

**Orijinal araştırma (Original article)**

**Two new species of *Coccidohystrix* Lindinger  
(Hemiptera: Coccoomorpha: Pseudococcidae) with notes on  
the related genus *Artemicoccus* Balachowsky**

*Coccidohystrix* Lindinger (Hemiptera: Coccoomorpha: Pseudococcidae) cinsine ait iki türün tanımlanması ve *Artemicoccus* cinsi üzerine sistematik araştırmalar

M. Bora KAYDAN<sup>1</sup>

Giuseppina PELLIZZARI<sup>2</sup>

Éva SZITA<sup>3\*</sup>

**Summary**

Scale insect (Hemiptera: Coccoomorpha: Pseudococcidae) samples were collected in Turkey (Hakkari-Yüksekova) and Bulgaria (Kresna Gorge) between 2007 and 2012. Two new *Coccidohystrix* Lindinger species, are described and illustrated. An identification key including the new species is also provided. Additionally, the type material of *C. zangherii* was studied and the species is transferred into the genus *Artemicoccus* Balachowsky. A new identification key for species in the genus *Artemicoccus* is also provided.

**Keywords:** Phenacoccinae, lacking ostiole. Eriococcidae

**Özet**

Bu çalışmada 2007 ve 2012 yıllarında Türkiye (Hakkari-Yüksekova) ve Bulgaristan (Kresna Gorge)'dan toplanan unlu bit (Hemiptera: Coccoomorpha: Pseudococcidae) örnekleri incelenmiştir. Çalışma sonucunda *Coccidohystrix* Lindinger cinsine ait iki yeni tür tanımlanmış olup cinse ait yeni teşhis anahtarları oluşturulmuştur. Buna ek olarak *C. zangherii* Kozár & Pellizzari'nin tip materyalleri incelenerek *Artemicoccus* Balachowsky cinsine aktarılmış ve *Artemicoccus* cinsine ait yeni teşhis anahtarları oluşturulmuştur.

**Anahtar sözcükler:** Phenacoccinae, ostiole eksikliği, Eriococcidae

<sup>1</sup> Çukurova University, Imamoglu Vocational School, Adana, Turkey

<sup>2</sup> Department of Agronomy, Food, Natural Resources, Animals and Environment DAFNAE, University of Padova, Italy,

<sup>3</sup> Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, H-1022, Herman Ottó út 15, Budapest, Hungary

\* Sorumlu yazar (Corresponding author) e-mail: [szita.eva@agr.ar.mta.hu](mailto:szita.eva@agr.ar.mta.hu)

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## Introduction

More intensive collecting and the identification of new scale insect species can help to improve the knowledge on morphological features of these insects and often allow to clarify the systematic position of controversial taxa.

In recent years the genera *Artemicoccus* and *Coccidohystrix* have been in the scope of several papers in which the above reported taxa are considered as separate genera (Danzig et al., 2012) or as synonyms (Gavrilov-Zimin & Matile-Ferrero, 2014; Danzig & Gavrilov-Zimin, 2014).

Within the Phenacoccinae (Hemiptera: Pseudococcidae), five genera include species with dorsal cerarii, namely *Artemicoccus* Balachowsky (2 species), *Coccidohystrix* Lindinger (9 species), *Pedronia* Green (4 species), *Pedrococcus* Mamet (8 species) and *Synacanthococcus* Morrison (3 species) (Ben-Dov et al., 2015). The genus *Peliococcus* Borchsenius has also dorsal cerarii but the cerarian setae are narrowly conical setae whereas those of the five genera reported above are broadly conical (Williams, 2004). On the other hand in the genera *Artemicoccus* and *Coccidohystrix* both anterior and posterior ostioles are missing, while at least posterior ostioles occur in the other genera mentioned above. *Artemicoccus* and *Coccidohystrix* are considered as Palaearctic originated genera, *Pedronia*, *Pedrococcus* and *Synacanthococcus* are mainly from Oriental and Afrotropical regions (Williams, 2004).

The genus *Artemicoccus* was separated from the genus *Centrococcus* Borchsenius, (currently synonym of *Coccidohystrix* Lindinger) by Balachowsky (1953b) and includes two species: *C. bispinus* Borchsenius and *C. lubersaci* Balachowsky. Balachowsky (1953b) clarified the morphological differences between the two genera and added some important biological observation "*in Artemicoccus the adult females were enclosed in a felt eggsac, in Coccidohystrix the adult females were mobile and covered with powdery wax*". Moreover he considered that these mealybugs showed an affinity with Eriococcidae (Balachowsky 1953a, b).

Later Kozár & Pellizzari (1989) described the new species *C. zangherii* Kozár & Pellizzari in *Coccidohystrix* but admitted that it could be placed into the genus *Artemicoccus*; at that time they considered that the characters reported by Balachowsky were not sufficient to separate *Artemicoccus* from *Coccidohystrix* and concluded that a revision of these genera could lead to the synonymy of *Artemicoccus* with *Coccidohystrix*.

