

Hesperopilio mainae, a new genus and species of harvestman from Western Australia (Opiliones: Caddidae: Acropsopilioninae)

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Abstract – *Hesperopilio mainae*, new genus and species, is described from Western Australia, based on specimens of both sexes. The new genus may be the most plesiomorphic of the subfamily.

INTRODUCTION

The opilionid genus *Acropsopilio* Silvestri (1904) was based on a Chilean species, *A. chilensis* Silvestri, and the genus was later used as a foundation for the family Acropsopilionidae by Roewer (1923). Soon, other acropsopilionine genera had been described: *Caddella* Hirst 1925, *Oonopsopilio* Lawrence 1931, *Zeopsopilio* Forster 1948, *Austropsopilio* Forster 1955, and *Tasmanopilio* Hickman 1957. In my 1975 review of the group, I recognized the affinities of the acropsopilionids with the northern hemisphere caddids, and placed Acropsopilioninae as a subfamily of Caddidae Banks 1895. I proposed *Oonopsopilio* as a synonym of *Caddella*, *Zeopsopilio* of *Acropsopilio*, and *Tasmanopilio* of *Austropsopilio* (Shear 1975). This latter synonymy was not accepted by Cokendolpher and Maury (1990), who argued that the form of the eyemound differed. However, I maintain it because of the very strong resemblances of the palpi of the two "*Tasmanopilio*" species to those of other *Austropsopilio*. Since writing in 1975, I have seen specimens of *Tasmanopilio fuscus* Hickman, and am firm in upholding my earlier conclusions. The main point of difference regards the eyemound, which in mainland Australian and Chilean *Austropsopilio* bears eyes which are not much enlarged and which extends on a short stalk out over the chelicerae. In the Tasmanian species *A. fuscus* Hickman, the eyes are intermediate in size but the eyemound is extended forward, while in *A. megalops* Hickman, the eyemound is sessile and the eyes are almost proportionally as large as in *Acropsopilio*. I find this transformation series in the eyes and the close resemblance of the palpi convincing evidence for synonymy.

The family Caddidae has one of the most interesting relictual distributions known. The subfamily Caddinae is known from eastern North America and Japan (Suzuki 1976); it consists of two living species, *Caddo agilis* Banks and *C. pepperella* Shear, and an Oligocene Baltic amber fossil, *C. dentipalpis* Koch and Berendt. I thought that the

smaller species, *C. pepperella*, originated as a neotenic isolate of *C. agilis* as recently as 15,000 years ago in adaptation to a shortened life cycle under periglacial conditions (Shear 1975). It so closely resembles juvenile *C. agilis* that even the type collection of the latter species was mixed. Suzuki (1976), in reporting both *Caddo* species from Japan, surmised that this could not be so, since there would be no way to account for the movement of *C. pepperella* from New England to Japan in so short a time. However, I think it entirely feasible that the Japanese populations are a second independent neotenic event, probably due to the same selection pressures. If this is true, although specimens from either population are indistinguishable in morphology, the Japanese isolate should have a new name. As an additional complication, both *C. pepperella* and *C. agilis* appear to be parthenogenic, with only three males of *C. agilis* ever reported among hundreds of specimens from many localities (Pennsylvania: Gruber 1974; Hokkaido: Suzuki and Tsurusaki 1983). However, given the Baltic Amber fossil *C. dentipalpis*, which seems nearly identical to living *C. agilis*, the Japanese and North American populations are probably relicts of a once much wider distribution for this species.

Amongst the acropsopilionines, *Caddella* consists of four South African species and would appear to be the sister group of the other two genera, which are more closely related to each other. *Austropsopilio* contains six species described from Australia, and an indeterminate number of species from Chile (Cokendolpher and Maury 1990). *Acropsopilio* has six nominate species. Two occur in Chile, and specimens of the genus have also been collected in Argentina and Brazil (Cokendolpher and Maury 1990). The South American members of the genus need re-examination as there may be additional species. Single species of *Acropsopilio* occur in Mexico, northeastern North America, New Zealand, and Australia.

