

A new genus and species in the diplopod family Nearctodesmidae from Mexico, with a proposed classification of the suborder Polydesmidea.

by

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With 5 figures

SUMMARY

Jaliscodesmus alticola is described as a new genus and species in the diplopod family Nearctodesmidae. As this group is virtually confined to western United States, the discovery of a new form in the Sierra Madre Occidental of Mexico (Colima), some 2400 km south of the nearest known nearctodesmid locality, is of great interest. Within the family *Jaliscodesmus* seems closest to *Ectopodesmus*, known from Montana and Illinois.

The proposal of a new classification for the suborder Polydesmidea is given, recognizing the following taxa: Polydesmoidea for the families Polydesmidae, Doratodesmidae, and Cryptodesmidae; Trichopolydesmoidea for Trichopolydesmidae and Nearctodesmidae; and Stylodesmoidea for Pyrgodesmidae. Brief diagnoses and commentary are supplied.

Heretofore, species of the family Nearctodesmidae have been known only from the Pacific Northwest region of the United States and Canada, with a single disjunct relict located in Illinois. It is therefore a matter of some importance to extend the distribution area of the group, with the revelation of a second isolated form recently discovered in the high mountains of western Mexico.

Among the rich material of diplopods collected during 1965 and 1966 by Drs. G. E. Ball and D. R. Whitehead, I noticed a collection of small polydesmoids which at first were presumed to be trichopolydesmoids (a group already known to be well-represented in southwestern United States). But detailed study of the specimens brought the surprising discovery that they are in fact actually nearctodesmids, and at the same time revealed a previously unsuspected relationship between the two groups.

In proposing new generic and specific names for the Mexican nearctodesmid, I take the occasion to provide a short outline of the classification of higher taxa in the suborder Polydesmidea, as visualized on the basis of numerous recent investigations of a variety of families.

Family NEARCTODESMIDAE Chamberlin & Hoffman, 1950

So far four generic names have been proposed in this family: *Nearctodesmus* Silvestri, 1910; *Kepolydesmus* Chamberlin, 1910; *Ergodesmus* Chamberlin 1949, and *Ectopodesmus* Hoffman, 1962.

Owing to the very small and schematic drawings published with the diagnosis of *Ergodesmus compactus* (Chamberlin, 1949), that species was somewhat enigmatic and, in 1962, I was induced to propose the new name *Ectopodesmus* for a species found in a cave in Illinois and thus widely separated from the main area of the family. The generic "differences" that I thought could be deduced from Chamberlin's diagnosis of *Ergodesmus* were purely illusory, as I could recently determine from a study of the type material of *E. compactus*, and I now have the unpleasant duty to state that *Ectopodesmus* is unquestionably a junior synonym of *Ergodesmus*. The type species of the two names are extremely closely related, perhaps at the subspecific level, making the distributional hiatus all the more remarkable. The following key will reflect this synonymy.

Key to the Genera of Nearctodesmidae

- 1. Prefemur of gonopod with one process, originating on the cephalolateral side of the appendage 2
- Prefemur of gonopod with two processes, one lateral, the other medial, in place of origin 3
- 2. Prefemoral process long and slender, curved strongly mesad across the anterior face of the telepodite, forming nearly a complete circle; solenomerite a discrete slender, distally directed process, located subterminally on lateral side of telepodite *Ergodesmus* Chamberlin
- Prefemoral process short, straight, lanciform, much shorter than the telepodite; prostatic groove ending on a small subterminal median lobe of the telepodite *Jaliscodesmus*, n. gen.
- 3. Lateral prefemoral process with distinct articulation or cingulum at its mid-length; lacking terminal branch or processes *Kepolydesmus* Chamberlin
- Lateral prefemoral process simple, not articulated, and usually with 1 to 3 small apical spines of branches *Nearctodesmus* Silvestri

Jaliscodesmus, new genus

Type species: *Jaliscodesmus alticola*, new species.

Diagnosis: A minute nearctodesmid apparently most closely related to *Ergodesmus*, differing in numerous details of gonopod structure, in the relatively strong development of dorsal areation on the anterior and posterior metaterga, and in the distinctly greater reduction of the paranota and different shape of the peritrematic groove.

