

## First record of *Isobactrus* from the Black Sea (Acari, Halacaridae, Rhombognathinae)

ILSE BARTSCH

(With 14 figures)

### Abstract

*Isobactrus peregrinus* n. sp. is described. The species is characterized by a short posterior dorsal plate (*PD*) and almost smooth claws. This is the first report of the genus *Isobactrus* from the Black Sea.

### Introduction

On algae in shallow water Black Sea areas, rhombognathine mites play an important role, sometimes even outnumbering nematodes, copepods or polychaetes (Makkaveeva 1961; Kolesnikova 1979, 1991). The two genera known from the Black Sea are *Rhombognathides*, with *R. pascens* (Lohmann, 1889), and *Rhombognathus*, with *R. karlvietsi* Bartsch, 1975, *R. magnirostris* Trouessart, 1889, *R. paranotops* Bartsch, 1986, *R. peltatus* Viets, 1939, *R. ponticus* Motas & Soarec, 1940, and *R. tonops* Bartsch, 1996 (Bartsch 1996b). To date there have been no records of the two rhombognathine genera *Isobactrus* and *Metarhombognathus*.

### Material and Methods

In May 1997, the halacarid fauna was studied in the Odessa area, northwestern Black Sea. The shoreline is characterized by sandy beaches, interrupted by scattered rocks and concrete walls. The upper layers of the Black Sea water have a salinity of 17 or 18 ‰; the mean salinity in the Odessa Bay is 14.5 ‰ (Zenkevitch 1963; Vorobyeva *et al.* 1992), but several rivers, rivulets and limans emptying into the Black Sea will locally reduce the salinity considerably. In the winter, the surface temperature in the Odessa area is often below zero; in the summer, the nearshore Black Sea water surpasses 25 °C (Zenkevitch 1963; Vorobyeva *et al.* 1992). The substrata investigated were algae, barnacles, mussels, and sediments. The *Isobactrus* species was cleared in lactic acid and mounted in glycerine jelly. The slide with the holotype is deposited in the Zoological Museum in Hamburg (ZMH).

Abbreviations used in the descriptions: *AD*, anterior dorsal plate; *AE*, anterior epimeral plate; *GO*, genital opening; *OC*, ocular plate(s); *PD*, posterior dorsal plate; *PE*, posterior epimeral plate; *vs*, ventral setae, numbered *vs-1* to *vs-3* from anterior to posterior. Legs numbered I to IV, leg segments 1 to 6.

## Description

### *Isobactrus peregrinus* sp. n. (Figs 1-11)

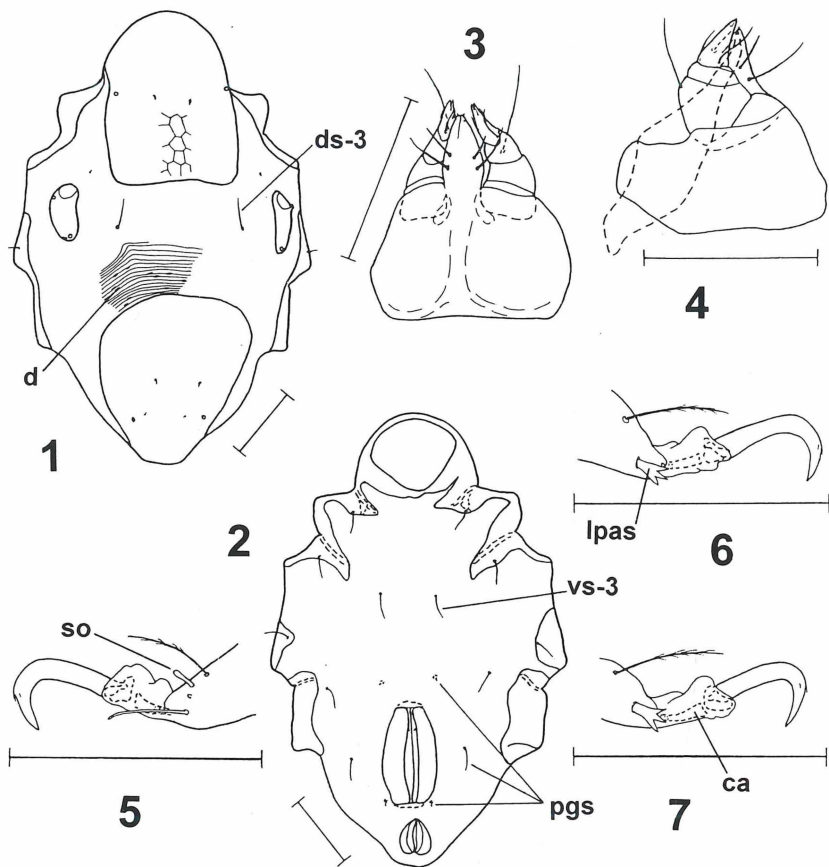
**MATERIAL.** Holotype, female (ZMH, Reg. No. A32/98), beach near Delfin, coarse sediment from 6 m landward and 30-50 cm depth, 20 May 1997. Coll. I. Bartsch. The meiofauna was extracted with sea water on the shore.

