

THE FIRST HYPORHEIC WATER MITES FROM THE AFROTROPICAL REGION (ACARI: HYDRACHNIDIA), WITH NEW SPECIES OF THE GENERA *KAWAMURACARUS* UCHIDA AND *BHARATOHYDRACARUS* COOK

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ABSTRACT — Two new water mite species are described from Ghana, *i.e.* *Kawamuracarus biscutatus* **n. sp.** and *Bharatohydracarus africanus* **n. sp.** These two genera have not been reported previously from the Afrotropical region. Moreover, they are the first known hyporheic species of the Afrotropical region.

KEYWORDS — New species; Ghana; systematics; hyporheic

INTRODUCTION

Thus far, no hyporheic water mites have been reported from the Afrotropical region, the region south of the Sahara including Madagascar (K.O. Vets 1970, D.R. Cook pers. comm.). In this paper two new hyporheic species will be described from Ghana. A hyporheic *Atractides* female is left unidentified, as males are necessary for describing new species.

is used on three locations in the mountains bordering Togo, but I was successful in only two streams. Streams in other parts of the country are either too sandy or rocky for collecting hyporheic water mites. Only three water mites were collected, and two of these are described in this paper. A hyporheic *Atractides* female (from Kue River) is left unidentified, as males are necessary for describing new species.

MATERIALS AND METHODS

All material for this paper has been collected by the author with the so called Karaman-Chappuis method (Karaman 1935, Chappuis 1942). A hole is dug in a gravel bank in a stream, and the water pouring in is filtered through a dip net. The material is then sorted in a white tray, and the mites are collected with a pipette. In Ghana this method

The following abbreviations are used: PI-PV = palp segment 1-5; I-leg-4-6 = fourth-sixth segments of first leg; asl = above sea level; NP = National Park; RMNH = Naturalis Biodiversity Center, Leiden. All measurements are in μm , measurements of palp and leg segments are of the dorsal margins.

SYSTEMATICS

Family Limnesiidae Thor

Genus *Kawamuracarus* Uchida, 1937

Species of the genus *Kawamuracarus* have been found in Japan (one species, Uchida 1937), Europe (two species, K.O. Viets 1978), India (three species, Cook 1967), North America (four species, Smith and Cook 2000), Mexico (three species, Cook 1980, Cramer 1987), Sulawesi, Indonesia (one species, Smit 1992) and Oman (one species, Smit 2003). The new species described below is the first from the Afrotropical region, and means a considerable extension of the known range of the genus.

Kawamuracarus biscutatus n. sp.

(Figures. 1A-C, 2A-C)

Material examined — Holotype female, Agumatsa River at first bridge crossing track, Agumatsa Wildlife Sanctuary, Ghana, 7° 06.830' N; 0° 35.760' E, alt. 253 m asl, 22-ii-2013 (RMNH).

Diagnosis — Dorsum with two large plates; PIV with extremely long setal tubercles located far proximally and a very long medial seta inserting at the same level.

Description — Female: Idiosoma pale yellow, 599 long and 365 wide. Eyes absent. Dorsum with two large plates, a smaller anterior plate, 130 long and 203 wide and a larger posterior plate, 332 long and 243 wide. Anterior plate with two pairs of glandularia and the paired postocularia, posterior plate with two pairs of glandularia. Anterior coxal plates not fused medially. Fourth coxal plates triangular, posterior to fourth coxal plates an extensive area of secondary sclerotization. Genital field 174 long and 138 wide, with three pairs of acetabula, acetabular plates indented between anterior pair and central pairs of acetabula; anterior acetabula elongated, posterior acetabula somewhat triangular. Pregenital sclerite 58 wide. Posterior to genital field a small platelet. Length of PI-PV: 30, 62, 70, 118, 56. Ventral margin of PII with a seta, inserted directly on segment surface. PIV with two very long setal tubercles (although no setae could be seen), anterior setal tubercle longer than posterior setal tubercle; at base of these long tubercles, which are inserted far

proximally, two short tubercles. Medial margin of PIV with a very long seta, located proximally, on the level of the tubercles and extending beyond anterior margin of segment. PV long and slender. Lengths of I-leg-5-6: 94, 102, 110. Length of IV-leg-4-6: 138, 182, 152. IV-leg-6 with small claws and a terminal seta, 36 long.