Body with 20 segments; pore formula normal; metaterga of midbody segments virtually smooth, with faint trace of transverse groove, segments 2-4 and 16-19 with fairly prominent transverse areation, on posterior segments imparting a serrate appearance to caudal dorsal edge of terga; segment 3 with paranota smaller than those of 2 and 4 but not narrower. Paranota of anterior midbody segments reduced in size but still distinct and projecting, those posterior to midbody becoming increasingly smaller, paranota of segment 19 only large enough to contain ozopores. No distinct elongate

peritrematic groove, the ozopores located at posterior corner in a shallow circular depression.

Sides of body smooth, unmodified except for an arcuate, upcurved ridge above leg bases on segments back to midbody. Sterna elevated, unmodified. Legs of normal polydesmoid form, lacking processes or other modification, the 2nd pair in males not completely fused to pleuroterga of 3d segment; prefemora strongly convex dorsally, ventral sides of most podomeres with a more or less median series of small spherotrichomes, podomeres only sparsely setose; tarsal claw prominent, nearly straight.

Gonopod aperture large, the coxae partly exerted at each end and somewhat galeate, open medially; medial edges of coxae fused, remnants of sternal apodemes remain on the anterior (oral) side as site of muscle attachment (Fig. 4, stippled), but no trace of sternum *per se* evident. Prefemora transversely elongate, directed mesad and slightly caudad, in contact medially, moderately setose, bent anteriorly at a 90° angle, the telopodite thence curved arcuately dorsally, ventrally, and posteriorly in generally one plane; prefemur with a single laminate, lanceolate process originating on the anterior-lateral side and terminating in an acute point between the two terminal lobes of the telopodite; prostatic groove originating on medial side of prefemoral base, thence running up the anterior side of telopodite and along the outer side of the lateral distal lobe, terminating on a small apical process of the latter. Telopodite with a prominent thysanate process projecting from median side of the femoral region.

Distribution: This genus is so far known only from its type species, found near the tree line on Volcan de Colima, near the western end of the Cordillera Volcánica Transversal. Presumably we have here an isolated fragment of an extensive pre-Pliocene distributional area for the family, and it will be interesting to see if future studies will reveal other similar relict populations elsewhere in Mexico and western United States.

***Jaliscodesmus alticola* n. sp.**

Figures 1-5

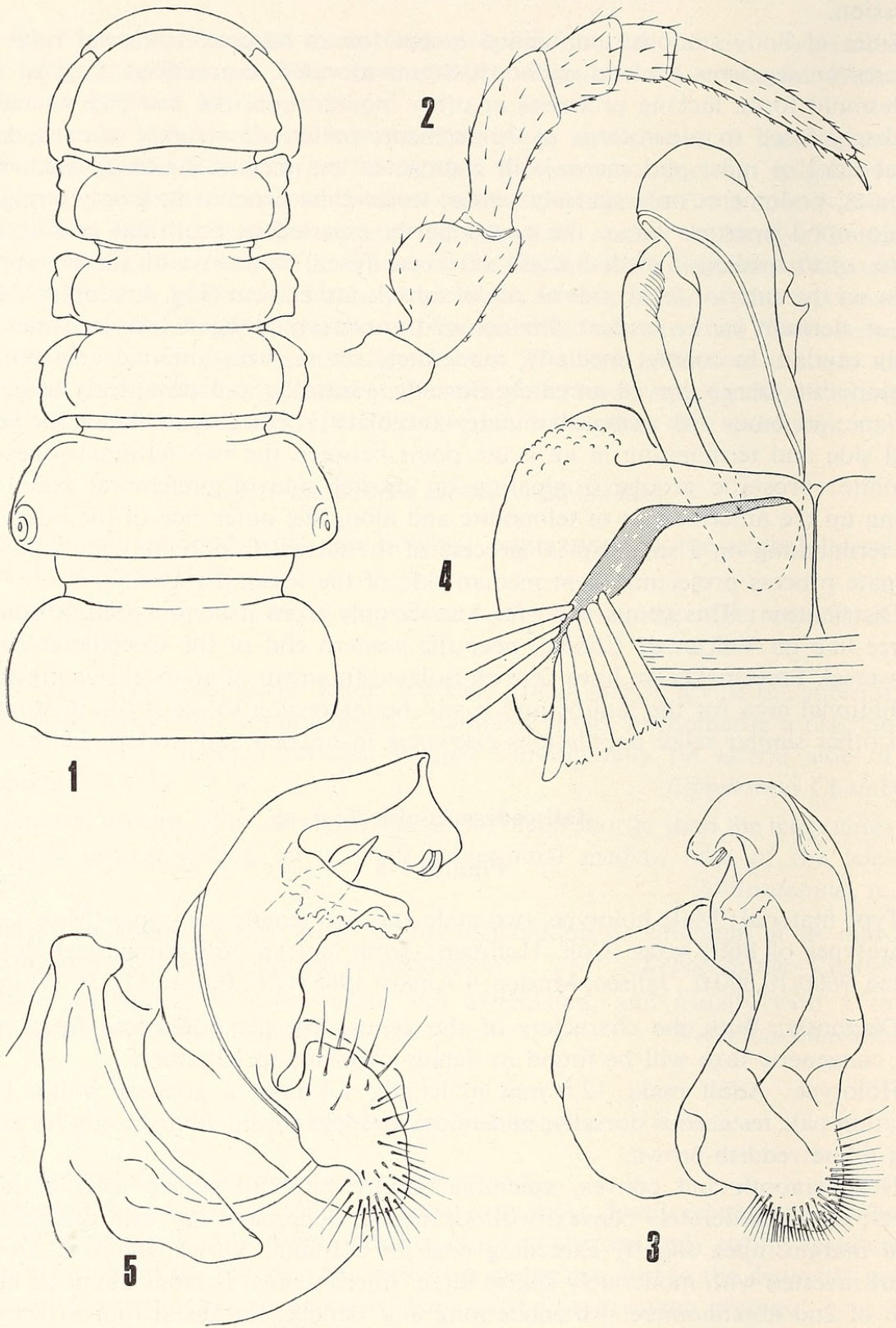
Type material: Male holotype, two male and two female paratypes (Mus. Geneve), 14 paratypes of both sexes (Coll. Hoffman), from Volcan de Colima, east slope near tree line, 9600-10,300 ft., Jalisco, Mexico; 1 August 1966 (G.E. Ball and D. R. Whitehead).

