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MILLIPEDES FROM AUSTRALIA, 1: ANTICHIROPODINI FROM SOUTH AUSTRALIA (DIPLOPODA, POLYDESMIDA, PARADOXOSOMATIDAE)

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ABSTRACT

Descriptions of two new species: *Antichiropus mammillifer* n.sp., the first species of the genus recorded from outside Western Australia, related to *A. minimus* Attems and *A. sulcatus* Attems, and *Tridactylogonus obscurus* n.g., n.sp., a small species, taxonomically rather isolated, and perhaps related most closely to *Notodesmus scotius* Chamberlin, from Tasmania. First record from the Australian continent of *Aulacoporus pruvoti* (Brölemann), previously known only from New Caledonia. *Orthomorpha coarctata* (De Saussure), a well-known tropical ubiquitous, is recorded for the first time from the Australian continent (Northern Territory).

INTRODUCTION

Our knowledge of South Australian millipedes as compared to other regions of Australia is particularly scanty. Among the family Paradoxosomatidae two species have been described: "*Strongylosoma*" *innotatum* (Karsch, 1881) and "*Australiosoma*" *castaneum* Attems, 1944. The first of these cannot be recognized on account of the totally inadequate description; the second is recognizable, but its generic status has to be reconsidered. It quite evidently belongs to the tribe Australiosomatini.

The material treated in this paper is part of a collection of millipedes received on loan from the South Australian Museum, Adelaide. In this collection, Paradoxosomatidae were well represented, the majority belonging to the Australiosomatini. These will be treated in a subsequent paper. The Antichiropodini in the collection are described and recorded herewith.

The collection contained also some paradoxosomatid samples from the Northern Territory, but these consisted of immature specimens and material of the well-known tropicopolitan *Orthomorpha coarctata* (Sauss.), which record is sub-

joined in the present paper.

The material, including the holotypes, is preserved in the museum at Adelaide; some paratypes and voucher specimens have been retained for the Zoological Museum of Amsterdam.

Antichiropus mammillifer nov. spec.

Material.-

Poochera, South Australia, 14.VI.1956, burnt out of *Spinifex*, G.F. Gross leg., ♂ holotype.

Without locality; labelled: E 220, ♂ paratype.

Description.-

Colour: The specimens are probably discoloured: the holotype is rather dark brown, with traces of a pale transverse band along the caudal margin of the metatergites. Clypeus of head also pale; the antennae blackish brown. The paratype is pale brown all over.

Width: 3.6 mm.

Head and antennae: Labrum weakly but very widely emarginate. Clypeus rather strongly impressed towards the labrum, the median surface slightly concave and roughened by wrinkles and setiferous pits. Pubescence of clypeus, frons and lateral sclerites of head moderately dense; the hairs rather short. Lateral margin of clypeus straight, weakly concave near the labrum. Frontal region smooth, weakly convex, not demarcated from vertex. Antennal sockets separated by about 1.4 times the diameter of a socket or by 0.7 times the length of the 2nd antennomere. Postantennal groove of moderate width and depth; the wall in front not conspicuously prominent. At caudal margin of sockets a bean-shaped swelling, sharply demarcated by a furrow. Vertex smooth, shiny, hairless; longitudinally weakly convex, but more convex at margin of collum; transversely also weakly convex, the lateral edges somewhat inflated. Vertigial sulcus transversely wrinkled, moderately impressed, disappearing towards the upper level of the sockets. Antennae of moderate length and width. The 2nd to 4th antennomeres subcylindrical, widening only slightly distad. The 5th and 6th antennomeres slightly more obconical in shape. Antennae hardly clavate, the 5th and 6th antennomeres scarcely wider than the more proximal ones.

Relative length of antennomeres: 2nd: 0.90; 3rd: 1.00; 4th: 0.95; 5th: 0.75; 6th: 0.70. Pubescence moderate in the proximal antennomeres to become rather dense in the distal ones.

Collum: A little wider than the head, subtrapezoidal in dorsal outline. Anterior margin straight in the middle, becoming widely convex more laterally, and finally straight or even faintly concave at lateral sides. Posterior margin widely and weakly emarginate in the middle, becoming widely convex more laterally. Lateral sides moderately widely, and almost evenly rounded. Marginal rim rather narrow, and rather weakly raised; the premarginal furrow distinct, disappearing gradually at the level of the antennae. Surface of collum smooth, shiny and hairless; longitudinally faintly convex, transversely almost flat in the middle to become strongly convex laterally.

Somites: Moderately constricted. The waist dorsally narrow, sharply demarcated from the pro and metasomite, rather finely longitudinally striate, the striation disappearing at about the level of the paranota. Prosomites somewhat dulled by a fine cellular structure, and with fine striae. Metatergites more shiny, smooth, or with some irregular wrinkles, hairless. Transverse furrow weakly impressed, visible from the 6th to the 18th or 19th somite, without sculpture, and disappearing laterally long before reaching the upper demarcation of the paranota. Sides smooth or somewhat uneven by some irregular longitudinal wrinkles, not granular. Pleural keels absent; only on the 7th somite a rudimentary keel represented by a small ridge near the caudal margin of the somite.

