *S. laeta* above.

Non Australian populations of *S. morsitans* often show the characteristics ascribed to *S. laeta* (see *S. laeta* above), namely tergite margination, number of antennomeres, adult size and, possibly, the proportions of the ultimate leg prefemora, see for example data on Sudanese and Nigerian *S. morsitans* (Lewis, 1966, 1968). The distribution of
pores on the coxopleura of the ultimate pair of legs, however, may well distinguish the
two species and should always be recorded as should the presence or absence of a tarsal
spur on the twentieth pair of legs.

NB Koch (1982) described the porose area of the coxopleuron as extending on each
side of the median ridge to the posterior edge. However, in the Nigerian specimens that I
have examined although the porose area extends to the posterior edge of the coxopleuron,
there are very few pores on the median surface of the coxopleural process (fig. 33).

Akkari et al. (2008) synonymised *S. morsitans scopoliana*, a deep olive green-black-
ish North African colour form from Morocco, Algeria and Tunisia under *S. morsitans*.

*S. multidens* Newport, 1844

*S. subspinipes multidens*: Artems 1930: Das Tierreich 54: 30.

*Distribution*: Japan, China, Taiwan, Philippines, Indonesia (Java).

*Remarks*: A valid species characterised by absence of genital appendages in male
and strongly punctate head capsule (Chao & Chan, 2003). On Taiwan it is distinct
from *mutilans* and *subspinipes*. However Schileyko (2007) referring to Vietnamese ma-
terial states that it represents the nominal form i.e. *S. s. subspinipes*.

*S. negrocapitis* Zhang & Wang, 1999


*Distribution*: China.

*Remarks*: Zhang and Wang state that the species is similar to *S. japonica* (*S. sub-
spinipes japonica*). Jui-Lung Chao (email dated 14.01.2009) says that it is very similar
to the *S. multidens* in Taiwan and doubts that it is a separate species. The shape and
spinulation of the prefemora of the ultimate legs are very similar to that of *S. sub-
spinipes cingulatoides*. Its exact identity is uncertain but may be clarified if *S. subspinipes*
and its subspecies are reassessed.

*S. nuda* (Jangi & Dass, 1980)


*Distribution*: India.
Remarks: *Trachycormocephalus nudus* (Jangi & Dass, 1980) was transferred to *Scolopendra* by Khanna & Yadav (1987). Jangi & Dass distinguished *nudus* from *mirabilis*, which it resembles extremely closely, by: 1) Sternite 21 longer than broad to a greater degree and only slightly rounded at corners. 2) Ultimate leg with a single pretarsal accessory spur (claw spine) but mostly without in *mirabilis*. 3) Tergites punctate. However characters 1 and 2 are variable in *mirabilis* and character 3 is rather subjective and not always recorded. *S. nuda* is a junior synonym of *S. mirabilis*.

*S. oraniensis* Lucas, 1846

*S. canidens oraniensis*: Attems 1930 Das Tierreich 54: 36.

*Distribution*: Portugal, southern Spain, Mallorca, Corsica, southern mainland Italy, Sicily, Sardinia, Malta, Morocco, Algeria, Iran; introduced into Japan.

*Remarks*: Continues to be treated as a subspecies of *S. canidens* by some workers. According to Würmli (1980), Attems’ (1930) description of the tarsi of the ultimate legs of males as densely covered with short setae is incorrect.

*S. paranuda* Khanna & Tripathi, 1987


*Distribution*: Haryana, India.

*Remarks*: Known from a single male, length 49 mm. Further material required.

*S. pinguis* Pocock, 1891

*S. pinguis*: Attems 1930 Das Tierreich 54: 27.

*Distribution*: Myanmar (=Burma), Indonesia (Java).

*Remarks*: *S. pinguis* is similar to *S. gracillima*. Both occur in Java and further data are required to elucidate their relationship.
**S. punensis** Jangi & Dass, 1984

Fig. 13


**Distribution:** Pune district, Maharashtra, India.

**Remarks:** Known from a single specimen 27 mm long with 17 antennomeres and only tergite 21 marginate. Coxopleural process ending in a single spine, no side spine. Leg 20 with a tarsal spur. Ultimate leg prefemur with a dorsomedial and a medial spine. Prefemoral process short and with two spines. If it is assumed that an older specimen would have more marginate tergites then it would run down to *S. subspinipes dehaani*, the ultimate leg prefemur lacking ventral spines being the character of that subspecies. However, the head plate is described as rugose, apparently a unique character, and sternite 21 “elongated with convex lateral and posterior margins and distinctly rounded posterior corners” not as in *S. subspinipes dehaani*. These latter characters require explanation but may be insufficient to justify the allocation of *S. punensis* to a separate species. It may well be an immature *S. subspinipes dehaani* but is here retained pending the acquisition of further data. It is also similar to *S. arborea* from Sarawak.

