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A NEW GENUS AND TWO NEW SPECIES OF THE FAMILY PARADOXOSOMATIDAE FROM AUSTRALIA (DIPLOPODA, POLYDESMIDA)

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ABSTRACT

Description of a new genus, *Streptocladosoma*, with two new species *S. dissimile* and *S. albovittatum*, both from Queensland. The genus belongs to the tribe Australiosomatini, and is remarkable on account of the complicated structure of the gonopods, which seem to represent the most highly evolved type as yet reported in the tribe.

INTRODUCTION

In a previous paper (Jeekel, 1968) a survey was given of the classification of the Australiosomatinae, in which this subfamily of the Paradoxosomatidae was divided into three tribes, the Australiosomatini, the Antichiropodini and the Aschistodesmini. More recently (Jeekel, in press) some emendations concerning the nomenclature and systematics of genera of the first two mentioned tribes were introduced, with the result that at present the taxonomic status of the known genera in the Australiosomatini can be regarded as

reasonably well established.

In 1968, the structure of the telopodite of the gonopods of the Australiosomatini was diagrammatically illustrated and the various evolutionary tendencies were briefly indicated.

The new genus described in the present paper is of particular interest inasmuch as it is characterized by a complicated type of gonopods as yet unknown. The copulatory apparatus approaches the structure met with in *Heterocladosoma* Jeekel, 1968, as illustrated in diagram in the cited paper (Jeekel, 1968, fig. 1e), but differs notably in

the presence of only one instead of two tibio-tarsal branches, and in a strong torsion of the entire acropodite along its longitudinal axis. As such, the gonopods in the new genus seem to represent one of the most advanced stages in the evolution of the Australiosomatini.

Streptocladosoma nov. gen.

Generic diagnosis.-

Medium-sized Australiosomatini with 20 somites and a normal poreformula. Headplate with or without paramedian vertigial swellings. Antennae of moderate length.

Somites moderately constricted; the waist of moderate width, with or without longitudinal striation. Metatergites smooth, hairless or with few setae. Transverse furrow present from the 5th to the 18th somite. Pleural keels present up to about the middle of the body.

Paranota weakly developed.

Sternites of middle somites longer than wide, with moderately developed cross impressions. Sternite of 5th somite of male with a process between the anterior coxae. Legs of moderate length, the first pair of the male provided with a femoral tubercle. Tibial and tarsal scopulae present in most legs of the male.

Gonopods with coxa relatively short and stout. Prefemur elongate ovoid, its axis almost transverse on the axis of the acropodite. Femorite vestigial. Tibiotarsus arising from the anterior side of the prefemur, curving laterad near base and pointing in a distal direction consisting of a single elongate prong. Solenomerite and femoral process coalesced over most of their length, arising from the caudal or medio-caudal side of the prefemur. Spermial channel running along the anterior side of the basis of solenomerite/femoral process towards the lateral side and caudal side. Free part of solenomerite a slender tapering ribbon. Free part of femoral process a relatively small lobe appearing as a branch of the solenomerite.

Type-species.-

Streptocladosoma dissimile nov. spec.

Remarks.-

This genus belongs in a group of genera of the Australiosomatini in which the femorite of the gonopods is so strongly reduced that it can hardly be distinguished as such and the acropodite of the gonopods consists mainly of the tibiotarsus and the solenomerite. Within this group it may come nearest to *Heterocladosoma* Jeekel, 1968, occurring along the east coast of Queensland, which like *Streptocladosoma* has the homolog of the femoral process arising from the distal half of the solenomerite. However, *Heterocladosoma* has a tibiotarsus which is deeply split into two branches. *Streptocladosoma* is most particularly characterized by the torsion of the femorite which results in a lateral position of the tibiotarsus and a medial position of the solenomerite. As far as is known today such a structure is unique in the Australiosomatini and distinguishes the new genus at once from all the other. A further important character is found in relative length of the long tapering solenomerite.

The type-species of the genus shows a remarkable and so far unique sexual dimorphism in the shape of the collum, which in the male has a normal, rounded anterior border but in the female has a widely and rather deeply emarginate front margin, exposing a large part of the normally covered hind region of the vertex. A similar structure is described for a second, unnamed species which is represented only by a single juvenile female specimen, but is not developed in *S. albovittatum*.