Paranota: 2nd somite scarcely wider than the collum. The paranota not very prominent, but ridgelike, sloping slightly in the anterior direction. Latero-anterior margin moderately convex; lateral margin faintly convex, the latero-posterior edge rather narrowly rounded. Upper furrow distinct, curving upward at anterior end, and slightly so near caudal edge. 3rd somite scarcely wider than the 2nd. The paranota latero-anteriorly widely rounded, the latero-posterior edge narrowly rounded; caudal border almost obsolete, transverse, straight, the

caudal edge not produced. Upper furrow quite distinct. 4th somite also scarcely wider than the preceding, a little narrower than the 5th. Paranota similar to those of the 3rd somite, but more widely rounded laterally and the posterior edge not as narrowly rounded, and without a distinct posterior margin. Paranota of 5th and subsequent somites weakly prominent. The dorsal furrow distinct posteriorly, but disappearing at about halfway the metasomite of the poriferous somites, and even behind the middle in poreless somites. Caudad of the posterior edge of the paranota the upper furrow curves slightly upward towards the caudal margin of the somite. From above the lateral margin of the paranota is widely convex, slightly diverging caudad; the posterior edge scarcely prominent, widely rounded, particularly in the poreless somites. Ventral demarcation of paranota not marked by a furrow but by a depression, reaching cephalad about as far as the dorsal furrow. Dorso-ventral width of paranota moderate, the upper furrow in lateral aspect straight. Pores notably small, in a small circular pit situated in about the middle of the paranota.

Sternites and legs: Sternites of middle somites longer than wide (ratio: 1.25 : 1.00). Cross impressions well developed. The longitudinal impression rather wide, evenly concave; the transverse impression a little more furrowlike, and a little deeper than the longitudinal. No sternal cones. Pubescence moderately dense, the hairs rather long. Sternite of 4th somite rather wide, concave and medially furrowed. Sternite of 5th somite with a broad swelling between the anterior legs, produced anteriorly in a broad parabolically rounded lamella, which is directed downward and cephalad, to project distinctly in front of the sternite. At the base the process is only a little narrower than the width between the coxae of the anterior legs. Anterior surface of process densely set with short setae, caudal surface with some long isolated hairs. Transverse furrow well impressed. Caudal half of sternite widely concave in the middle. Just medio-cephalad of the coxal apertures a short cylindrical, distally rounded process, projecting downward and a little cephalad. Long setae arise from near the base of the

processes and behind, the middle surface of the sternite being hairless. Sternite of 6th sternite deeply concave, almost level with the ventral side of the metasomal ring, except at medial side of coxal apertures, where the sternite is raised to four isolated irregularly rounded swellings, each bearing three tufts of long setae. Sternite of 7th somite with a large gonopod aperture occupying most of the sternite and pressing the coxal apertures of the ambulatory legs a little laterad. Latero-cephalad of the gonopod aperture on each side a rather narrow but distinct transverse rounded ridge. Sternite of 8th somite unmodified, except that the longitudinal impression is wider than normally between the anterior legs. Legs of moderate length, rather stout, the prefemora dorsally rather strongly convex, the femora slightly arched. First legs incrassate and with the usual femoral process, 2nd pair also incrassate. All legs ventrally rather densely pubescent, the tarsi rather densely pubescent all around. Scopulae well developed, very dense in tarsi and tibiae of the anterior legs; thinning out gradually and disappearing in the last two pairs of legs. Ventral pubescence of legs growing longer towards the posterior half of the body. Relative length of podomeres: 2nd: 0.65; 3rd: 1.00; 4th: 0.50; 5th: 0.50; 6th: 0.45.

Anal somite: Dorsal profile faintly evenly convex, without impression. Epiproct of moderate length and thickness. In dorsal aspect the side are moderately concavely converging, to become almost parallel near the apex; no stepwise narrowing of apex. Setae not on tubercles. Apex rather narrowly truncate, with the lateral edges narrowly rounded, and the caudal margin faintly emarginate. Paraprocts rugulose; the marginal rims rather low and rather narrow. Setae not arising from granules. Hypoproct rather broad, rather widely rounded and almost trapezoidal. Setae on low tubercles, which do not project outside the margin.

Gonopods: (fig. 1) Coxa relatively short and stout, slightly crooked halfway, with a setiferous area on medial, anterior and lateral sides. Prefemur relatively large, rounded, its longitudinal axis oblique on the axis of the femurite. Lateral demarcation between prefemur and femurite slightly oblique. Medio-posterior-

ly at the transition between prefemur and femorite a thick, low conical process. Femorite elongate, straight, apically somewhat clavate. Spermial channel running straight along latero-anterior side of femorite. Solenomerite arising from the medio-anterior side of femorite, strongly elongate, more or less ribbon-like. It curves distad, cephalad and proximad, and finally cephalad and distad again, the whole curve conforming more or less to an 8. Apex of solenomerite finely lamellate. The spermial channel running along medial side of solenomerite at its base, it follows the curve of the solenomerite and ends apically without making a terminal loop. At latero-posterior side of the apex of the femorite (postfemoral section?) arise two processes (tibiotalarsus?), connected at their base, curving mesad and caudad. The proximal process is slender and spiniform, the distal one is thick and rounded at the base but tapers distally and ends in an acuminate spine.

