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## Two new Strongylosomidae from Indochina<sup>1)</sup> (Diplopoda, Polydesmida)

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*Tonkinosoma flexipes* n.g. n.sp. (figs. 1—4).

*Material*: Indochina, Tonkin, Manson Mts. 2—3000'. April—May. (Coll. H. FRUHSTORFER), 2 ♂♂, 1 ♀.

*Colour*: probably somewhat faded. Head yellowish, with frons and vertex rather dark brown. Antennae yellowish, the distal part of the 6th, and the 7th joint brownish. Somites with a broad median yellowish band from collum to tail and yellowish lateral keels, the rest castaneous, slightly paler at the ventral side. Sternites and legs yellowish.

*Width*: ♂ holotype: 3.7 mm., ♂ paratype: 4.7 mm., ♀ allotype: 4.4 mm.

*Head and antennae*: Labrum moderately emarginate, tridentate. Clypeus weakly convex, moderately impressed towards the labrum. Lateral margin somewhat emarginate. Headplate with some irregular wrinkles on lower part of clypeus, otherwise smooth and shining, moderately setiferous up to between the antennal sockets. Antennal sockets separated by slightly more than half the length of the 2nd joint. Vertex moderately convex, the sulcus well impressed, especially anteriorly, running downward to the upper level of the antennal sockets. 1 plus 1 vertigial bristle. Antennae rather long and slender. Joints 2 to 5 of equal length, the 6th slightly shorter. Distal joints only a trifle thicker than the proximal ones.

*Collum*: (figs. 1—2) distinctly broader than the head. Anterior border very weakly rounded in the middle, more laterally straight to even very weakly concave. Lateral sides widely rounded so that there is no distinct latero-posterior edge. Largest width of collum about in its middle. Surface moderately convex, smooth and shining in the middle, laterally somewhat wrinkled. Marginal rim very weak anteriorly, more distinct and somewhat raised laterally. Posterior border straight or weakly convex in the middle, very slightly concave towards the sides.

*Body segments*: weakly constricted by a rather narrow waist, which is finely and rather weakly longitudinally striate. Prozonites dulled by fine cellular structure. Metazonites more shining, smooth and hairless, in anterior segments wrinkled above the lateral keels. Transverse furrow

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present from 4th to 18th segment, very well developed from 5th to 17th, rather deeply and sharply impressed, without sculpture, extending rather far laterad, though not reaching the lateral keels. Sides finely granulose, somewhat wrinkled below the lateral keels in anterior segments. Pleural keels moderately developed up to the 4th segment, completely absent from the 5th.

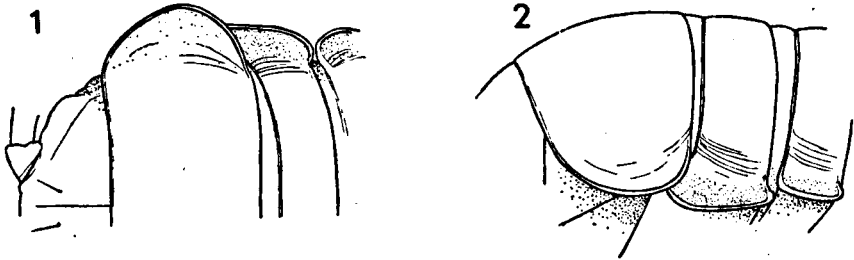


Fig. 1. *Tonkinosoma flexipes* n. g. n. sp.; dorsal view of right side of collum and adjacent parts of the holotype. Fig. 2. id.; lateral view of left side of same.