Diagnosis: With the characters of the genus. Specific differences from possible other congeneric taxa will be found in details of gonopod structure.

Holotype: Adult male, 12.0 mm in length, 1.4 mm in greatest width. General coloration pale testaceous dorsally, undersides and legs sordid-whitish; 4th-7th antennomeres dilute reddish-brown.

Head smooth and convex, epicranial suture bifurcate above level of antennal sockets; genae moderately convex, without median depression but with distinct narrow lateral margin, apex slightly exceeding edge of cranium. Vertex glabrous, frons and clypeus invested with moderately sparse setae. Interantennal isthmus about as broad as length of 2nd antennomere. Antennae long and slender, the distal four articles larger and darkly pigmented; article 1 glabrous and globose-pyriform, articles 2-3 cylindrical, very slightly broader distally, 2 glabrous or nearly so, 3 with long setae on its ventral surface only; articles 4-6 clavate, 7 elongate-conic, truncate, with four sensory cones; articles 4-7 profusely setose. No enlarged setae or sensory areas evident.

Collum relatively small, narrower than head and 2nd segment; hemispherical in outline, lateral ends evenly rounded when seen in lateral aspect, and set off by fine marginal rim; surface of collum smooth and polished, no setae nor setal sockets evident.



FIGS. 1-5. *Jaliscodesmus alticola*, n. sp.—1: Head and first six body segments, dorsal aspect, antennae and tergal sculpture not shown.—2: Leg from midbody segment. coxa incompletely shown.—3: Right gonopod, *in situ*, ventral aspect.—4: Left gonopod, anterior aspect, sternal remnants stippled.—5: Left gonopod, mesal aspect.

Anterior segments of the form as shown in figure 1, segments 2-4 smaller than 5 and with dentate lateral edges, paranota of segment 2 produced cephaloventrad into distinct bidentate lobes. Metaterga of these segments with areate sculpture, with usually six fairly distinct elevated areas on the caudal margin of each. Segments 5-15 subsimilar, larger than 2-4, and dorsally smooth, a trace of transverse groove usually evident; paranota largest on segments 5-10, thence becoming progressively smaller to the 19th segment where barely large enough to accomodate peritreme; paranota of these segments with smooth lateral edges, and peritreme confined to posterior third, as ovate-rounded depression containing the pore, not elongate as in *Ectopodesmus*. Formation of posterior segments without peculiarities.