Remarks.-

All the available information on *Antichiropus* dates back from 1911 when Attems (1911: 168) proposed the genus for the reception of seven species all from Western Australia. The discovery of a new species at a locality situated at the western basis of the Eyre peninsula, South Australia, extends the known range of the genus considerably in eastern direction and is quite significant from a biogeographical point of view. *Antichiropus* is the only paradoxosomatid genus reported from southwest Australia, and the present record establishes a faunistic tie between the two regions divided by the Great Australian Bight.

The species were described in a reasonably adequate way, but judging from the drawings of the gonopods these were illustrated after treatment with potassium, and probably the typical curves of the solenomerite in natural position are not represented. For that reason the present illustration is difficult to compare with those given by Attems.

Nevertheless it seems that the new species, on account of the two processes arising from the apex of the femorite, is related most closely to *A. minimus* Att., *A. sulcatus* Att., and perhaps also to *A. whistleri* Att. Actually,

the gonopods of *A. minimus* and *A. sulcatus* appear to be quite similar to each other, and differ only in small details.

A. mammillifer belongs to the largest species of its genus. In fact it is equalled in this respect only by *A. variabilis* Att., from which it clearly differs in the structure of the gonopods and in having well demarcated paranota. The absence of a sharp dorsal furrow demarcating the paranota distinguishes also *A. minimus* and *A. whistleri* from the new species. Probably *A. sulcatus* comes closest to *A. mammillifer*, on account of the gonopod structure and the development of the paranota. But *A. sulcatus* has strong sternal cones from the 8th somites onwards, appears to lack the peculiar sternal processes on the posterior half of the sternite of the 5th somite, and has a width of only 2.5 mm.

Aulacoporus pruvoti (Brölemann)

Paraulacoporus pruvoti Brölemann, 1931: 295, figs. 29-35.
Aulacoporus pruvoti; Attems, 1937: 264, fig. 331; Jeekel, 1968: 29.

Previous record.-

New Caledonia: Dumbea.

Material.-

Underdale, Adelaide, South Australia, 14.XII.1958, G.F. Gross leg., 4♂, 1♀.

Description.-

Colour: Probably the original colour is lost: the specimens are yellowish brown, with the frontal and clypeal region of the head darker brown, and the 6th and 7th antennomeres (the latter excepting its apex) blackish brown.

Width: ♂: 2.7-2.9 mm, ♀: 2.8 mm.

Head and antennae: Labrum widely and moderately deeply emarginate. Clypeus deeply impressed towards the labrum; the impression crescent-shaped, and limited orad by a widely concave series of closely set bristles. Above this impression the clypeus is rather convex, its surface uneven by rather coarse setiferous pits. Pubescence of clypeus moderately dense; the lateral sclerites of the head with some sparse

hairs. lateral border of clypeus weakly convex, with a notch near the labrum. Frons moderately convex, rather sparsely setiferous and with a fine median furrow. Antennal sockets separated by 1.3 times the diameter of a socket, or by 0.7 times the length of the 2nd antennomere. Frontal region scarcely demarcated from vertex. Postantennal depression of moderate width and depth, the wall in front rather weakly prominent. Bean-shaped area behind the antennal sockets only vaguely indicated, not inflated. Vertex transversely weakly convex, more strongly rounded near the lateral edges but these not inflated. Vertex longitudinally almost evenly and widely convex. Vertigial sulcus anteriorly well impressed, less so in upper region; running downward to well above the upper level of the antennal sockets. Surface of vertex smooth, hairless. Antennae of moderate length and moderately slender, slightly clavate with the 5th and 6th antennomeres a little thicker than the more proximal ones. 2nd to 4th antennomeres subcylindrical, widening distad; the 5th and 6th more elongate obconical. Relative length of antennomeres: 2nd: 1.00; 3rd: 0.95; 4th: 0.95; 5th: 0.85; 6th: 0.80. Pubescence of antennomeres moderate, becoming rather dense in the distal ones.

Collum: Scarcely wider than the head, subtrapezoidal in dorsal outline. Anterior border straight in the middle, widely convex more laterally, to become straight again laterally. Posterior border widely emarginate dorsally, faintly convex more laterally and straight towards the sides. Lateral sides evenly and rather narrowly rounded. Surface of collum smooth, hairless; longitudinally widely convex, most convex near anterior margin; transversely widely convex in the middle, more convex towards lateral sides, and laterally incurved a little. Marginal rim laterally distinct but low and rather narrow; the premarginal furrow disappearing gradually towards the lateral edge of the vertex.