Danzig et al. (2012) considered these two genera separately following Balachowsky (1953b) and Ben-Dov (1994) and provided a key for their differentiation. The main diagnostic morphological character between the two genera is the situation of dorsal conical setae: in *Coccidohystrix* the dorsal conical setae on dorsum are situated on elevated sclerotised prominences, while in *Artemicoccus* those are not on sclerotised prominences.

Gavrilov-Zimin & Matile-Ferrero (2014) regarded *Artemicoccus* a subjective synonym of *Coccidohystrix* and described further two new species, *C. maghribensis* Gavrilov-Zimin & Matile-Ferrero and *C. monicae* Gavrilov-Zimin & Matile-Ferrero. Moreover they transferred *Amonosterium echinatus* (Balachowsky) to the genus *Coccidohystrix* as *Coccidohystrix echinata* (Balachowsky) *comb. nov.*

Danzig & Gavrilov-Zimin (2014) considered *Artemicoccus* as a junior synonym of *Coccidohystrix* in their recent valuable volume on Pseudococcidae and indicated that the genus *Coccidohystrix* was very close to the family Eriococcidae.

Nine *Coccidohystrix sensu stricto* species are currently recognized (Ben-Dov et al., 2015); of which seven have a Palaearctic distribution (*C. artemisiae* (Kiritchenko), *C. burumandi* Moghaddam, *C. echinata* (Balachowsky), *C. insolita* (Green), *C. samui* Kozár & Konczné Benedicty, *C. splendens* (Goux), *C. zangherii* Kozár & Pellizzari Scaltriti), one is an Oriental species (*C. eleusines* Williams) and one an Afrotropical species (*C. madecassa* (Mamet)) (Ben-Dov et al., 2015).

The collecting of two new species referred to *Artemicoccus* -*Coccidohystrix* gave us the opportunity to reconsider the morphology of these two controversial taxa, also on the basis of a recent phylogenetical study that resulted these two genera as separate ones in a very distinct clade (Kaydan et al., 2015)

In the present study the authors agree with Balachowsky (1953b), Ben-Dov (1994), Danzig et al. (2012) and regard *Coccidohystrix* and *Artemicoccus* as separate genera and described two new *Coccidohystrix* species, collected in Turkey and Bulgaria with new identification key of the genus. In addition the type material of *C. zangherii* was studied and the species transferred to the genus *Artemicoccus*. A new identification key for the genus *Artemicoccus* is also provided.

## Materials and methods

Scale insect samples were collected in Turkey (Hakkari-Yüksekova) and Bulgaria (Kresna Gorge) between 2007 and 2012. Specimens were taken from wild plants in natural areas. Collecting data, province, locality, GIS coordinates, date of collection, collector, data of the host plant and the collection numbers are given.

Specimens were slide-mounted for light microscopy using the method of Kosztarab & Kozár (1988). Morphological terminology follows that of Kosztarab & Kozár (1988) and Williams (2004) for description of the new mealybug species. Measurements and counts of the new species were taken from all available material.

All type materials are deposited in the Scale Insect Collection of Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Budapest, Hungary (PPI).

## Results

### Genus *Coccidohystrix* Lindinger

*Echinococcus* Balachowsky, 1936. Type species: *Echinococcus echinatus* Balachowsky, by original designation. Homonym of *Echinococcus* Rudolphi, 1801, in Vermes.

*Coccidohystrix* Lindinger, 1943. Replacement name for *Echinococcus* Balachowsky.

*Centrocooccus* Borchsenius, 1948. Unjustified replacement name for *Echinococcus*; discovered by Morrison & Morrison, 1966. Notes: Synonymy by community of type species.

*Seabrina* Neves, 1943: type species *Seabrina cistorum* Neves, 1943, by original designation and monotypy (synonymized by Danzig & Gavrillov-Zimin, 2014).

*Type species: Echinococcus echinatus* Balachowsky, by original designation

*Generic diagnosis. Adult female.* Female covered with white powdery wax or with few threads of wax (Balachowsky, 1953b; Marotta & Tranfaglia, 1994). Labium three segmented, slightly longer than wide. Posterior pair of spiracles always larger than anterior spiracles, spiracles associated with trilobular pores at opening of the atrium. Circulus absent. Legs well developed, claw with a denticle; tarsal digitules hair-like, not capitate; claw digitules knobbed, claw digitules broader than tarsal digitules. Both pairs of ostioles absent (except *C. insolita*, see comments). Anal lobes well developed. Anal ring oval, with 6 setae; with 1 inner row of pores and 1 or 2 outer rows of pores.