Streptocladosoma dissimile nov. spec.

Material.-

Australia, Queensland: Iron Range, 50 - 75 ft, June 1948 (Archbold Exped., Museum New York), ♂ holotype, 2 ♂ and 2 ♀ paratypes.

Description.-

Colour: Head very pale brown or beige, with the frontal area and the vertigial sulcus blackish brown. Antennae also blackish brown, with only the 8th antennomere whitish. Collum beige; a narrow median stripe and a sickle-shaped spot,

concavity upwards, on each side blackish brown. Lateral margin beige. Body somites beige dorsally, with a narrow blackish brown median stripe on pro and metasomites. Metasomites with a blackish brown zone above the paranota of about one and a half times the dorsoventral diameter of a paranotum. Anterior half of each paranotum also blackish brown, the posterior half beige. Pro-somites on the level of the paranota light brown. Lateral sides of pro and metasomites pale brown, slightly darker than the groundcolour of the tergites. Venter and sternites pale brown. Legs blackish brown, the proximal podomeres somewhat paler, in particular the basal half of the femur. Anal somite and tail beige, in the anterior half a faint dark median stripe. Upper side of the lateral side of the anal ring and the valves blackish brown, the lower side and the hypoproct pale.

Width: ♂: 4.5 mm (holotype) - 4.8 mm; ♀: 4.6 mm - 5.0 mm.

Head and antennae: Labrum rather widely but weakly emarginate, tridentate. Clypeus rather weakly convex, strongly impressed towards the labrum. Lateral border widely convex, weakly emarginate near the labrum. Headplate moderately densely setiferous in the clypeal part, weakly setiferous in the frontal area; vertex hairless. Antennal sockets separated by about one and a half times the diameter of a socket or by two thirds of the length of the 2nd antennomere. Postantennal groove moderately developed, the wall in front rather weakly prominent. Vertex rather weakly convex, not demarcated from the frontal area. Sulcus deeply and widely impressed, running downward to between the antennal sockets. Immediately behind the frontal area each side of the vertex is a little swollen. Antennae of moderate length, rather slender, moderately setiferous in the proximal antennomeres to rather densely setiferous in the distal ones. Relative length of antennomeres: 3rd > 2nd = 4th = 5th > 6th; the 6th antennomere about three quarters of the length of the 5th; the 5th and 6th antennomeres of subequal width, scarcely wider than the others.

Collum: subtrapezoidal in dorsal outline, slightly wider than the head (figs. 1 - 2). Anterior border widely and evenly convex. Posterior border scarcely emarginate in the middle, somewhat convex laterally. Sides moderately

widely rounded. Surface of collum shiny, somewhat uneven, hairless or with a few hairs. The middle of the surface flat or even slightly concave transversely, the sides rather strongly convex. Marginal rim rather weak laterally, becoming obsolete anteriorly.

Body somites: moderately constricted. Prosomites somewhat dulled by a fine cellular structure. Waist of moderate width, distinctly but finely longitudinally striate down to the level of the stigmata. Metatergites smooth, shiny, hairless. Transverse furrow smooth, rather deeply and sharply impressed, not reaching the upper demarcation of the paranota, but remaining separate by a distance equal to about the dorsoventral diameter of a poriferous paranotum. Furrow present from the 5th to the 18th somites. Sides smooth, also in anterior somites. Pleural keels well developed, up to the 4th somite ridgelike. In the 2nd and 3rd somites not produced into a caudal lappet, but in the 4th there is a blunt lappet which, however, does not reach the caudal margin of the somite. In the 5th, 6th and 7th somites the pleural keels are present only in the caudal half of the sides and have a posterior lappet as in the 4th somite. In the 8th somite there is only a weak prominence near the posterior margin of the somite. A similar prominence is indicated in the 9th somite. From the 10th somite onwards pleural keels are completely absent.