Body somites: Weakly constricted. The waist dorsally narrow, widening considerably on the lateral sides; dorsally distinctly ribbed or "beaded", from the level of the paranota downward to the level of the stigmata longitudinally striate. Prosomites dullish by fine cellular

structure, with minute mostly longitudinally arranged striae. Waist sharply demarcated from pro and metasomites. Metatergites a little more shiny, also with minute striae. Transverse furrow present from the 6th to 17th somite, weakly impressed in the 6th and 17th somites, distinct but not deeply impressed and without sculpture in the others. Sides smooth, but up to the 4th somite a little subgranulose-uneven. Pleural keels absent. Lower part of sides with irregular wrinkles curving upward near the caudal border.

Paranota: 2nd somite a little wider than the collum; the 3rd slightly narrower than the 2nd and as wide as the 4th. Paranota of 2nd somite situated on a low level, narrow ridgelike, weakly prominent. In lateral aspect upper side weakly concave, sloping a little in the anterior direction. Lateral border very weakly convex, invisible from a dorsal aspect. Paranota of the 3rd and 4th somites represented by a curved furrow, concavity upwards with a slight swelling underneath. Paranota from the 5th somite onwards absent, indicated only by some irregular longitudinal wrinkles near the posterior margin of the somite. Pores rather large, in a small, rounded and conspicuous pit.

Sternites and legs: Sternites of middle somites longer than wide (ratio: 1.7 : 1.0). Cross impressions well developed, both furrow-like, the transverse deeper than the longitudinal one. No sternal cones. Pubescence moderately dense, the setae of moderate length. Sternite of 4th somite widely excavate, and level with ventral side of the somite; coxal bases not raised. Some isolated setae. Sternite of 5th somite with a strong rounded process occupying most of the room between the coxal apertures of the anterior legs, anteriorly produced into a shovel-like lamella, which is somewhat constricted at the base but otherwise is as wide as the distance between the coxae. Apex of process widely triangular, the median angle wide, but pointed. Process directed ventrad and cephalad, projecting distinctly in front of anterior margin of sternite. Anterior surface distally with a dense pubescence of short setae; posterior surface with some isolated hairs. No transverse furrow; the posterior part of the sternite is sloping caudad to the level of the