*Dorsum.* Antennae 7–9 segmented. Eyes oval, on a small basal cone. Number of cerari on margin varies between 16–18 pairs, each cerarius situated on an elevated sclerotised prominence bearing several (1–12) enlarged conical setae, several minute discoidal pores and 1 or 2 spine-like setae. These prominences form several rows along the body; the number of conical setae varies in different species. Dorsal body setae of various sizes (in *C. artemisiae*, *C. burumandi*, *C. eleusines* and *C. insolita*) or absent. Multilobular disc pores absent. Oral collar tubular ducts of one or two sizes or absent. Trilobular pores each 3–5 µm in diameter, often slightly larger than ventral trilobular pores, scattered over dorsum. Minute discoidal pores scattered.

**Venter.** Most ventral setae slender and hair-like, of various sizes. Oral collar tubular ducts of one or two sizes present around vulva or in transverse rows on body segments. Multilocular disc pores present on posterior abdominal segments, especially around vulva, sometimes also on thorax and head. Quinquelocular pores absent or present around median area of thorax or scattered on venter. Trilocular pores present, mostly near spiracles, each 2.5–5.0 µm in diameter. Minute discoidal pores scattered.

**Comments.** The genus *Coccidohystrix* can be distinguished by combination of the following characters (i) 7–9 segmented antennae; (ii) cerarii numbering 16–18 pairs, present on body margin, each cerarius formed of an elevated sclerotized prominence bearing several (1–12) enlarged conical setae, several minute discoidal pores and 1 or 2 spine-like setae, (iii) similar prominences distributed in longitudinal rows on dorsum, medial ones not divided; (iv) prominences and cerarii do not bear any trilocular pores (except in case of some population of *C. artemisiae* (Danzig et al., 2012).

The type material of *C. zangherii* was examined and consequently it was decided to transfer this species to the genus *Artemicoccus* as *A. zangherii* (Kozár & Pellizzari) *comb. nov.* Moreover, according to the drawings and descriptions of *C. echinata*, *C. maghribiensis* Gavrilov-Zimin & Matile-Ferrero and *C. monicae* Gavrilov-Zimin & Matile-Ferrero by Gavrilov-Zimin & Matile-Ferrero (2014) we regard these species as belonging to the genus *Artemicoccus* as *A. echinatus* (Balachowsky) *comb. nov.*, *A. maghribiensis* (Gavrilov-Zimin & Matile-Ferrero) *comb. nov.* and *A. monicae* (Gavrilov-Zimin & Matile-Ferrero) *comb. nov.*

**Key to Palearctic species of *Coccidohystrix*, adult females.**

- 1 – Oral collar tubular ducts present on dorsum ..... *C. artemisiae* (Kiritchenko)
  - Oral collar tubular ducts absent on dorsum ..... 2
- 2 – Oral collar tubular ducts on venter very few, if present, only on posterior abdominal segment .... 3
  - Oral collar tubular ducts on venter numerous ..... *C. insolita* (Green)
- 3 – Hind tibia with translucent pores ..... 4
  - Hind tibia without translucent pores ..... 6
- 4 – Antennae 9 segmented; ventral quinquelocular pores scattered ..... 5
  - Antennae 7 segmented; ventral quinquelocular pores only on the posterior abdominal segment and near spiracles ..... *C. zsuzsannae* Kaydan *sp. nov.*
- 5 – Ventral trilocular pores present only on body submargin, with a few around spiracles .....
  - ..... *C. katieae* Kaydan & Szita *sp. nov.*
  - Ventral trilocular pores scattered on body surface, numerous around spiracles .....
    - ..... *C. burumandi* Moghaddam
- 6 – Elevated sclerotised prominence on dorsum without small spine like setae; dorsal prominences in 6-7 rows, number of enlarged conical setae on dorsal cerarii maximum 8 .....
  - ..... *C. splendens* (Goux)
  - Elevated sclerotised prominence on dorsum with small spine like setae; dorsal plates in 5 rows, number of enlarged conical setae on dorsal prominences maximum 5 .....
    - ..... *C. samui* Kozár & Konczné Benedicty

*Coccidohystrix zszsanna* Kaydan, *sp. nov.* (Fig. 1).

*Material studied. Holotype.* Female, Turkey, Hakkari-Yüksekove road, N: 37°40.966'; E: 044°06.227'; 1860 m; on plant from Asteraceae, 05.vii.2007, coll: M. Bora Kaydan, (KPCT: 3972).

