

## FOUR NEW SPECIES AND ONE NEW RECORD OF OTOCEPHEIDAE (ORIBATIDA) FROM THE PHILIPPINES<sup>1</sup>

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### ABSTRACT

Four new species of oribatids are described from the Philippines, namely, *Acrotocepheus banahawensis*, *A. palawanus*, *Cerostoecepheus baloghi* and *Leptocepheus mahunkai*. *Archeogotocepheus brevisetus* Mahunka is also recorded as new to the Philippine fauna.

**Key words:** Acarina, mites, new species, new record, Oribatida, Otocepheidae.

### INTRODUCTION

During the course of taxonomically reviewing specimen holdings of the family Otocepheidae in the Museum of Natural History, University of the Philippines Los Baños (UPLB), numerous species were found to be undescribed or unrecorded from the Philippines. Most of these belong to the genus *Dolicheremaeus* Jacot which is treated in a separate paper. Five species in four smaller genera, *Acrotocepheus* Aoki, *Archeogotocepheus* Mahunka, *Cerostoecepheus* Mahunka and *Leptocepheus* Balogh, are presented in this paper.

The Otocepheidae are one of the best studied families of oribatid mites from the Philippines. Aoki recorded and described the first known species of this family, indeed of the entire suborder Oribatida, from the Philippines, namely, *Acrotocepheus philippinensis* (Aoki 1965) and *Dolicheremaeus philippinensis* Aoki 1967. Corpuz-Raros (1979, 1990, 1991, 1998) discovered many more new species and described 6 new genera. These, together with new forms reported presently, brings the total known Philippine otocepheid fauna to 26 species and 11 genera.

Members of the family Otocepheidae are rather large, elongate apterogasterine oribatid mites that have no pteromorphae, areae porosae nor sacculi, and their prodorsum has no true lamellae in which place are long, submedian and subparallel costulae. Their genital plates are small and dark brown and are widely separated by a ventral plate from the larger anal plates. Genital setae usually number 4 pairs and anal setae usually 2 pairs. However some genera deviate from these usual chaetotactic patterns. *Acrotocepheus* and *Leptocepheus* species have these usual numbers of setae while *Archeogotocepheus* spp. have 4 genital and 3 anal pairs, and *Cerostoecepheus* spp. have 3 genital and 2 anal pairs. Genera differ further by the number of prodorsal and notogastral condyles and the number of notogastral and adanal setae. *Leptocepheus* spp. have very small rectangular pedotecta 2 + 3 like other members of the subfamily Tetracondyliinae and a single median notogastral

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condyle. On the other hand, the three other genera which are members of the Otocephalinae, have well developed fishtail-shaped pedotecta 2 + 3 whose anterior projection is much smaller than the posterior one in *Cerostocephus* while these projections are subequal in *Acrotocephus* and *Archegottocephus*.

Specimens used in this study are part of material accumulated in the 1970s from Mt. Makiling, Laguna and other parts of the country. These were mostly slide-mounted and, as such, have become slightly flattened out as shown in accompanying illustrations. The medium has become discolored after more than 20 years of storage and the slide mounts had to be remounted prior to microscopic studies. Remounting was done by soaking the old slides in a dish of water until the coverglass freely slipped, absorbing the debris around specimen with a tiny roll of tissue paper, and replacing the old medium with fresh Hoyer's fluid. Illustrations were prepared with the aid of a camera lucida mounted on a compound microscope.

Morphological and descriptive terms were adopted from Aoki's (1965, 1967) revision of the family and Balogh and Balogh's (1992) keys to world oribatid genera. The "unideficient holotrichy nomenclature" for notogastral setae is adopted from the latter cited authors. Measurements refer to the holotype and are given in microns. The ratio of body length to width (BL/W) is given to describe the degree of elongatedness of the body of each species.

Type specimens for all new species described herein are deposited in the UPLB Museum of Natural History.

### DESCRIPTIONS OF SPECIES

1. *Acrotocephus banahawensis* Corpuz-Raros, n. sp. Figs. 1A-C

**DIAGNOSIS.** This new species can be recognized by its striate genital plates and long notogastral setae including anterior pairs. *A. philippinensis* (Aoki 1965) and *A. surigaoensis* Corpuz-Raros 1979 also have striate genital plates but their notogastral setae are comparatively shorter than in *A. banahawensis*.