Etymology — Named for the two dorsal plates.

Remarks — The presence of two dorsal plates is unique within the genus, and will separate it from all other known species. All species known from Mexico, North-America and Japan have three large plates, two anterior and one unpaired posterior plate. In species from the Oriental region (including Oman) and the W. Palearctic, the dorsal platelets are either much smaller or absent. Moreover, no other species has a PIV with similarly long tubercles and medial setae. Also in *K. polyporus* Cook, 1967 from India, most similar in this character state, these extensions and setae are not as long as in the new species. This species differs from *K. biscutatus* furthermore in a higher number of acetabula (8-14 pairs, Cook 1967).

Family Hungarohydracridae Motaş and

Tanasachi

Genus *Bharatohydracarus* Cook, 1967

Thus far, the genus is known from India (six species, Cook 1967), Japan (two species, Imamura 1957, 1959), Java, Indonesia (one species, Lundblad 1971) and Oman (two species, Gerecke 2004). A new species is described here from Ghana, which means a considerable extension of the known range of the genus.

Bharatohydracarus africanus n. sp.

(Figures 3A-D)

Material examined — Holotype male, Kue River, Kyabobo NP, Ghana, 8° 31.087' N; 0° 36.049' E, alt. 208 m asl, 25-ii-2013, leg. H. Smit (RMNH).

Diagnosis — Posterior margin of male fourth coxal plates only slightly oblique, PII slender, widening anteriorly; IV-leg-2-4 with a row of setae, IV-leg-4 with four additional very long setae.