*Description. Adult female.* Body elongate oval, 2.02 mm long, 1.32 mm wide. Eye marginal, 50–65 µm wide. Antenna 7 segmented, 400 µm long; apical segment 65 µm long, 20 µm wide, with apical setae 17.5 µm long plus three fleshy setae, each 20 µm long. Tentorium 170 µm long, 160 µm wide. Labium 140 µm long, 87.5 µm wide. Anterior spiracles 60 µm long, 25 µm wide across atrium; posterior spiracles 65 µm long, 25 µm wide across atrium. Legs well developed; data for first legs: coxa 145 µm, trochanter + femur 260 µm, tibia + tarsus 325 µm, claw 30 µm, tarsal digitules each 20 µm long, hair-like, claw digitules knobbed each 27.5 µm long; data for mid legs: coxa 130 µm, trochanter + femur 275 µm, tibia + tarsus 335 µm, claw 27.5 µm, tarsal digitules each 20 µm long, hair-like, claw digitules knobbed each 27.5 µm long; data for hind legs: coxa 140 µm, trochanter + femur 280 µm, tibia + tarsus 360 µm, claw 30 µm, tarsal digitules each 20 µm long, hair-like, claw digitules knobbed each 32.5 µm long. Anal ring 70 µm wide, with 6 setae, each setae 125–130 µm long. Cerarii 16 pairs, each cerarius formed of an elevated sclerotized prominence bearing several (5–8) enlarged conical setae, 3–6 minute discoidal pores and 1 or 2 spine-like setae each 4–5 µm long.

*Dorsum.* Enlarged conical setae, each 27–45 µm long on an elevated sclerotized prominence bearing 1–7 setae, 1–5 minute discoidal pores and 1–3 spine like setae. These prominences form five longitudinal rows along the body. Trilocular pores each 4–5 µm in diameter, a few on the surface; minute discoidal pores each 2–3 µm diameter, scattered. Multilocular disc pores, quinquelocular pores and oral collar tubular ducts absent.

*Venter.* Body setae hair-like setae, each 15.0–50.0 µm long, longest setae medially on head. Apical setae of anal lobe each 70 µm long. Multilocular disc pores absent, numbering of quinquelocular pores in rows on abdominal segments VIII + IX: 6; each pore 5 µm in diameter in pentagonal shape. Trilocular pores, each 3–4 µm in diameter, present on the submargin, numerous near spiracles, each spiracles with 61–75 associated trilocular pores. Minute discoidal pores scattered, each 2–3 µm in diameter. Oral collar tubular ducts concentrated on abdominal segments: V 2, VI 4, VII 4.

*Comments.* *C. zszsanna* *sp. nov.* can be distinguished from other *Coccidohystrix* species in having (i) antennae seven segmented (ii) oral collar tubular ducts concentrated on abdominal segments: V, VI, VII, (iii) a few quinquelocular pores only on abdominal segment VIII+IX; and (iv) a few trilocular pores sparse on dorsum and on ventral submargin. This species is very close to *C. splendens* (Goux) and *C. burumandi* Moghaddam, but differs from these two species in having seven-segmented antennae and much less quinquelocular pores on venter.

*Etymology.* This species is named after Zszsanna Konczné Benedicty (Plant Protection Institute, Centre for Agricultural Research, Hungarian Academy of Sciences, Budapest, Hungary) who made great studies on the scale insects.

*Host plant.* Asteraceae.

*Distribution.* Turkey.