**DESCRIPTION.** Adult elongate, rather large, 878 x 426, L/W 2.05, dorsal and ventral surfaces entirely granulate.

**Prodorsum.** Rostrum rounded; rostral setae long, finely pointed, densely barbed on outer margin. Lamellar setae long, finely pointed, sparsely barbed bilaterally. Interlamellar setae 170 long, strongly pointed, sparsely barbed. Sensillus moderately long, club oval, smooth. Exobothridial setae very short and fine. Lateral condyles large, angular; median condyles small, crescentic, arising closely but distinctly separate.

**Notogaster.** Lateral condyles large, rectangular; median condyles absent. Notogastral setae 10 pairs, all long, finely pointed and sparsely barbed; *c2* 177, *la* 184, *lm* 204, *lp* 173, *h1* 224, *h2* 228, *h3* 150, *p1* 238, *p2* 221, *p3* 185 long; *lm* slightly closer to and in line more with *la* than *lp*; *h3* arising midway between level of *h1* and *h2*; distance *p1-p1* slightly shorter than *p1-p2* and about half those of *p2-p3* and *p3-h3*. Pore *ips* posterior to seta *h3*. Gland opening *gla* close and posterolateral to pore *im*.

**Venter.** Epimeral setae 3-1-3-3, apparently smooth, median pairs *1a*, *2a*, *3a* and *4a* very short, all others much longer; *3b* unusually close to midline, near *3a*. Genital plates striate; genital setae 4 pairs, smooth. Aggenital setae 1 pair, short and smooth (missing in holotype). Anal setae 2 pairs, finely pointed and smooth, *an1* 85,