**Lateral keels:** weakly developed, especially from the 5th segment onward. 2nd segment narrower than collum, the keels below the level of those of following segments. Anterior border of keels rather strongly thrust forward, largest width before the middle, the sides almost straight and somewhat converging in the caudal direction when seen from the dorsal side. Anterior and posterior edge rather narrowly rounded, the posterior edge somewhat produced behind the posterior margin of the segment. Marginal rim narrow but distinct. 3rd segment narrower than 2nd, largest width near anterior edge of keels. Keels similar to those of 2nd segment, though not produced forward, and posterior edge only weakly produced behind the posterior border of segment. 4th segment narrower than 3rd, largest width before the middle of the metazonite. Keels similar to those of the preceding segment, the sides somewhat more rounded and somewhat more converging in the caudal direction when seen from the dorsal side. Posterior edge not prominent and not produced. Keels of the 5th segment, which is wider than the 4th, and subsequent segments very weakly elevated above the lateral surface, anteriorly and posteriorly rounded from a dorsal view, without a prominent posterior edge. Poreless keels demarcated only at the upper side by a deep furrow and a well developed marginal rim, which from a lateral view is anteriorly widely, posteriorly more narrowly curving upward. Poriferous keels slightly more prominent, from a lateral view similar to the poreless ones, but the upper margin is convexly sinuate above the pores and the underside is posteriorly demarcated by a depression meeting the upper margin at an angle of about  $30^\circ$ , at some distance from the posterior margin of the metazonite. Behind this posterior edge the marginal rim is continued and curves upward before fading away. Pores rather large in a slight excavation, lying in about the middle between the dorsal and ventral demarcation of the keels.

**Sternites and legs:** Sternites in middle segments somewhat broader than long in  $\delta$ ,  $1\frac{1}{2}$  times broader than long in  $\text{♀}$ , moderately setiferous. Transverse furrow distinct, no longitudinal furrow but a rather wide

excavation. Sternite of 4th segment without particulars. Sternite of 5th segments of ♂ with a well developed transverse furrow. Between the anterior pair of legs a rather short parabolically rounded process, directed ventrad and slightly cephalad, rather densely setiferous, setae rather long and not of a special type. Sternite between the posterior legs not excavated, in the middle with two small, flat and densely setiferous prominences. 6th sternite of ♂ with a weak transverse impression. Between the anterior legs transversely slightly convex, in the middle with a densely setiferous, flat prominence, between the posterior legs very weakly concave with two prominences similar to those between the posterior pair of legs of the 5th sternite. Legs long and rather slender. Anterior legs of ♂ up to those of 6th segment with rather thick brushes on distal part of tibia and tarsus, thinning out on subsequent legs, though tarsi remain rather densely setiferous in posterior legs. In middle legs length of 2nd joint equal to that of 4th, 5th longer than 4th, 6th longer than 5th, 3rd longer than 6th. 5th joint about half the length of 3rd.

*Anal segment*: Tail not long, sides rather strongly converging, the end rather broadly truncate and weakly emarginate. Anal scale parabolically rounded, setiferous tubercles rather small, not projecting. Valves with narrow and rather low marginal rims.

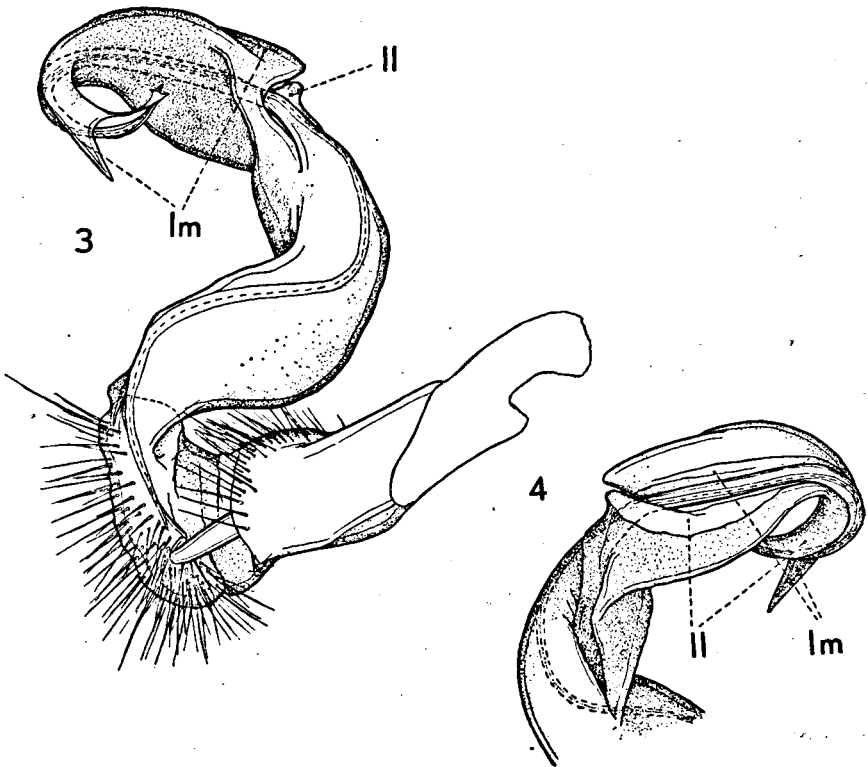


Fig. 3. *Tonkinosoma flexipes* n. g. n. sp.: medial view of right gonopod of the holotype  
lm: lamina medialis. ll: lamina lateralis.

