

DESCRIPTION OF A NEW SPECIES OF *ACANTHOCOCCUS*
(HEMIPTERA: COCCOIDEA: ERIOCOCCIDAE)
FROM AUSTRIA

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A new felt scale species, *Acanthococcus thaleri* SZITA et KOZÁR, collected on shoots of *Erica carnea* (Ericaceae) is described from Austria. The closest relatives are *A. devoniensis* (WILLIAMS, 1985) from the Palearctic region and *A. arenosus* (COCKERELL, 1897), *A. barri* MILLER, 1991 and *A. mackenziei* MILLER et MILLER, 1992 from the Nearctic region. According to catalogues and some recent publications, the list of scale insect species from Austria has now reached 88 species with this record.

Key words: *Acanthococcus*, Austria, Alps, *Erica carnea*, new species

INTRODUCTION

The Eriococcidae are well represented in the Palearctic Region where 198 species have been recorded (KOZÁR 2009). The taxonomy of the World fauna of this family is not well understood and the number of new genera and species is continuously increasing (BEN-DOV *et al.* 2009, KOZÁR 2009, MILLER & GIMPEL 2000). Similar trends have been shown by KOZÁR and DROZDJÁK (1986) for the Palearctic Region.

Although the scale insect fauna of Austria has been studied by several authors (BORATYNSKI 1955, KAWECKI 1971, KOSZTARAB 1955, LINDINGER 1912, LÖW 1872, 1882, 1883, REH 1903, 1904, RUSSELL 1941, SCHRANK 1781, 1801), a complete list of species can be extracted only from catalogues (BEN-DOV *et al.* 2009, KOSZTARAB & KOZÁR 1988, KOZÁR 1998) and some recent publications (KOZÁR & NAGY 1998, MÁTRAHEGYI & KOZÁR 2008). Based on the above mentioned sources, only 9 eriococcid species were known in six genera among the 87 scale insect species recorded from Austria. This suggests that new species of Eriococcidae can still be expected from Austria, especially when one considers that 30 eriococcid species are known from Hungary (KOSZTARAB & KOZÁR 1988).

The aim of this work is to describe a new species of Eriococcidae from the Alps in Austria, to give some new faunistic information from there and to provide a brief diagnosis on the genus *Acanthococcus* SIGNORET.

MATERIAL AND METHODS

The scale insect samples were collected in 1934 in two districts of Austria on *Erica carnea* in the Alps. The samples were taken by E. E. GREEN from the collection of Natural History Museum, Vienna, to the British Museum of Natural History, London, in 1940, where the specimens were mounted on two slides.

In the present paper, we follow the generic concepts of BORCHSENIUS (1949), KOSZTARAB and KOZÁR (1988), TANG and HAO (1995) and KOZÁR (2009), which are based mostly on those of SIGNORET (1875). Morphological terminology follows WILLIAMS (1985), KOSZTARAB and KOZÁR (1988), HODGSON and TRENCHVA (2008), KOZÁR *et al.* (2007) and KAYDAN and KOZÁR (2008). Measurements and frequencies were taken from all specimens.

Data given separately refer to the holotype; the size ranges include the paratypes and are given in parentheses when they differ from those of the holotype.

The mounted material is deposited in the Natural History Museum, London.

SYSTEMATICS

Genus *Acanthococcus* SIGNORET, 1875

Type species: *Acanthococcus aceris* SIGNORET, 1875.

Generic diagnosis – Ovisac ovoid, completely encloses female body. Adult female elongate-oval, with anal lobes conical and normally heavily sclerotized; antennae 6-, 7-, rarely 8-segmented; labium 3-segmented, with 16 setae (of these 10 on apical segment); legs well-developed, coxa often with translucent sensory pores, claw usually with a denticle; spiracles often with a few associated disc pores; disc pores on venter only, most usually quinquelocular, but the number of loculi vary between 3 to 9; oval disc pores (or cruciform pores) absent from dorsum, but often on prosomal venter in a marginal band; tubular ducts of 2 types: micro- and macrotubular ducts; microtubular ducts ca 7 µm long and 2 µm wide, scattered or form transverse rows or bands on dorsum, often associated with dorsal conical setae; macrotubular ducts often of 2 sizes, usually form transverse rows or bands on body surfaces; enlarged conical setae normally present at least in dorsal margin, but often on entire dorsum where they form transverse bands or rows; hair-like setae on venter only; anal ring well developed, sclerotized with partly double row of pores and 8, rarely 6, anal ring setae, latter often as long as apical seta on anal lobes; each anal lobe with a long apical seta and usually with 3 short dorsal conical setae, seldom with more, but at least with 2, ventral hairlike setae also present (BORCHSENIUS 1949, HODGSON & MILLER 2010, KOSZTARAB & KOZÁR 1988, KOZÁR & KONCZNÉ BENEDICTY 2008).