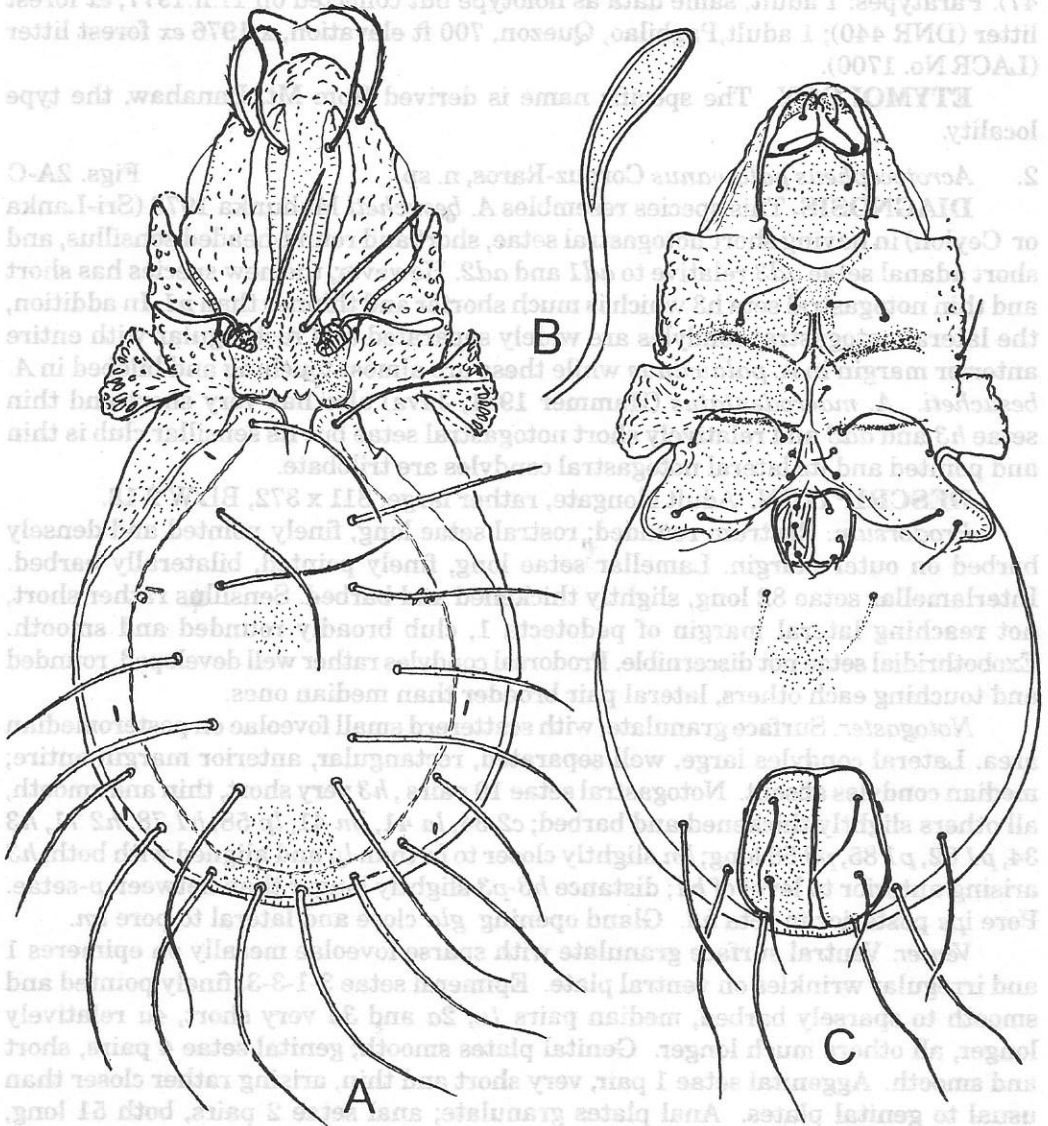


Figure 1. *Acrotocepheus banahawensis* Corpuz-Raros, n. sp.: A. dorsum, B. sensillus, C. venter.

*an2* 68 long. Adanal pore *iad* paraanal. Adanal setae 3 pairs, very long, finely pointed and sparsely barbed, *ad1* 170, *ad2* 211, *ad3* 136 long; *ad3* paraanal.

*Legs.* All legs monodactyl. Terminal seta *u* of tarsi L-L-L-L.

**TYPES.** *Holotype* adult, LUZON IS.: Mt. Banahaw, Concepcion, Sariaya, Quezon, 20.ii.1977, J.M. Sotto & R.C. Garcia, *ex* leaves of *Callicarpa erioclana* (DNR-47). Paratypes: 1 adult, same data as holotype but collected on 11.ii.1977, *ex* forest litter (DNR 440); 1 adult, Pagbilao, Quezon, 700 ft elevation, x.1976 *ex* forest litter (LACR No. 1700).

**ETYMOLOGY.** The specific name is derived from Mt. Banahaw, the type locality.

2. *Acrotocephus palawanus* Corpuz-Raros, n. sp.

Figs. 2A-C

**DIAGNOSIS.** This species resembles *A. besucheti* Mahunka 1973 (Sri-Lanka or Ceylon) in having short notogastral setae, short and round-headed sensillus, and short adanal setae *ad3* relative to *ad1* and *ad2*. However, the new species has short and thin notogastral seta *h3* which is much shorter and thinner than *p1*. In addition, the lateral notogastral condyles are widely separated and rectangular with entire anterior margin in *A. palawanus* while these are almost touching and bilobed in *A. besucheti*. *A. macrodentatus* (Hammer 1981, Java) also has very short and thin setae *h3* and *ad3* and relatively short notogastral setae but its sensillar club is thin and pointed and its lateral notogastral condyles are trilobate.

**DESCRIPTION.** Adult elongate, rather large, 811 x 372, BL/W 2.18.

*Prodorsum.* Rostrum rounded; rostral setae long, finely pointed and densely barbed on outer margin. Lamellar setae long, finely pointed, bilaterally barbed. Interlamellar setae 82 long, slightly thickened and barbed. Sensillus rather short, not reaching lateral margin of pedotecta 1, club broadly rounded and smooth. Exobothridial setae not discernible. Prodorsal condyles rather well developed, rounded and touching each others, lateral pair broader than median ones.