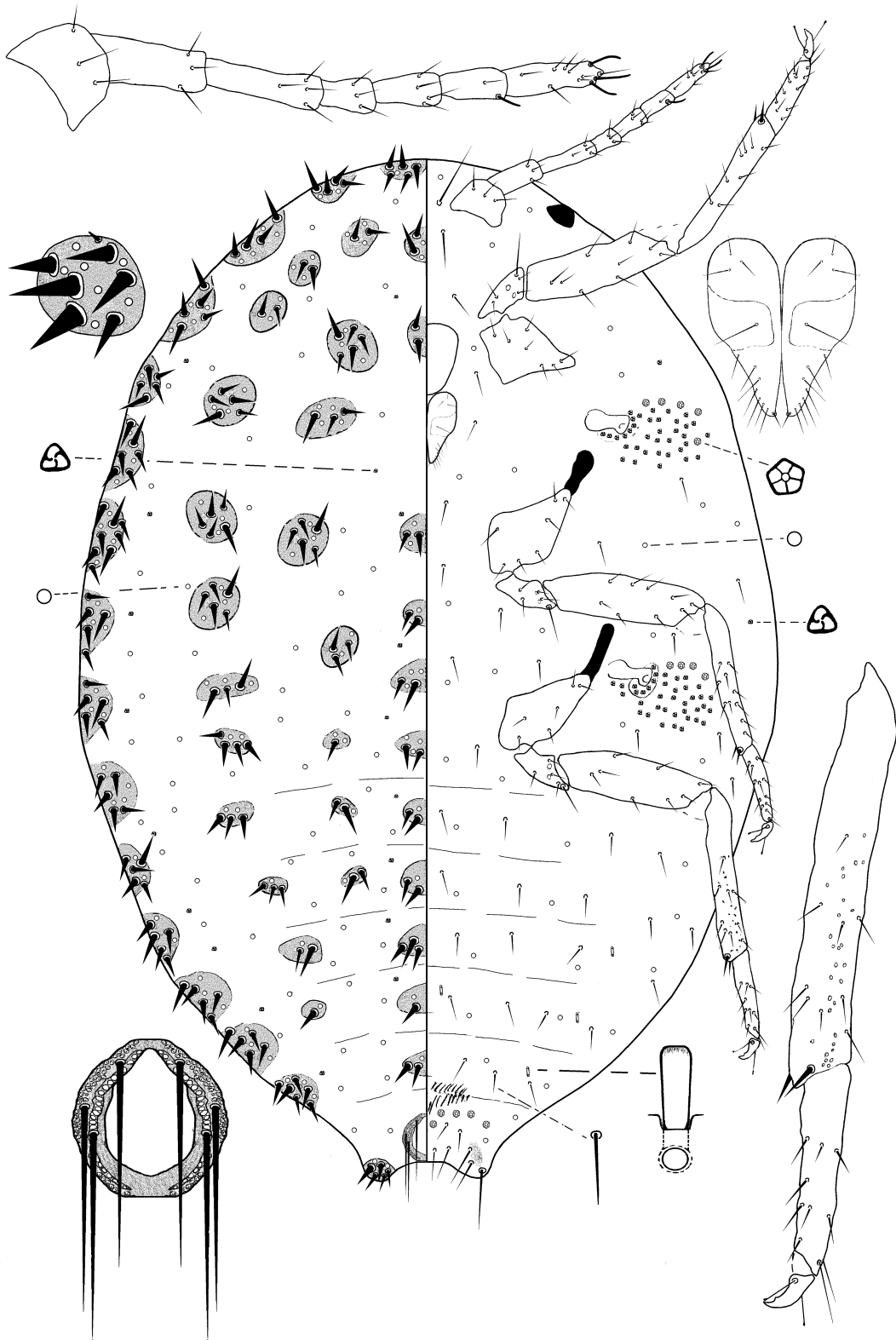


Figure 1. *Coccidohystrix zsuzsannae* Kaydan, *sp. nov.*, holotype female.

*Coccidohystrix katiae* Kaydan & Szita, *sp. nov.* (Fig. 2).

*Material studied. Holotype.* Female, Bulgaria, Kresna Gorge, *Thymus* sp. (Lamiaceae), 27.vi.2012, coll: K. Fetykó (PPI: 10517).

*Description. Adult female.* Body elongate oval, 1.66 mm long, 1.09 mm wide. Eye marginal, 45–50 µm wide. Antenna 9 segmented, 400 µm long; apical segment 55–60 µm long, 20.0 µm wide, with apical setae 15 µm long plus three fleshy setae, each 20.0–22.5 µm long. Tentorium 140 µm long, 125 µm wide. Labium 107.5 µm long, 95 µm wide. Anterior spiracles 55–60 µm long, 25 µm wide across atrium; posterior spiracles 62.5–65 µm long, 25.0–27.5 µm wide across atrium. Legs well developed; data for first legs: coxa 120–135 µm, trochanter + femur 207.5–215.0 µm, tibia + tarsus 247.5–250.0 µm, claw 32.5–35.0 µm, tarsal digitules each 22.5 µm long, hair-like, claw digitules knobbed each 25 µm long; data for mid legs: coxa 125 µm, trochanter + femur 215 µm, tibia + tarsus 255–260 µm, claw 30 µm, tarsal digitules each 20.0–22.5 µm long, hair-like, claw digitules knobbed each 25 µm long; data for hind legs: coxa 130 µm, trochanter + femur 220 µm, tibia+tarsus 292.5–300.0 µm, claw 27.5–32.5 µm, tarsal digitules each 25 µm long, hair-like, claw digitules knobbed each 20.0–22.5 µm long. Anal ring 70 µm wide, with 6 setae, each setae 110 µm long. Cerarii 17 pairs, each cerarius formed of an elevated sclerotized prominence bearing several (2–7) enlarged conical setae, 2–5 minute discoidal pores and 1 or 2 spine-like setae each 4–5 µm long.

*Dorsum.* Body setae enlarged, each 15–25 µm long on an elevated sclerotized prominence bearing 1–7 setae, 1–5 minute discoidal pores and 1–3 spine like setae. Trilocular pores each 3–4 µm in diameter, a few on the surface, minute discoidal pores each 2–3 µm diameter, scattered on dorsum. Multilocular disc pores, quinquelocular pores and oral collar tubular ducts absent.