Acanthococcus thaleri SZITA et KOZÁR, sp. n.

(Fig. 1)

Type data – Holotype: female, Austria, Siebenstein (near Molln vill., Kirchdorf an der Krems distr., 47°49' N, 14°12' E, ca. 1100 m altitude) on *Erica carnea*, E. E. GREEN, ex. coll. No: Nat. Hist. Mus. Vienna EEG. 5/34, no. 2. Deposited in the scale insect collection of the British Museum of Natural History, coll. No: BM, 1940, 180.

Paratypes: Two females on a separate slide, Austria, Gloggnitz town (Neunkirchen distr., ca. 47°40' N 15°56' E), on *Erica carnea*, E. E. GREEN, ex. coll. No: Nat. Hist. Mus. Vienna EEG. 5/34, no. 3. Deposited in the scale insect collection of the British Museum of Natural History, coll. No: BM, 1940, 180.

Adult female.

Live appearance – Not seen.

Mounted female – Body elongate oval (Fig. 1), 1.55 (1.55–2.02) mm long and 0.88 (0.88–1.04) mm wide.

Venter – Labium 3-segmented, 86 (86–91) μm long; basal segment not well developed, but with two setae on each side; median setae on apex of labium needle-like. Antenna 6 segmented, length of segments: I: 31 (30–31), II: 17 (17–25), III: 55 (55–70), IV: 14 (14–15), V: 14 (14–17), VI: 24 (24–30) μm ; segment II with 1 sensory pore; segment III almost parallel sided; all segments with a few hair-like setae; apical segment with apical seta 31 (28–31) μm long; apical segment also with 3 falcate sensory setae, each 24 (24–25) μm long; two preapical segments each also with 1 sensory falcate seta: on segment IV 12 (12–14), V 14 μm long. Frontal tubercle and frontal lobe present. Eyes situated on venter near margin. Legs normal: prothoracic legs: coxa 48 (46–48) μm , trochanter 43 (43–45) μm , femur 89 (89–104) μm , tibia 72 (70–80) μm ; tarsus 84 (84–96) μm and claw 24 (24–29) μm , tarsal digitules 45 μm , claw digitules (30) μm ; mesothoracic legs: coxa 48 (48–50) μm , trochanter 46 (46–55) μm , femur 84 (84–105) μm , tibia 77 (77–84) μm , tarsus 82 (82–108) μm , claw 26 μm , length of tarsal digitules unknown, claw digitules (31) μm ; metathoracic legs: coxae 52 (50–58) μm , trochanter 48 (48–55) μm , femur 89 (89–110) μm , tibia 79 (79–90) μm , tarsus 89 (89–102) μm ; claw 29 (29–30) μm , tarsal digitules 47 (47–48) μm , claw digitules 34 μm , tarsal and claw digitules slightly knobbed. Meso- and metathoracic coxae with spinulae on anterior surface; metathoracic coxae and femur also with small pores on posterior surface. Each trochanter with two pores on each side. Claw with a denticle. Legs with a few hair-like setae, and with one sensory pore on tarsus. Tibia with 4 or 5 setae, tarsus with 5 setae. Multilocular pores each 4–6 μm in diameter and with 3–9 loculi, mostly 5, distributed in sparse rows on all abdominal and thoracic segments. Width of anterior spiracles 31 (31–38) μm . A few hair-like setae present on submedian venter. Margin with a row of truncate conical spines, each 19–29 μm long plus a band of macrotubular ducts, each 7 μm wide and 18 μm long. Smaller macrotubular ducts, each 4 μm wide and 18 μm long; scattered throughout venter but most abundant submarginally. Microtubular ducts sparse submarginally and marginally. Cruciform pores sparse on submargin, each 4 μm wide. Blunt conical spines, each 17 μm long, present on submargin, forming a wide band, together with small macrotubular ducts, cruciform pores and microtubular ducts. Suranal setae hair-like.

