The New Genus Tetracondyla in the Pacific
(Acari: Oppiidae)

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Among the Hawaiian Acari in the writer's collection is a rather unusual mite which does not seem to belong to any of the presently described genera of Oribatei. However, it appears to be congeneric with a number of species which various authors have described from widely scattered parts of the Pacific area under a variety of generic and subgeneric designations. A study of the Hawaiian species has made it possible to clarify the systematic position of these species and also the status of certain of the groups in which they have been arrayed. The latter points will be treated following the description of the genus and its type species.

Tetracondyla, new genus

Body and hysterosoma elongate, low-arched, hysterosoma of known species with at least some of the marginal setae projecting well beyond the posterior and lateral margins.Distinctive areae porosae absent. Propodosoma and hysterosoma separated from each other dorsally by an apparently flexible articulation characterized by four condyles (hence the generic name), ventral wall of podosoma with no corresponding articulation. Dorsum of propodosoma with lamellae but without translamella. Epimeral areas III and IV collectively with about 8 pairs of setae. Genital plates with four pairs, anal plates with two pairs of setae, at least in type species. Chelicerae of normal chelate form; palpi 4-segmented, tibia and tarsus fused. Tarsus of all legs monodactyle in known species. External sexual dimorphism absent except for smaller size of male.

Type species: Tetracondyla pallida, new species.

Distribution: Java, New Guinea, Hawaii, Juan Fernandez Islands. Species of this genus have not yet been reported from the Asiatic and South American mainlands.

The form of the dorsal solenidion of the tibiotarsus of the palp and the chaetotaxy of the genital and anal sclerites would place the new genus in the

1 The drawings in this paper were prepared by Mari Riess of the University of California at Riverside. The scales provided are marked off in 10μ units. This study was supported jointly by the University of Hawaii and the University of California at Riverside.
family Oppiidae Grandjean. It resembles *Oppia* Koch, 1836, but differs most strikingly from that genus in the structure of the junction of the propodosoma and hysterosoma (*Oppia*: a narrow and continuous suture line without condyles), the presence of four pairs of setae on the genital plates (*Oppia*: five to six pairs in all species known to the writer), the partial fusion of tibia and tarsus I and II (*Oppia*: these segments freely articulating, tarsi with a very short peduncle), the large size of the genital acetabula (*Oppia*: these structures usually small and less conspicuous), and the partial separation of epimera III and IV by an apodeme extending about half-way across the width of the area (*Oppia*: epimeral areas III and IV usually broadly joined across the entire width).

**Tetracondyla pallida**, new species

Adult female: 536–558 µ long to tip of propodosoma, 221–270 µ wide at widest part of hysterosoma, length/width 2.06–2.22 (average of 5 females 542 µ long, 248 µ wide, length/width 2.14). Color pale straw-yellow, legs yellowish-brown. Dorsum of propodosoma (fig. 1) with lamellae well-developed, cusps and translamella absent. Distal end of sensilla (ss) fusiform, directed laterally; pseudostigmata opening anteriorly (fig. 12). Parasensillar (pss) seta anterolateral to base of sensillum, moderately long and slender; interlamellar setae (Us) thick, stiff, faintly pectinate. Lamellar (Is) and rostral setae (rs) long, simple to very faintly pectinate, curved. Lamellae nearly parallel throughout most of length, diverging sharply near posterior ends. Posterior margin of propodosoma with two condyles on either side of midline articulating with two opposing condyles on anterior margin of hysterosoma. Interval between propodosoma and hysterosoma evidently occupied by membranous cuticle on dorsal surface of body, but body as a whole not flexible at this point. Dorsum of hysterosoma (fig. 2) with ten pairs of long, heavy setae, smooth to faintly pectinate at high magnification. Areae porosae absent. Cuticle of entire dorsum faintly and uniformly punctate at high magnification; cuticle just lateral to lamellae of propodosoma minutely tuberculate.

All epimeral areas fairly well defined except for III and IV which coalesce medially; chaetotaxy as shown in figure 4. Tectopedia I and II well-developed; I with lateral surface somewhat paneled. Genital sclerites with four pairs of setae, the anterior two pairs nearest the medial margin, the posterior two pairs nearest the lateral margin. Two pairs of large block-like genital acetabula. Ventral plate with four pairs of setae. Anal plates considerably larger than genital plates, bearing two pairs of setae. Hysterosoma containing up to eight eggs.