Paranota: (figs. 1 - 4) Second somite distinctly wider than the collum. Its paranota situated below the level of those of the 3rd somite, strongly declined. Anterior border widely rounded, the latero-anterior edge obtusely angular. Lateral border widely rounded, with the latero-posterior edge obtuse, rounded, scarcely produced. Marginal rim narrow, present along the three sides. Third somite somewhat narrower than the 2nd, scarcely wider than the 4th. Lateral border of paranota rather strongly rounded, the posterior edge obtusely angular, weakly produced. Paranota of 4th somite more widely rounded laterally, the posterior edges narrowly rounded, scarcely angular, not produced. Paranota of 3rd and 4th somites rather thick dorsoventrally, the dorsal furrow reaching the waist, ventral side scarcely demarcated. Paranota of 5th and subsequent somites weakly developed, laterally widely rounded, the posterior edge obtusely rounded, not produced. In the second half of the body the posterior edges

become a little more angular, but in none of the somites the edges are acute or produced posteriorly. Dorsal furrow of paranota not reaching the waist. Poriferous paranota slightly convex dorsally, the poreless ones weakly concave. Poriferous paranota dorsoventrally almost two times as wide as the poreless ones. Ventral demarcation distinct only in the caudal half of the paranota. Pores situated somewhat nearer to the ventral than to the dorsal delimitation of the paranota.

Sternites and legs: Sternites of middle somites one and one third times longer than wide, rather densely setiferous. Cross impressions moderately developed, the longitudinal furrow very wide, the transverse furrow narrower and a little deeper. Sternite of 5th somite with a tongue-shaped process of moderate length. The process is about one and a half times longer than broad, and directed somewhat cephalad without, however, projecting in front of the sternite. From a lateral view the anterior and posterior sides are gradually converging towards each other. Both sides rather densely setiferous. Caudad of the base of the process there is a weak transverse furrow, and between the posterior pair of legs the sternite is scarcely raised above the ventral level of the metasomal ring. Sternite of 6th somite also not raised above the level of the metasomal ring, and even a little concave in the middle. At the base of each anterior coxa a blunt cone. Sternite of 7th somite a little callous in front of the gonopod aperture. Legs (fig. 5) of moderate length, somewhat incrassate especially the two basal podomeres. Legs of 1st pair strongly incrassate and with a strong ventral process on the femora. All podomeres ventrally rather densely setiferous, with rather long hairs, especially in the anterior half of the body. Dorsal surface of podomeres almost hairless except in tibiae and tarsi. Dense tibial and tarsal brushes are present on all legs except those of the ultimate two pairs. Relative length of podomeres: 3rd > 6th > 5th = 4th > 2nd; the 6th podomere two thirds of the length of the 3rd.

Anal somite: (fig. 6) Epiproct of moderate length and width, broad at the base with sides rather strongly converging and straight. Apex

relatively narrowly truncate and weakly emarginate, with two weak paramedian tubercles. Lateral setiferous tubercles very small. Dorsal side of epiproct faintly transversely impressed at the base, its ventral side flat or faintly convex. Paraprocts with low and moderately wide marginal rims. Setiferous tubercles moderately developed. Hypoproct triangular, with straight sides and a rounded apex. Setiferous tubercles weakly developed, scarcely projecting outside margin.

Gonopods: (figs. 8 - 9) Coxa relatively short and stout, rather strongly curved caudad. Setae rather numerous on lateral, anterior and medial sides. Prefemur rather short, its longitudinal axis almost transverse on the longitudinal axis of the acropodite. Femorite almost obsolete. Acropodite split up nearly to its base into two main branches, the solenomerite and the tibiotarsus. The latter arises from the medio-anterior side of the base of the acropodite and curves along the anterior side towards the lateral side, pointing distad and a little mesad and cephalad finally. The tibiotarsus is a simple rod, a little incrassate near its apex where it has a concavity marked with fine fringes. The apex itself is a slightly concave acuminate prong. The solenomerite is stouter and a little shorter than the tibiotarsus. It arises from the caudal side of the femorite, is much wider in its middle than at its base, and terminates in a complicated structure consisting essentially of two processes. One of these, probably the homolog of the femoral process, is a knife-like blade densely covered with scales and with a fringed margin. The other, the solenomerite proper, is a thin process containing the spermal channel and curved into a finely acuminate spiral. Course of spermal channel in the telopodite very complicated: it starts at the medial side of the prefemur, but immediately curves along the anterior side towards the lateral side where it enters the solenomerite. In the solenomerite it follows a course along the caudal side, the medial side again and towards the anterior side again, finally curving abruptly distad to enter the terminal spiral, which is coiled in a transverse plane.