Dorsum – Dorsal setae truncate conical spines, each 19–29 μm long, width at base ca. two thirds of its length, in rows across all segments. Macrotubular ducts each 7 μm wide and 18 μm long, associated with truncate conical spines. Microtubular ducts each 4 μm long, scattered throughout. Anal ring strongly sclerotized, oval, 53 (53–62) μm wide, 62 (62–72) μm long, with partly double

rows of pores but posterior part without pores, with 4 pairs of long setae, each 74 (74–86) μm long; anal ring situated on margin of dorsum. Anal lobes well developed, membranous, each with three spines on dorsal surface, one spine stronger. Anal lobe seta 139 (139–160) μm long. Cauda not seen.

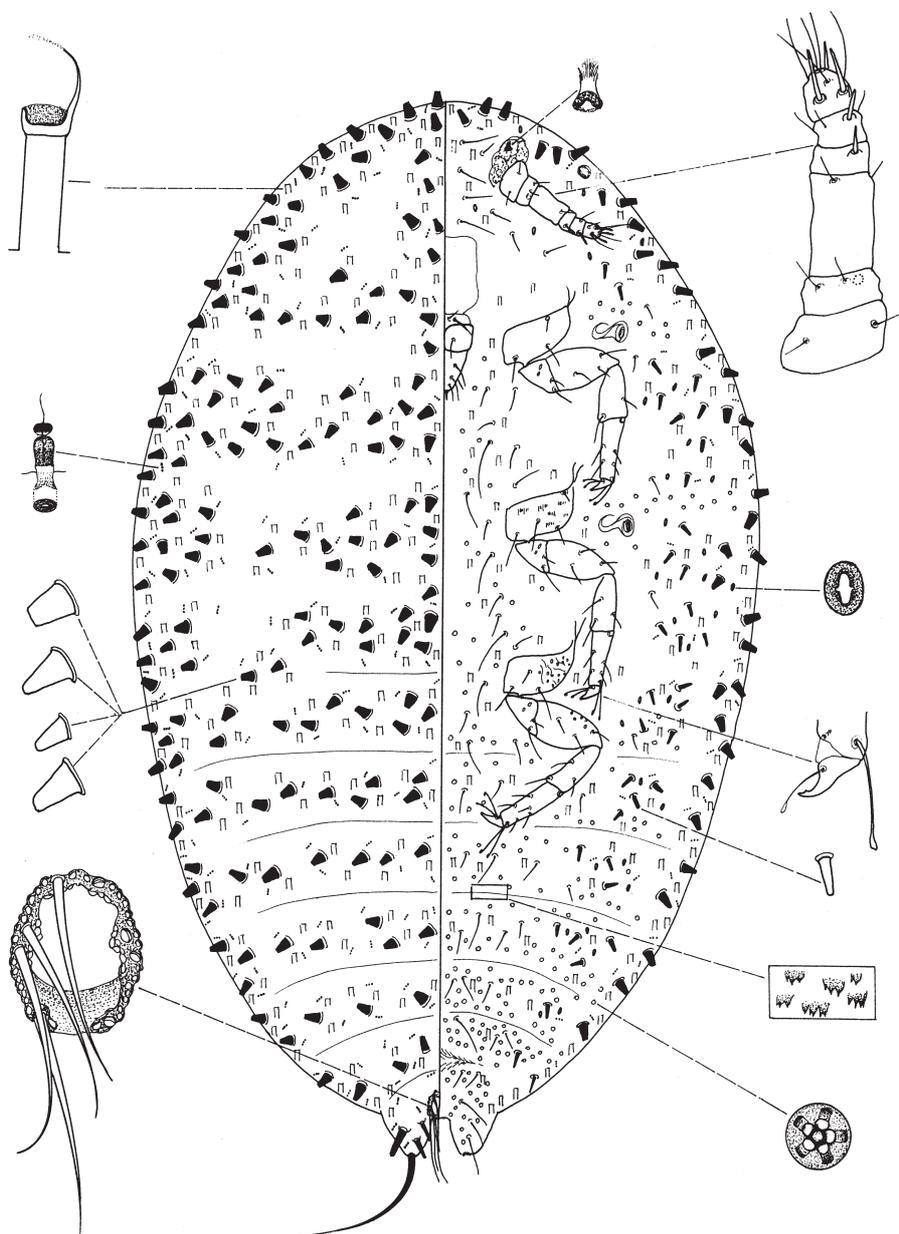


Fig. 1. *Acanthococcus thaleri* sp. n.: mounted female. Austria, Siebenstein, on *Erica carnea*

