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A new species of *Isobactrus* from the Black Sea (Acari, Halacaridae, Rhombognathinae)

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Abstract: A new species, *Isobactrus ponticus*, is described. The species is an inhabitant of barnacles near the high water edge; it is characterized by a dorsal shield. This is the second report on the genus *Isobactrus* from the Black Sea.

Résumé: *Une nouvelle espèce* d'Isobactrus *de la Mer Noire (Acari, Halacaridae, Rhombognathinae)*. Une espèce nouvelle, *Isobactrus ponticus*, est décrite. Cette espèce se caractérise par le bouclier dorsal; elle vit sur des balanes dans l'étage supralittoral. Elle est la deuxième espèce d'*Isobactrus* de la mer Noire.

Keywords : Black Sea, Acari, Halacaridae, *Isobactrus*, new species.

Introduction

In the phytal of the North Atlantic, North Sea and Baltic the algivorous rhombognathine mites numerically play an important role (Viets, 1927; Otto, 1936; Bartsch, 1974, 1978, 1979; Pugh & King, 1985; Somerfield & Jeal, 1995): the genera *Isobactrus* and *Metarhombognathus* are spread in the upper and mid-littoral zone, *Rhombognathides*- and *Rhombognathus*-species inhabit the littoral as well as the sublittoral. The first rhombognathines of the Black Sea, *Rhombognathus magnirostris* Trouessart, 1889 and *Rhombognathides pascens* (Lohmann, 1889), were reported on at the beginning of the 20th century (Chichkoff, 1907). Recent studies of the Black Sea fauna resulted in the recovery of five species of *Rhombognathus* (*R. karlvietsi* Bartsch, 1975, *R. magnirostris*, *R. paranotops* Bartsch, 1986, *R. peltatus* Viets, 1939, and *R. tonops* Bartsch, 1996, and one species each of *Rhombognathides* (*R. pascens*) and *Isobactrus* (*I. peregrinus* Bartsch, 1998) (Bartsch, 1996, 1998). Collections from the coast of Turkey contained a second *Isobactrus* species which is described.

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Material and methods

In autumn 1999, the halacarid fauna of the southern Black Sea coast was studied in Sinop, Turkey, in an area with rocky and sandy shores and salt marshes. The salinity is approximately 18.000, though locally there is a considerable drop in salinity after heavy rainfall.

The specimens described were cleared in lactic acid and mounted in glycerine jelly. The holotype is deposited in the Zoological Museum in Hamburg (ZMH), paratypes in the ZMH, Muséum National d'Histoire Naturelle, Paris (MNHNP) and Senckenberg Museum Frankfurt (SMF).

Abbreviations used in the descriptions: AD, anterior dorsal plate; ds, dorsal setae; ds-1 to ds-5, idiosomatic setae from anterior to posterior; OC, ocular plate(s); pas, parambulacral setae; PD, posterior dorsal plate; PE, posterior epimeral plate(s); vs, ventral setae of idiosoma, numbered vs-1 to vs-5 from anterior to posterior. Legs numbered I to IV.

Description

Isobactrus ponticus sp. nov.

Material and collecting data

Holotype. Female (ZMH A54/00), Turkey, Sinop, lighthouse near Sinop Su Ürünleri Fakültesi; barnacles (*Chthamalus* sp.) on boulders, upper water edge, 14 October 1999. Coll. I. Bartsch.

Paratypes. One female (MNHNP), one female (SMF), 1 tritonymph (ZMH A55/00), 2 tritonymphs, author's collection; collecting data as above.

Description

Female

Idiosoma 265-285 µm long, holotype 273 µm long, 190 µm wide. AD and PD fused to a dorsal shield (Fig. 1), 273 µm long, 140 µm wide; shield widest just anterior to level of insertion of leg IV. One pair of gland pores within area corresponding to AD at level of insertion of leg I; one pair of pores in area corresponding to posterior portion of PD. Surface of shield partly with delicate reticulate ornamentation, partly almost smooth. OC 55 µm long, 37 µm wide, with one cornea and two gland pores. Minute pore canaliculus immediately posterior to second gland pore. Setae ds-1 spur-like; ds-2 lacking; ds-3 distinctly longer than ds-1, inserted within margin of dorsal shield. Setae ds-4 lacking; pair of ds-5 peg-like. Dorsal and marginal striated integument with short epicuticular villi or spikes.

Venter mainly covered with striated integument. Epimeral plates small (Fig. 2). Setae vs-1 to vs-3 within striated integument, vs-4 in margin of epimeral plate III, and vs-5 within striated integument; dorsal portion of PE with one seta. Genital opening 57 µm long. Three pairs of perigenital setae within striated integument. Single pair of minute subgenital setae partly concealed by genital sclerites. Anal plate lacking, anal opening in ventral position. Adanal setae lacking.