Female: differing from the male, besides in the usual secondary sexual characters, as follows. Vestigial sulcus of head less deeply impressed, running downward to just above the upper level of

the antennal sockets. Antennae relatively a little shorter, the 3rd antennomere scarcely longer than the 2nd, the distal antennomeres not thicker than the proximal ones. Collum (fig. 7) with the anterior border conspicuously emarginate in the middle, and also very slightly so along the lateral sides. Lateral border rather narrowly rounded. The middle of the surface with a slight, rounded swelling or with some rather coarse wrinkles. Body somites relatively a little less constricted. Pleural keels of the 2nd to 4th somites with strongly produced and sharply pointed caudal lappets, which project distinctly caudad of the margin of the somites. The pleural keels of the 3rd somite are not ridgelike but are represented by a strong swelling in the caudal half of the side from which the lappet arises. In the 4th somite the pleural keels are ridgelike, in the 5th, 6th and 7th somites they are represented by rather thick ridges in the caudal half of the sides only which are not caudally produced. In the 8th somite the ridge is only indicated and from the 9th somite onwards pleural keels are absent. Sternites of middle somites about as long as wide. Legs comparatively a little shorter and more slender, the two basal podomeres not incrassate. Relative length of podomeres 3rd > 6th > 5th > 4th > 2nd. The 5th podomere about three quarters of the length of the 6th, the 6th about three quarters of the length of the 3rd. Ventral pubescence of podomeres as in the male, but dense only in the tibiae and tarsi. No brushes.

Streptocladosoma spec.

Material.-

Australia, Queensland: Upper Nesbit River, Leo Creek, 1500 ft, 15 - 21 August, 1948 (Archbold Exped., Museum New York), 1 juv. ♀.

Remarks.-

A juvenile female with 19 somites, measuring 3.7 mm in width, agrees in most of its essential characters with the female of *S. dissimile* nov. spec. It differs in the relatively shorter antennae, with the antennal sockets separated by three quarters of the length of the 2nd antennomere. The emargination of the anterior border of the collum is not as deep as in the female of

S. dissimile. The pleural keels are somewhat less developed and their caudal edge is not distinctly produced. On the other hand the paranota are more strongly developed, with the caudal edges slightly acutely angular and very slightly produced caudad, although not projecting behind the margin of the somites.

On the account of these differences the specimen cannot be assigned to *S. dissimile*, although it is clearly congeneric. It is of importance to note that the juvenile female has the front border of the collum emarginate, showing that the sexual dimorphism is already present in the pre-adult stage.

Streptocladosoma albovittatum nov. spec.

Material.-

Australia, Queensland: Townsville, 3 - 6 February, 1945 (Coll. Borys Malkin, Museum New York), ♂ holotype, 3 ♂ and 2 ♀ paratypes.

Description.-

Differing from *S. dissimile* nov. spec. as described above in the following particulars.

Colour: Head and antennae black, with only the labral area pale brown. Collum black, with a median triangular brownish yellow spot, somewhat longer than broad and pointing cephalad, in the caudal half. Body somites black, with a continuous longitudinal brownish yellow band of about one quarter of the total width of the metasomites. Ventral side, sternites and legs very dark, almost blackish brown. Anal somite black, the middle of its dorsal side and the epiproct brownish yellow. Hypoproct dark brown. Gonopods conspicuous by the bright yellow colour of the acropodite.

Width: ♂: 1.8 mm - 2.1 mm (holotype: 2.0 mm); ♀: 2.5 mm.

Head and antennae: Vertex with a pair of hairs. Antennal sockets separated by about three quarters of the length of the 2nd antennomere. Vertigial sulcus rather weakly impressed, running downward to about the upper level of the antennal sockets. Vertex not prominent behind the frontal area. Antennae somewhat shorter and distinctly stouter. Antennomeres slightly decreasing in length from the 2nd to the 6th, the 6th only slightly shorter than the 5th. The 5th and 6th antennomeres

distinctly thicker than the others.