Comment – The most conspicuous diagnostic character of the species is the wide truncate conical spines on the dorsum, rare for the genus *Acanthococcus*. The closest species is *A. devoniensis* (GREEN, 1896) in the Palaearctic Region which lives on several species of Ericaceae. The new species differs from *A. devoniensis* by having 6-segmented antennae; dorsal truncate setae much shorter, wider; and the number of setae on last abdominal tergite only about half the number on *A. devoniensis* (WILLIAMS, 1985). There are several palaearctic *Acanthococcus* species feeding on Erica spp. (Ericaceae) – *A. ericae* (SIGNORET, 1875), *A. thymi* (SCHRANK, 1801), *A. timidus* (HULDEN, 1985), *A. uvaeursi* (LINNEAUS, 1761) – but their morphology is clearly different from *A. thaleri*. In the Nearctic region, three species seem to be similar to the new species: *Acanthococcus arenosus* (COCKERELL, 1897), *A. barri* (MILLER, 1991) and *A. mackenziei* (MILLER et MILLER, 1992). *A. arenosus* differs from *A. thaleri* in having 7-segmented antennae; truncate dorsal setae of two distinct sizes, all of them three times longer than wide, larger ones slightly curved and more abundant near the margins; and absence of cruciform pores. *A. barri* differs from the new species by having 7 segmented antennae; much more abundant dorsal setae in three sizes; absence of cruciform pores; and more robust legs. *A. mackenziei* differs from *A. thaleri* in having truncate setae two times longer than wide that are much more abundant on dorsum; absence of loculate pores with more than five loculi; tarsi much longer than tibiae.

Etymology – The new species is named to the honour and memory of arachnologist Prof. Dr. KONRAD THALER, who has collected several new scale insect species in Austria.

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REFERENCES

- BEN-DOV, Y., MILLER, D. R. & GIBSON, G. A. P. (2009) ScaleNet: A database of the scale insects of the world. <http://www.sel.barc.usda.gov/SCALENET/SCALENET.HTM>. (Accessed November 25, 2009)
- BORATYNSKI, K. L. (1955) Coccoidea (Hem. Homoptera) from the Austrian Tyrol. *Entomologist's Monthly Magazine* **91**: 66–67.

- BORCHSENIUS, N. S. (1949) *Fauna of USSR (Homoptera, Pseudococcidae). Vol. 7.* Akademii Nauk Zoologicheskogo Instituta Leningrad (n.s. 38), Leningrad, 383 pp. [in Russian]
- HODGSON, C. J. & MILLER, D. R. (2010) A review of the eriococcid genera (Hemiptera: Sternorrhyncha: Coccoidea) of South America. *Zootaxa* **2459**: 1–101.
- HODGSON, C. J. & TRENCHVA, K. (2008) A new species of *Eriococcus* (Hemiptera: Sternorrhyncha: Coccoidea: Eriococcidae) and redescriptions of *Eriococcus roboris* Goux and *E. thymelaeae* Newstead, with a key to the *Eriococcus* species on *Quercus* in the western Palaearctic. *Zootaxa* **1959**: 1–38.
- KAWECKI, Z. (1971) A note on some European Lecaniidae (Coccoidea) with new additions of the Austrian, British, Italian and Polish fauna. *Bulletin de l'Academie Polonaise des Sciences* **19**: 255–260.
- KAYDAN, B. M. & KOZÁR, F. (2008) Two new genera and species of Eriococcidae (Hemiptera: Sternorrhyncha: Coccoidea) with new data on the family in Turkey. *Zootaxa* **1848**: 16–26.
- KOSZTARAB, M. (1955) Revision und Ergänzung der in der "Fauna Regni Hungariae" angeführten Cocciden. *Annales historico-naturales Musei nationalis hungarici* **47**: 371–385.
- KOSZTARAB, M. & KOZÁR, F. (1988) *Scale insects of Central Europe.* Akadémiai Kiadó, Budapest, 456 pp.
- KOZÁR, F. (1998) *Catalogue of Palaearctic Coccoidea.* Plant Protection Institute, Hungarian Academy of Sciences, Budapest, Hungary, 526 pp.
- KOZÁR, F. (2009) Zoogeographical analysis and status of knowledge of the Eriococcidae (Hemiptera), with a World list of species. *Bollettino di Zoologia Agraria e di Bachicoltura Series II* **41**: 87–121.
- KOZÁR, F. & DROZDJÁK, J. (1986) Some questions concerning the knowledge of Palaearctic Coccoidea (Homoptera). *Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri* **43**: 97–105.
- KOZÁR, F. & KONCZNÉ BENEDICTY, ZS. (2008) Description of three new genera, five new species and some additional data on the taxonomy and distribution of Neotropical Eriococcidae (Homoptera Coccoidea Eriococcidae). *Bollettino di Zoologia Agraria e di Bachicoltura (Ser. II)* **40**: 1–8.
- KOZÁR, F., MARTIN, J. & KONCZNÉ BENEDICTY, ZS. (2007) Revision of *Gossypariella* Borchsenius with description of new species (Homoptera Coccoidea Eriococcidae). *Bollettino di Zoologia agraria e di Bachicoltura, ser. II* **39**: 79–90.
- KOZÁR, F. & NAGY, B. (1998) New data to the distribution of some Palaearctic scale insects (Homoptera: Coccoidea). *Folia entomologica hungarica* **59**: 53–56.
- LINDINGER, L. (1912) *Die Schildläuse (Coccidae) Europas, Nordafrikas und Vorder-Asiens, einschliesslich der Azoren, der Kanaren und Madeiras.* Ulmer, Stuttgart, 388 pp.
- LÖW, F. (1872) Ueber *Diaspis visci* SCHRANK, eine auf der Mistel lebende Schildlaus. *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien* **22**: 273–278.
- LÖW, F. (1882) Eine neue Cocciden-art (*Xylococcus filiferus*). *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien* **32**: 271–278.
- LÖW, F. (1883) Über eine neue Nadelholz-coccide und den Dimorphismus der Cocciden-männchen. *Wiener entomologische Zeitung* **2**: 3–7.
- MÁTRAHEGYI, E. & KOZÁR, F. (2008) New scale insect species in Austria's fauna. Pp. 155. In: BRANCO, M., FRANCO, J. C. & HODGSON, C. J. (eds): *Proceedings of the XI. International Symposium on Scale Insect Studies, Oeiras, Portugal, 24–27 September 2007.* ISA Press, Lisbon, Portugal.