*Notogaster.* Surface granulate, with scattered small foveolae on posteromedian area. Lateral condyles large, well separated, rectangular, anterior margin entire; median condyles absent. Notogastral setae 10 pairs, *h3* very short, thin and smooth, all others slightly thickened and barbed; *c2* 34, *la* 41, *lm* 41, *lp* 58, *h1* 78, *h2* 71, *h3* 34, *p1* 82, *p1* 85, *p3* 58 long; *lm* slightly closer to *la* than *lp* and aligned with both; *h3* arising anterior to level of *h1*; distance *h3-p3* slightly longer than between *p*-setae. Pore *ips* posterior to seta *h3*. Gland opening *gla* close and lateral to pore *im*.

*Venter.* Ventral surface granulate with sparse foveolae mesally on epimeres 1 and irregular wrinkles on ventral plate. Epimeral setae 3-1-3-3, finely pointed and smooth to sparsely barbed, median pairs *1a*, *2a* and *3a* very short, *4a* relatively longer, all others much longer. Genital plates smooth; genital setae 4 pairs, short and smooth. Aggenital setae 1 pair, very short and thin, arising rather closer than usual to genital plates. Anal plates granulate; anal setae 2 pairs, both 51 long, smooth. Adanal pore *iad* paraanal. Adanal setae 3 pairs, *ad1* 54, *ad2* 61, *ad3* 31 long; *ad1* and *ad2* sparsely barbed, *ad3* thin and smooth; *ad3* paraanal, widely separated from *ad2* at a distance that is about twice that of *ad2-ad1*.

*Legs.* All legs monodactyl. Terminal seta *u* of tarsi L-S-S-S.

**TYPE.** *Holotype* adult, PALAWAN IS.: Balsahan, Iwahig Penal Colony, Puerto Princesa, Palawan, 29.iv.1978, L.S. Cuy, *ex* forest litter (LACR No. 1843).

**ETYMOLOGY.** The specific name is derived from Palawan, the island and province of origin of the type specimen.



- 3 *Archegotocepheus brevisetus* Mahunka Figs. 3A-D  
*Archegotocepheus brevisetus* Mahunka, 1989: 388. [Type: Bukit Timah Nature Reserve, Taban Valley, Singapore, ex soil in buttress of large tree].

*Megalotocepheus crinitus* (nec Berlese, 1905): Corpuz-Raros, 1991: 140; Corpuz-Raros, 1992: 91.

**DIAGNOSIS.** *A. brevisetus* is recognized by its short notogastral setae *c2* which are much shorter than the distance *c2-la*. The interlamellar and adanal setae are also short, the latter much shorter than their mutual distances. The sensillus has a small oval club, lateral and median prodorsal condyles are strong, surface of notogaster is sparsely foveolate, and notogastral setae are barbed, with long barbs distally. As in other *Archegotocepheus* species, pedotecta 2 + 3 has equally developed anterior and posterior projections, and 4 genital, 1 aggenital, 3 anal and 3 adanal pairs of setae. Terminal setae *u* of tarsi are L-S-S-S. A Philippine example measures 1184 x 638, which is slightly greater than the type from Singapore.

**DISTRIBUTION.** Singapore, Philippines (**new record**).

**SPECIMENS EXAMINED.** One adult, LUZON IS.: Makiling Botanic Gardens, Mt. Makiling, Los Baños, Laguna, iii.1975, L.A.C. Raros, ex secondary forest litter (LACR No. 462); 8 adults, PALAWAN IS.: Rio Tuba, Bataraza, Palawan, 23.v.1982, M.J.P. Cañete, ex leaf litter and soil (LACR No. 2112).

**REMARKS.** The author mistakenly reported this species from the Philippines (Corpuz-Raros, 1991) as *Megalotocepheus crinitus* (Berlese) (now also in the genus *Archegotocepheus*) on account of the relatively short notogastral setae. Examination of remounted specimens revealed its greater similarity with *A. brevisetus* Mahunka 1989 whose description was overlooked at the time of the report. The present paper rectifies the identification error made.