Eig. 4. *Tonkinosoma flexipes* n. g. n. sp.: distal portion of right gonopod of the holotype  
lateral view. lm: lamina medialis. ll: lamina lateralis.

*Gonopods*: (figs. 3—4). Coxa rather small in comparison with the strongly developed telopodite, subcylindrical and straight, the distal part slightly incrassate. Distal bristle area extending over lateral, anterior and medial side. Coxal hook without particulars. Praefemur well developed, somewhat obliquely, distinctly demarcated from femur. Femur strongly developed, thick and strongly curved. Channel running from medio-posterior side along the medial side towards the medio-anterior side, where the solaenomerite arises. Postfemur not distinctly demarcated, at least not on the medial side. On the lateral side there is a deep oblique furrow which may represent such a demarcation. Tibiotarsus broad in the proximal part, distally attenuate and strongly curved towards the medial and anterior side. Solaenomerite running along the lateral side of the tibiotarsus, sheathed by tibiotarsus only near the base and near the end. Lamina medialis near the end with a triangular blade.

Genus *Tonkinosoma* n.g.

20 segments. Poreformula normal: 5.7.9.10.12.13.15—19. Metazonites without sculpture, hairless. Transverse furrow well developed, present from 4th to 18th segment. Lateral keels reduced especially from the 5th segment, those of 2nd segment below the level of the succeeding keels. Waist narrow with fine longitudinal striation. Pleural keels present up to the 4th segment. 5th sternite of ♂ with a process between the anterior pair of legs, and a pair of small flat knobs between the posterior pair. 6th sternite of ♂ with a flat knob between the anterior legs, a pair of small flat knobs between the posterior legs. Legs of ♂ with distal tibial and tarsal brushes on anterior pairs, without other particulars. Coxa of gonopod much shorter than telopodite. Praefemur well demarcated from femur, demarcation almost transversely crossing the longitudinal axis of the telopodite. Femur strongly developed, without processes. Channel running along the medial side, solaenomerite rising from the medio-anterior side. No chitinous demarcation of postfemur nor of tibiotarsus. Tibiotarsus well developed and strongly curved in medial direction, without secondary processes. Solaenomerite running along the lateral side of the tibiotarsus, hardly sheathed. Lamina lateralis only well developed in the proximal part of the tibiotarsus. Lamina medialis well developed, with a triangular process near the end.

Type species: *Tonkinosoma flexipes* n.sp.

With the gonopods presenting sufficient characteristic features, it seems justified to create a new genus for the present species, rather than to force it in one of the existing generic categories. It apparently comes closest to *Orthomorpha* and allied genera though there seems to exist no special relationship to any of these. Some resemblance may be found in the gonopods of *Streptogonopus* Att. but in this genus the solaenomerite remains at the medial side of the tibiotarsus, while the tibiotarsus itself, apart of being much more elongate, is curved laterad.

The terms lamina lateralis and lamina medialis are used here for the first time as indications for two lamellae of the tibiotarsus of the gonopods which are sheathing the solaenomerite, in the majority of the *Strongylosomidae*. In general the development of these lamellae is very different in various genera and the introduction of these names

in descriptions may be of importance to a further extension of the comparative morphology in this group.

*Sundanina emarginata* n.sp. (figs. 5—7).

*Material*: Indochina, Tonkin, Manson Mts. 2—3000'. April—May. (Coll. H. FRUHSTORFER), 1 ♂.

*Colour*: probably somewhat faded. Head brownish yellow, vertex somewhat darker, pale brownish. Collum brownish yellow, with a narrow very dark brown anterior border, fading away at the lateral sides. Posterior border also with a narrow dark band ending at the latero-posterior edge. Subsequent segments yellowish brown with a similar dark posterior margin all around the segment having a width equal to about  $\frac{1}{4}$  of the length of the metazonite. Anal segment unicolour yellowish brown. Sternites and legs pale yellowish.

*Width*: 2.6 mm.