Collum: subsemicircular in dorsal outline (figs. 10 - 11). Caudal border widely and weakly emarginate in the middle. Lateral border more widely rounded. Surface of middle moderately convex, slightly more convex towards the sides.

Body somites: Waist slightly broader, without distinct striation. Metatergites sometimes with some sparse hairs. Pleural keels in the 2nd to 4th somites represented by very weakly developed ridges. In the 5th somite a well developed ridge; in the 6th and 7th somites the pleural ridges are strongly developed, especially in the 7th, and are produced posteriorly in a blunt lappet, which in the 7th somite projects slightly behind the margin of the somite. Pleural keels of 8th somite similar to those of the 5th. In the 9th and following somites the pleural keels are represented only by some wrinkles which disappear gradually in successive somites.

Paranota: (figs. 10 - 13) of 2nd somite a little less strongly developed and less declining. Latero-anterior edge not angular but narrowly rounded. Latero-posterior edge about rectangular, rounded, slightly produced caudad. Marginal rim narrow, but widening slightly in the caudal half. Lateral border of paranota of 3rd somite widely rounded anteriorly becoming straight in the caudal half, the latero-posterior edge acutely angular, blunt, rather weakly produced caudad. Latero-posterior edge of paranota of 4th somite less acutely angular than those of 3rd somite, blunt, scarcely produced caudad. Paranota of 5th and subsequent somites about rectangular, becoming a little acutely angular, especially in the 16th to 18th somites, blunt. They are slightly produced caudad but project scarcely beyond the margin of the somite. Poriferous paranota in lateral aspect somewhat more convex dorsally.

Sternites and legs: Sternites of middle somites about one and one fifth times broader than long. Sternite of 5th somite with a broad process, about twice as broad as long, with the distal margin slightly convex and the lateral edges rounded. In lateral aspect the process is thick at the base, with caudal and cephal sides slightly converging and the end rounded;

it is directed vertically. Transverse impression behind the process deep, just as the longitudinal impression of the second half of the sternite, which separates a pair of rather strong swellings each bearing a thick tuft of setae. Sternite of 6th somite deeply excavate, but raised near the coxal sockets and bearing a number of setae there, especially near the anterior sockets. Legs (fig. 14) relatively stouter. Relative length of podomeres: 3rd > 2nd > 4th = 5th = 6th; the 6th podomere about three fifths of the length of the 3rd.

Anal somite: Epiproct dorsally not impressed; the lateral setiferous tubercles rather weakly developed. Hypoproct parabolically rounded, with the apex slightly angular.