**S. somala** (Manfredi, 1933) **comb. nov.**


**Distribution:** Somalia, Yemen.

**Remarks:** Here transferred from *Arthrorhabdus* (see above). In her paper Manfredi (1933) gave the locality Hodeida as being in Asia Minor. This has been changed in my copy to Yemen, Arabia which is the correct location for the town. Further data are required for *S. somala*. The species is similar to *S. mirabilis* that is also recorded from Somalia and the Yemen. The two may prove to be conspecific.

*Scolopendra somala* is also very similar to *S. zuluana* and specimens with only tergite 21 marginate run down to that species from which they differ in having 8 to 10 glabrous antennomeres as opposed to 6.

**S. spinosissima** Kraepelin, 1903

Fig. 18


**Distribution:** Philippines.
**S. subcrustalis** Kronmüller, 2009

*S. subcrustalis* Kronmüller 2009 Arthropoda 17: 48-51.

**Distribution:** Philippines.

**Remarks:** Kronmüller considers the species to be closely related to *S. subspinipes*. However, in some specimens the ultimate legs have the prefemur, femur and tibia dor-sally flattened with lateral ridges, a situation otherwise seen only in male *S. morsitans* to which the species is similar, differing primarily in lacking a median longitudinal suture on tergite 21. A comparison of *S. subcrustalis* with *S. morsitans* from the Philippines would be of considerable interest.

**S. subspinipes** Leach, 1815

*S. subspinipes:* Attems 1930 Das Tierreich 54: 29.

**Remarks:** Shelley (2000) wrote that “*Scolopendra subspinipes* is a common centipede that has been introduced throughout the world and is abundant on tropical islands; it is frequently intercepted at continental ports in quarantines of plants and foods from the tropics. Kraepelin (1903) and Attems (1930) recognised 7 subspecies … but in my opinion their validity as true geographical races, as opposed to simple variants, have never been unequivocally established. As widely as these variants have been spread by humans, it may not be possible to determine subspecies anymore, because the native areas may be masked. … I therefore combine all variants under *S. subspinipes.*” In fact Attems (1930) raised two of the subspecies namely *S. s. spinosissima* and *S. s. hardwickei* to specific status. He did not include *S. s. gastroforeata* Muralewič, 1913 in his mono-graph. Subsequently three further subspecies were described, namely: *S. s. piceoflava* Attems, 1934, *S. s. cingulatooides* Attems, 1938 and the Brazilian *S. s. fulgurans* Bücherl, 1946 which is not considered here.

Lewis (2004) showed that *Otostigmus puncticeps* Attems, 1953, and *O. politoides* Attems, 1953, were juvenile *S. subspinipes* but did not assign them to a subspecies.

Chao & Chang (2003) raised *S. s. multidens* to full specific status and suggested that *S. s. mutilans* L. Koch 1878 recorded from the Malay Peninsula, China, Taiwan, and Japan may be a young *S. s. subspinipes*. They also suggested that *S. s. japonica* may be a subspecies or geographic variant of *S. multidens* but subsequently Chao (2008) suggested that it might be a separate species. Schileyko (2007) confirmed the identity of *S. s. mutilans* with *S. s. subspinipes* (the only character separating *S. s. subspinipes* and
S. s. mutilans is colour: S. s. subspinipes with head and tergites brown, olive or yellowish brown with dark green posterior borders to tergites, S. s. mutilans with head and first tergite red, the trunk olive brown. He regarded S. s. multidens as synonym of S. s. subspinipes but the status allotted it by Chao & Chang (2003) is here maintained.

A thorough examination of the S. subspinipes problem will not be attempted here. A detailed survey of variation is required. Schileyko (1995) observed that only 10 of his 20 Vietnamese specimens corresponded to the nominate subspecies, while the attribution of the other specimens to any of the subspecies was rather problematical.

**S. subspinipes subspinipes** Leach, 1815

Fig. 21

S. subspinipes gastroforeata Muralewič 1913 Zool. Anz. 41: 201. syn. nov.
S. s. subspinipes: Attems 1930 Das Tierreich 54: 29.
S. s. mutilans: Attems 1930 Das Tierreich 54: 30.