Palpi (figs. 3, 5) four-segmented. Trochanter very small, appearing incomplete dorsally. Femur with one dorsal and two ventral setae; patella also with three setae. Tibia and tarsus completely fused. A prominent pit-like
depression dorsally at base of tibiotarsus. A dorsal and a ventral eupathid (e) at about 0.72 and either one or two eupathids terminally (extremely difficult to resolve). The solenidion (s) is recumbent along the dorsal surface of the tibiotarsus; otherwise with four normal setae. Chelicerae (fig. 17) of normal chelate form. Chaetotaxy of legs (s = solenidia, e = eupathidia, f = famulus, n = normal setae, c = companion seta):

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Patella I and II with a dorsal solenidion each; tibia I with two solenidia, II with one. Tarsus I with two solenidia, three eupathids, and a terminally swollen famulus (f, figs. 14, 15). The unpaired eupathid is located distiventrally. No companion setae could be found. Tarsus II lacking eupathidia, but with two dorsal solenidia (fig. 16). Tarsi I and II appear to be inflexibly joined to their respective tibiae, but III and IV are normally joined. The basiventral seta of tarsus IV is greatly expanded distally, flat, and peripherally pectinate (fig. 18). All tarsi with a single heavy claw.

Male: Resembling female in all essential respects except for smaller size and the structure of the internal genitalia. Body length 445 to 450 μ, width 198 to 207 μ, length/width 2.19 to 2.22 (two specimens). Of the nine specimens of this species in the writer's collection, six are females and three are males.


This mite was found in a sample of leaf litter from a tropical rain forest at an elevation of about 1,000 feet. It has not been found in collections from other parts of Oahu, or from other islands.

In general this species and others of the genus appear to be more primitive in structure than members of the genus Oppia. T. pallida cannot be differentiated from T. damoeoides (Berlese, 1913) on the basis of any characters mentioned in the original description of the latter species, but considering the wide geographical separation of the two forms, it is unlikely that they are identical unless by direct introduction from one region to the other. Berlese described the Java species as dark brown, while the Hawaiian form is very pale. This of course is only indicative of a probable difference between the two, but it is likely that other differences would be found upon direct comparison. T. pallida can be separated readily from the other species of the genus on the basis of the characters given in the formula key below.
SUMMARY OF OTHER SPECIES IN THE GENUS TETRACONDYLIA

Tetracondyla crinita (Berlese, 1905), new combination

Carabodes (Otocephus) crinitus Berlese, 1905, Redia 2:172.

This species was described from material collected at Buitenzorg, Java. A study of the original description reads essentially as follows (author’s translation): Body hard, dark, 1,100 μ long. Cuticle of hysterosoma marked with elegant punctate areolae. Margin of hysterosoma with seven elongate setae on each side, of which the anterior three are somewhat anterodorsal. Pseudostigmatic organ long, clavate, bent forward at first, then backward. Anteromedian portion (of propodosoma) moderately elevated. Differs sharply from Carabodes cristatus Canestrini (New Guinea) in the longer body setae, but not in the structure of the pseudostigmatic setae (end of translation).

Berlese placed this species in his new subgenus Otocephus, the type species of which was Otocephus longior (Berlese, 1905). However, a study of Berlese’s figures of the two forms shows that they are considerably different and almost certainly not congeneric. At the same time Carabodes (Otocephus) crinitus Berlese, 1905, is certainly congeneric with Tetracondyla pallida, and is therefore removed to the genus Tetracondyla.

Tetracondyla damoeoides (Berlese, 1913), new combination

Otocephus damoeoides Berlese, 1913, Redia 9:93.

As indicated above, the original description of this species, based on material collected in Samarang, Java, contained no information which would enable us to separate it from Tetracondyla pallida, new species. The interlamellar setae in T. damoeoides appear to be somewhat longer and more tapering than in the type species, but this is not certain. The Java species is dark brown, while the Hawaiian form is pale, but this is only indicative of a probable difference between the two.

Tetracondyla longipila (Trägårdh, 1931), new combination


This species can be distinguished from all others presently described on the basis of the very long setae of the hysterosoma, all of which extend beyond the margin. The type material was collected in the Juan Fernandez Islands, about 400 miles west of the coast of Chile.

Tetracondyla sexdentata (Trägårdh, 1931), new combination


It is difficult to see why Trägårdh placed these two species in separate genera for they are quite certainly congeneric. This species was described from a single damaged individual collected at Puerto Ingles, Juan Fernandez.

**Tetracondyla curtipilina** (Trägårdh, 1931), *new combination*


In general appearance this species is quite similar to *T. pallida*, but the lamellae are much shorter than in the type species, and other differences would probably be found upon a direct comparison of the two. Like Trägårdh's other species, this was found in the Juan Fernandez Islands (Mastaterra) and was quite common, being found in 8 separate samples of dry leaves collected in different localities.