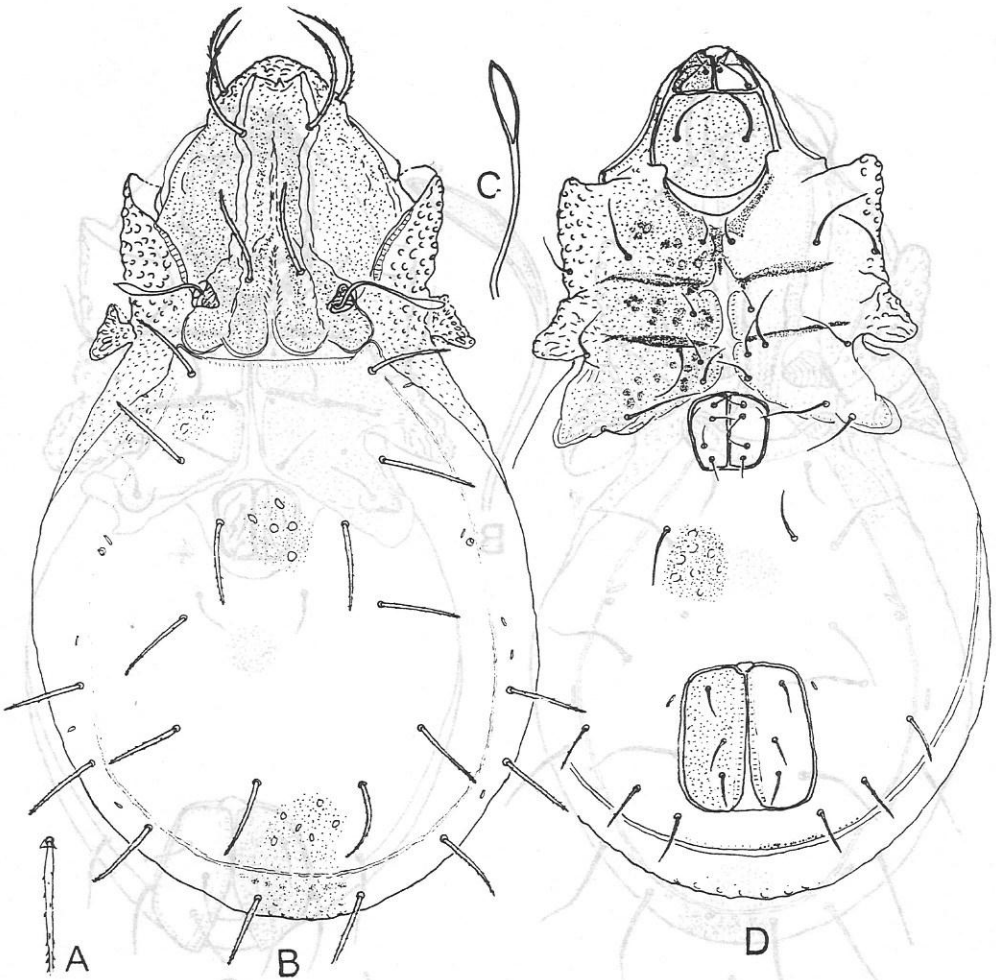
4. *Cerostocepheus baloghi* Corpuz-Raros, n. sp. Figs. 4A-C  
*Eurostocepheus trisetosus* nec Balogh, 1970: Corpuz-Raros, 1979: 11.

**DIAGNOSIS.** This is the second known species in the genus *Cerostocepheus*. Mahunka 1973 established this genus apart from *Eurostocepheus* Aoki 1965 based on their difference in number of genital setae, there being 3 pairs in the former and 4 pairs in the latter. The type species, *C. trisetosus* (Balogh 1970) (Sri Lanka or Ceylon) has 10 pairs of short notogastral setae while the new species has only 9 pairs of relatively longer setae. This difference was overlooked when Corpuz-Raros mistakenly recorded *C. trisetosus* from the Philippines in 1979.

**DESCRIPTION.** Adult elongate, large, 958 x 492, BL/W 1.95; dorsal and ventral surfaces entirely granulate.

*Prodorsum.* Rostrum broadly rounded; rostral setae long, finely pointed, unilaterally barbed. Lamellar setae long, finely pointed, very sparsely barbed on both sides. Interlamellar setae short, 61 long, fine and smooth. Sensillus rather short, with long and thin fusiform club. Exobothridial setae not discernible. Lateral condyles large, oval; median condyles very small but touching, crescentic.