With *Acropsopilio* and *Austropsopilio* already

known from the eastern coastal regions of Australia (Shear 1974; Cantrell 1980), it only remained to find an acropsopilionine as a relict in Western Australia. The requisite specimens were collected at Torbay Head in 1987, and at additional localities in southern Western Australia in 1995.

SYSTEMATICS

Family Caddidae Banks

Subfamily Acropsopilioninae Roewer

Hesperopilio gen. nov.

Type species

Hesperopilio mainae sp. nov.

Etymology

From *hesperus*, the west, and *opilio*, a shepherd, used as a combining stem in this group of harvestmen. The gender is masculine.

Diagnosis

The peculiar features of the palpus separate this genus from all other acropsopilionines: the femur lacks ventral spined tubercles and the tibia and tarsus are much reduced. Specifically, the reduction of the tarsus to a small appendage of the tibia and (in females) the shortened, swollen, globular tibia with many glandular setae, are not duplicated anywhere in the family. *Austropsopilio* have somewhat reduced tarsi, but the tibiae retain setose lobes and are normally cylindrical; in *Acropsopilio*, the setose lobes of the tibia are usually absent, but

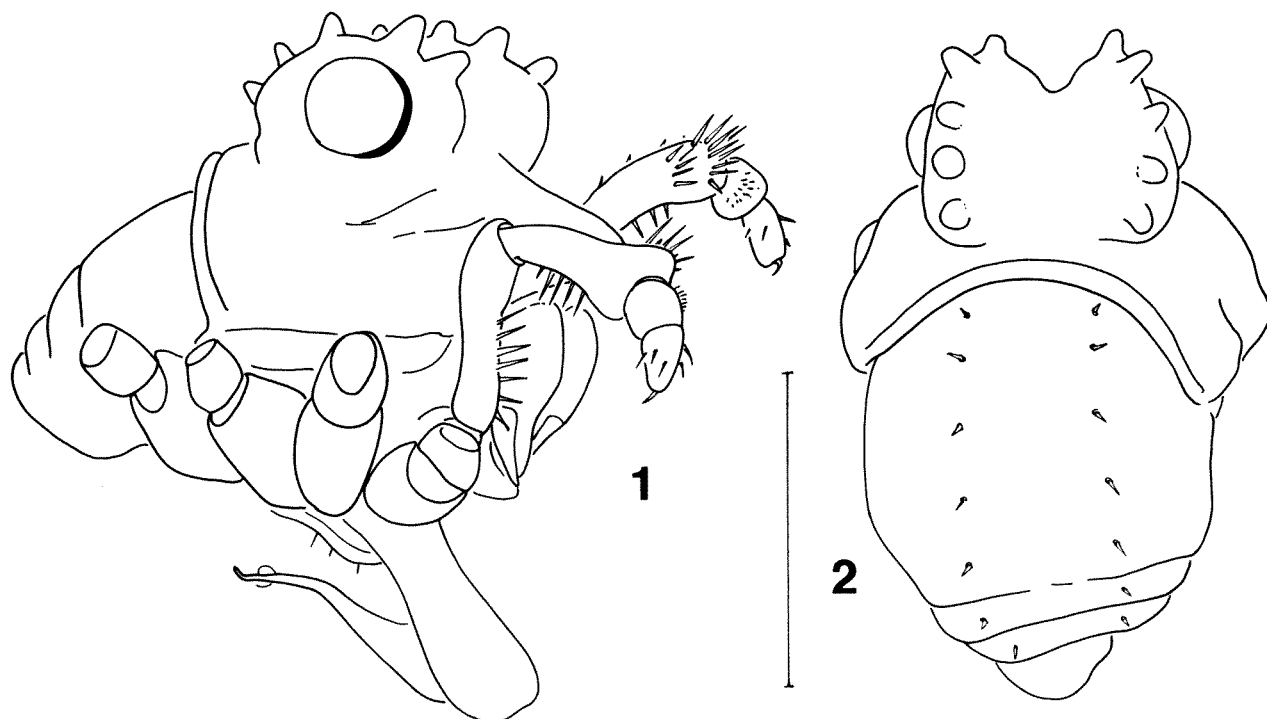
the tarsus is not reduced. *Caddella* species have essentially unmodified palpal tibiae and tarsi.