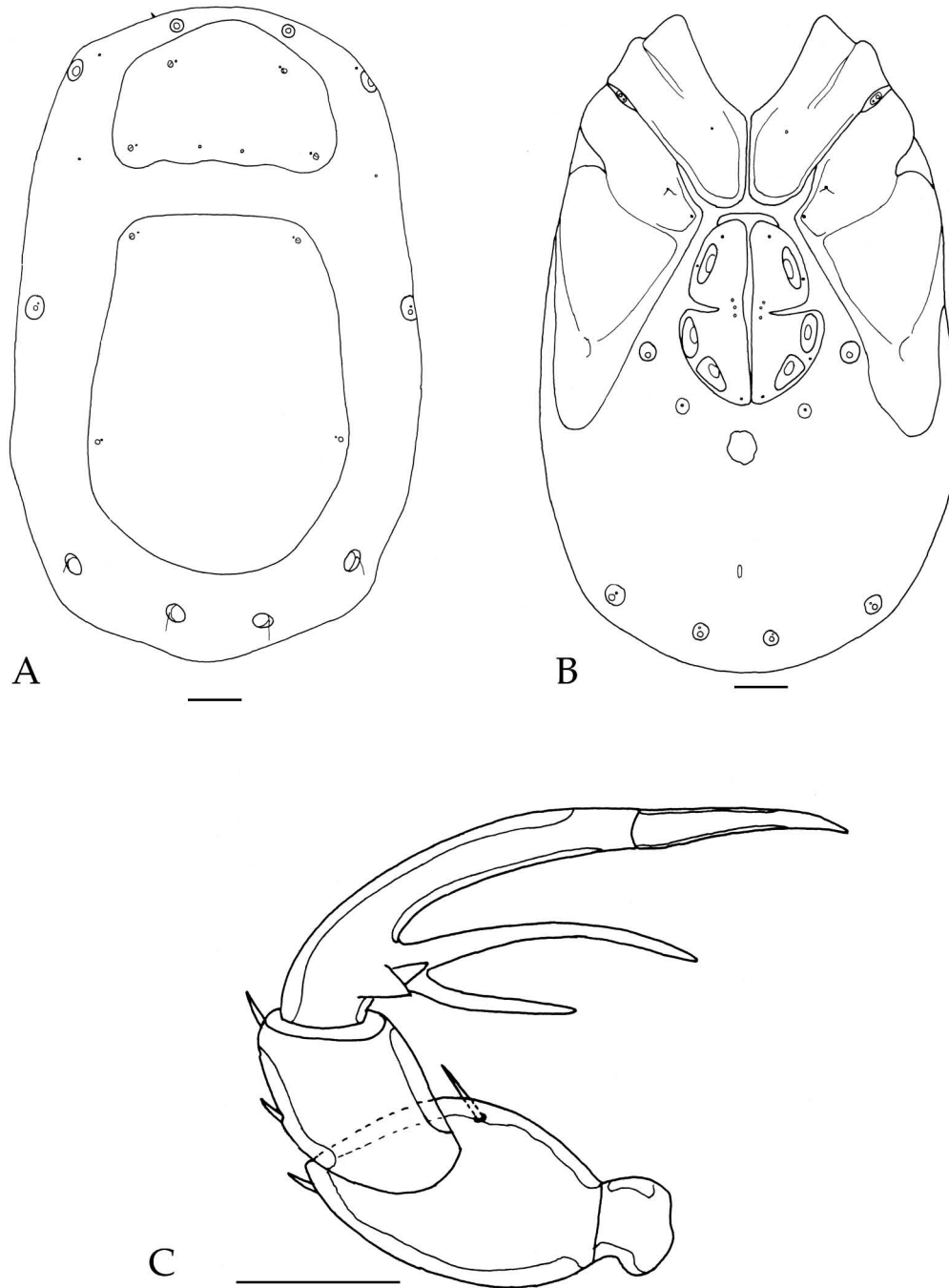


FIGURE 1: *Kawamuracarus biscutatus* n. sp., holotype female: A – Dorsal view; B – Ventral view; C – Palp. Scale bars = 50 µm.