*Venter.* Body setae hair-like slender setae, each 7.5–45.0 µm long, longest setae medially on head. Apical setae of anal lobe each 100 µm long. Multilocular disc pores absent, quinquelocular pores scattered on all surface, each pore 5–6 µm in diameter in pentagonal shape. Trilocular pores, each 3–4 µm in diameter, present on the submargin and associated to spiracles. Minute discoidal pores scattered over entire body, each 2–3 µm in diameter. Oral collar tubular ducts concentrated on abdominal segments VI 4, VII 2.

*Comments.* *C. katiae* can be distinguished from other *Coccidohystrix* species by (i) antennae nine segmented (ii) oral collar tubular ducts placed only anterior segments of vulva, (iii) quinquelocular pores scattered on venter; (iv) trilocular pores scattered on both venter and dorsum. This species is very close to *C. samui* Kozár & Konczné Benedicty but differs from this species in having translucent pores on tibia, (absent on *C. samui*).

*Etymology.* This species is named after Katia Trencheva (University of Forestry, Faculty of Agronomy, Plant Protection Department, Sofia, Bulgaria) who made great studies on the scale insects in Bulgaria.

*Host plant.* *Thymus* sp. (Lamiaceae).

*Distribution.* Bulgaria

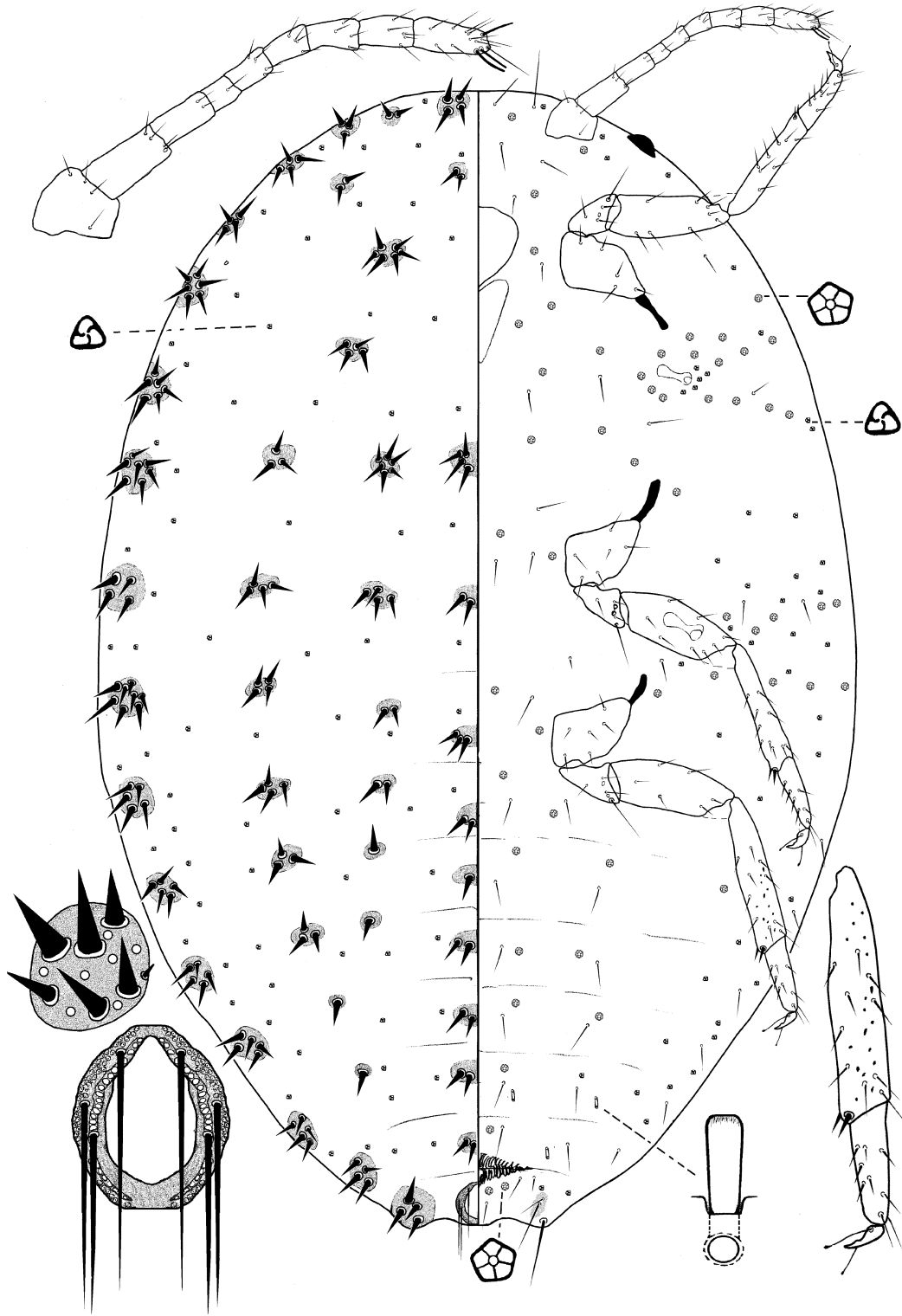


Figure 2. *Coccidohystrix katiae* Kaydan & Szita, *sp. nov.*, holotype female.