Males are known only in *Caddella* and *Austropsopilio*; the penes are complex, with accessory spines, and often exhibit torsion. The penis of *Hesperopilio mainae* is simple and acuminate, somewhat recalling the same organ in *Caddo agilis* (Gruber 1974). While some species of *Austropsopilio* have tuberculate bodies, none have the rows of tubercles above the eyes found in *Hesperopilio*.

Remarks

Cokendolpher and Maury (1990) claimed that *Austropsopilio* males were unknown until they found some in Queensland Museum collections (they excluded *A. fuscus*, males of which were described by Hickman [as *Tasmanopilio fuscus*, Hickman 1957]). They did not describe the specimens, but James Cokendolpher very kindly compared a drawing of the penis of *H. mainae* with his drawings of that of *Austropsopilio* species, and agreed that the Western Australian species represented a new genus. He pointed out that in *Caddella* and *Austropsopilio*, the other two genera with reduced palpal tibiae and tarsi, the penis is complex and spiny.

The palpi of *Hesperopilio mainae* converge to some degree on the palpi of the unrelated family Sabaconidae, in which a small tarsus reflexes against a swollen tibia, heavily set with glandular setae. Sabaconids collect prey by using the palpi as 'flypaper' and then rake them off the palpi with specialized cheliceral combs. While glandular



Figures 1, 2 *Hesperopilio mainae* n. gen., n. sp., ♂. 1, body, dorsal view; 2, same, lateral view. Scale line = 0.5 mm.

palpal setae are probably a basic character of opilionids, most acropsopilionines also have raptorial adaptations in the palpi. These seem minimized in *H. mainae*, while the glandular setae have become more important.

The relationships of *Hesperopilio* are difficult to assess. Because the penis resembles that of caddines (the immediate outgroup) and some phalangiids (the next outgroup), it is possible that this genus is the most plesiomorphic of the subfamily. On the other hand, male genitalia have not been described for *Acropsopilio*. Some or all of the species of this genus may be parthenogenic, but only *A. boopis* of eastern North America has been collected in quantity without the discovery of males. Based on palpal and available penial characters, it would appear that a reasonable arrangement for the subfamily would be (((*Hesperopilio* ((*Caddella* (*Austropsopilio*, *Acropsopilio*))).

***Hesperopilio mainae* sp. nov.**

Figures 1–9

Material Examined

Holotype

♂, Torbay Head (35°08'S, 117°38'E), Lot 40 (refers to a block of land, not a group of specimens), Western Australia, Australia, 20 April–14 May 1987, B. Y. Main (WAM 95/403).

Paratypes

Australia: Western Australia: 2 juveniles, same

collection data as holotype, but 5 October–2 November 1987 (WAM 95/404–5); 1 ♀, Stirling Range National Park, Bluff Knoll, 1070 m elevation (34°22'36.6"S, 118°15'10"E), 7 September 1995, S. Barrett (WAM 95/770); 1 ♂, same data as preceding ♀ but 900 m elevation (34°20'56.1"S, 118°14'54.7"E) (WAM 95/771); 1 ♂, Mt Lindsay, 410 m, (34°50'30"S, 117°18'21"E), 31 August 1995, S. Barrett (WAM 95/768).