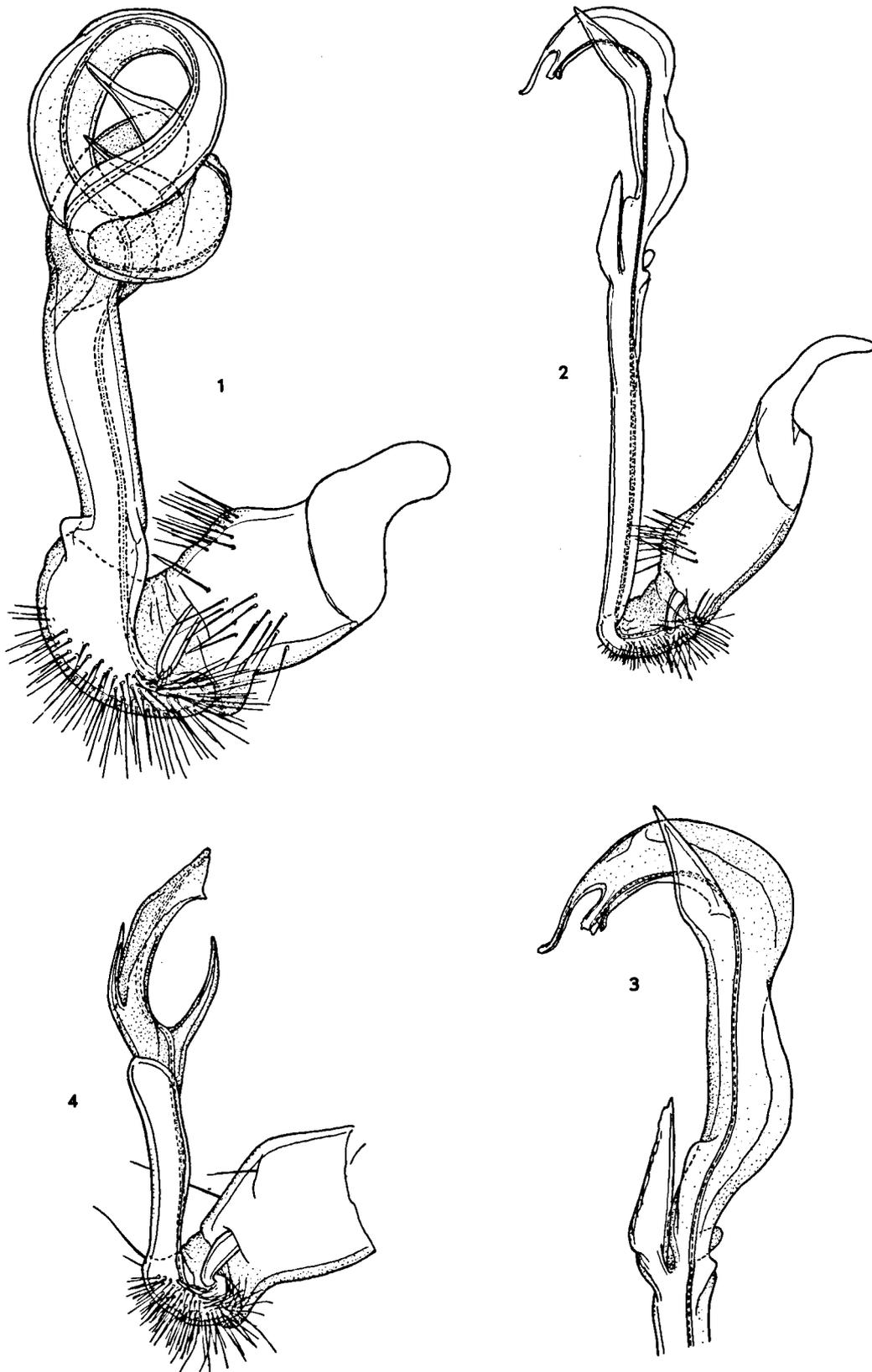


Fig. 1. *Antichiropus mammillifer* nov. spec., right gonopod of holotype ♂, medial aspect.-
 Figs. 2-3. *Aulacoporus pruvoti* (Brölemann), 2: right gonopod, medial aspect; 3: apex of same,
 enlarged.- Fig. 4. *Tridactylogonus obscurus* nov. gen., nov. spec., right gonopod of holotype ♂,
 medial aspect.

metasomal ring. Coxal bases not raised. Pubescence sparse. Sternite of 6th somite deeply excavate, and level with the ventral side of the metasomal ring; coxal bases not raised. Surface with four small setiferous areas arranged in a square. Sternite of 7th somite with a callous ridge on each side latero-cephalad of the gonopod aperture; the ridge rather low but thick, hairless. Sternite of 8th somite deeply excavate, and level with the ventral side of the metasomal ring; raised only quite near the bases of the coxae. Pubescence restricted to two transverse series of tufts of setae. Legs of moderate length, rather stout; the prefemora dorsally rather convex. The femora not particularly incrassate, faintly arched. Coxa of anterior leg of 6th somite elongate, with a thick conical rounded process on medial side. The coxa of the posterior leg with a similar but shorter and smaller process. Relative length of podomeres: 2nd: 0.80; 3rd: 1.00; 4th: 0.65; 5th: 0.55; 6th: 0.55. First pair of legs incrassate and with the usual ventral femoral tubercle. 2nd pair of legs with a rather strong, but short, coxal process. Pubescence of legs moderate on the ventral side, the hairs of moderate length, dorsal side without apparent pubescence except in tibiae and tarsi. Dense tarsal and tibial scopulae present on all legs except those of the 18th somite.

Anal somite: Upper profile straight. Epiproct of moderate length, somewhat compressed dorso-ventrally. Sides of epiproct concavely converging, but most of the apex parallel-sided, or even faintly constricted at base of epiproct proper. Close at apex the sides narrow again. End truncate, rather broad, the edges quite narrowly rounded, the posterior margin weakly emarginate. Surface of anal ring minutely rugulose-granulose. Setae not on tubercles. Paraprocts smooth, or a little rugulose. The setae on abortive tubercles. Marginal rim moderately high, but rather narrow. Hypoproct rather widely parabolically rounded; the setae on abortive, not projecting, tubercles.

Gonopods: (figs. 2-3) The gonopod of the type material has been well illustrated by Brölemann, who gave an illustration of the left gonopod in lateral aspect, and one of the apex of the same in caudal aspect. It should be

emphasized that the distal portion of the gonopod (i.e. the solenomerite) is quite flexible, and may be curving more or less widely in a caudal direction, and may be crooked at the base. In this respect the difference between the drawings by Brölemann and the present illustrations have no taxonomic significance. The spermal channel follows a course along the anterior and medial sides of the telopodite; in the membraneous apex of the solenomerite it makes a small loop quite near its end. The small process marked 'u' by Brölemann probably represents a femoral process; the larger process at the end of the femur may be regarded as tibiotarsus. It is variable in size, and in one of the specimens it is one and a half times as long as in the illustrated gonopod. The other processes emanating from the telopodite, about halfway and near its apex, are probably processes of the solenomerite, such as are found also in certain species of *Antichiropus*.

Female: Aside from the usual sexual characters the female differs from the male in having the vertex of the head a little more globose. 2nd pair of legs with medio-caudal coxal processes, distally rounded-truncate. No apparent epigynal modification. Sternites of middle somites a little wider than in the male (ratio length/width: 1.5 : 1.0). Relative length of podomeres: 2nd: 0.90; 3rd: 1.00; 4th: 0.55; 5th: 0.50; 6th: 0.55. The legs much less incrassate.

Remarks.-

The genus *Aulacoporus* Verhoeff, 1924, has nine described species and one subspecies occurring in the coastal region of Queensland and northern New South Wales. *A. pruvoti* was known only from New Caledonia, and it was suggested earlier (Jeekel, 1968) that the species was probably introduced into New Caledonia from the Australian mainland. This seemed the more probable because New Caledonia otherwise has no endemic Paradoxosomatidae.