### Genus *Artemicoccus* Balachowsky

*Artemicoccus* Balachowsky, 1953b: 146.

*Type species*: *Centrococcus bispinus* Borchsenius, 1949, by original designation.

*Generic diagnosis. Adult female.*

Body oval, yellowish, enclosed in a felt-like eggsac, similar to that of Eriococcidae. Labium three segmented, slightly longer than wide. Posterior pair of spiracles always larger than anterior spiracles, spiracles associated with trilocular pores at opening of the atrium. Circulus absent. Legs well developed, claw with a denticle; tarsal digitules hair-like, not capitate; claw digitules knobbed, claw digitules broader than tarsal digitules. Both pairs of ostioles absent. Anal lobes well developed. Anal ring oval, with 1 inner row of pores and 1 or 2 outer rows of pores plus with 6 setae.

*Dorsum.* Antennae 7 segmented. Eyes oval, on a small basal cone. Number of cerarii variable: 7–18 pairs present on body margin, each cerarius formed by 1–7 enlarged conical setae. Conical setae, similar to those of cerarii, singular or in groups of 2–5 also present on dorsum. Other dorsal body setae small cylindrical of various sizes. Multilocular disc pores absent. Oral collar tubular ducts of one or two sizes or absent. Trilocular pores each 3–5 µm in diameter, often slightly larger than ventral trilocular pores, scattered over dorsum. Minute discoidal pores scattered.

*Venter.* Most ventral setae slender and hair-like, of various sizes. Oral collar tubular ducts of one or two sizes present around vulva or in transverse rows on body segments. Multilocular disc pores present on posterior abdominal segments, especially around vulva, sometimes also on thorax and head. Quinquelocular pores absent or present around median area of thorax or scattered over surface. Trilocular pores each 2.5–5.0 µm in diameter, scattered over surface. Minute discoidal pores scattered.

After the detailed studies of Danzig et al. (2012) the borders between the genera *Artemicoccus* and *Coccidohystrix* become clearer, in having different combination of characters (characters for the genus *Coccidohystrix* in brackets): (i) enlarged conical setae situated on dorsum, not on elevated sclerotized plate (present on elevated sclerotized plate); (ii) dorsal spine-like setae (besides from conical enlarged setae) of different sizes (same size); (iii) anal lobes with three conical setae (more than three conical setae).

*Artemicoccus zangherii* (Kozár & Pellizzari), *comb. nova* (Figure 3)

*Coccidohystrix zangherii* Kozár & Pellizzari, 1989: 507. Holotype, female, ITALY: Campo Imperatore, Fonte Vetica, on *Juniperus nana* (deposited in DAFNAE). Paratype, female, same data as holotype.

Description: For details see (Kozár & Pellizzari) 1989.

*Comments.* It was mentioned by the authors in the original description that this species could have been placed into the genus *Artemicoccus* (Kozár & Pellizzari, 1989). They considered that *Artemicoccus* could be a possible synonym of *Coccidohystrix* but did not formally synonymized the two genera and described the new species in *Coccidohystrix*.

The type material of *C. zangherii* was examined and consequently, according to the genus concept reported above, this *Juniperus* feeding species is transferred from *Coccidohystrix* to *Artemicoccus* as *A. zangherii* (Kozár & Pellizzari) *comb. nov.*

Moreover, according to the drawings and descriptions of *C. echinata* (Balachowsky, 1930), *C. maghribiensis* Gavrillov-Zimin & Matile-Ferrero and *C. monicae* Gavrillov-Zimin & Matile-Ferrero we regard the above reported species as belonging to the genus *Artemicoccus* as *A. echinatus* (Balachowsky) *comb. nov.*, *A. maghribiensis* (Gavrillov-Zimin & Matile-Ferrero) *comb. nov.* and *A. monicae* (Gavrillov-Zimin & Matile-Ferrero) *comb. nov.*

