A PRIMITIVE NEW SPECIES OF *HYDROMETRA* FROM TAHITI (HETEROPTERA: HYDROMETRIDAE)

John T. Polhemus
University of Colorado Museum
3115 South York St., Englewood, Colorado, USA 80110

and

Dan A. Polhemus
Dept. of Natural Sciences, Bishop Museum
1525 Bernice Street, Honolulu, Hawaii, USA 96817

ABSTRACT. The most primitive *Hydrometra* so far discovered, *H. gagnei* n. sp., is described from Tahiti and compared to other relatively primitive taxa of Hydrometridae, most of which have terrestrial or phytophilous behaviors. Illustrations are provided of the dorsal habitus, head, and abdominal structures for the single known female of *H. gagnei*, and for the male abdomen of *H. aculeata* Montrouzier, another primitive species from New Caledonia.

INTRODUCTION

Some years ago Dr. Frank Howarth wrote to one of us (JTP) concerning a strange hydrometrid that had been collected from a dead tree fern on a mountain top in Tahiti, and asking if it could belong to one of the strange annectant genera that occur on the Marquesas to the east. From the color slide provided it appeared that the species might be *Hydrometra aculeata* Montrouzier, known from New Caledonia, or a closely related species, but it definitely belonged to the genus *Hydrometra*, and not to either of the Marquesan taxa. After the untimely death of Dr. Gagne, who intended to publish on this specimen, it was sent to JTP for further study which revealed that indeed the species is closely related to *aculeata*, but is undescribed and retains even more primitive characteristics than the latter (see discussion below).

For those who would subscribe to Hennig's progression rule (see Ashlock 1974), the mid-Pacific Hydrometridae provide an interesting study, with two primitive genera on the Marquesas, followed by the most primitive known species in *Hydrometra* (*H. gagnei*) on Tahiti, then the next most primitive (*H. aculeata*) on New Caledonia, and then geographically beyond this a basal group containing *H. cavernicola* J. &. D. Polhemus from Madagascar and *H. papuana* from New Guinea. These issues will be addressed in a cladistic analysis of groups within *Hydrometra* to be presented in a future paper. According to the cladistic analysis of Andersen (1982b), the three most plesiomorphic genera of Hydrometridae occur in Africa and the Neotropical region; a primitive genus of Hydrometridae is also known from Paleocene/Eocene fossils in Denmark (Andersen 1982a). We believe that the distributional pattern of primitive taxa in the Pacific most likely results from the persistence of such species in the absence of competition by more recently evolved groups.

A most striking attribute of the more primitive hydrometrid taxa, however, is that, where known, they are all either terrestrial, hygropetric, or phytophilous, thus supporting the hypothesis that this is the ancestral habitat of the Gerromorpha (see discussion in Andersen 1982, p. 335 ff.). Progressing from the most plesiomorphic to the most apomorphic genera, the habitats and geographical distribution are: *Veliometra* Andersen, on damp logs or litter at the edge of still water, Amazon Basin of South America; *Heterocleptes* Villiers, damp earth at the edge of still water or somewhat removed from it, Africa and Borneo; *Limnobatodes* Hussey, habitat unknown (taken only from light samples), Honduras, Brazil, French Guiana and Peru; *Dolichocephalometra* Hungerford, from high altitude but precise habitat unknown, Marquesas; *Chaetometra*, mountain top, on ferns, Marquesas; *Bacillometra* Esaki, large boulders in rivers, South America; *Hydrometra gagnei* n. sp., dead tree fern stump, Tahiti; *Hydrometra aculeata* Montrouzier, along the edges of small upland streams, New Caledonia; *Hydrometra cavernicola* Polhemus and Polhemus, on damp walls of shallow caves or rock face recesses, Madagascar; *Hydrometra papuana* Kirkaldy, along the edges of ponds or rivers, Papua New Guinea.

All measurements in the following description are given in mm. The holotype of *H. gagnei* is held deposited in the Bishop Museum, Honolulu, Hawaii (BPBM).

Hydrometra gagnei Polhemus & Polhemus **new species** Figs. 1–4

Description

MICROPTEROUS FEMALE. Length 6.81, width (across middle of thorax) 0.50 (Fig. 1).