The present record seems to corroborate this opinion. However, the occurrence of this species in South Australia is quite unexpected considering the distance between the present locality and the main area of the genus. Perhaps South Australia is the country of origin of *A. pruvoti*, but, considering the species was col-

lected in a suburb of Adelaide, it seems more likely that it was introduced there, just as it was imported into New Caledonia. Ecological data are needed to solve the problem.

The above description is given to extend the previous characterization by Brölemann. The only apparent discrepancies concern the colour of the species (the present specimens seem to have lost their original colour) and the fact that the present specimens have a fine but distinct transverse furrow on a number of metatergites (Brölemann states the contrary for his material). These differences are, however, not considered of sufficient importance to consider the present material not conspecific with *A. pruvoti*.

Tridactylogonus nov. gen.

Generic diagnosis.-

A genus of relatively small-sized Paradoxosomatidae with 20 somites and a normal poreformula. Vertex of male normally spherical. Antennae of moderate length, clavate, the antennomeres submoniliform.

Somites moderately constricted; the waist rather wide, distinctly longitudinally ribbed. Metatergites smooth, hairless. Transverse furrow present from the 4th somite onwards, well impressed. Pleural keels abortive.

Paranota moderately developed.

Sternites of male longer than wide. Sternite of 5th somite of male with a process between the anterior legs. Legs of moderate length; the first leg of the male with a femoral tubercle. Tibial and tarsal scopulae only present in a few anterior legs of the male.

Gonopods with coxa of moderate length, rather stout. Prefemur short, rounded, its axis oblique on the axis of the femorite. Femorite long, spermal channel following an almost straight course. Apical portion of telopodite marked by a strong chitinous ridge (demarcation between femur and postfemur?), giving rise to a broad and rather long solenomerite and two additional branches. Of these one arises cephalad of the course of the spermal channel and might be considered as a postfemoral process; the other arises a little more distad and caudad of the course of the spermal channel and is

probably the homolog of the tibiotarsus.

Type species.-

Tridactylogonus obscurus nov. spec.

Remarks.-

This new genus, which is referred to the Antichiropodini, seems to stand rather isolated in this tribe. It appears to belong to a group of Australian Paradoxosomatidae of rather small size, most of which have not yet been described, except the genus *Notodesmus* Chamberlin, 1920. The type and only known species of this genus, *N. scotius* Chamberlin, 1920, from Tasmania, is similar to *Tridactylogonus obscurus* in its general aspect. It differs, however, in morphological details, and particularly in the gonopods (cfr. Jeekel, 1979). In *Notodesmus*, these appear to have the same apical configuration as in *Tridactylogonus*, but the distal section of the telopodite is less sharply set off from the femur. The three processes in *Notodesmus* may be homologous to the postfemoral process, solenomerite and tibiotarsus in *Tridactylogonus*. But the presumptive tibiotarsus in *Notodesmus* is much smaller, not more than a short triangular lobe, and arises from about the same level as the postfemoral process. The solenomerite in *Notodesmus* is describing a rather narrow curve, being directed caudad at the base, and bending laterad and finally cephalad.

Although the reference of *Tridactylogonus* to the tribe Antichiropodini is correct, the discovery of this genus might seem to narrow the taxonomic disjunction between this tribe and the Australiosomatini. In particular the genus *Akamptogonus* Attems, 1914, which up to now has been considered to belong to the Australiosomatini, in the simple structure of its gonopods is rather similar to *Tridactylogonus*. The much shorter gonopod femur in *Akamptogonus*, however, indicates that this similarity is an instance of convergence rather than evidence of taxonomic relationship.

Tridactylogonus obscurus nov. spec.

Material.-

Bungaree, South Australia, 33°45'S, 138°34'E, 27.II.1885, pres. Ed. Barton, ♂ holotype, 2♂ and 2♀ paratypes.

Top end of Alligator Gorge, near Wilmington, South Australia, 12.VI.1954, G.F. Gross leg. (E.S.I. 1334), 1♂, 1♀ (see Remarks).

Description.-

Colour: In general dark brown to castaneous. The labral area and the lateral sclerites of the head, the intersegmental membranes of the antennomeres, the legs, the epiproct, hypoproct and the margins of the paraprocts brownish yellow.

Width: ♂: 1.7-1.8 mm; ♀: 2.1 mm.

Head and antennae: Labrum rather deeply and moderately widely emarginate. Clypeus rather strongly impressed towards the labrum, the middle of the lower surface even a little concave; on each side below the antennal sockets also a weak impression, Lateral border of clypeus faintly concave. The surface of the clypeus smooth, rather weakly pubescent, the setae rather long. Lateral sclerites of head almost hairless. Frontal region not demarcated from either clypeus or vertex, sparsely setiferous. Antennal sockets separated by 1.8 times the diameter of a socket, or by 0.7 times the length of the 2nd antennomere. Postantennal groove of moderate width and depth; the wall in front not particularly prominent. Bean-shaped area behind the antennal sockets not inflated, simply marked by a furrow. Vertex smooth and hairless: transversely widely and evenly convex; longitudinally rather convex, especially in the caudal half. Vertigial sulcus well impressed, running downward to the upper level of the antennal sockets. Antennae of moderate length, rather stout and distinctly clavate, with the 5th and 6th antennomeres wider than the more proximal ones. Antennomeres elongate obconical, the 6th more convex. Pubescence moderate in the proximal antennomeres, becoming rather dense in the distal ones. Relative length of antennomeres: 2nd: 1.00; 3rd: 0.95; 4th: 0.85; 5th: 0.70; 6th: 0.80.