Gnathosoma of holotype 52 µm long, 55 µm wide (Fig. 3). Rostrum 22 µm long, 12 µm wide, much shorter than gnathosomal base; the former with two pairs of maxillary setae. Tectum almost truncate. Palps slightly surpassing rostrum. P-2 with dorsal seta (Fig. 4). P-4 with 4 setae.

Legs I and II short and wide (Figs 5 and 6), legs III and IV more slender. Genua and tibiae short. Tarsi III and IV longer than telofemora (Figs 7 and 8). Leg chaetotaxy from trochanter to tarsus (solenidia and pas excluded): legs I and II: 1, 2, 3, 3, 5, 3; leg III, 1, 2, 1, 2, 4, 4; leg IV, 0, 2, 1, 2, 4, 3. Ventromedial seta on tibia I very wide and bipectinate, ventrolateral seta slender and faintly pectinate (Fig. 9). Ventromedial seta on tibia II bipectinate, more slender than that on tibia I, ventrolateral seta slender. Single ventral seta on tibiae III and IV slender. Pair of apical fossary setae delicately plumose. Tarsus I with clavate solenidion, 4 µm long, and bud-like famulus (Fig. 10). Dorsolateral seta on tarsus III removed from dorsal fossary seta. Tarsi I and II each with pair of doubled pas. Lateral pas of tarsi III and IV spiniform and pectinate (Fig. 11), medial pas setiform (Fig. 12). Carpite moniliform. Claws apically with approximately 6-7 delicate tines.

