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A new species of the *Agauopsis brevipalpus*-group from India (Acari: Halacaridae)

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(With 12 figures)

Abstract

Agauopsis arabia sp. n. is described from the Indian coast of the Arabian Sea. The species is a member of the *brevipalpus*-group. With the four denticulate ventral spines on telofemur I, *A. arabia* sp. n. resembles *A. brevipalpus* (Trouessart, 1889) and related species.

Introduction

The genus *Agauopsis* Viets, 1927 is cosmopolitan, with records from littoral to bathyal zones. The majority of the 72 species described can be attributed to natural species groups (Bartsch 1986, 1996, 1999, Otto 1999), one of these groups is the *brevipalpus*-group, named after *Agauopsis brevipalpus* (Trouessart, 1889). The *brevipalpus*-group is characterized by: anterior dorsal plate with H-shaped costae; posterior dorsal plate with pair of porose costae; ventral plates uniformly porose; third palpal segment with blunt, denticulate spur; fourth palpal segment with two setae; tarsi II to IV with three dorsal but no ventral setae; on tarsus II medial parambulacral seta spur-like, lateral parambulacral seta setiform; tarsi III and IV each with spur-like lateral but no medial parambulacral seta; telofemur I with one to three ventral and none, one or two ventromedial spines; tibia I with one ventral and two ventromedial spines.

Agauopsis brevipalpus, described on the base of a specimen from Le Croisic, French Atlantic coast (Trouessart 1889; Trouessart & Neumann 1901), is characterized by its four spines on telofemur I. A similar number and arrangement of spines is present in many of the species of the *brevipalpus*-group. *A. brevipalpus* is presently known from the eastern Atlantic, Mediterranean and Black Sea. Records from other oceans are in need of verification (Bartsch 1996), e.g. those by Rao & Ganapati (1968) and Chatterjee (1995). Examination of individuals collected on the coast of southwestern India proved these to be similar but not conspecific with *A. brevipalpus*.

Material and methods

The halacarids were collected by the junior author (T.C.) in the Arabian Sea, southwestern coast of India, on a shore with boulders, rocky platforms, and rock pools. The mites are mounted in glycerine jelly. The holotype is deposited in the Zoological Museum Hamburg (ZMH), paratypes in the ZMH and the Senckenberg Museum Frankfurt (SMF).

Abbreviations used in the description are: *AD*, anterior dorsal plate; *AE*, anterior epimeral plate; *ds-1* to *ds-5*, first to fifth pair of dorsal setae on idiosoma; *GA*, genitoanal plate; *GO*, genital opening; *OC*, ocular plate(s); *PD*, posterior dorsal plate(s); *PE*, posterior epimeral plate; *pgs*, perigenital setae. Legs numbered I to IV.

The position of a seta is given in a decimal system, with reference to the length of a plate, from the anterior to the posterior margin.

Systematics

Agauopsis arabia sp. n.

Figs 1-12

MATERIAL: Holotype. Male, ZMH, Acc. No A46/01. India, west coast, Kerala, Kovalam beach, 8° 23'N, 76° 57'E, amongst intertidal algae, November 1992; coll. T. Chatterjee.

Paratypes. One female, ZMH, Acc. No A47/01. Collecting data as in holotype. Male, female, SMF; collecting data as in holotype.

ETYMOLOGY: The name is derived from the locality, the Arabian Sea.

DIAGNOSIS: A species of the *Agauopsis brevipalpus*-group with 4 ventral apically denticulate spines. Medial costae of *PD* 2-3 porose panels wide; lateral costae delicate. Rostrum slightly longer than gnathosomal base. Tibia II to IV with 3, 2, 2 pectinate and spiniform ventral setae. Claw pectines on tarsi III and IV rudimentary.

DESCRIPTION: Male. Idiosoma of holotype 416 µm long, 270 µm wide; paratype 422 µm long. Costae of dorsal plates pierced by canaliculi which are arranged in panels. Each panel with 4-9 such canaliculi. Integument outside costae with epicuticular droplets fused to reticulate ornamentation (Fig. 3); each polygon of reticulum with 5-8 very delicate pores. Idiosoma with minute frontal spinelet (Fig. 1). *AD* 152 µm long, 122 µm wide; with H-shaped costae. Pair of small gland pores in anterior portion of 'H'; *ds-1* medial to gland pores. Setae *ds-2*, *ds-3* and *ds-4* within striated integument. *OC* 92 µm long, 67 µm wide. Each plate with oblique porose costa extending to medial margin of the plate, 2 corneae, a gland pore and a pore canaliculus. Interval between posterior cornea and gland pore, and between gland pore and pore canaliculus, equalling width of posterior cornea. *PD* 204 µm long, 169 µm wide; anterior margin rounded. Medial pair of longitudinal costae almost V-shaped; costae 2, rarely 3 porose panels wide (Fig. 3). Porose areola in posteromedian edge of *PD* somewhat delimited from longitudinal costae. Lateral costae weakly developed, hardly raised but with canaliculi. Setae *ds-5* at 0.40 relative to length of *PD*, and midway between medial and lateral costae. Adanal setae delicate.