Stricture well-defined on most segments, its anterior edge sharp and slightly elevated, surface of prozonite minutely reticulate, that of metazonite smooth. Lower side of segments back to midbody with an arcuate ridge above bases of legs as in other nearctodesmids; stigmata small, subconical. Podosterna moderately elevated, glabrous, about as wide at midbody as length of prefemora, produced into a small, conic, anteriorly directed tubercle at base of coxae. Legs (fig. 2) moderately long, slender, the prefemora convex dorsally, a median series of small but distinct sphaerotrichomes is present, setation generally sparse. Length formula: $6 > 3 > 2 > 1 > 5 > 4$.

Sternum of segment 7 produced into a high transverse ridge between 8th pair of legs, concave on its anterior side; gonopod aperture without an internal shelf on its posterior edge; median area of prozonite shallowly excavated to accomodate telopodites. Gonopods as described under the generic diagnosis and illustrated in figures 3-5.

Anterior legs and sterna not modified, the latter about as wide as length of coxae on segments 3-6.

Taxonomic position of the Nearctodesmidae

Because of the general similarity in body form, various nearctodesmid species were included in the Polydesmidae until 1950, at which time the Nearctodesmidae was defined as a discrete family chiefly because of the absence of a prostatic vesicle ("Samenblase") from the gonopod telopodite. Although 19 species names have been based upon members of this group, and four generic names set up within it, no careful study of gonopod anatomy has yet been published and the exact place of the family within the order Polydesmida has never been clearly established. Published drawings of the genitalia are generally small and represent only the telopodite as seen *in situ*, leaving the important details of sternal and coaxal structure entirely in the dark. A revision of the group—now in progress—will include an extended account of gonopodal structure; for the present it is sufficient to mention a few generalities about systematic position of the family.

There is, I feel, no particularly close relationship with the Polydesmidae aside both families being in the same suborder. But a very close affinity can be stated with the Trichopolydesmidae, a family which has only recently been established as a large and important taxon whose components were, prior to about 1950, dispersed through a number of other families.

In the Polydesmidae the telopodite of the gonopod normally is provided with a small internal chamber near its midlength, into which the prostatic groove debauches (this vesicle may be sporadically absent in very small polydesmid species), and the prefemoral region generally merged imperceptably into the acropodite in a plane parallel to the median axis of the body (as seen in ventral aspect). In both the Trichopolydesmidae and Nearctodesmidae, the prostatic vesicle is always wanting, and more significantly,

the prefemur of the gonopod is oriented transversely to the median body axis, thence bent at a right angle anteriad and dorsad.

Although the achievement of a stabilized classification of polydesmoids is still a long way off, and will require among other things the patient correction of the extensive mischief wrought by the work of K. W. Verhœff in particular, it is at the present time possible to visualize the fabric of the major groups. On the basis of material examined for sternocoxal characters, I think that a partial grouping of families in the suborder Polydesmidea can be accomplished and herewith offer the following system for the judgement of my colleagues and successors. Obviously, no claim for completeness is made. Many nominal « families » cannot be placed at all, and one family—the Dalodesmidae—has so far resisted my efforts to assign it to a particular suborder.

Suborder POLYDESMIDEA Brolemann, 1916

This group (called « phylum » by Brolemann) was defined by its author in the following manner: « Gonopodes non indépendents. Orifice gonopodial toujours grand, de forme variable, jamais étranglé sur la médiane. Hanche des gonopodes a profilé subtriangulaire, à face interne très courte ou linéaire, le bord proximal interne étant redressé à la rencontre du bord correspondant de la hanche opposée, avec lequel elle peut se souder; ce bord forme, avec la saillie du bord distal externe de la hanche, une dépression plus ou moins profonde dans laquelle le telopodite est abrité en partie ou en totalité. » In my view this statement requires no changes despite the passage of 60 years. Brolemann recognized two families, Polydesmidae and Cryptodesmidae, in this suborder, and if I do not follow this division today, it is chiefly because Brolemann was handicapped by having no knowledge of true cryptodesmids and so in following the practice of his time produced a melange of unrelated forms under the general concept of « cryptodesmoids ». On the basis of considerable material personally examined, I have recently (1973) proposed a new system of the Cryptodesmidae considerably different from that of Brolemann.

Superfamily POLYDESMOIDEA, nov.

In terms of content, this new taxon must not be confused with the category of the same spelling used as a suborder by Pocock in 1887, or as a order by Attems in 1898 and subsequently. The ending « -oidea » has become almost universally used to denote superfamilies, and is here used in that context. This group contains the families in which the gonopod prefemur is not conspicuously elongated transversely, the prostatic vesicle is normally present, and the coxae, of normal size, are more or less fused to each other along their median edges with a raised sutural ridge sometimes formed. There are at least three families to be placed here.