*Head and antennae*: Labrum rather widely and moderately emarginate, tridentate. Clypeus weakly convex, moderately impressed towards the labrum. Surface irregularly and rather coarsely wrinkled in clypeal area. Headplate setiferous up to above the antennal sockets, rather densely in lower clypeal part, moderately for the rest. Lateral margin of clypeus somewhat emarginate. Antennal sockets separated by about  $1\frac{1}{3}$  of the diameter of one of them. Vertex rather convex, sulcus well impressed, especially anteriorly, running downward to upper level of antennal sockets. Antennae broken off and lost.

*Collum*: about as wide as head. Anterior border straight in the middle, more laterad widely rounded, latero-posterior edge rather narrowly rounded, so that largest width lies behind the middle. Surface moderately convex, smooth and shining. Marginal rim absent in middle of anterior border, narrow at the sides. Posterior border very weakly emarginate in the middle, very weakly convex laterally.

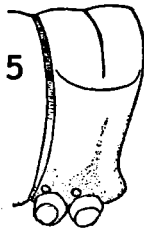


Fig. 5. *Sundanina emarginata* n. sp.; lateral view of metasomite of 11th segment of the holotype.

*Body segments*: (fig. 5) rather weakly constricted by a rather narrow waist, which is finely longitudinally striate. Prozonites dulled by fine cellular structure. Metazonites smooth and shining, hairless. Transverse furrow from 4th to 18th segment, rather deeply and sharply impressed, extending far laterad, in some segments reaching the lateral keels. Furrow without or with very weak sculpture. Sides finely granulose on a few anterior segments, smooth on the others. Pleural keels present up to the 4th segment, absent from 5th. From 5th to 18th segment, but especially from 8th to 17th segment, the posterior border of the metazonites is rather strongly emarginate just below the middle of the sides, as well as behind the sternites, and rather strongly convex at the level

of the stigmatae. Along the emarginate posterior border of the metazonites the sides are somewhat swollen.

*Lateral keels*: weakly developed, especially from 3rd segment onward. 2nd segment slightly wider than collum, the keels below the level of those of following segments. Anterior border rather strongly thrust forward, largest width at the latero-anterior edge, the sides somewhat converging in the caudal direction when seen from the dorsal side. Anterior edge rather narrowly rounded, posterior edge hardly prominent and weakly produced. Marginal rim narrow but distinct. 3rd segment narrower than the 2nd, largest width before the middle. Keels similar to those of 2nd segment, but weakly elevated above the lateral surface. Anterior edge rather widely rounded, not thrust forward, posterior edge not prominent and not produced. 4th segment slightly narrower than 3rd, the keels similar to those of 3rd segment. 5th segment wider than 4th. Keels from 5th segment only very weakly elevated above lateral surface, anteriorly and posteriorly rounded, with prominent posterior edges. Poreless keels only dorsally demarcated by a furrow and a marginal rim. The upper margin being anteriorly somewhat more widely, posteriorly narrowly curving upward. Poriferous keels slightly more prominent, from a lateral view similar to poreless keels, but upper margin somewhat convexly sinuate above the pore, and underside demarcated by a depression in the posterior part, which meets the upper margin at an angle of about  $30^\circ$ , at some distance from posterior margin of metazonite. Behind the posterior edge the marginal rim is continued and curves upward before fading away. Pores rather large in a slight excavation in the middle between dorsal and ventral demarcation of the keels.

*Sternites and legs*: Sternites as wide as long in middle segments, weakly setiferous. Transverse furrow only present between the coxae of subsequent legs, longitudinally the sternite are rather widely excavated. Sternite of 4th segment without particulars. Sternite of 5th segment with a distinct transverse furrow, between the anterior legs a moderately developed process directed obliquely forward, the sides weakly converging distally, the end truncate and very slightly incised in the middle. The process is setiferous but not densely and setae not of a special type. Between the posterior legs the sternite is somewhat concave. Sternite of 6th segment not essentially different from those of the middle segments, only somewhat more excavated between the posterior legs. 7th sternite without particulars. Legs rather long and rather slender. Tarsal and distal tibial brushes present on a few anterior legs but rapidly thinning out on subsequent legs. In middle legs 2nd joint as long as 4th, 5th somewhat longer, 6th longer than 5th, 3rd longer than 6th. 4th joint about half as long as 3rd.