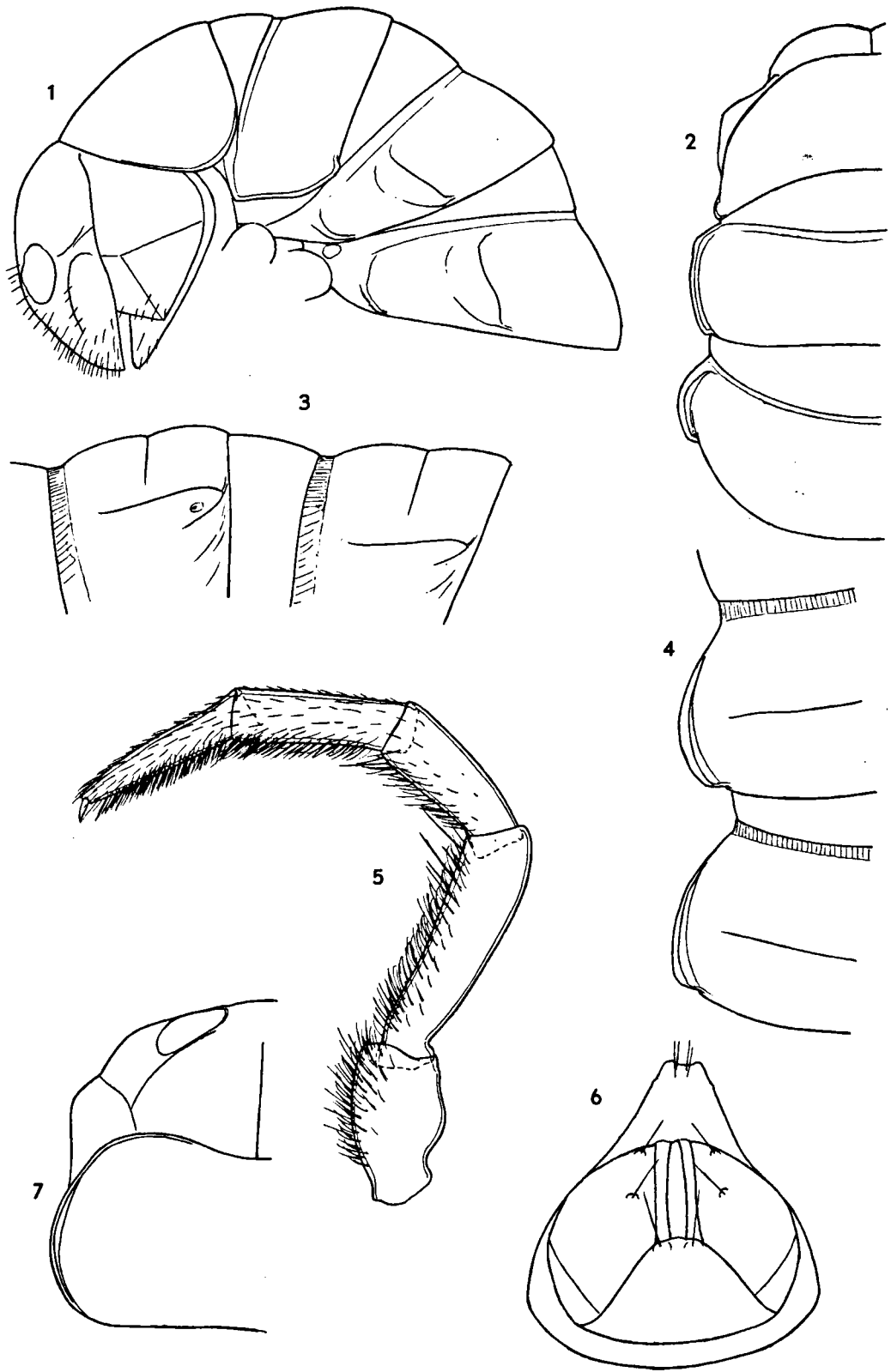
Gonopods: (figs. 15 - 16) Coxa relatively much more strongly developed. Acropodite less complicated. The tibiotarsus of simple lanceolate shape, curving slightly caudad, the apex rounded. The femorite slightly less torced, resulting in a slightly arched structure, curving caudad. The femoral process smaller and of simple triangular shape. Solenomerite not curved in a spiral, simply tapering and pointing essentially distad, although the end is variably directed, and projecting distad of the tibiotarsus.

Female: differing from the male by the antennae being slightly shorter and thinner. Pleural keels of 2nd to 4th somites represented by well developed curved ridges. These ridges also present in the 5th somite becoming gradually less developed and changing into a swelling which disappears towards the 10th somite. Pubescence of legs less dense than in the male. Sternites of middle somites one and one quarter times broader than long.