**Distribution:** (including records as S. subspinipes): Russia (Maritime Province), India, Sri Lanka, Malaysia (Peninsular Malaysia, Sarawak), Singapore, Laos, Vietnam (Annam), Thailand, China including Hong Kong, Japan, Philippines, Indonesia (Sumatra [Sinkip Island], Java, Krakatau, Lombok, Sunda, Sulawesi, Irian Jaya); São Tomé & Príncipe, Ivory Coast, Liberia, Zanzibar, South Africa (Port Elizabeth, import from India); Seychelles, Réunion, Mauritius (now probably absent), Rodrigues, Madagascar, Andaman and Nicobar Islands; Pacific Islands (detailed by Shelley 2000 and 2004); Western Hemisphere – Bermuda; Central America & Caribbean Islands (detailed by Shelley 2002), Colombia, Guyana, Surinam, French Guyana, Brazil.

**S. subspinipes cingulatoides** Attems, 1938.

Fig. 24


**Distribution:** Vietnam, Laos.

**Remarks:** Attems (1938) commented: “This form shows some characters of subspinipes and some of cingulata. The relative length and thickness of the prefemur of the end leg is the same as in cingulata. Distinguished from cingulata by the absence of sternite sutures that are quite distinct in cingulata. Further, the spines of the end leg...
prefemur are much stronger than in *cingulata* where they are very small. The coxopleural process is longer than in *cingulata*. In all these points it agrees with *subspinipes* to which it also belongs on geographical grounds. *S. subspinipes* is one of the most common species in Asia, *cingulata* is only known from the Mediterranean and adjacent lands”. In fact *S. cingulata* extends into Iran and the prefemora of the ultimate legs are very similar to those of *S. s. cingulatoides* (see Figs 20 and 24 in this paper).

Muralewič (1913) described a specimen from Annam (Vietnam) which he assigned to *S. subspinipes* noting “(Subspecies?)”. Data: Length 125 mm, forcipular coxosternal tooth plates with 6+7 teeth, single spined coxopleural process, ultimate prefemur with two ventral and 2, 2 dorsolateral spines and single spined prefemoral process. All spines very large.

Schileyko (2007) referred this specimen to the nominate subspecies. However, he has subsequently examined it (Zoological Museum of the Moscow State Lomonsov University, N 6842) and found it to be *S. s. cingulatoides*, having ultimate legs with very large prefemoral spines and a ratio of width to length of the prefemora of 1:1.25 (Schileyko, personal communication).

The relationship of *S. cingulata* and *S. s. cingulatoides* should be explored. The former is very variable; the latter was not fully described by Attems (1938). However, Arkady Schileyko (email dated 20.01.2009) informed me that *S. s. cingulatoides* is well-recognisable because of its *cingulata*-like ultimate legs and in other respects this form is a quite normal *subspinipes*.

*S. subspinipes dehaani* Brandt, 1840

*S. De Haani* Brandt 1840 Bull. Ac. St-Pétersb. 7: 152.

*Distribution*: India, Bangladesh, Myanmar (Burma), Malay Peninsula, Andaman and Nicobar Is., Indonesia (Sumatra, Java), Thailand, Vietnam, Cambodia, China, Japan (Okinawa Is.).

*Remarks*: Characterised by the absence of ventral spines on ultimate leg prefemur.

*S. subspinipes gastroforeata* Muralewič, 1913.


*Distribution*: Philippines (Mindanao).

*Remarks*: Based on a single specimen with coxopleural process and ultimate prefemoral process two-spined but twentieth pair of legs without tarsal spur. The specimen was listed under material of *S. s. subspinipes* by Schileyko (2007). It falls within the variation seen in *S. s. subspinipes* with which it is here synonymised. Not listed in Attems (1930).
**S. subspinipes multidens** Newport, 1844  
(See above under *S. multidens*)

**S. subspinipes japonica** L. Koch, 1878

*S. subspinipes japonica* Attems, 1930 Das Tierreich 54: 30.

**Distribution**: Japan, Taiwan.  
**Remarks**: Chao (2008) suggested that *S. subspinipes japonica* may be separate species a suggestion supported by Shinohara's (1961) having collected both *S. s. japonica* and *S. s. mutilans* (=*S. s. subspinipes*) in the same locality (Manazuru sea shore) indicating that they are not subspecies.  
Iorio's (2003) drawing of the genital segments of a male *S. cingulata* is here used (Fig. 26) to illustrate genital appendages, there being no drawing for *S. s. japonica*.

**S. subspinipes piceoflava** Attems, 1934


**Distribution**: Indonesia (Sulawesi).  
**Remarks**: A typical *S. s. subspinipes* with the exception of the extremely weak to completely obscure tergite paramedian sutures, sternite paramedian sutures truncated either reaching the anterior edge or also truncated here. The taxon is here retained pending further information.