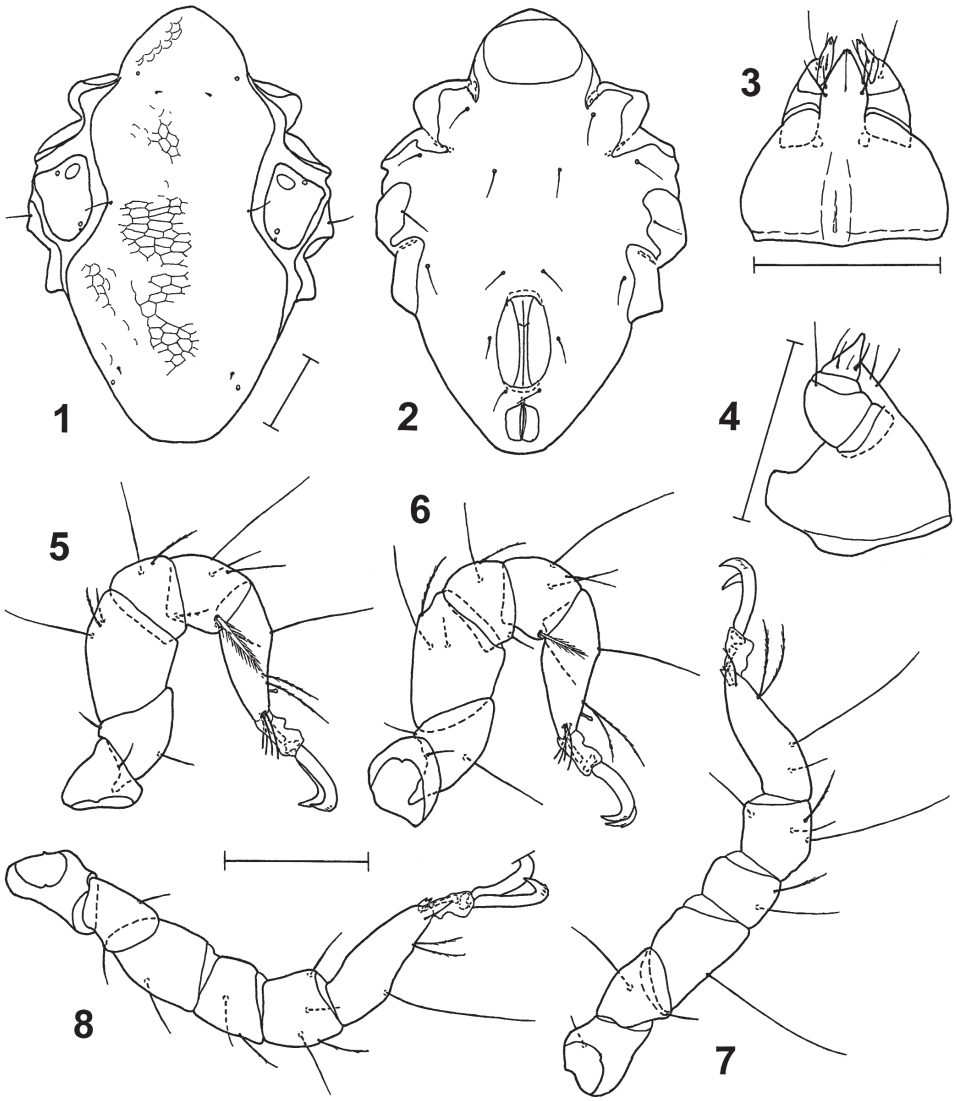
Tritonymph

Idiosomal length 236-259 µm. AD and PD separated by striated integument (Fig. 14). In a tritonymph, 259 µm long, the AD is 80 µm long, 93 µm wide; the PD 125 µm long, 112 µm wide. Striae of dorsal and marginal integument with delicate epicuticular spikes (Fig. 15); ventral striae smooth. Setae ds-3 within striated integument. Outline of epimeral plates as in female. Genital plate small; including primordial genital opening, minute pair of subgenital setae, and pair of one and a half anterior and one posterior internal genital acetabula (Fig. 13). Two pairs of perigenital setae within striated integument. Leg chaetotaxy: legs I and II, 1, 2, 3, 3, 5, 3; leg III, 1, 2, 1, 2, 4, 4; leg IV, 0, 1, 1, 2, 4, 3.

Remarks

Isobactrus ponticus is characterized by its dorsal shield composed of AD and PD. In the majority of *Isobactrus* species, the dorsal plates AD, OC and PD are separated. Exceptions are: *I. pulchellus* Bartsch, 1975, which has all plates fused, and *I. uniscutatus* (Viets, 1939) and *I. ponticus*, in both the AD and PD are fused but the OC separated. *I. pulchellus* inhabits barnacles and algae in the upper tidal zone of Brittany, France (Bartsch, 1975, 1979); *I. uniscutatus* was described from the Adriatic Sea, Mediterranean (Viets, 1939); later it proved to be very abundant in the upper littoral of northern European coastal areas (Green & MacQuitty, 1987). In contrast to *I. uniscutatus* the dorsal shield and the OC of *I. ponticus* are wider, the basidorsal seta of the tarsi is hardly longer than this segment (in *I. uniscutatus* almost twice as long) and the claws bear delicate tines (in *I. uniscutatus* the claws are smooth).

Compared to *Isobactrus* from the North Atlantic, *Isobactrus ponticus* is most similar to *I. rugosus* Bartsch, 1975. The arrangement of setae and gland pores is similar, in both species the ventromedial seta of tibia I is very strong



Figures 1-8. *Isobactrus ponticus* sp. nov., female. **1.** Idiosoma, dorsal; **2.** idiosoma, ventral; **3.** gnathosoma, ventral; **4.** gnathosoma, lateral; **5.** leg I, medial; **6.** leg II, medial; **7.** leg III, medial; **8.** leg IV, medial. Scale bar = 50 µm.

Figures 1-8. *Isobactrus ponticus* sp. nov., femelle. **1.** Idiosome, vue dorsale ; **2.** idiosome, vue ventrale ; **3.** gnathosome, vue ventrale; **4.** gnathosome, vue latérale; **5.** patte I, vue antérieure ; **6.** patte II, vue antérieure ; **7.** patte III, vue postérieure ; **8.** patte IV, vue postérieure. Échelle = 50 µm.

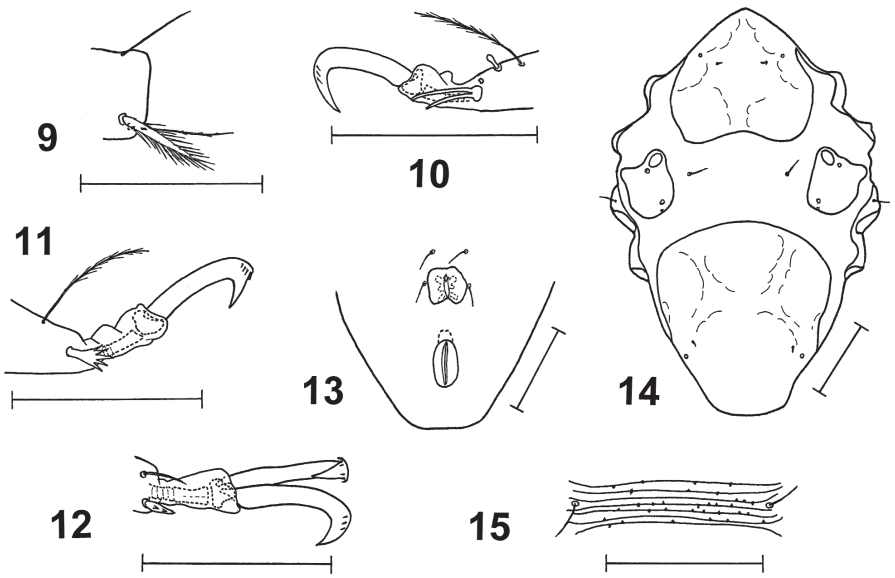
and the ornamentation of the tritonymphal dorsal plates is almost the same.