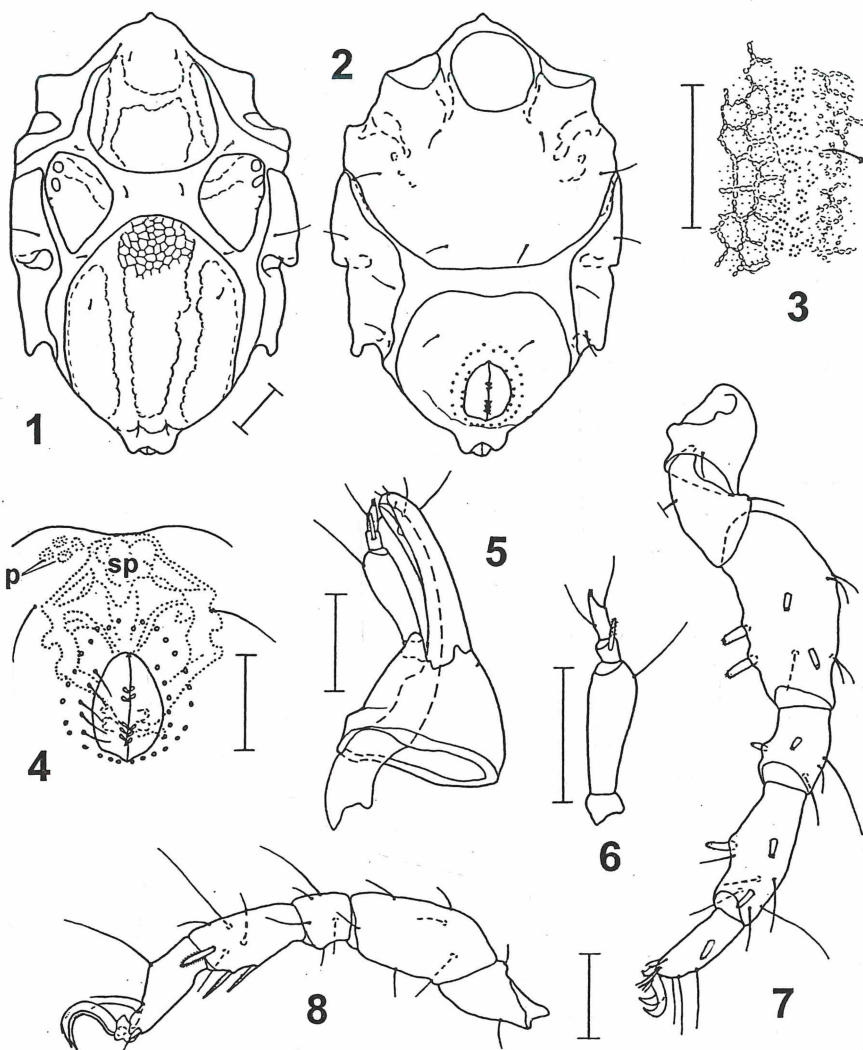
Ventral plates panelled, each panel with 6-18 canaliculi. *AE* 147 μm long, 257 μm wide; with 3 pairs of ventral setae and pair of epimeral pores. The latter with internal cup-shaped structure opening to exterior with minute slit. *PE* 177 μm long; with 1 dorsal and 3 ventral setae. *GA* 147 μm long, 160 μm wide. Anterior margin in holotype slightly concave (Fig. 2), in paratype truncate. *GA* 60 μm long, 45 μm wide. Distance from *GA* to *GO* equalling length of *GO*. Spermatopositor large (Fig. 4); from anterior truncate portion to base of furca 107 μm long. Pair of outlying setae almost at the same level as anterior setae of ring of *pgs*. Holotype with 5 and 6 *pgs* on either side immediately lateral to *GO*, and 28 *pgs* in a ring around *GO*. Paratype on either side with 4 and 5 inner *pgs* and 13 and 14 outer setae. Genital sclerites with 5 pairs of spur-like subgenital setae.