*Notogaster.* Lateral condyles large, angular; median condyles absent. Notogastral setae 9 pairs, *h1* absent, moderately long, fine and smooth; *c2* 58, *la* 85, *lm* 75, *lp* 109, *h2* 102, *h3* 78, *p1* 68, *p2* 102, *p3* 82 long; *lm* equidistant from *la* and *lp*; *h3* arising at about same level as *h2*; distances between p-setae subequal and about 2/3 that of *h3-p3*. Pore *ips* posterior to seta *h3*. Gland opening *gla* close and posterior to pore *im*.



**Figure 3.** *Archegotocepheus brevisetus* Mahunka: A. dorsum, B. sensillus, C. venter.

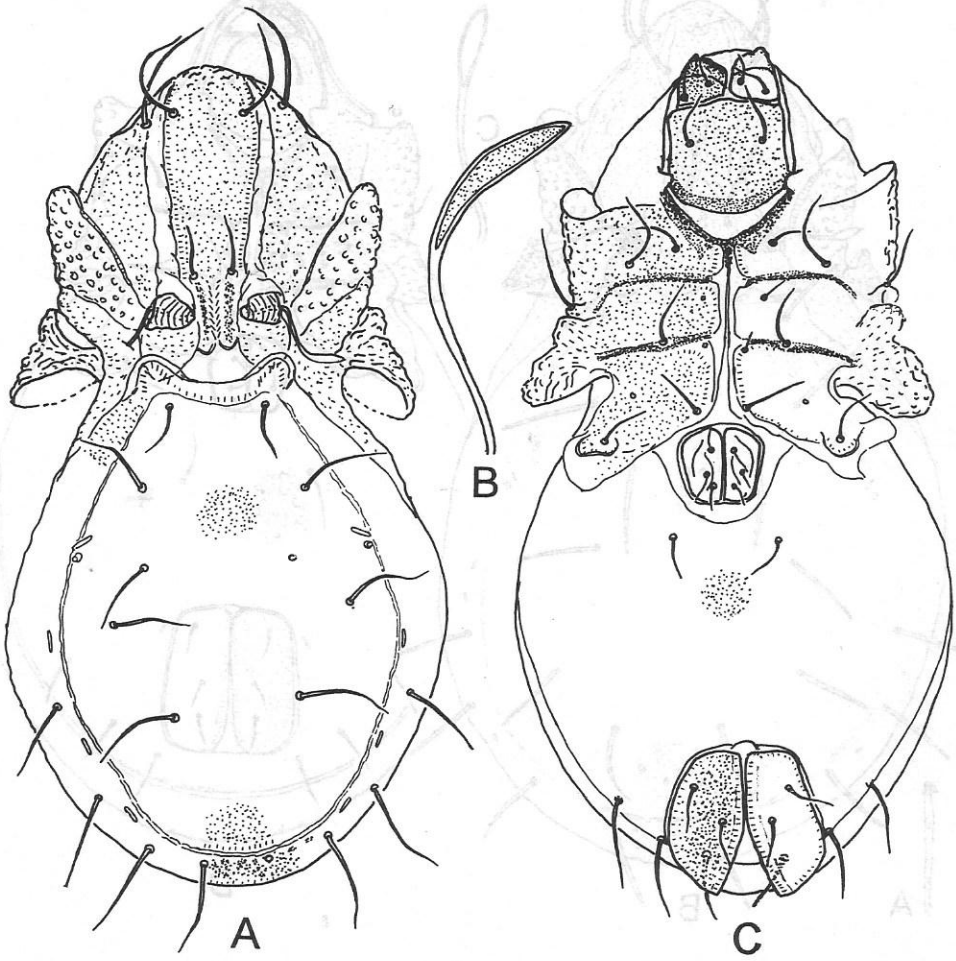


Figure 4. *Cerostocephus baloghi* Corpuz-Raros, n. sp.: A. dorsum, B. sensillus, C. venter.