**Key to *Artemicoccus* species, adult female.**

- 1 – Dorsal oral collar tubular ducts numerous ..... 2
  - Dorsal oral collar tubular ducts very few or absent ..... *A. lubersaci* (Balachowsky)
- 2 – Trilocular pores scattered on both venter and dorsum ..... 3
  - Trilocular pores present only on venter, near spiracles ..... 5
- 3 – Groups of conical setae forming transverse rows on dorsum ..... 4
  - Groups of conical setae only on body margin; rarely a few conical setae placed on dorsum .....  
..... *A. echinatus* (Balachowsky)
- 4 – Dorsal oral collar tubular ducts of two sizes; conical enlarged dorsal setae up to seven for each setae group ..... *A. zangherii* (Kozár & Pellizzari)
  - Dorsal oral collar tubular ducts of only one size; conical enlarged dorsal setae up to three for each setae group ..... *A. bispinus* (Borchsenius)
- 5 – Groups of conical setae forming transverse rows on dorsum .....  
..... *A. maghribiensis* Gavrillov-Zimin & Matile-Ferrero
  - Groups of conical setae present only on body margin; rarely a few conical setae placed on dorsum .....  
..... *A. monicae* Gavrillov-Zimin & Matile-Ferrero

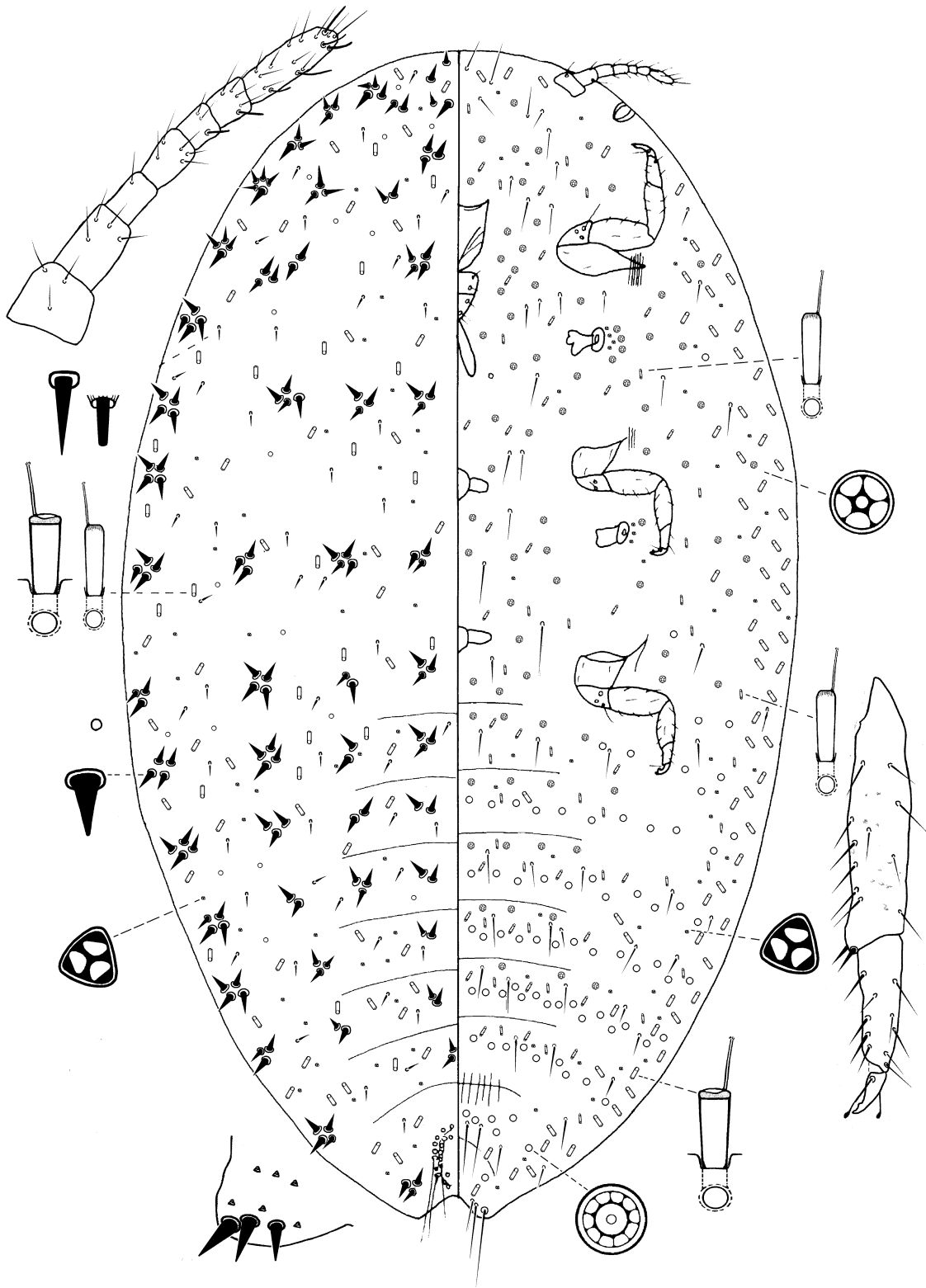


Figure 3. *Artemicoccus zangherii* (Kozár & Pellizzari), paratype female.

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