Diagnosis

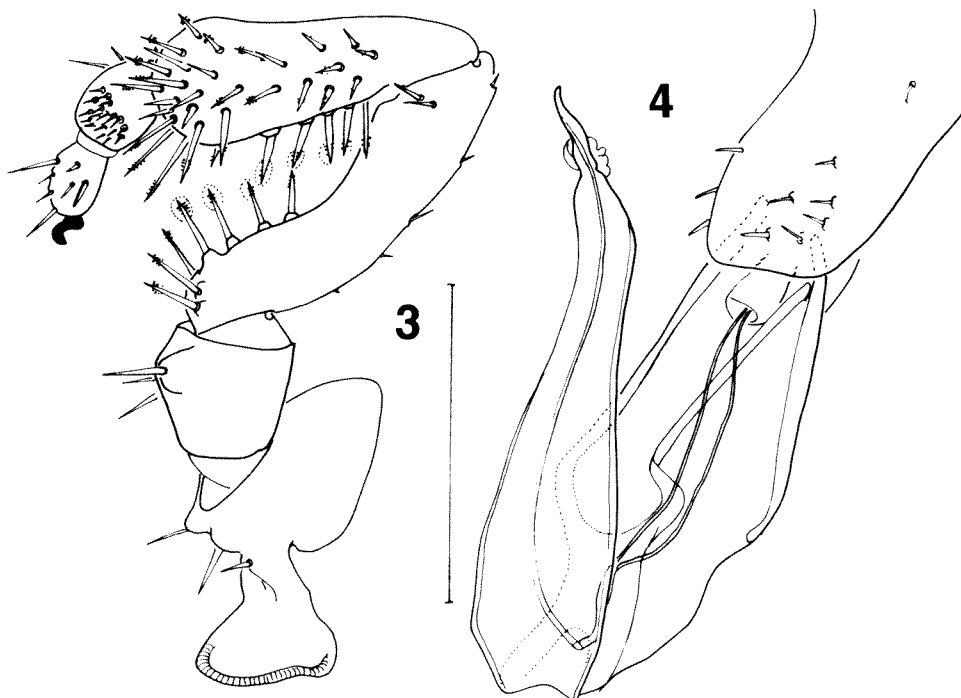
See the generic diagnosis.