Gnathosoma 155 μm long. Gnathosomal base porose. Tectum scaliform (Fig. 5). Rostrum, as in female (Fig. 11) slender, parallel-sided, slightly longer than gnathosomal base. Basal pair of maxillary setae long, situated on gnathosomal base; the other pair in apical fourth of rostrum. Tip of rostrum with 2 pairs of slender rostral setae. Palps slender; extending to end of rostrum. Spine on third palpal segment long, bluntly ending and pectinate (Fig. 6).

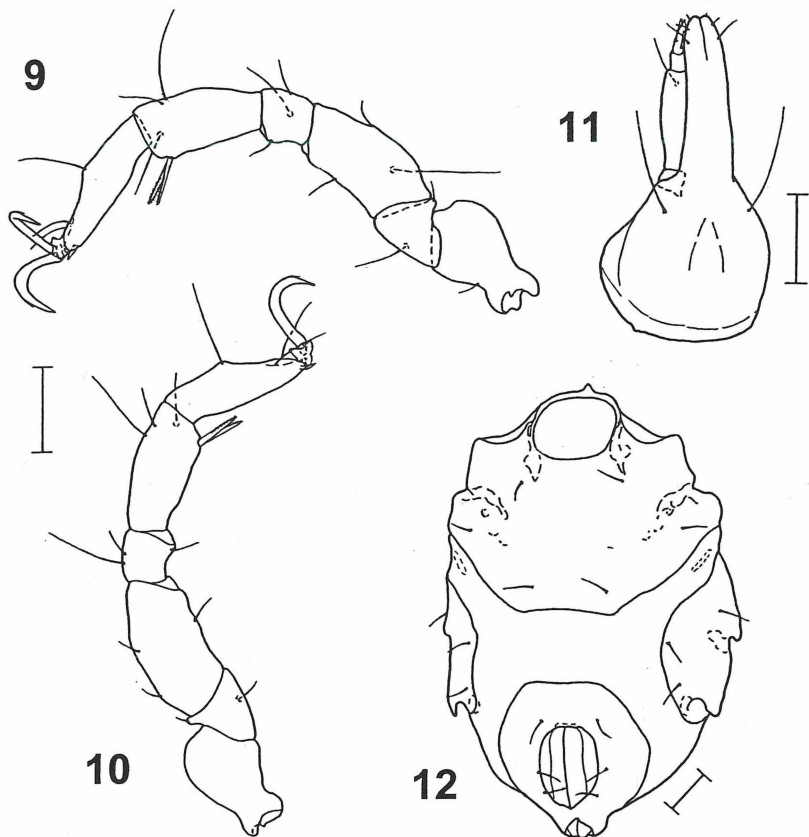
First pair of legs larger than succeeding pairs. Integument of all telofemora and lateral flank of trochanters and basifemora III and IV pierced by canaliculi. Telofemora II to IV 2.0-2.2 times longer than high. Leg chaetotaxy, from trochanter to tarsus (solenidia omitted): leg I, 1, 2, 9, 5, 9, 10; leg II, 1, 2, 6, 5, 7, 5; leg III, 1, 2, 3, 3, 5, 4; leg IV, 0, 2, 3, 3, 5, 4. Telofemur I with 2 ventral and 2 ventromedial spines; genu I with pair of spines; tibia I with 1 ventral spine and 2 ventromedial ones (Fig. 7); tarsus I with 1 ventromedial spine. Spines short, with denticulate tip. Tibia II with 3 ventral setae, ventromedial seta slightly flattened, short and bipectinate; 2 ventral setae spiniform and pectinate (Fig. 8). Tibiae III and IV each with pair of pectinate, spiniform ventral setae (Figs 9, 10); ventromedial seta slightly smaller than ventrolateral one. Tarsi II to IV with short membranes of claw fossa. Tip of tarsus I with 2 small ventral setae and pair of doubled parambulacral setae.

Claws on tarsus I much shorter than those on succeeding tarsi; claws smooth, without accessory process and pecten. Claws on tarsi II to IV slender, each with delicate accessory process and remnants of pectines. Tines of pectines visible only under oil immersion. On tarsus II short pectines present both in convex and concave portion of claws; the former pecten with about 7 tines, the latter with 12 tines. Pectines of claws III and IV present only in concave portion of claws, its 5-6 tines rudimentary. Central sclerite on tarsus I with large, bidentate median claw; upper tooth much smaller than ventral one. Central sclerite on tarsi II to IV small, without claw-like process.

F e m a l e. Idiosoma 490 μm long, 319 μm wide. Dorsal aspect as in male. *PD* 1.3 times longer than wide. *GA* 169 μm long, 159 μm wide. Anterior margin truncate (Fig. 12). *GO* 93 μm long, 62 μm wide. Distance between anterior margin of *GA* to *GO* about half length of *GO*. Ovipositor not extending beyond *GA*. The three pairs of *pgs* close to *GO*. Subgenital setae lacking.



