Balaustium xerothermicum sp. nov. from Poland with remarks on all World species of the genus (Acari: Actinedida: Erythraeidae)

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Abstract.— Male, female and nymph of Balaustium xerothermicum sp. nov. are described. Key to the Polish species and data on distribution and ecological requirements are given.

Key words.— Acari, Parasitengona, Erythraeidae, Balaustium, new species, taxonomy, key.

Introduction

There have been 18 species described within Balaustium von Heyden, 1826 hitherto, the generic affiliation of which is doubtless: 10 from Palaeartic, 4 from Nearctic, 3 from Ethiopian, and 1 from Neotropical regions. The systematic position of other species seems problematic. There are several clues which suggest that Erythraeus antarcticus Trägårdh, 1907 which has been described from Falkland Islands (Port Darwin) and Erythraeus medioareolatus Kramer, 1898 from Tierra del Fuego (Argentina) belong to the genus Abrolophus Berlese, 1891 (see Southcott 1961). Some of the Ethiopian species described by Meyer and Ryke (1959) from South Africa show characters intermediate between Balaustium and Abrolophus (e.g. B. medicagoense — fading crista metopica, characteristic denticle on palpal claw present but urnulae absent and B. vignae — palpal claw denticle present but urnulae absent). I herein accept the Southcott (1961) criterion of affiliation to the genus Balaustium which is the presence of a pair of urnulae. Therefore I do not discuss in this paper the four species listed above. Their systematic status can be established only after the examination of the type material. In the course of systematic study of Polish Erythraeidae, 60 individuals, exclusively xerothermic, have been recognized as new species of the genus Balaustium.

Material and Methods

Several collection methods were applied for specimens: sifting the substrate (litter, turf etc.) with entomological sieve of 6 mm mesh and then collecting mites directly on a white sheet without prior extraction with Tullgren apparatus (Berlese funnels), sifting substrate and then extracting with Tullgren apparatus, extracting with Tullgren apparatus without prior sifting, collecting with entomological sweeping net, direct collecting in the field.

Material was cleared in cold KOH (<10%) and mounted in Faure’s medium (see Gabryś 1994).

The terminology follows Southcott (1961), Welbourn and Young (1987) and Gabryś (1992a, b, 1999). All drawings were made by camera lucida, all measurements are in micrometers (μm) unless stated otherwise.

Taxonomy

Balaustium xerothermicum sp. nov.
(Figs 1–27, 31, Table 1)

Etymology. The species epithet is derived from ecological preferences of newly described taxon.

Diagnosis. Female (Figs 1, 19, 20). Relatively small, one pair of typical urnulae located posterad and mesad of the eyes (Fig. 5); palps narrow and fine, palpal claw denticle weaker than in the “murorum” group, a cluster of specialized setae on palpgenu (semitectinalae) absent (Figs 24–27); the rod of crista metopica almost always present, sensillary areas absent, always 4 nonsensillary setae AL, posterior AL always shorter than the anterior ones (Figs 5, 8, 9); sensillary setae PSens always longer than ASens, setae of both types setulose in the distal part (Figs 5–7); dorsal setae short (the longest never exceed 36 μm), stem divided into two branches running very close to each other, one straight, the second slightly curved what makes it look a bit shorter; both branches setulose but setulae on the straight one shorter; from the side view both branches seem to form one, hairy stem (Figs 10, 11); ventral setae soft, similar in length, mid-ventral smooth (Figs 12, 13); on coxae III, an unusually long, bare and apically pointed flagellate seta (80–100 μm!) (Fig. 4).

Male (Figs 2, 21–23). General appearance similar to female; differences basically refer to the genital region; there is a strongly sclerotized internal genital sclerite, gen-
Figures 1–3. *Balaustium xerothermicum* sp. nov. General view in transparency: (1) female, (2) male, (3) nymph.
ital opening longer, labialae shorter, more numerous and setulose, anus slightly shorter (Figs 21–23).

**Nymph** (Fig. 3). General appearance similar to adults; differences are rather quantitative: smaller body size, scarcer body and leg setation, somewhat stronger sclerotized region of crista metopica (particularly the rod). Genital opening rudimentary, still closed.

**Larva.** Not known.

For differential diagnosis see “Remarks on taxonomy”.

Species markedly xerothermic.  

**Description** (based on holotype, supplemented by data of paratypes, all metric data in Table 1). Body oval, covered with dense setae both on the dorsal and ventral sides; colour in life red; legs relatively short, I and IV pair more or less of body length, epimera well pronounced (Figs 1–3).