Collum: Scarcely narrower than the head, subreniform in dorsal outline. Anterior border weakly rounded in the middle, only slightly more convex laterally, and almost straight along the lateral side. Posterior border widely emarginate dorsally, to become weakly convex laterally. Lateral sides asymmetrically round-

ed, more strongly so at posterior side. Surface smooth, with a few setae along the anterior border; a weak median furrow not reaching the anterior and posterior borders. Surface transversely weakly convex in the middle, laterally much more convex; longitudinally widely and almost evenly convex. Marginal rim of lateral sides narrow, but distinctly brimlike. Premarginal furrow disappearing gradually towards the middle of the anterior border.

Body somites: Moderately constricted. The waist rather broad, sharply demarcated from pro and metasomites, rather coarsely longitudinally ribbed, down to the level of the stigmata. Prosomites dulled by a fine, but quite conspicuous cellular structure. Metatergites more shiny, smooth, hairless except in a few anterior somites, where some unapparent setae may occur just behind the waist; in some somites, especially in the posterior half of the body, the metatergites may have some irregular longitudinal wrinkles behind the transverse furrow. Transverse furrow present from the 4th to the 19th somite, quite deeply impressed, and with distinct longitudinal ribs. Transverse furrow in most tergites extending laterad to quite near the base of the paranota. Behind the transverse furrow a median furrow visible on the 6th to 19th somites. Sides uneven, subgranulose, granular in particular in the anterior somites. Pleural keels quite weakly developed in the 2nd and 3rd somites.

Paranota: 2nd somite a little wider than the collum. Paranota ridgelike, narrow dorsoventrally, but rather prominent, projecting on a horizontal level, the upper surface straight. In dorsal aspect the latero-anterior edge is narrowly rounded, the lateral margin straight or faintly convex. Posterior edge not angular, but more or less lobate, narrowly rounded and produced caudally so as to project very slightly behind the margin of the somite. 3rd somite slightly wider than the 2nd, the 4th a little wider than the 3rd. Paranota of 3rd and 4th somites subsimilar. Lateral outline in dorsal aspect widely convex, almost evenly rounded in the 4th somite, a little more convex in the anterior half in the 3rd. Latero-posterior edge narrowly rounded and the minute posterior margin a little incurved. Dorsal furrow distinct,

curved with concavity upwards, and continued a little along the caudal border of the somite. No ventral demarcation. Paranota of 5th and subsequent somites moderately developed. The latero-anterior edge narrowly rounded in dorsal aspect, the lateral border faintly convex and slightly diverging from the longitudinal axis. Latero-posterior edge narrowly rounded, the angle wider than 90°. The minute posterior border somewhat convex, a little emarginate at the base. Lateral border of poriferous somites in their posterior third a little emarginate on account of the pore-area. The latero-posterior edges in poreless somites a little more acuminate than in the poriferous ones. Posterior edges equalling the caudal margin of the somites, produced slightly and projecting caudad of the margin of the somite very slightly in the 18th somite only. In lateral aspect the dorsal delimitation of the paranota is widely convex in poriferous somites and about straight in poreless somites. Dorsal furrow curving inward and upward anteriorly, but not reaching the waist. Paranota of poriferous somites of moderate dorso-ventral width, one and a half times wider than those of poreless somites. Paranota ventrally demarcated by a depression reaching cephalad to about halfway the length of the metasomite, the ventral demarcation being convex in poriferous, and faintly convex in poreless somites. Posterior edges in lateral aspect acuminate, in particular in the poreless somites. Margins of paranota distinctly callous, the posterior border with a weak rim. Pores of moderate size, situated at the anterior end of an oval excavation.

Sternites and legs: Sternites of middle somites longer than wide (ratio: 1.2 : 1.0). Cross impressions moderately developed, the longitudinal impression wide, the transverse impression narrow and furrowlike between the subsequent coxae. No sternal cones. Pubescence rather weak, the setae rather long. Sternite of 4th somite of moderate width, with a deep median furrow. Sternite of 5th somite with a large oval hump occupying most of its anterior half. This protuberance is caudally rounded; anteriorly it is not produced into a laminate process, but it is angular with a faintly indicated transverse crest, not at all projecting