*Venter.* Epimeral setae 3-1-3-3, all fine and smooth, *1a*, *2a* and *3a* short, *4a* rather long; *4b* arising farther from *4c* than usual. Genital plates each with 2 strong longitudinal lines; genital setae 3 pairs, fine and smooth. Aggenital setae 1 pair, 37 long, fine and smooth. Anal plates granulate; anal setae 2 pairs, short and fine, *an1* 48, *an2* 51 long. Adanal pore *iad* paraanal. Adanal setae 3 pairs, fine and smooth, *ad1* 51, *ad2* 68, *ad3* 68 long; *ad3* paraanal.

*Legs.* All legs monodactyl. Terminal seta *u* of tarsi L-S-S-S.

**TYPES.** *Holotype* adult, LUZON IS.: Mt. Makiling, Upland Hydroecology Program site, Puting Lupa, Calamba, Laguna, 22.viii.1977, UHP staff, *ex* secondary forest litter. *Paratypes*: 2 adults from same sample as holotype; 2 adults with same data but from different sample as holotype; and 1 adult, same data as holotype but sample taken on 24.v.1977.

**ETYMOLOGY.** This species is named in honor of Prof. Dr. Jans Balogh, Zoosystematical and Ecological Institute, EOTVOS Lorand University, Budapest, Hungary, leading contemporary oribatologist, whose world reviews of oribatid genera and extensive works on the world fauna, have inspired many workers including the author to pursue systematic studies on these ecologically important soil mites.

5. *Leptocephus mahunkai* Corpuz-Raros, n. sp.

Figs. 5A-C

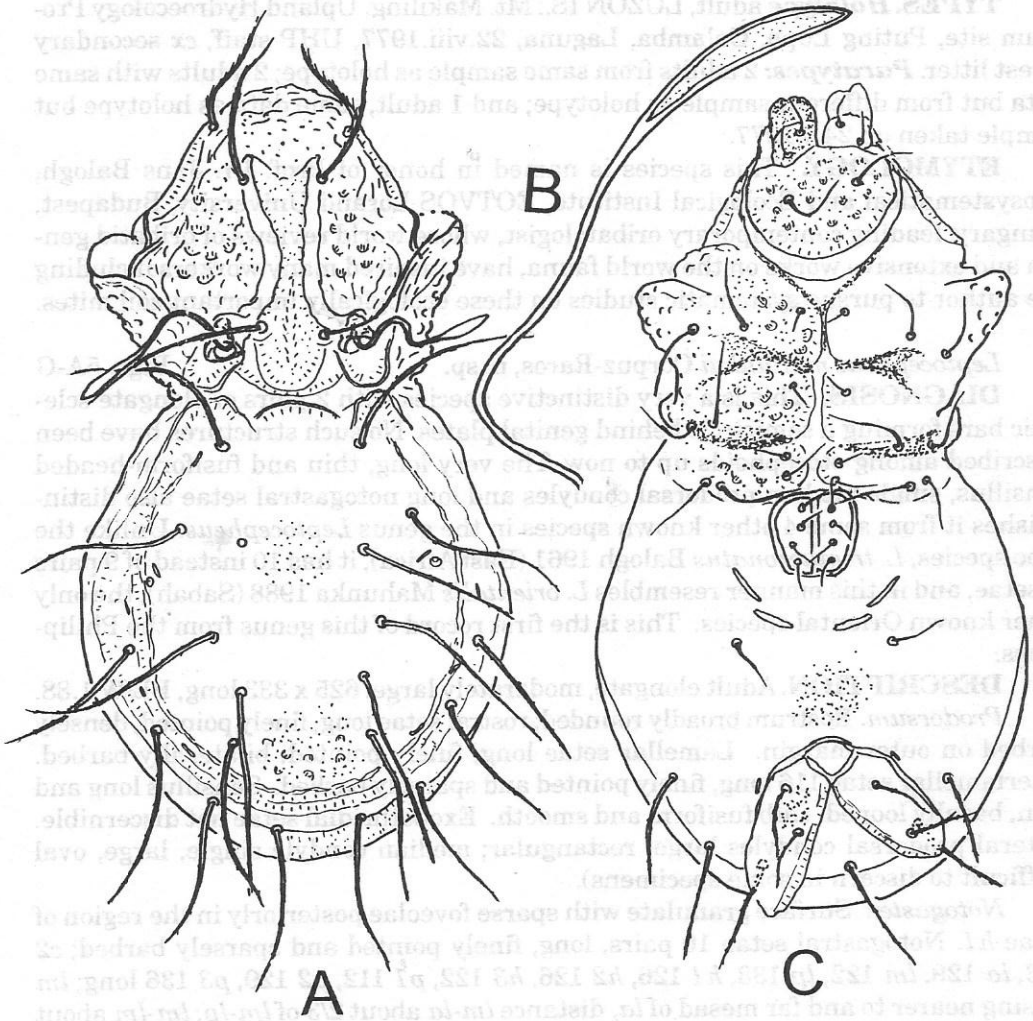
**DIAGNOSIS.** This is a very distinctive species with 2 pairs of elongate sclerotic bars forming a semicircle behind genital plates. No such structures have been described among otocephs up to now. The very long, thin and fusiform-headed sensillus, single median prodorsal condyles and long notogastral setae also distinguishes it from some 4 other known species in the genus *Leptocephus*. Unlike the type species, *L. trimucronatus* Balogh 1961 (East Africa), it has 10 instead of 9 pairs of setae, and in this manner resembles *L. orientalis* Mahunka 1988 (Sabah), the only other known Oriental species. This is the first record of this genus from the Philippines.