Description

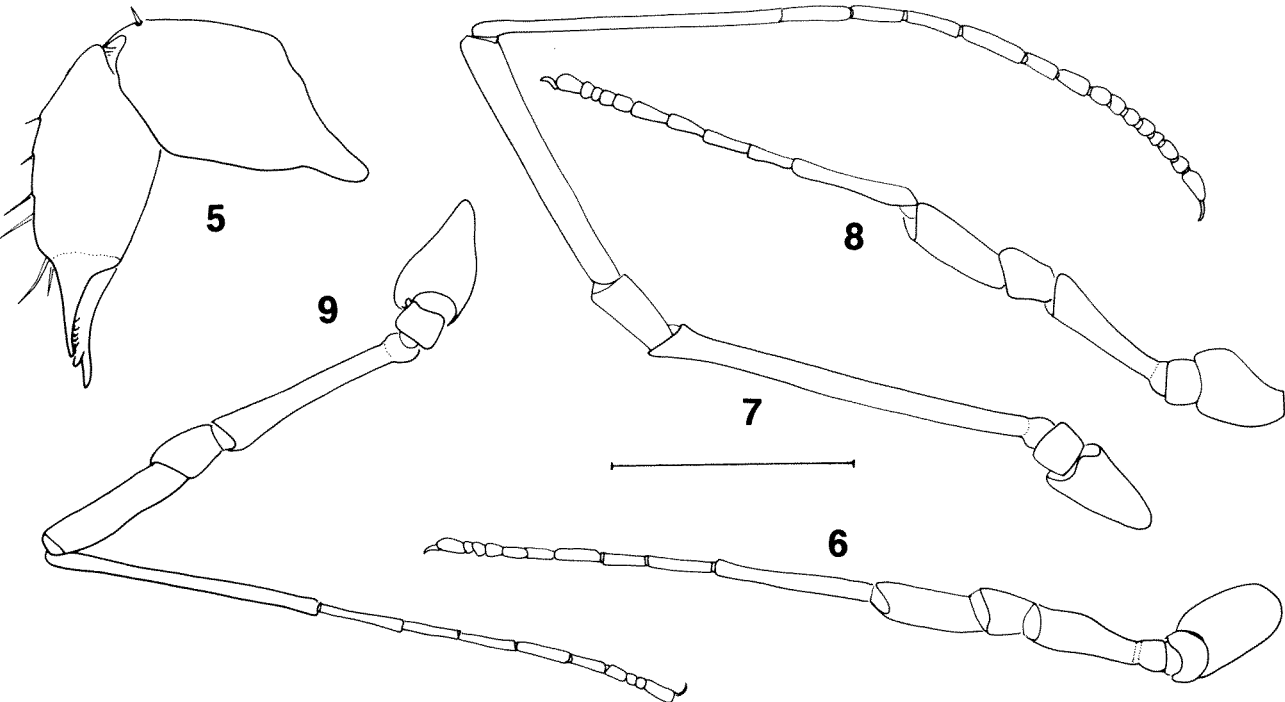
Male

1.25 mm long, 0.8 mm wide. Carapace about as broad as long, thoracic tergites not well marked, but with raised transverse ridge at posterior carapace margin; cuticle leathery, not heavily sclerotized. Eyemound nearly as wide as carapace (0.5 mm), strongly depressed between eyes, bearing series of five prominent tubercles over each eye. Eyemound not extending forward over chelicerae (Figures 1, 2). Ozopores not detected. Abdominal tergites not distinct, abdomen less voluminous than prosoma, soft. Abdominal sternites not distinct. Genital operculum (Figure 4) rounded, sparsely setose. Coxae and endites typical, similar to those of *Acropsopilio* species.

Chelicera (Figure 5) stout, largely unarmed, basal article 0.17 mm wide, 0.36 mm long, distal article 0.16 mm wide, 0.39 mm long. Fixed finger narrow, shorter than movable finger; movable finger 0.17



Figures 3, 4 *Hesperopilio mainae* n. gen., n. sp., ♂. 3, palpus, mesal view; 4, penis and genital operculum, ventral view. Scale line = 0.3 mm.



Figures 5–9 *Hesperopilio mainae* n. gen., n. sp., ♂. 5, chelicera, mesal view; 6, leg 1; 7, leg 2; 8, leg 3; 9, leg 4. Scale line = 0.3 mm for Figure 5, 0.40 mm for Figures 6–9.

mm long, with large subapical tooth, row of subequal smaller teeth on blade.

Palpus (Figure 3; lengths of articles given in Table 1) with trochanter robust, subquadrate, bearing three setae on ventral surface, mesal seta arising from prominent tubercle. Femur slightly sinuous, with row of six macrosetae on ventral surface of basal half; two small setae on mesal surface near distal end. Patella as long as femur, densely setose, drawn out mesoapically into large, globose lobe; ventrally with row of five macrosetae. Tibia reduced, subglobular, mesally with dense patch of about 20 small setae. Tarsus slightly longer than wide, subequal in length to tibia, with few dorsal setae, prominent curved claw lacking teeth.

Legs (Figures 6–9) in order of length 2:4:3:1; lengths of articles given in Table 1. Legs 1, 3 and 4 with 9 tarsal articles, leg 2 with 14.

Penis (Figure 4) with broad basal division strengthened ventrally with Y-shaped sclerotization, dorsally with single sclerotized bar, sharply bent posteriad at articulation with penis

shaft; shaft broad at base, narrowing to slightly less than half basal width. Glans sinuous, acute, tapering, with membranous inflated region at base.

Color light brown dorsally, darker on carapace around eyemound, with metallic highlights; paired white dots on each abdominal segment; palpi and chelicerae yellowish; legs dark brown, lighter distally.

Female

As described for male, but 1.6 mm long, 1.0 mm wide. Palpus (Figure 10) with trochanter bearing distinct ventral setose knob; femur with series of seven proximoventral setae, distomesal setose lobe at articulation with patella; patella lacking distal lobe, with five ventral setae, numerous setae on mesal surface; tibia subglobose, heavily setose; tarsus much reduced, with few setae and small claw. Ovipositor (Figure 11) with 12 darkly pigmented rings, distal nine with six setae each; labia with two series of six setae, distinct apical sense organs.