Figs 1-8. *Agauopsis arabia* sp. n. (♂): 1 - idiosoma, dorsal; 2 - idiosoma, ventral; 3 - portion of right PD at the level of *ds-5*; 4 - anterior portion of GA with spermatopositor; 5 - gnathosoma, lateral; 6 - palp, medial; 7 - leg I, ventromedial; 8 - basifemur to tarsus II, medial (p, porose panels; sp, spermatopositor. Scale = 50 μ m).



Figs 9-12. *Agauopsis arabia* sp. n.: 9 - leg III, medial (♂); 10 - leg IV, medial (♂); 11 - gnathosoma, ventral (♀); 12 - idiosoma, ventral (♀). (Scale = 50 µm).

Gnathosoma 172-180 µm long, 85-92 µm wide; length almost twice the width. Rostrum slightly longer than gnathosomal base. Chaetotaxy as in male. Legs as in male.

Remarks

The *brevipalpus*-group includes species with one to three denticulate ventral spines or none, one or two similar shaped ventromedial spines on telofemur I. Adults of *Agauopsis arabia* sp. n. have four such spines. The same number of spines are present in the eight species *A. atacamae* Newell, 1984, *A. borealis* Newell, 1947, *A. brevipalpus* (Trouessart, 1889), *A. ibssi* Bartsch, 1996, *A. littoralis* Bartsch & Iliffe, 1985, *A. moorea* Bartsch 1992, *A. ripa* Otto, 1999, and *A. sordida* Bartsch, 1992. *A. atacamae* and *A. littoralis* can be separated from the others on the base of the

numbers of setae on tibiae III and IV, four setae on each in *A. atacamae*, six setae in *A. littoralis*, but five setae in the other species. *A. ibssi* is characterized by the uniformly ornamented *PD* and very slender telofemora, with the telofemora III and IV having a length:height ratio of 2.8-2.9, whereas the *PD* of the other species have distinct costae and telofemora III and IV a length:height ratio of less than 2.5. *A. sordida* has a short rostrum, its length is 0.7 of that of the gnathosomal base, in contrast, the rostra of *A. arabia*, *A. borealis*, *A. brevipalpus*, *A. moorea*, and *A. ripa* are longer; the rostra of *A. arabia*, *A. borealis*, *A. brevipalpus*, and *A. moorea* are almost as long as or longer than the gnathosomal bases. On the *OC* of *A. moorea*, the gland pore is in the posterior half of the plate and is separated from the posterior cornea by more than the latter's diameter, in *A. arabia* sp. n. the pore is in the anterior half of the *OC* and close to the posterior cornea. The *PD* of *A. borealis*, *A. brevipalpus* and *A. ripa* each have a pair of elongate medial and lateral costae, the medial costae are about four porose panels wide; in *A. arabia* sp. n. the medial costae are two to three porose panels wide, the lateral costae are weakly developed.

Agauopsis borealis and *A. brevipalpus* are spread in the boreal North Atlantic, *A. borealis* on the American Atlantic coast, from Rhode Island to North Carolina (Newell 1947, Bartsch 1979), *A. brevipalpus* on the European Atlantic coast, in the Mediterranean and Black Sea (Bartsch 1996b). Records of *A. littoralis* are from the Bermuda Islands and Florida (Newell 1947, Bartsch and Iliffe 1985) and those of *A. ibssi* from the Black Sea (Bartsch 1996b). *A. atacamae*, *A. moorea* and *A. ripa* are species of the Pacific Ocean, *A. atacamae* was taken on the shores of Chile (Newell 1984), *A. moorea* from the Society Islands (Bartsch 1992a), and *A. ripa* proved to be abundant in shallow water habitats in eastern Australia (Otto 1999). Records of *A. sordida* are from Southern China (Bartsch 1992b). *A. arabia* sp. n. is from the southern edge of India; the species is supposed to be widely spread in the Indian Ocean. In respect of the *Agauopsis brevipalpus*-group, obviously each biogeographic region or subregion – as outlined by Ekman (1953) and Vermeij (1978) – harbours species of its own.

Zusammenfassung

Die im Arabischen Meer, an der Südküste Indiens, gesammelte *Agauopsis arabia* sp. n. wird beschrieben. Die Art gehört zur *brevipalpus*-Gruppe. Sie trägt, wie *A. brevipalpus* Trouessart, 1889, vier fein-gezähnte Ventraldornen an den Telofemora des ersten Beins.

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