**Tetracondyla cristata** (Canestrini, 1897), *new combination*


The writer has not yet seen the original description of the species, and its placement here is provisional, based upon Berlese's comparison of the species with *T. crinita* (Berlese, 1905). It was described from New Guinea material.

**Formula Key to Described Species of Tetracondyla**

**Characters and Variants**

1. Dorsal and marginal setae of hysterosoma all very long, projecting well beyond margin of hysterosoma.
   a. Dorsal setae of hysterosoma shorter, at least two pairs of these not reaching to the margin of the hysterosoma (fig. 2).

2. Number of pairs of dorsal hysterosomal setae.

3a. Lamellae short, not reaching to level of lamellar setae.
   b. Lamellae reaching beyond level of lamellar setae (fig. 1).

4. Number of pairs of setae on genital sclerites.

5a. Basiventral seta of tarsus IV greatly expanded and flattened distally.
   b. Basiventral seta of tarsus IV otherwise.

6a. Sensillum fusiform distally.
   b. Sensillum clavate or pyriform distally.

7a. Color yellowish, or yellowish with brown patches.
   b. Color light brown.
   c. Color dark brown.

8a. A median elongate, oval depression between the interlamellar setae.
   b. No such depression here.

9a. Cuticle of hysterosoma uniformly punctate.
   b. Cuticle of hysterosoma marked with polygonal punctate panels.
10. Body length (by sex, where known.)

Distribution of Variants

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Otocepheus Berlese, 1905, and Odontocepheus Berlese, 1913

Since species of the genus Tetracondyla have been described under the above names, it is well to clarify the relationship between these and the new genus. Trägårðh (1931, pp. 580-581) reviewed the history of these two genera established by Berlese, but certain of his conclusions must now be revised.

Otocepheus Berlese, 1905. Berlese (1905, p. 172) published no description of this group; he regarded it as a subgenus of Carabodes Koch, 1836, but established it solely by placing in it two of the species which he described at that time—Carabodes (Otocepheus) longior, and Carabodes (Otocepheus) crinitus. Neither was designated the genotype by Berlese but Tragardh (1931, p. 581) stated: "0. longior having been described first, this species must be considered the type of the genus Otocepheus, the diagnosis of which I propose to formulate as follows:" (etc.). Thus Trägårðh not only recognized the generic status of Otocepheus but also at that time designated the type of the genus. He also pointed out: "If we examine the diagnoses and the drawings of these two species, O. crinitus and O. longior, we find that they differ so profoundly in some essential respects, that it seems very doubtful whether they belong to the same subgenus." He stated somewhat later: "This leaves O. crinitus out, and as it can neither be placed in Carabodes sensu stricto nor in Odontocepheus a new genus must be created, which will also include the new species from Juan Fernandez. As a further investigation of the tropical acarina-fauna will undoubtedly yield many new forms more or less related to this genus, I think it is most appropriate to defer the establishment of a new genus till more forms have been investigated." While Trägårðh clearly recognized that a new genus was involved here, he did not name it. Two of his new species, Otocepheus pacificus, and Otocepheus longipilus, were described under this name. The first of these does not appear to be a Tetracondyla, and for the time being must be left in the genus Otocepheus, to which it may or may not belong. The writer has removed the second species to the new genus Tetracondyla. It should be pointed out that the tibia and the tarsus of the palp of
Otocepheus pacificus Tragardh, 1931, are not fused, and moreover tarsus I appears to be flexibly articulated to tibia I. In both of these important characteristics the species differs from T. pallida, assuming Tragardh’s figures to be correct.

Odontocepheus Berlese, 1913. This was also established as a subgenus of Carabodes Koch, and Berlese designated Tegeocranus elongatus Michael as type. Berlese described Odontocepheus as follows: Hysterosoma with anterior margin bidentate; posterior margin of propodosoma also bidentate, the teeth of the propodosoma and the hysterosoma contiguous. Otherwise as in the subgenus Carabodes (author’s translation). Tragardh (1931, p. 581) pointed out that Michael did not mention or delineate any teeth on the propodosoma or hysterosoma of Tegeocranus elongatus, and queried why Berlese designated this as the type species of his Odontocepheus. It should be pointed out, however, that other European workers have subsequently published figures of Odontocepheus elongatus (Michael) which clearly show four opposing teeth on the propodosoma and hysterosoma. Therefore Odontocepheus was appropriately described, and the type species was properly designated. We can conclude then that despite the vagaries referred to by Tragardh the type species of Otocepheus and Odontocepheus are well established and generically distinct. Moreover neither of these is congeneric with Tetracondyla pallida.

References

Tragardh, Ivar. 1931. Acarina from the Juan Fernandez Islands. NAT. HIST. JUAN FERNANDEZ AND EASTER ISLAND, ZOOl. 3(4):553–628.