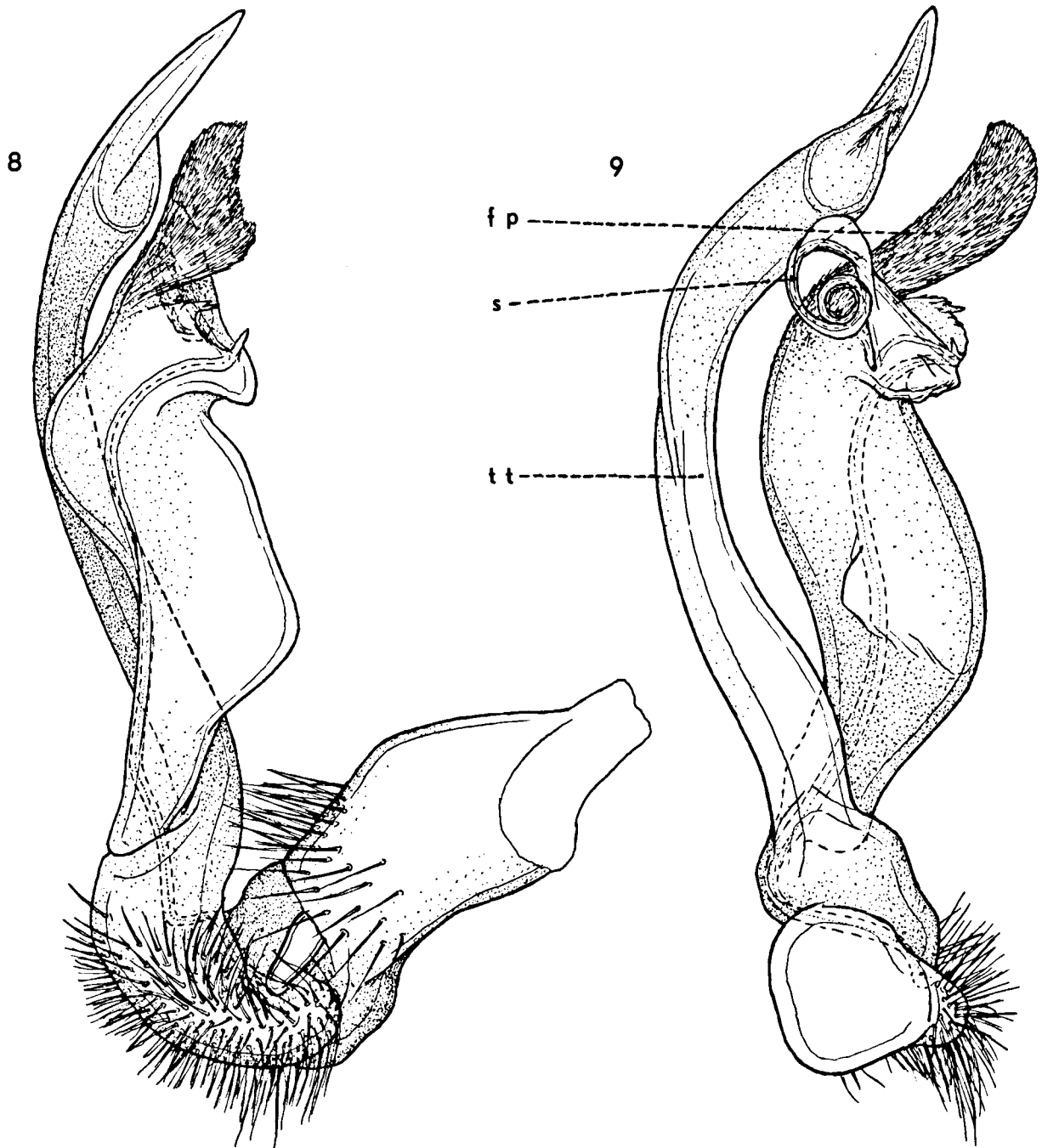
LITERATURE

JEEKEL, C.A.W., 1968. On the classification and geographical distribution of the family Paradoxosomatidae (Diplopoda, Polydesmida): i - vii, 1 - 162 (Amsterdam, privately printed).