**FEMALE.** I d i o s o m a 306  $\mu$ m long, 195  $\mu$ m wide. Dorsal plates *AD* and *PD* delicately reticulated. Areas between dorsal plates large (Fig. 1). Striated integument with delicate oblong cuticular droplets. *AD* 116  $\mu$ m long, 90  $\mu$ m wide; posterior margin almost truncate. Gland pores in lateral margin level with insertion of leg I. *OC* oblong, 38  $\mu$ m long, 20  $\mu$ m wide, with single cornea; anterior gland pore near lateral margin at level of cornea; posterior gland pore and adjacent pore canaliculus in posterior edge of *OC*. *PD* 116  $\mu$ m long, 102  $\mu$ m wide; widest within anterior portion; pair of gland pores in posterior half of the plate. *AD* with a pair of peg-like, approximately 2  $\mu$ m long setae between pair of gland pores. *PD* with a pair of similar setae anterior to pair of gland pores, and another pair of more delicate setae between gland pores. Second pair of dorsal setae very delicate, inserted within striated integument between *AD* and *OC*. Third pair of setae 16  $\mu$ m long, present within striated integument between *AD* and *PD*.

Venter with narrow, delicate epimeral plates (Fig. 2). Setae *vs-1* and *vs-2* within margins of plates, *vs-3* within striated integument. Epimera III short, not fused with epimera IV. Epimera III with 1 dorsal and 1 ventral seta. No seta on epimera IV, but seta present within striated integument. Middle pair of perigenital setae level with insertion of leg IV. Anterior and posterior pair of perigenital setae vestigial in this single female. *GO* 65  $\mu$ m long, with anterior and posterior crescent sclerite included 73  $\mu$ m long. *GO* not surrounded by a plate. Pair of subgenital setae 1  $\mu$ m long.

G n a t h o s o m a triangular in outline, 59  $\mu$ m long, 60  $\mu$ m wide (Fig. 3). Rostrum short, 28  $\mu$ m long, 13  $\mu$ m wide. Maxillary setae stout; both pairs on rostrum; apical pair of setae 13  $\mu$ m long, basal pair 20  $\mu$ m long. Tip of rostrum with flattened rostral setae. Palps flattened, four-segmented, 40  $\mu$ m long (Fig. 4). Second palpal segment with distodorsal seta. Apical segment 17  $\mu$ m long.

L e g s subequal in length. Legs, without claws, half as long as idiosoma. Tibiae I and II hardly longer than genua; telofemora I and II about as long as tarsi (without ambulacrum) (Figs 8, 9). Tibiae III and IV slightly longer than genua, and tarsi III and IV somewhat longer than telofemora (Figs 10, 11). Chaetotaxy, from trochanter to tarsus (solenidia excluded): leg I, 1, 2, 3, 3, 5, 5; leg II, 1, 2, 3, 3, 5, 5; leg III, 1, 1, 2, 2, 4, 6; leg IV, 0, 1, 1-2, 2, 4, 5. Telofemur on right leg IV with 2 setae, on left leg with 1 seta. Ventromedial seta on tibia I with coarse pectination. Ventral setae on tibiae II to IV slender, smooth. Tarsi I to IV with 3, 3, 4, 3 dorsal setae; paired fossary setae delicately plumose. Solenidion on tarsi I (Fig. 5) and II dorsolateral in position, 5  $\mu$ m long. Pair of parambulacral setae on both tarsus I and II singlets. Medial parambulacral seta on tarsi III and IV setiform, lateral parambulacral setae spiniform, tridentate (Figs 6, 7).



Figs 1-7. *Isobactrus peregrinus* sp. n.: 1 - idiosoma, dorsal; 2 - idiosoma, ventral (anterior and posterior pair of perigenital setae vestigial); 3 - gnathosoma, ventral; 4 - gnathosoma, lateral (chelicera in broken line); 5 - tip of tarsus I, lateral (medial setae and claw omitted); 6 - tip of tarsus III, lateral (medial setae and claw omitted); 7 - tip of tarsus IV, lateral (medial setae and claw omitted). (*ca*, carapite; *d*, cuticular droplet; *ds-3*, third dorsal seta; *lpas*, lateral parambulacral seta; *pgs*, perigenital setae; *pc*, pore canaliculus; *so*, solenidion; *vs-3*, third ventral seta). Scale = 50  $\mu$ m.