In *Isobactrus ponticus* the number of setae on the telofemora III and IV is reduced. The majority of the northern Atlantic species bears three setae, that of the Pacific two setae (Abé, 1996: Table 1). One seta, as in *I. ponticus*, is present in *I. calderensis* Newell, 1984, a species recorded from the Pacific coast of South America (Newell, 1984). The two species, *I. ponticus* and *I. calderensis*, are very different, in *I. calderensis* the AD and PD are separated, the epimera I are fused to a large median plate, and the telofemora I and II have no more than two setae each.

Ecology

A variety of shallow water substrata were examined for presence of halacarids: green, brown and red algae (*Enteromorpha*, *Cladophora*, *Cystoseira*, *Padina*, *Gelidium*, *Ceramium*, *Corallina*, *Lithophyllum*), colonial organisms (bryozoans), barnacles, and clumps of *Mytilus* (Bivalvia) rich in microcavernes. *Isobactrus ponticus* was present only amongst barnacles growing near the upper water edge. The type substratum was a layer of barnacles (*Chthamalus* sp.) between and on the underside of boulders which, at calm water, is just above the water line, in stormy periods inundated and washed by waves. The barnacles have a delicate green coating of algae. Apart from *Isobactrus ponticus* one mesostigmatid and one nanorchestid (Prostigmata) mite were found. Both belong to the terrestrial moiety of seashore Acari. No other vagile epifauna was present. The barnacles form a single layer, 3 mm thick. There is no marked crevice system between the shells of adjoining barnacles. The rhombognathine mite assumedly only inhabited the shells with algae.

Compared to the rich rhombognathine fauna on the Atlantic coast (Bartsch, 1975, 1978, 1979), the halacarid fauna in the upper littoral of the Black Sea is rare in species. In the Roscoff area, Brittany, France, five species of rhombognathines (four *Isobactrus* and one *Metarhombognathus*), one *Copidognathus* and one *Agauopsis* species were found amongst upper tidal barnacle



Figures 9-15. *Isobactrus ponticus* sp. nov. **9.** Detail of tibia I, medial, female; **10.** tip of tarsus I, lateral, female (medial setae and claw omitted); **11.** tip of tarsus III, lateral, female (medial setae and claw omitted); **12.** tip of tarsus IV, ventral, female; **13.** posterior part of idiosoma, ventral, tritonymph; **14.** idiosoma, dorsal, tritonymph; **15.** detail of striated integument between setae ds-3, tritonymph. Scale bar = 50 µm.

Figures 9-15. *Isobactrus ponticus* sp. nov. **9.** Extrémité du tibia I, vue antérieure, femelle ; **10.** extrémité du tarse I, vue postérieure, femelle (sans la griffe et les soies antérieures) ; **11.** extrémité du tarse III, vue antérieure, femelle (sans la griffe et les soies postérieures) ; **12.** extrémité du tarse IV, vue ventrale, femelle ; **13.** région postérieure de l'idiosome, vue ventrale, tritonymphe ; **14.** idiosome, vue dorsale, tritonymphe ; **15.** détail du tégument membraneux entre les soies ds-3, tritonymphe. Échelle = 50 µm.

aggregations (Bartsch, 1978), in the North Sea, too, five species of rhombognathines (three *Isobactrus*, one *Metarhombognathus* and one *Rhombognathides*) (Bartsch, 1974) inhabit barnacle encrusting, in contrast, a single rhombognathine (*Isobactrus*) was present in the Sinop area, Black Sea. On the Atlantic coast, encrusting of *Lithophyllum* (Rhodophycea) contain a very rich halacarid fauna (Bartsch, 1978) whereas nothing was found in samples from the Sinop area. Two rhombognathine species are regularly, often in large numbers present in northern European salt marshes (Bartsch, 1974, 1976, 1978, 1979) but none in the Black Sea marshes. Though rare in species, the rhombognathines nonetheless play numerically an important role in the shallow water Black Sea fauna; they may even outnumber nematodes, copepods or polychaetes (Makaveeva, 1961).

One of the most conspicuous character of *Isobactrus ponticus* is the fusion of the dorsal plates AD and PD. Amongst northern European rhombognathines a dorsal shield and a delicately villous epicuticula is present in *I. pulchellus*, *I. uniscutatus*, *I. ponticus*, and *Rhombognathides spinipes* (Viets, 1933); the four species live in the upper littoral. Bilio (1966), after having studied the meiofauna in Baltic and North Sea salt marshes, argued that enlarged or even fused dorsal plates are correlated with a life in a dense substratum hard to move in. Bartsch (1974) raised doubts about this thesis. In the species mentioned above, both the dorsal shield and the epicuticular spikes seem to be correlated with life in an area exposed to long and severe desiccation. In addition, an epicuticular villosity may prevent intense biofouling.

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