1. Family Polydesmidae Leach, 1815. This group is basically Holarctic in distribution, with centers of differentiation in the Appalachians of eastern United States, in the Balkan peninsula, and in Japan. A few species occur also in the Oriental region as far as Java. Pending a revision along modern systematic lines, it is impossible to state how many genera should be recognized, particularly in the European fauna.

2. Family Doratodesmidae Cook, 1896. This small group occurs only in southeast Asia, and has not been taken seriously by any author since its proposal nearly 80 years ago. In 1940, Attems associated *Doratodesmus* with *Cyrtodesmus* on the basis of external form only (he had seen no males of either genus). From the study of a new species of *Doratodesmus* from Malaya, I could verify a coxal structure similar to that of *Polydesmus*, as well as the presence of a vestigial setose area at the end of the prostatic groove.

Familial separation is made on the basis of body form: depressed paranota, those of the 2nd segment enlarge for volvation, segments with prominent median dorsal processes, etc. The genus has no close relationship with Neotropical cyrtodesmids.

3. Family Cryptodesmidae Karsch, 1880. My concept of this group includes the nominal families Pterodesmidae, Peridontodesmidae, Kiusiunidae, Otodesmidae, and Niponiellidae, but excludes the variety of tropical taxa often recognized under the collective term "stylodesmoids" in which the gonopods are highly specialized by enlargement of the coxae and reduction of the telopodites. My recent system for this family recognized as valid 31 genera dispersed among three subfamilies; the group is best developed in South America, tropical Africa, and southeast Asia, it extends only marginally northward through Mexico and into southern China and Japan.

Superfamily TRICHOPOLYDESMOIDEA, nov.

External resembling polydesmoids in general form, the members of this group share the gonopod characters of transversely-elongated prefemora, usually one or more elongate prefemoral processes, and a fairly simple telopodite which lacks a prostatic vesicle. The prostatic groove terminates usually upon a distinct solenomerite branch.

1. Family Trichopolydesmidae Verhoeff, 1910. Generally small, fragile forms, often depigmented, normally the terga with enlarged clavate setae. The history, extent, and status of this group is being treated in a separate paper now in preparation. The gonopods of the "typical" genera resemble those of the Nearctodesmidae but have retained a median sternal remnant, lost in the other group. Many tropical genera, heretofore referred to this family, may have to be separated off owing to a trend for the gonopods to resemble those of the Stylodesmoidea.

2. Family Nearctodesmidae Chamberlin & Hoffman, 1950. Moderately large and usually well-pigmented forms (often bright red), the metaterga usually without areate sculpture and without setae. So far as known, the family is endemic to North America. A revision is in progress.

Superfamily STYLODESMOIDEA Cook, 1911

This group in a somewhat restricted sense includes a wide variety of small tropical millipeds referred previously to a number of families of very dubious status. Most are small, the dorsum arched, the paranota depressed or set low on the sides, collum enlarged and covering the head. Part or all of the ozopores may be borne above the surface on whitish porosteles. The ability to curl up is largely lost. Clearly, most of these characteristics are adaptive and it is entirely likely that "stylodesmoidy" is more a grade of organization than a unit in milliped phylogeny. This superfamily will probably remain in confusion for years or generations, owing to the technical problems inherent in its study, but an ultimate resolution must I think depend largely upon the sedulous analysis of comparative gonopod morphology.

In most if not all stylodesmoids the gonopod coxae are greatly enlarged and project ventrally or ventrolaterad outside their aperture, often galeate and partly concealing the telopodites. Previous authors (Cook in particular) set up a series of small families on the basis of external body form only, but current opinion suggests that most of these groups must be reduced in rank or abolished entirely as taxonomic categories.

1. Family Pyrgodesmidae Silvestri, 1896. This name has about one month of priority over the much better-known name Stylodesmidae of Cook, assuming that we

place *Stylodesmus* and *Pyrgodesmus* in the same family. Other names referable here are Helodesmidae Cook, Hercodesmidae Cook, Stiodesmidae Cook, Chytodesmidae Cook, Decaporodesmidae Kenyon, Eoromidae Cook & Loomis, and Ceratesmidae Chamberlin. It is entirely possible that the present composite group can be broken up into two or more families different in content from any of the preceeding, when the gonopod structure has been studied comparatively.

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