Gnathosoma. Chelicerae typical, dagger like, contracted into the body; rostrum typical with several setae of various length located apically (ventral ones more numerous); palps narrow and slender with diverse setae, palptarsus cylindrical, slightly narrowing and rounded apically and with numerous solenidia; palptibial claw with a denticle; the arch on the ventral side between the top of the claw and the denticle shallow; palpigen and other palpal segments without specialized setae of the “semipectinalae” type (Figs 24–27).

Dorsal side of idiosoma. Divided into aspidosoma and opisthosoma by an indistinct furrow, covered with short, relatively uniform, setulose setae which have ciliate fringes on lateral sides of two branches of the stem (see diagnosis) (Figs 10, 11). The region of crista metopica marked by weakly sclerotized scutum; crista metopica present only in a form of a rudimentary rod between bases of ASens and PSens (Fig. 5); ASens and PSens scarcely setulose in distal part, ASens always shorter than PSens (Figs 6, 7); the nonsensillary setae AL distinct from other dorsal setae and arranged into two pairs: first one (Fig. 9) always long and slender, located anterad of ASens, the second one (Fig. 8) short, stout, its stem divided into two branches running closely and parallelly, located posterad of ASens, all AL slightly setulose at sides. Urmulae well shaped, placed closely to the eyes – slightly posterad and mesad, more or less at the PSens base level; one pair of sessile eyes (Fig. 5).

Ventral side of idiosoma. Covered with dense, fine, smooth or slightly setulose, straight setae of relatively uniform length (Figs 12, 13). Genital opening elongate, centro- and epivalves covered with setae similar to ventral setae in shape but shorter; anus oval, surrounded by distinct sclerite with 10 setae slightly shorter than ventral and genital ones but similar in shape (Figs 19, 20).

Legs. Typical, pair I the longest, IV a little shorter, II and III the shortest, more or less...
equal; length of the legs and, consequently, all segments (including tarsus) variable (Table 1). Coxae I–IV with flagellate setae similar to ventral ones but always longer – medial coxal III is particularly characteristic (see diagnosis) (Fig. 4). All legs covered with simple scobalae and tactalae, ventral side of tarsi I–IV with characteristic “brush”, all tarsi with two claws on a stalk. Specialized setae are: solenidia, particularly numerous on tarsi; vestigialae singly in distal dorsal parts of Ti I (11 μm), Ge I (8 μm) and Ge II (8 μm). Famulus absent (Figs 14–18).

**Male and nymph.** See the diagnosis.

**Type material.** Holotype – PL/BK/7/6 ♀ collected directly, 11 June 1985, Sutno on Bug River at Siemiatyce (Podlaskie Province), xerothermic meadow, leg. G. Gabryś, deposited in Museum of Natural History, Wrocław University (MU 814).

Fifty nine paratypes distributed as follows: 1 ♀ (KI/4/2) and 1 nymph (ZA/38/5) in Zoologisches Institut und Zoologisches Museum, Universität Hamburg, Germany; 2♂♂ (KI/2/8, ZA/37/3). 4♀♀ (BK/9/2, BK/9/3, KI/2/5, KI/4/4) and 2 nymphs (ZA/17/8, ZA/17/9) in Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Gainesville, Florida, USA; 5♂♂, 26♀♀ and 18 nymphs in author’s collection. For paratypes’ distribution see “Localities in Poland” and Fig. 31.

**Localities in Poland** (see Fig. 31). Abbreviations used: AK – A. Kaźmierski; BOR – L. Borowiec; DAM – Dept. of Animal Morphology, Adam Mickiewicz University, Poznań; GAB – G. Gabryś; N – nymph; NP – National Park; NR – Nature Reserve; RAF – J. Rafalski; WN – W. Niedbała.

Species extremely xerothermic, found at 10 localities all over Poland from May to August; all postlarval life stages have been present in samples (♂♂, ♀♀, ♀♀, 21 N). The ecological preferences are confirmed in detailed description of the localities. Numbers correspond to those in Fig. 31.