Distribution

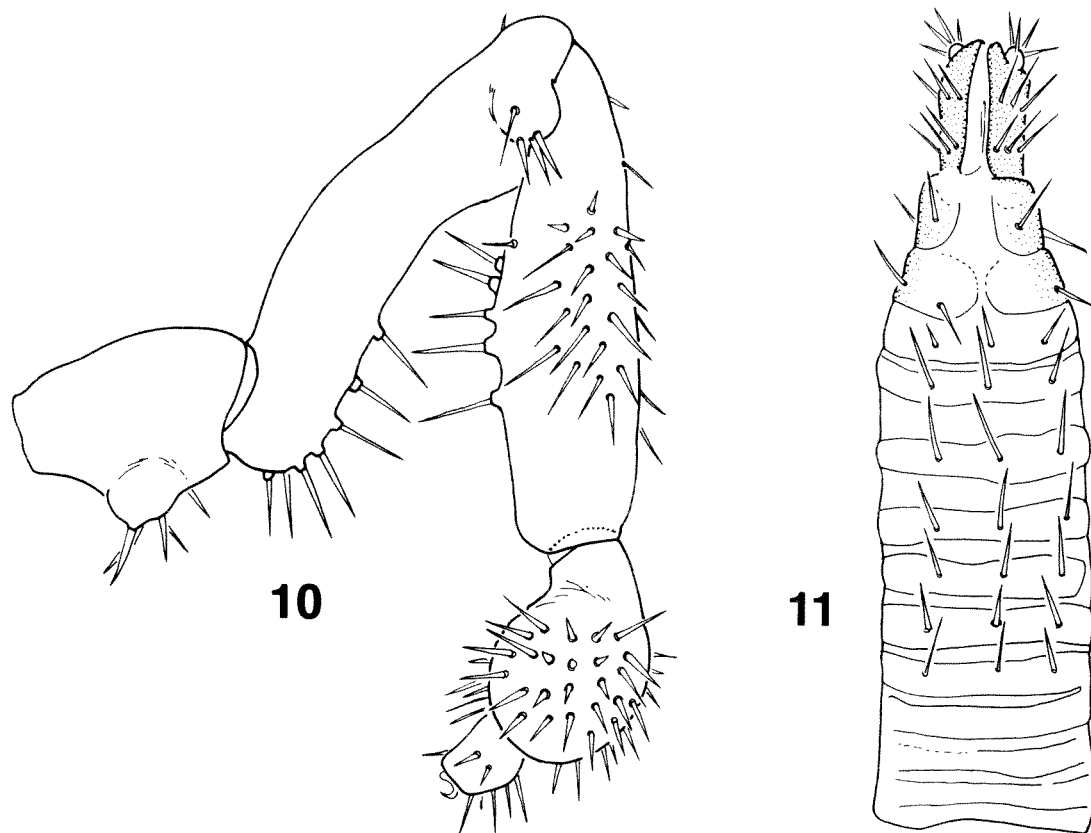
All specimens were taken in pitfall traps. The Mt Lindsay locality is about 40 km northwest of Torbay Head, while the Bluff Knoll sites are 100 km north-northeast. This indicates a fairly general distribution for the species in the area.

Etymology

It is my great pleasure to name this species for Barbara York Main, the collector of the holotype,

Table 1 Lengths of appendage articles of holotype *Hesperopilio mainae*

	TR	FEM	PAT	TIB	MTAR	TAR
palpus	0.15	0.34	0.34	0.11	–	0.08
leg 1	0.12	0.48	0.22	0.34	0.44	0.88
leg 2	0.14	1.40	0.26	0.86	1.02	1.56
leg 3	0.10	0.46	0.18	0.32	0.56	0.94
leg 4	0.12	0.72	0.22	0.46	0.94	1.26



Figures 10–11 *Hesperopilio mainae* n. gen., n. sp., ♀. 10, palpus, mesal view; 11, Ovipositor. Scale line = 0.3 mm.

who has for many years been a leading figure in Australian arachnology.

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