**DESCRIPTION.** Adult elongate, moderately large, 625 x 333 long, BL/W 1.88.

*Prodorsum.* Rostrum broadly rounded; rostral setae long, finely pointed, densely barbed on outer margin. Lamellar setae long, finely pointed, bilaterally barbed. Interlamellar setae 116 long, finely pointed and sparsely barbed. Sensillus long and thin, basally looped, club fusiform and smooth. Exobothridial setae not discernible. Lateral prodorsal condyles large, rectangular; median condyle single, large, oval (difficult to discern in some specimens).

*Notogaster.* Surface granulate with sparse foveolae posteriorly in the region of setae *h1*. Notogastral setae 10 pairs, long, finely pointed and sparsely barbed; *c2* 153, *la* 129, *lm* 122, *lp* 133, *h1* 126, *h2* 126, *h3* 122, *p1* 112, *p2* 129, *p3* 136 long; *lm* arising nearer to and far mesad of *la*, distance *lm-la* about 2/3 of *lm-lp*; *lm-lm* about 1/2 *la-la*; *h3* arising far anterior to level of *h2*, almost at level of *lp*; distances between *p*-setae subequal to *h3-p3*. Pore *ips* posterior to seta *h3*. Gland opening *gla* close and posterior to pore *im*.

*Venter.* Ventral surfaces granulate with rather large foveolae on subcapitulum and mesal areas of epimeres. Epimeral setae 3-1-3-3, fine and smooth, median pairs *1a*, *2a* and *3a* short, *4a* slightly longer, all others much longer. Genital plates smooth; genital setae 4 pairs, short and smooth. Ventral plate with 2 pairs of elongate sclerotic bars forming a semicircle behind genital plates and arising anterior to aggenital setae. Aggenital setae 1 pair, 51 long, fine and smooth. Anal plates granulate; anal



**Figure 5.** *Leptocephus mahunkai* Corpuz-Raros, n. sp.: A, dorsum, B, sensillus, C, venter.

setae 2 pairs, barbed, *an1* 61, *an2* 68 long. Adanal pore *iad* paraanal. Adanal setae 3 pairs, barbed, *ad1* 78, *ad2* 85, *ad3* 82 long; *ad3* paraanal.

*Legs.* All legs monodactyl. Terminal seta *u* of tarsi L-S-S-S.

**TYPES.** *Holotype* adult, LEYTE IS.: Mt. Pangasugan, Baybay, Leyte, 2.x.1990, A.M. Almeroda, *ex* leaf litter (LACR No. 4029). *Paratypes*: 3 adults collected with holotype.

**ETYMOLOGY.** This species is named in honor of Dr. Sandor Mahunka, Hungarian Museum of Natural History, Budapest, in recognition of his numerous contributions to oribatid systematics worldwide including the Oriental Region.

### ACKNOWLEDGEMENTS

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