*Anal segment*: Tail of moderate length, sides moderately converging with well developed lateral setiferous tubercles, the end rather broadly truncate, weakly concave. Anal scale parabolically rounded, setiferous tubercles rather small, not projecting. Valves with narrow and rather low marginal rims.

*Gonopods*: (figs. 6—7). Coxa moderately developed, cylindrical, with a slight bent in the distal half. A rather small latero-anterior bristle area. Coxal hook rather strongly developed. Praefemur moderately developed, a little obliquely demarcated from femur at the lateral side. Femur rather

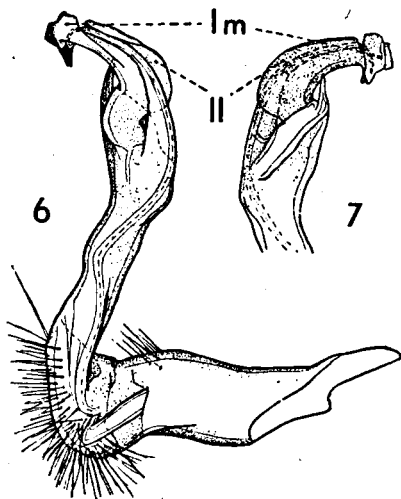


Fig. 6. *Sundanina emarginata* n. sp.: medial view of right gonopod of the holotype  
 lm: lamina medialis. ll: lamina lateralis. Fig. 7. id.; distal portion of  
 same gonopod, lateral view.

slender, straight, a little concave at the medial side. Channel running along the medial side. Solaenomerite rising at the medio-anterior side. Postfemur not demarcated from femur, laterally with a well developed oblique ridge, which ends latero-posteriorly in a narrow spiniform process. Tibiotarsus moderately developed, curving in a lateral direction. Lamina lateralis well developed especially in proximal part of tibiotarsus, more reduced distally. Lamina medialis only well developed at the distal end. Tibiotarsus without secondary processes.

*Sundanina* Att. is one of the largest Strongylosomid genera of the oriental region, at least in the conception of ATTEMS in the 'Tierreich', vol. 68, 1937. According to that author it has 20 species to which must be added the two forms described by CARL in 'Orientalische Polydesmoiden' (Rev. Suisse Zool. 48: 359—376, 1941) and one described by TURK in his paper. 'On a collection of Diplopods from North India, etc.' (Proc. Zool. Soc. London 117: 65—78, 1947).

Although these species are held together by the main character of the genus, i.e. the presence of one, two three or four processes at the end of the femur of the gonopods (or perhaps better at the postfemur though this appears to be not clearly demarcated), there are otherwise rather strong discrepancies in the gonopod-structure as well as in other morphological characters which are making the close relationship between the species somewhat questionable. In fact, it is not improbable that the appearance or disappearance of processes on the femur has occurred at various places of the system and is not suitable for the characterisation of larger groups when it does not correlate with other morphological features.

In many respects different from the type of *Sundanina*, the Sumatran *S. gastrotricha* (Att.) and its closest relatives appear to be *S. gracilipes*

(Verh.) from China, *S. bimontana* (Carl) from S. India and the group which has *S. contortipes* (Schub.), *S. nulla* Att. and *S. pleuroptera* Att. from N. India. For these three groups generic names are already available, namely *Mandarinopus* Verh., *Gyrodrepanum* Carl and *Kaschmiriosoma* Schub. Other forms which equally should deserve a generic status each when it comes to splitting up the genus are *S. granulifera* Att., *S. trifida* Carl and the group of *S. hirta* Carl and *S. laevisulcata* Carl all from the Indian peninsula. This may be the case also with the newly described species which may come closest to *S. spinipleura* Carl. (l.c. p. 366, fig. 9—16) from Birma, particularly in view of the peculiar emargination of the posterior border of the middle segments at the sides and behind the sternites. This character, which according to CARL is a secondary sexual one of the ♂, is unique in the family as far as I am aware. *S. emarginata*, however, has the lower part of the sides not produced into a spiniform process, and differs also in colour, in the form of the lateral keels, etc. and in the gonopods which have only one femoral process against two in *spinipleura*.

The types of the new species are preserved in the Museum at Strasbourg, France; the ♂ paratype of *Tonkinosoma flexipes* has been retained for the Museum at Amsterdam.