1 – Radolin at Trzcianka, xerothermic slope, 4 June 1975 leg. DAM (♂♀); 2 – NR Zbocza Plutowskie at Chełmno, S slope of xerothermic ravine, very dry, 25 June 1968 leg. RAF (♂♀); 3 – Sutno at Siemiatyce, xerothermic meadow, 9–11 June 1985 leg. GAB (♂♂, 16♀♀); 4a – Skowronno, at road side, 3 Aug. 1993, leg. BOR (♂♂, 3♀♀); 4b – Pińczów, xerothermic meadow (sward), 5 June 1984 leg. BOR (♂♂, 9♀♀); 5 – NR Milechowy at Chećiny, small patches of xerothermic meadow (sward) (*Thalietro-Salvietum* among others) between rocks at a top of a ravine slope, 20 May 1982 leg. AK and WN (1♀); 6 – Sandomierz-Kamienniki Plebaniak, dry slopes of Cambrian shale, scarce bushes: *Rosa, Crataegus, Prunus spinosa*, scarce grass, dry leaves, moss, very dry, 1 Aug. 1968 leg. RAF (♂♀); 7 – Wieprzeczka Góra at Zamość, dry meadow with *Geranium sanguineum, Echium vulgare*, Vincel-
oxicum officinale and Salvia pratensis, moss, 11 June 1987 leg. GAB (8 NN); 8 - Zwierzyniec, at the border of the Roztoczański NP, dry cavity beneath sand dune at the edge of pine forest, 22 May 1986 leg. GAB (1 N); 9 – Józefów, quarries, xerothermic vegetation of a different type, 12 June 1987 leg. GAB (1°C, 9 NN); 10 - Siedliska at Lubicza Królewska, psammophilous meadow (sward) with Hieracium pilosella, 8 June 1987 leg. GAB (2NN).

**Remarks on taxonomy**

All Ethiopian species, i.e. B. cristatum Meyer and Ryke, 1959, B. graminum Meyer and Ryke, 1959 from South Africa and B. southeottii Feider and Chiorneau, 1977 from St. Helen Island differ from B. xerothermicum sp. nov. in presence of distinct metapleura with two sensillary areas, structure of idiosomal setae and absence of a denticle on ventral side of palpal claw. Moreover: B. cristatum (nymph) has clearly shorter PSens (41) and shorter (49) and narrower (18°) Ta I. B. graminum (nymph) has longer (89) Ta I and B. southeottii (adult) is slightly bigger (829–1305 long, 605–734 wide), has longer dorsal setae (32–47), longer Ta IV (101), longer Ti IV (188–261) and smooth ASens and PSens.

Neotropical B. obtusum (Trägårdh, 1931) from Juan Fernández Islands (Más a Tierra) differs from B. xerothermicum sp. nov. in more spherical body shape (1080 long and 720 wide), stronger palps, structure of idiosomal setae which are simple, setiform and slightly bent, and in longer legs (I - 1356, II - 810, III - 846, IV - 1116, without coxae).

In Neartic, there are 4 species known: B. aonidiphagus (Ebeling, 1934) from California (USA), B. dowelli Smiley, 1964 (fully described in 1966) from Arkansas (USA), B. pulmani Smiley, 1965 from Ontario (Canada) and B. kendalli Welbourn, 1991 from Maine. B. aonidiphagus differs from B. xerothermicum sp. nov. in larger body size (1750–2000 long), clearly longer palps (350) and absence of denticle on palpal claw. B. dowelli differs from B. xerothermicum sp. nov. in the length ratio of nonsensillary setae AL to PSens; its AL are almost equal to PSens (in B. xerothermicum AL are always distinctly shorter), considerably longer Ta I (191) and Ti I (300) and structure of ASens and PSens which are hairy all over; B. pulmani (in which two sexes are also known) differs from B. xerothermicum sp. nov. in having strongly elongate, cylindrical palparsi, ASens equal to PSens, and both ASens and PSens setulose all over (B. xerothermicum sp. nov. has ASens visibly shorter than PSens, and both types of sensillary setae setulose only in distal part), greater and unstable number of AL (♀ - 9, ♂ - 5), longer Ta I (186), and leg IV shorter than leg I by 1/3 (in B. xerothermicum sp. nov. the leg IV is shorter by 1/6 at most); the body length of the holotype (♀ - 1600) exceeds considerably that of the largest specimen from Poland (985). B. kendalli differs from B. xerothermicum sp. nov. in posterior dorsal setae (PDS) length and structure: they
Figures 19-23. *Balaustium xerothermicum* sp. nov. (19) Genital-anal region of female; (20) genital setae of female; (21) genital-anal region of male; (22) genital setae of male; (23) male internal genital sclerite.
are slightly longer (37–44) and have setulae only in their basal parts. Moreover B. kendalli has more AL setae (9–10), bigger eye (28), much longer legs (I - 1262, II - 888, III - 986, IV - 1224, all without coxae) and is considerably bigger (1125 - 1197 long by 810 - 887 wide).