Basal portion of carpite moniliform. Median sclerite small. Claws large, with 2 delicate dents at their distal edge.

MALE. Not seen.

### Remarks

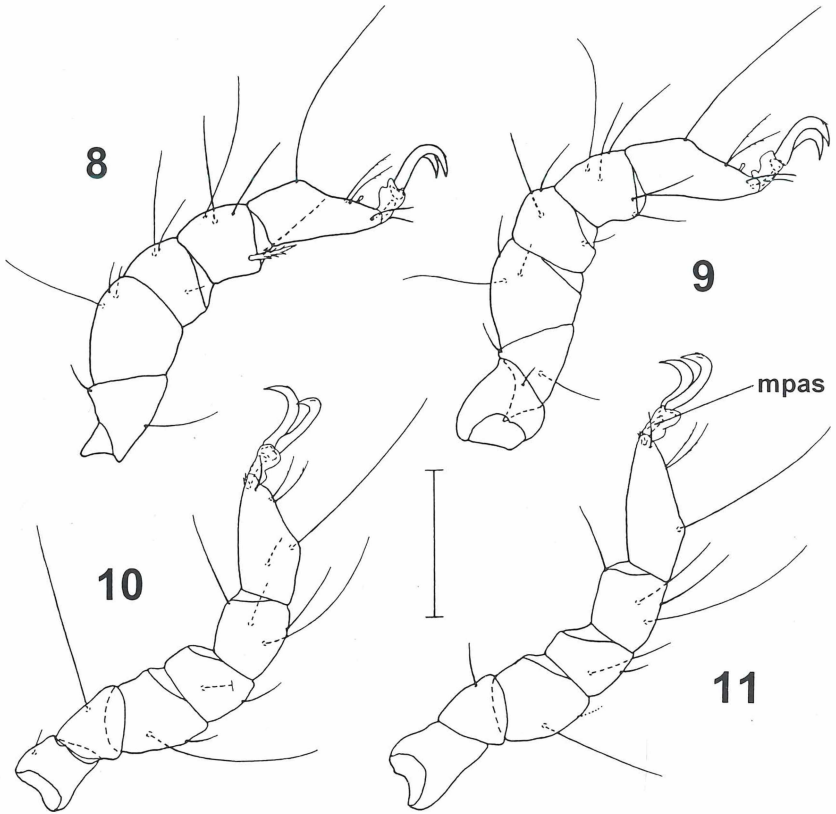
The most readily noticed characters of *Isobactrus peregrinus* sp. n. are the short *PD*, the reduced epimeral plates and the almost smooth claws.

*Isobactrus cryptorhynchus* (Trouessart, 1901), a species recorded from the French Atlantic coast (Trouessart 1901), has a similar short *PD*, but, in contrast to *I. peregrinus* sp. n., the accessory process of the claws of *I. cryptorhynchus* has numerous dents.

The claws of *Isobactrus peregrinus* sp. n. have a smooth shaft and two very minute dents at the distal arc which easily escape attention; at low magnification the claws seem to be smooth. Smooth claws are present in *I. caldarensis* Newell, 1984, *I. hutchinsoni* Newell, 1947, and *I. uniscutatus* Viets, 1939. *I. caldarensis* lives on the shores of Chile (Newell 1984). In contrast to *I. peregrinus*, the epimeral plates I and II of *I. caldarensis* are large and fused in the median. In *I. hutchinsoni*, a species reported from eastern North America (Newell 1947; Bartsch 1979), is the *PD* at least 1.5 times longer than the *AD*. *I. uniscutatus*, first recorded from the Mediterranean (Viets 1939), and now known to be a very common species along the shores of northwestern Europe (Bartsch 1972, 1975, 1976; Green & MacQuitty 1987), is characterized by its dorsal shield.

Table 1. The genus *Isobactrus*: number of dorsal/ventral setae on the basifemora III and IV, telofemora I to IV, and genua III and IV.

Species	Leg segment							
	III-2	IV-2	I-3	II-3	III-3	IV-3	III-4	IV-4
<i>cryptorhynchus</i>	?	?	3/1	?	?	?	?	?
<i>hartmanni</i>	0/1	0/0	3/0	3/0	2/0	2/0	2/0	2/0
<i>levis</i>	0/1	0/0	3/0	3/0	2/0	2/0	2/0	2/0
<i>peregrinus</i> sp. n.	0/1	0/1	3/0	3/0	2/0	1-2/0	2/0	2/0
<i>pulchellus</i>	1/1	1/0	3/1	3/1	2/1	2/1	2/1	2/1
<i>rugosus</i>	1/1	1/1	3/1	3/1	2/1	2/1	2/0	2/0
<i>setosus</i>	1/1	1/1	3/1	3/1	2/1	2/1	2/1	2/1
<i>ungulatus</i>	1/1	1/1	3/1	3/1	2/1	2/1	2/0	2/0
<i>uniscutatus</i>	0/1	0/0	3/1	3/1	2/1	2/1	2/0	2/0



Figs 8-11. *Isobactrus peregrinus* sp. n.: 8 - basifemur - tarsus I, medial; 9 - leg II, medial; 10 - leg III, medial; 11 - leg IV, medial (dotted seta present only on the right leg). (*mpas*, medial parambulacral seta). Scale = 50  $\mu$ m.