**S. teretipes** (Porat, 1893)  
Figs.25, 36

*Trachycormocephalus teretipes*: Attems 1930 Das Tierreich 54: 54.  
*Scolopendra* (*Trachycormocephalus*) *mirabilis*: Negrea 1997 Israel J. Zool. 43: 287 (nec Porat, 1876).  

**Distribution**: Israel (Negev) and Palestinian territories (Jericho).  
**Remarks**: Negrea (1997) synonymised *S. teretipes* under *S. mirabilis*. He wrote: “In the absence of important morphological differences and considering the distribution of “teretipes” is confined to the Dead Sea and Negev areas, which are within the range
of the valid species *S. mirabilis* … “teretipes” cannot be considered as a valid species or as a subspecies of *S. mirabilis.* However, *S. teretipes* has a very different number of ultimate prefemoral spines from *S. mirabilis* viz. 1 or 2 ventrals, 2 to 4 medials and a two-spined prefemoral process (Fig. 36). *S. mirabilis* has 6 to 8 ventrolaterals in 2 rows, 3 to 8 ventromedials and 4 to 7 dorsomedials (Fig. 22). Moreover, except for the prefemora, the ultimate legs in *S. teretipes* are densely clothed in short setae which are absent in *S. mirabilis*. Lewis (1985) suggested that characters of the ultimate legs such as the number and arrangement of spines are important in maintaining the separation of species in scolopendrids. The specific status of *S. teretipes* is here restored.

**Scolopendra valida** Lucas, 1840

Fig. 2

*S. valida* Lucas 1840 in Webb & Berthelot, Hist. Canar. 2 ii Ent. 49.
*S. valida + S. valida simonyi*: Attems, 1930 Das Tierreich 54: 41 & 42.

**Distribution:** Canary Islands, Cameroon, Sudan, Eritrea, Ethiopia, Somalia, Saudi Arabia, UAE, Oman, Yemen (including Socotra and Abd al Kuri) Iran, India, St Helena (doubtful).

**Remarks:** The only *Scolopendra* species with a curved anterior transverse sulcus on tergite 1 known for certain outside the Americas although it is possible that there is more than one species (see notes on *S. gigantea*). Pocock (1896) described three new subspecies on the basis of colour. These were considered by Kraepelin (1903) to be synonyms of *S. valida*. He noted the extraordinary variation in colour of specimens from Tenerife and stated that it was impossible to distinguish geographical races or subspecies of this species on colour alone. Attems (1930) followed this synonymy but appears to have overlooked Pocock (1903) who further distinguished *S. v. balfouri* Pocock, 1896 from *S. v. valida*, both occurring on Socotra, as follows:

* S. valida balfouri: maximum length 180 mm, ultimate legs long and slender, more than twice as long as broad, antennae long, about four times as long as head.

* S. valida valida: maximum length 80 mm, ultimate legs short and thick, less than twice as long as broad, antennae short, only about three times as long as head. Certainly the Socotra material merits re-examination.

It is clear that *S. valida* is quite variable. Thus specimens from the Sudan, Arabian Peninsula and Iraq (Lewis 1967, 1986b; Pocock 1888) have 3 or 4 basal antennomeres glabrous whereas Kraepelin (1903) gives 4 to 6.
**S. zuluana** (Lawrence, 1958)

Fig. 15

*S. zuluana*: Lewis et al. 2006 Zootaxa 1155: 36.

**Distribution**: South Africa (KwaZulu-Natal).

**Remarks**: Known from two specimens only. Appears to be closely related to *S. afer*, which also occurs in South Africa. Further data, in particular on the spinulation of the ultimate legs, are required. Specimens of *S. somala* with only tergite 21 marginate run down to *S. zuluana* from which they differ in having 8 to 10 glabrous antennomeres as opposed to 6.

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**References**


Leach, W. E. (1815) A tabular view of the external characters of four classes of animals, which Linné arranged under Insecta, with the distribution of the genera comprising three of these classes into orders, and descriptions of several new genera and species. – Transactions of the Linnean Society of London 11: 306-400.


Pocock, R. I. (1895b) Description of a new species of Scolopendra from the Solomon Islands. – Annals and Magazine of natural History [6], 16: 423-424.

Pocock, R. I. (1896) On the Arachnida and Myriopoda obtained by Dr. Anderson’s collector during Mr. T. Bent’s expedition to the Hadramaut, South Arabia with a supplement upon the scorpions obtained by Dr Anderson in Egypt and the Eastern Soudan. – Journal of the Linnean Society of London 25: 292-316 + pl. 9.


A key to Old World Scolopendra species

Würmli, M. (1980) Statistische Untersuchungen zur Systematik und postembryonalen Entwicklung der Scolopendra-canidens-Gruppe (Chilopoda: Scolopendromorpha: Scolopen-