The Palearctic species can be divided into two groups: "murorum" and "araneoides". The first group includes: B. afghanicum Cooreman, 1960, B. bulgariense Oudemans, 1913, B. florale Grandjean, 1947 (postlarval form interpreted in 1959), B. madeirensense Willmann, 1939, B. murorum (Hermann, 1804), B. neomurorum Schweizer, 1951, B. submurorum Schweizer and Bader, 1963 and B. unidentatum (Tragardh, 1904); the second one includes: B. araneipes Cooreman, 1956 and B. araneoides (Berlese, 1910).
All species of the “murorum” group have opisthosomal setae (MDo, PDO) considerably longer; reaching 48–60 on distal end of opisthosoma (analogous setae in B. xerothermicum sp. nov. never exceed 36); B. afghanicum is bigger (1600), has longer AL (100), ASens (90), ISD (220), palps (264 – excluding PaTr) and legs (III – 1250, II – 850, III – 900, IV – 1150); B. madeirense has different shape of anterior part of aspidosoma, eyes situated behind bases of PSens (i.e. distance OPS is negative), AL are about twice longer than ASens and visibly longer than PSens; B. neomurorum has very characteristic tubular urnulae which visibly protrude from idiosoma in the not mounted specimens, longer ISD (180–192), considerably longer legs (I – 1287, II – 945, III – 1017, IV – 1237 including coxae), longer Ta I (162 long, 72 wide), Ti I (270), Ta IV (118 long, 63 wide) and Ti IV (270); B. submurorum has longer ASens (72) and PSens (96), strongly shaped denticle on palpal claw and characteristic ring shaped urnulae. B. murorum and B. unidentatum have stouter palps, more strongly framed denticle on palptibial claw; different dorsal and ventral setae (both longer, and ventral more setulose), shorter and stouter coxalae III – they are thicker, setulose and do not exceed 50 (in B. xerothermicum sp. nov. they are smooth, flagellate and always over 80), generally bigger body size reaching 1600; the most characteristic feature is the cluster of strong, serrate setae (“sempitectinale”) on medial ventral side of palpogenu (generally 6–8 in adults and 3–4 in nymphs)(Figs 28–30). It seems that the last feature is characteristic of all species of the “murorum” group but it requires re-examination of types. The authors probably did not pay sufficient attention to it and did not put it in the descriptions. Both B. florale and B. bulgariense (from post-larval instars known only as nymphs) have such kind of setae.

Moreover, it seems that B. murorum is a parthenogenetic species. The best interpretation of the latter one was given by Oudemans (1916) and Schweizer (1951).

Species of the “araneoides” group differ in length of the legs. B. araneoides (sensu Berlese, 1910) from Sicily has leg I 2200 while its body is 850 (i.e. the ratio Leg I : LB = 2.3:1). B. araneipes Cooreman, 1956 (= B. araneoides sensu Halbert, 1920 non Berlese, 1910) from Ireland (Halbert) and Algeria (Cooreman) differs from B. xerothermicum sp. nov. in longer legs (I – 1460–1560, II – 900, III – 860, IV – 1100, without coxae), ratio leg I (without coxa) : body length 1.45:1 (Ireland) and 1.56:1 (Algeria), stout palps with wide femur and arched genu and PSens setulose from the base and ASens setulose in 3/4 distally.

**KEY TO THE POLISH SPECIES OF POSTLARVAL BALAUSTIUM**

1(2). Dorsal setae very short (max. 36) (Figs 10–11), palpogenu without specialized stout setae (sempitectinale) (Figs 24, 25), mid-ventral setae needle-like, elongate, slender and almost bare (Figs 12, 13) ............................... **Balaustium xerothermicum** sp. nov. 2(1). Dorsal setae much longer (up to 60), palpogenu with 5–7 (adults) or 3–5 (nymphs) specialized stout setae (sempitectinale) (Figs 28–30), mid-ventral setae similar to dorsal but narrower and strongly setulose .......................... 3
3(4). Palps strong, palpgenum thick, as long as wide, "swollen", twice as wide as palpibia base (Figs 29, 30) ....... Balaustium murorum (Hermann, 1804)

4(3). Palps slender, palpgenum distinctly longer than wide, V wider than palpibia base (Fig. 28) ..............................................

Balaustium unidentatum (Trägårdh, 1904)

REFERENCES


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Table 1. Metric data of *Balaustium xerothermicum* sp. nov. for holotype (H)(BK/7/6) and 6 paratypes (P) - 2♀, 2♂♂, 2 nymphs (N).