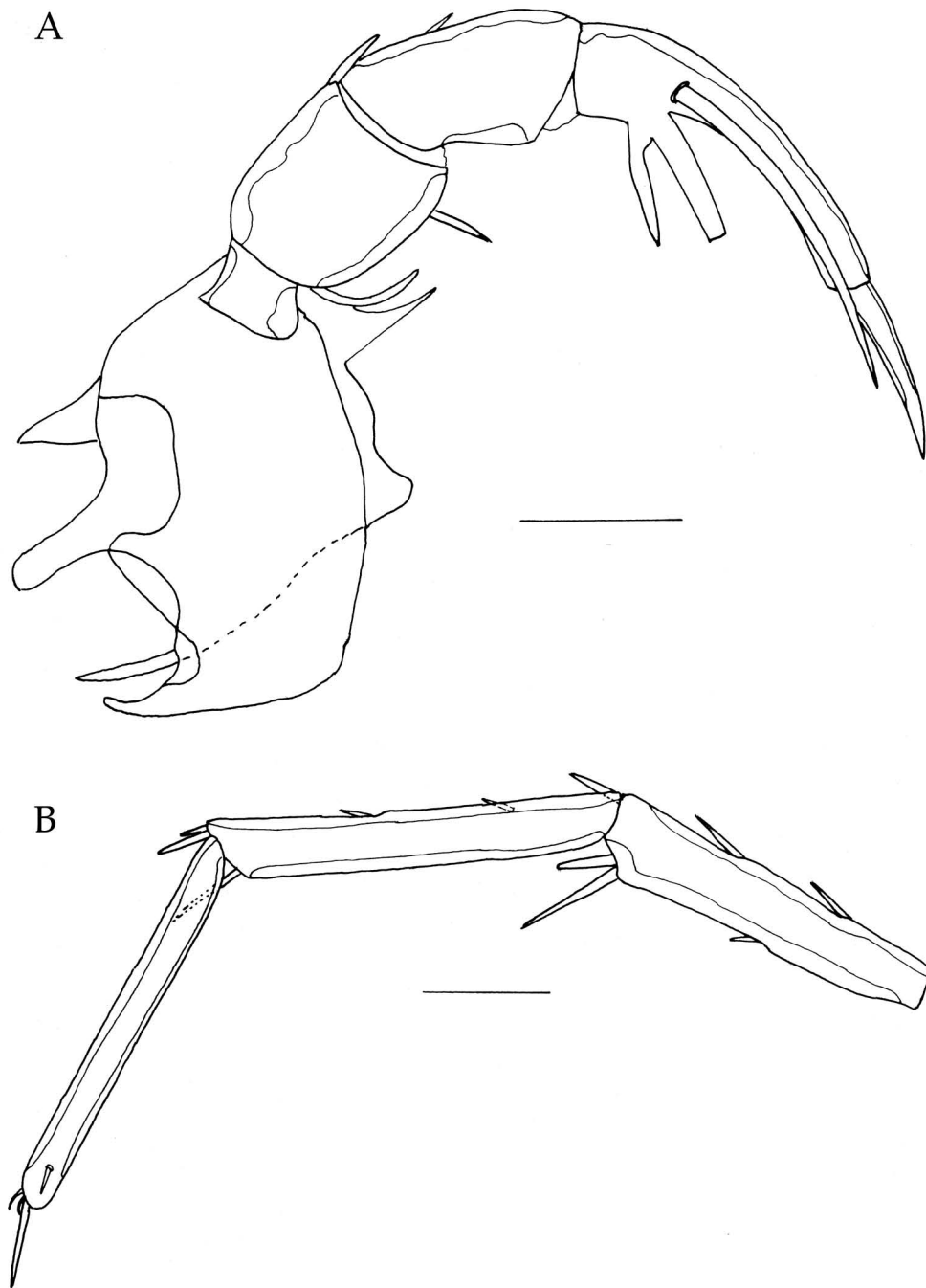


FIGURE 2: *Kawamuracarus biscutatus* n. sp., holotype female: A – Palp + capitulum; B – IV-leg-4-6. Scale bars = 50 µm.