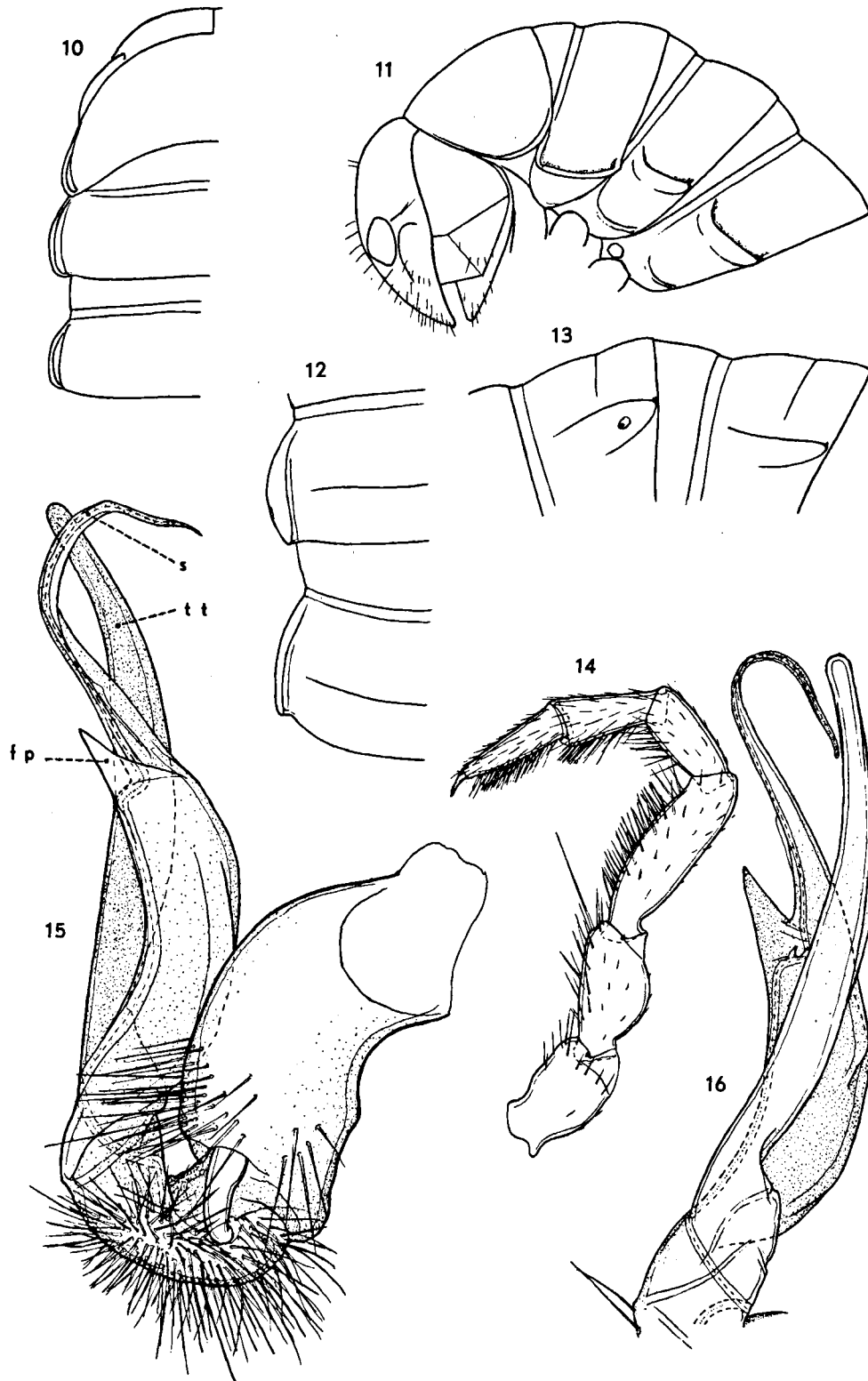
-----, in press. Notes on the classification of some little-known Australian paradoxosomatid genera (Diplopoda, Polydesmida).- J. nat. Hist.



Figs. 1 - 7. *Streptocladosoma dissimile* nov. spec. - 1: left side of head and four anterior somites of ♂ holotype, lateral aspect; 2: left side of head and three anterior somites of ♂ holotype, dorsal aspect; 3: left side of 10th and 11th somites of ♂ holotype, lateral aspect; 4: the same, dorsal aspect; 5: telopodite of ambulatory leg of 7th somite of ♂ holotype; 6: anal somite of ♂ holotype, ventral aspect; 7: left side of head and collum of ♀ paratype, dorsal aspect.



Figs. 8 - 9. *Streptocladosoma dissimile* nov. spec. - 8: right gonopod of ♂ holotype, medial aspect; 9: telopodite of left gonopod of ♂ holotype, anterior aspect. fp = femoral process; s = solenomerite; tt = tibiotarsus.



Figs. 10 - 16. *Streptocladosoma albovittatum* nov. spec. - 10: left side of head and three anterior somites of ♂ holotype, dorsal aspect; 11: left side of head and four anterior somites of ♂ holotype, lateral aspect; 12: left side of 10th and 11th somites of ♂ holotype, dorsal aspect; 13: the same, lateral aspect; 14: ambulatory leg of 7th somite of ♂ holotype; 15: right gonopod of ♂ holotype, medial aspect; 16: left gonopod acropodite of ♂ holotype, latero-caudal aspect. fp = femoral process; s = solenomerite; tt = tibiotarsus.

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