in front of the sternite itself. Posterior surface of protuberance with some long hairs; no anterior brush of short setae. Transverse furrow of sternite weakly impressed. Posterior part strongly sloping caudad, the base of the posterior coxae somewhat raised but not distinctly produced. Posterior part of sternite in the middle hairless, some hairs at the base of the coxae. Sternite of 6th somite deeply concave, about level with the ventral side of the metasomal ring; the area around the coxal bases raised a little as in the posterior half of the 5th sternite, and similarly with some long hairs. Sternite of 7th somite without callus in front of the gonopod aperture, the aperture itself large, pressing the ambulatory legs a little laterad. Sternite of 8th somite a little more concave anteriorly, the posterior part not modified. Legs of moderate length, rather thick; the prefemora dorsally convex and the femur incrassate. Femora slightly arched. Ventral pubescence moderate on all podomeres, setae rather long. Rest of pubescence weak and unapparent. Tibiae and tarsi also dorsally moderately pubescent. Scopulae present only in a few anterior legs up to 4th somite, obsolete from legs of 5th somite onwards. Femur of first pair of legs with the usual ventral tubercle. Anterior legs more incrassate. Relative length of podomeres: 2nd: 0.70; 3rd: 1.00; 4th: 0.60; 5th: 0.65; 6th: 0.85.

Anal somite: Dorsal profile of anal somite weakly convex, a very slight depression at base of epiproct, epiproct itself faintly concave. Epiproct rather thick dorsoventrally, broad, of moderate length. The sides almost straightly converging (or faintly concave), the end broadly truncate, straight, with the edges rounded, no stepwise narrowing of epiproct. Setae not on tubercles. Surface roughened subgranulose. Paraproct subsmooth, setae on abortive tubercles. The rims moderately high and moderately wide. Hypoproct rather broadly triangular, with convex sides and rounded apex. Setae not on tubercles.

Gonopods: (fig. 4) Coxa of moderate length, very stout at base, to become narrower towards the apex. Only a few isolated setae. Prefemur short, rounded subovoid, oblique on the longitudinal axis of the femur. Demarcation almost

transverse. Femorite long and rather slender, ending meso-caudad in a sharply demarcated crest. Spermial channel running along the anterior side of the femur. Apex of gonopod consisting of three elements: the solenomerite broad and ribbon-like, widely curving mesad but principally directed straight distad. Its apex broad, the spermial channel running along its latero-anterior side, without terminal loop. Cephalad of solenomerite arises a lanceolate process which is considered to be the postfemoral process. Just proximad of middle of length of solenomerite, on its medio-caudal side a smaller, spiniform process, considered to be the tibiotarsus. All three apical elements emanate from a common base which is considered to represent the postfemur.

Female: More robust than the male, because the somites are slightly less constricted in the waist area. Sternites more flattened with the cross impressions less developed. Ratio of length to width: 1.0 : 1.2, sternites thus wider than long. Legs shorter and more slender than in the male, the femora not arched. Relative length of podomeres: 2nd: 0.85; 3rd: 1.00; 4th: 0.60; 5th: 0.65; 6th: 0.85. Epigynal modification behind the 2nd pair of legs consisting of a small median, narrowly triangular and apically pointed process pointing downward and cephalad.

Remarks.-

The material from near Wilmington is provisionally referred to the present species, but cannot be regarded as paratypical. On account of the gonopod structure one would not hesitate to refer it *T. obscurus*, but because of a different colour and smaller size some reservations must be made.

The general colour is whitish, but the head is brown with the antennae darkest in the 6th antennomere. Collum light brown, with broad whitish paramedian bands confluent near the anterior border. Remaining somites also whitish, with a rather narrow dark median line, darkest on metatergites in front of the transverse furrow. A dark longitudinal band also just above the level of the paranota. The lateral surface of the paranota (calluses) also brownish. Venter including sternites and legs whitish..

The width of the male is 1.5 mm, of the female 1.8 mm. The posterior edges of the paranota seem to be a little more produced caudad, with the edges a little more pointed and vaguely projecting behind the posterior margin of the somites.

Perhaps this material will prove to belong to a different taxon, but it is also possible that the differences in size and in the development of the paranota will vanish when more material becomes available. The colour difference seems significant enough. However, it has become known that in some heavily infuscated small species of the Antichiropodini (e.g. *Notodesmus*) the juveniles have a colour pattern reminding of that described above, and that such a juvenile pattern may persist more or less distinctly in certain adults. A similar condition in *T. obscurus* might give an explanation for the aberrant coloration of the Wilmington material. Moreover, it seems that the material studied has suffered from discoloration owing to preservation.

Orthomorpha coarctata (De Saussure)

Polydesmus coarctatus De Saussure, 1860: 297.
Orthomorpha coarctata; Attems, 1937: 62, fig. 75.

Material.-

In gully near Hotel dam, Darwin, Northern Territory, 6.I.1961, G.F. Gross leg., 1♂, 1♀
Parap, Darwin, Northern Territory, 8.I.1961, G.F. Gross leg., 12♂, 34♀, 1 juv.

Remarks.-

This appears to be the first record of this species for continental Australia. *O. coarctata* probably originates from somewhere in South-east Asia, but it has become distributed throughout the tropical regions of the world. It is particularly common and widely distributed in Indonesia and on the Pacific islands, and it is not surprising that it has established itself in tropical Australia.

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