Color. Ground color brown; abdominal tergites I–VI brown, dull, sparsely set with minute recumbent setae, faintly rastrate; VII and VIII mat, clothed with fine pubescence, VIII with shining posterior wedge. Head lighter dorsally between eyes, basally and anteriorly. Thorax dorsally with median irregular light areas, pronotum laterally with narrow arched frosted longitudinal stripe. Abdomen laterally lightly frosted, visible in oblique light. Laterotergites, laterosternites basally broadly yellowish. Legs, light brown to brown, darker distally, antennae brown to piceous; coxae, trochanters mostly light brown, similar to bases of femora.

Structure. Head relatively short (2.41), widest at antennal tubercles (0.46); set with a few bristly setae beneath, longer, denser anteriorly; ventral lobe large, truncate, not obscuring basal rostral segments in lateral view; maxillary plate small, not extending ventrally (Fig. 2); rostrum long, reaching onto prosternum to anterior coxae; ratio anteocular/postocular portions: 1.38/0.87; interocular space/width of an eye: 0.15/0.10; clypeus almost parallel sided, broadly rounded anteriorly (Fig. 3). Antennal formula I:II:III:IV; 0.36 : 0.56 : 2.61 : 1.64. Prothorax with small median depression on anterior lobe, posterior lobe with a few large shallow pits. Pronotum length 0.82; remainder of thorax 0.72 (to lateral suture behind metacetabula); abdomen length 2.92. Metanotum short (on midline, 0.26), without pronounced median sulcus. Thoracic, abdominal sternites pilose, setae short, about equally dense on all segments. Distance between anterior and middle coxae (measured between closest margins) 0.31; between middle and hind coxae 0.41. Acetabulae without pits; posterior acetabula with a weak depression dorsally. Abdominal mediotergite I present, rectangular, about 1/2 the length of II (Fig. 1).

Proportions of legs as follows: femur, tibia, tarsal I, tarsal II, tarsal III of foreleg, 2.25: 2.71: 0.07: 0.36: 0.20; of middle-leg, 2.46: 3.07: 0.07: 0.36: 0.20; of hind-leg, 3.43: 4.92: 0.07: 0.41: 0.23.

Female abdominal terminalia as shown in Fig. 4. Sternite VII prolonged caudad medially, posterior margin shining, forming an obtuse triangle. Tergite VIII simple, unmodified, without sharp process.

BRACHYPTEROUS FORM, MACROPTEROUS FORM, and MALE. Unknown.

Etymology. The patronymic *gagnei* honors the contributions of Dr. Wayne Gagné to entomology in general and Hemipterology in particular.

Discussion. *Hydrometra gagnei* n.sp. is most closely related to *Hydrometra aculeata* Montrouzier from New Caledonia, with which it shares a distinct quadrate abdominal mediotergite I (compare Figs. 1, 5). It differs from *aculeata* by being shorter and stouter, lacking a caudal process on female tergite VIII, and by the different proportions as given in the description. The male of *H. gagnei* is not yet known, but likely to be similar to *H. aculeata*; a figure of the male abdomen of this latter species is provided (Fig. 6), which should allow comparison once this male of *gagnei* is finally discovered.

In general facies *H. gagnei* approaches the annectant genera *Dolichocephalometra* Hungerford and *Chaetometra* Hungerford, but these monotypic genera are set apart by the reduced eyes, equidistant coxal spacing and nearly quadrate abdominal mediotergites II–VII; in *H. gagnei* the eyes are normal, the hind coxae are farther removed from the middle ones than the fore coxae, and abdominal medio-tergites II–VII are elongate. The form of the female ventrite VII, shape of the anteclypeus and lack of pits on the acetabulae suggest a relationship of both *gagnei* and *aculeata* with *H. cavernicola* J. &. D. Polhemus and *H. papuana* Kirkaldy.

The characters discussed above, plus the reduced maxillary plate and ventral lobe of the head (Fig. 2) place *H. gagnei* as the most primitive *Hydrometra* species known, followed by *H. aculeata* from New Caledonia. *H. cavernicola* from Madagascar is intermediate between these two species and the remainder of those in the genus, having in common with them a number of the plesiomorphic characters, but sharing with all remaining *Hydrometra* species the reduced mediotergite I and typical very elongate body shape.

Distribution. Tahiti.