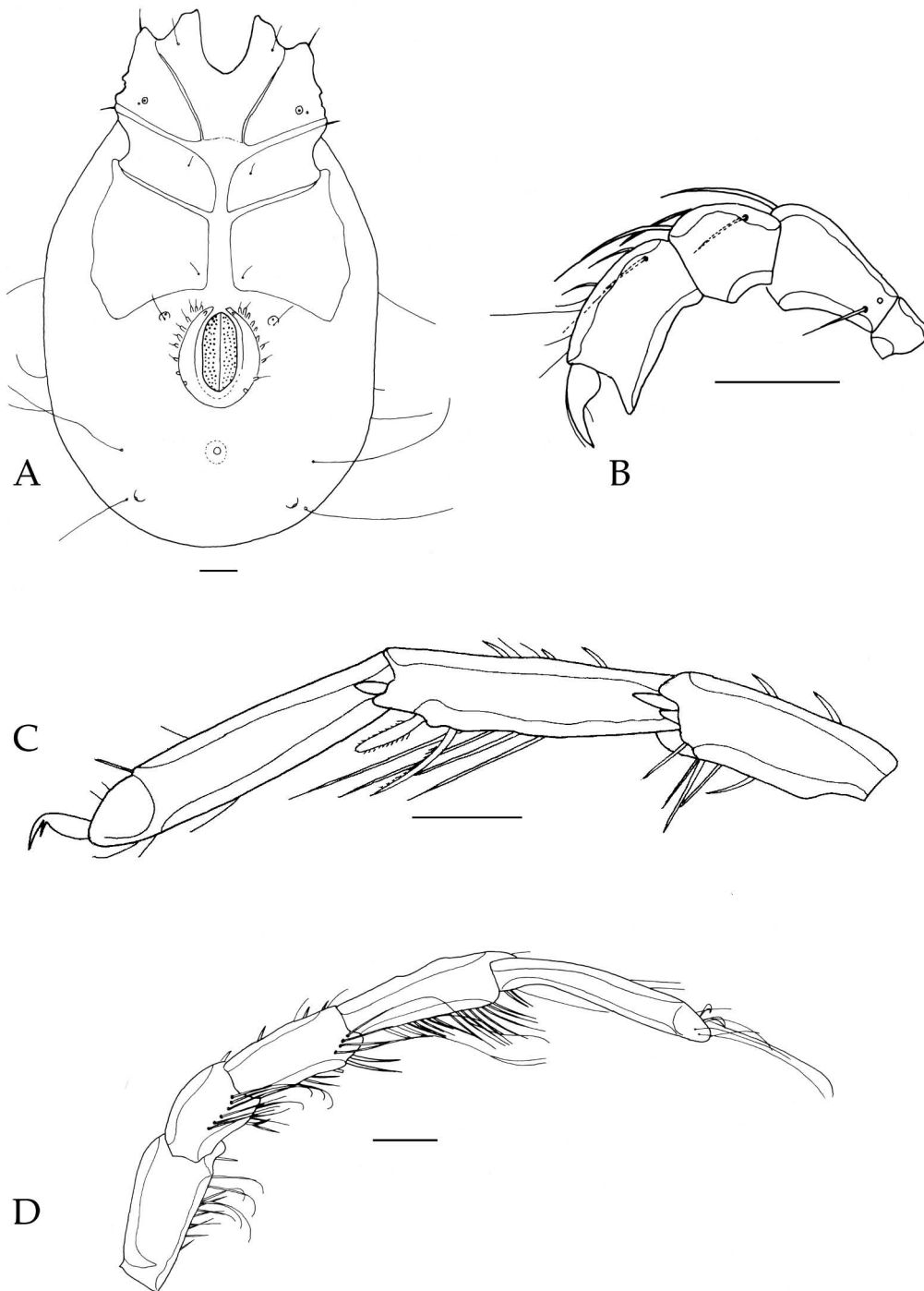


FIGURE 3: *Bharatohydracarus africanus* n. sp., holotype male: A – Ventral view; B – Palp; C – III-leg-4-6; D – IV-leg-2-6. Scale bars = 50 μm.

Description — Male: Idiosoma 632 long and 437 wide, colour pale yellowish. Dorsal shield complete, 599 long and 405 wide. Eyes reduced in size, lying below the integument. Anterior coxal plates extending well beyond anterior idiosoma margin. Posterior margin of fourth coxae only slightly oblique. Gonopore 108 long and 48 wide, rounded anteriorly and posteriorly and parallel lateral margins and with approximately 50 pairs of acetabula. A fringe of stalked setae surrounding the genital field. Lengths of PI-PV: 22, 64, 46, 62, 26. PII slender, widening anteriorly with two medial setae and one anterodorsal seta; PIII with one medial and one anterodorsal seta; PIV pointed anteroventrally, with six dorsal setae of different length and shape and one long medial seta. Lengths of I-leg-4-6: 100, 110, 116; I-leg-2 and -3 with two and three long, stiff setae, respectively. Third leg more or less unmodified, but III-leg-2 with 13 short, heavy setae, III-leg-3 with two long, stiff setae and III-leg-5 with three long stiff setae. Lengths of IV-leg-4-6: 102, 130, 153. Fourth leg segments relatively unmodified; IV-leg-2-4 with a row of setae of different length, setae longest on third segment; IV-leg-4 with a row of four additional, very long setae; IV-leg-5 ventrally with a row of setae, increasing in length distally; IV-leg-6 with two long and two shorter setae inserted near tip of segment. Claws with narrow claw blade and clawlet.

Female: Unknown.

Etymology — Named for its occurrence on the African continent.

Remarks — All known *Bharatohydracarus* species have the posterior margin of the fourth coxal plates more oblique than the new species. The males of *B. latus* (Imamura, 1959) and *B. imamurai* Cook, 1967 are similar in the elliptical gonopore shape. The latter species has IV-leg-1 with an extension, which is absent in the new species. The male of *B. latus* has the fourth leg with a different setation (long setae at tip of IV-leg-6 lacking, IV-leg-4 with only one very long seta in stead of four), while the posterior margin of the fourth coxal plates is very oblique. From *B. debilis* Gerecke, 2004 only the female is known, but this species is much smaller (Gerecke 2004).

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