Species which have claws provided with one or two minute dents are *I. asper* Bartsch, 1977, *I. gryptosetus* Abé, 1996, *I. levis* (Viets, 1927), *I. luxtoni* Bartsch, 1992, *I. microdens* Newell, 1984, and *I. obesus* Bartsch, 1992. *I. asper* and *I. microdens* are recorded from the southeastern Pacific, from the Galapagos Archipel and southern Chile (Bartsch 1977; Newell 1984). The *PD* and the anterior epimeral plates of the two latter species are much larger than in *I. peregrinus* sp. n. The species *I. gryptosetus*, *I. luxtoni*, and *I. obesus* live in the northwestern Pacific (Bartsch 1992; Abé 1996). In *I. gryptosetus*, the gland pores on the *AD* insert anterior to the pair of dorsal setae, in *I. peregrinus* sp. n. on a level with the setae. In both *I. luxtoni* and *I. obesus* is the *PD* distinctly larger than the *AD*, whereas in *I. peregrinus* sp. n. the two plates are similar in length and width. *I. levis* is widely spread in the northern Atlantic, with records both from the American and European coasts (Viets 1927;

Newell 1947; Bartsch 1972, 1975, 1979; Green & MacQuitty 1987). A re-examination proved, the claws of *I. levis* have a minute dent at the distal edge. *I. levis* has 4 instead of 3 dorsal setae on the tarsi I, II and IV.

Within the genus *Isobactrus*, the number of setae on the legs generally is a reliable specific character; the percentage of intraspecific variation is low. Table 1 presents the chaetotaxal formula of the basifemora and genua III and IV and telofemora I to IV of the North Atlantic species *I. hartmanni* Bartsch, 1972, *I. levis*, *I. puchellus* Bartsch, 1975, *I. rugosus* Bartsch, 1975, *I. setosus* (Lohmann, 1889), *I. unguulatus* Bartsch, 1975, and *I. uniscutatus*. According to the table, *I. peregrinus* sp. n. is the only species with a ventral but no dorsal seta on the basifemora III and IV.

**ECOLOGY.** This is the first record of the genus *Isobactrus* from the Black Sea. The female *I. peregrinus* sp. n. was found in the light fraction removed from a sediment sample agitated in seawater. The female was dead before it was collected with the sample, and certainly neither the locality nor the substratum is the genuine habitat of *I. peregrinus* sp. n.

The genus *Isobactrus* is present world-wide, generally bound to algal communities; many species are adapted to living in diluted brackish water. For example, the two species *I. hutchinsoni* and *I. uniscutatus* are inhabitants of oligomixohaline, periodically almost fresh water (Bartsch 1996a). Both species have large genital acetabula, and in the males, the acetabula are moved to a position posterior to the GO. Genital acetabula, in general, have osmoregulatory functions (Bartsch 1973, 1974; Alberti 1977). In contrast to *I. hutchinsoni* and *I. uniscutatus* are the genital acetabula of *I. peregrinus* not enlarged. Accordingly, it seems to be unlikely that *I. peregrinus* sp. n. lives in the large oligohaline water bodies of the Dniester Liman, the rivers Dnieper and Danube, or in small rivulets emptying into the limans on the northwestern coast of the Black Sea. An explanation for the presence of *I. peregrinus* sp. n. is that it was introduced from water bodies outside the northwestern Black Sea area.

### Zusammenfassung

*Isobactrus peregrinus* sp. n., der erste Vertreter der Gattung *Isobactrus* im Schwarzen Meer, wird beschrieben. Die Art ist gekennzeichnet durch die kurze Postdorsalplatte (PD) und die fast glatten Krallen.

### Acknowledgements

Thanks are due to Dr B. Alexandrov, director of the Odessa Branch of the Institute of Biology of Southern Seas, and Dr L. V. Vorobyeva, head of the Department of Hydrobiology, for invitation and help during my stay in Odessa. Travel funding was provided by Deutsche Forschungsgemeinschaft which is gratefully acknowledged.

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Author's address:

Dr. I. Bartsch, Biologische Anstalt Helgoland, Notkestraße 31, 22607 Hamburg, Germany.



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