Material examined. Holotype, micropterous female: SOCIETY ISLANDS, Tahiti, Mt. Marau summit, 1400 m., 20 Sept. 1977, J. Gourves, Bishop Museum Acc. #1977.568 (BPBM).

ACKNOWLEDGMENTS

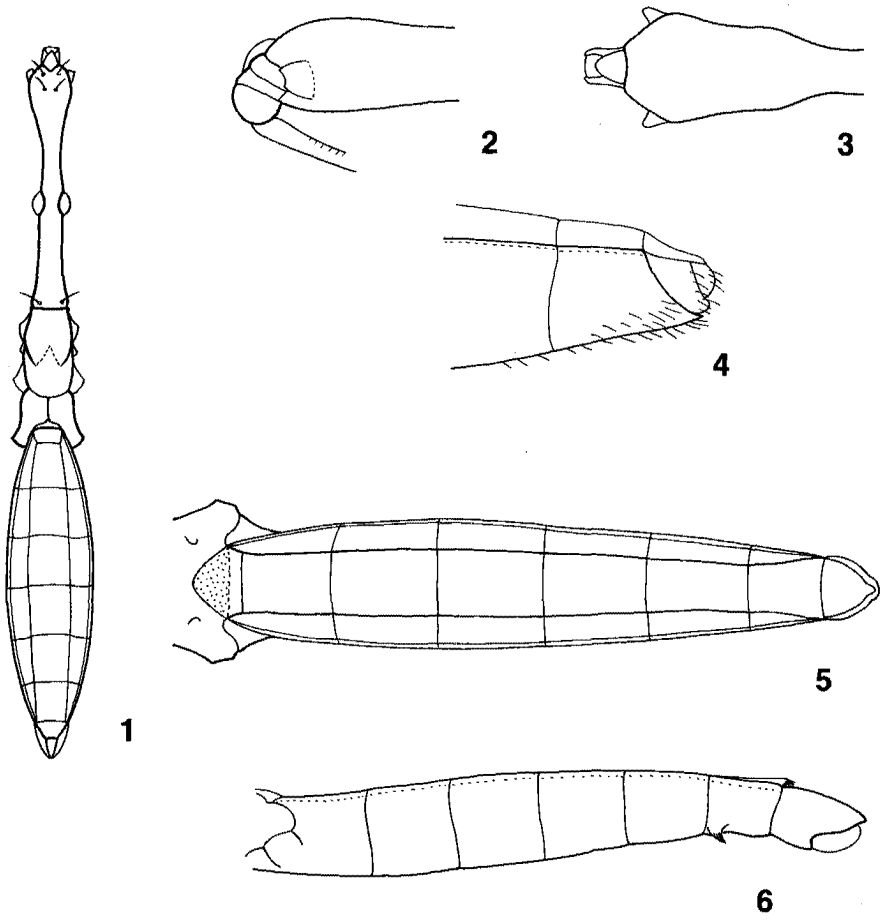
We are indebted to the late W. C. Gagné, Bishop Museum, Honolulu (BPBM), for the opportunity to study the specimen of the new species described here. Detailed habitat data for several of the genera were gathered during various expeditions supported by the National Geographic Society, to whom we are deeply grateful for their support. This research is supported in part by grant BSR–9020442 from the National Science Foundation, Washington, D. C.

LITERATURE CITED

Andersen, N.M. 1982a. A fossil water measurer (Insecta, Hemiptera, Hydrometridae) from the Paleocene/Eocene of Denmark and its phylogenetic relationships. *Bull. geol. Soc. Denmark* **30**: 91–96.

Andersen, N.M. 1982b. The semiaquatic bugs (Hemiptera, Gerromorpha). Phylogeny, adaptations, biogeography and classification. *Entomonograph* **3**, 455.

Ashlock, P.D. 1974. The uses of cladistics. *Annl. Rev. Ecol. Syst.* **5**: 81–99.



Figs. 1–4. *Hydrometra gagnei* n. sp., female. **1.** Dorsal habitus, legs omitted. **2.** Apex of head, lateral view. **3.** Apex of head, dorsal view. **4.** Terminal abdomen, lateral view. **5, 6.** *Hydrometra aculeata* Montrouzier. **5.** Female abdomen, dorsal view. **6.** Male abdomen, lateral view.