- MILLER, D. R. (1991) Systematic analysis of *Acanthococcus* species (Homoptera: Coccoidea; Eriococcidae) infesting *Atriplex* in Western North America. *Proceedings Entomological Society of Washington* **93**: 333–355.
- MILLER, D. R. & GIMPEL, M. E. (2000) *A systematic catalogue of the Eriococcidae (Felt scales) (Hemiptera: Coccoidea) of the World*. Intercept Ltd., Andover, U.K., 589 pp.
- MILLER, D. R. & MILLER, G. L. (1992) Systematic analysis of *Acanthococcus* (Homoptera: Coccoidea: Eriococcidae) in the Western United States. *Transactions of the American Entomological Society* **118**: 1–106.
- REH, L. (1903) Zur Naturgeschichte Mittel- und Nordeuropäischer Schildläuse. *Allgemeine Zeitschrift für Entomologie* **8**: 301–469.
- REH, L. (1904) Zur Naturgeschichte Mittel- und Nordeuropäischer Schildläuse. *Allgemeine Zeitschrift für Entomologie* **9**: 12–36.
- RUSSELL, L. M. (1941) A classification of the scale insect genus *Asterolecanium*. *United States Department of Agriculture, Miscellaneous Publications* **424**: 1–319.
- SCHRANK, F. (1781) *Coccus*, Gallinsect. Pp. 295–296. In: SCHRANK, F. (ed.): *Enumeratio insectorum Austriae indigenorum*. 552 pp. Augustae Vindelicorum.
- SCHRANK, F. (1801) *Fauna Boica: Durchgedachte Geschichte der in Baiern einheimischen und zahmen Thiere. Vol. 2(1)*. Stein'schen Buch-handlung, Nürnberg, 274 pp.
- SIGNORET, V. (1875) Essai sur les cochenilles ou gall insectes (Homoptères-Coccides), 14^e partie. *Annales de la Société Entomologique de France, (série 5)* **5**: 15–40.
- TANG, F. T. & HAO, J. (1995) *The Margarodidae and others of China (Homoptera: Coccinea of Insecta)*. Chinese Agricultural Science Technology Press, Beijing, P. R. China, 738 pp.
- WILLIAMS, D. J. (1985) The British and some other European Eriococcidae (Homoptera: Coccoidea). *Bulletin of the British Museum (Natural History)* **51**: 347–393.

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