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**Review of *Kiritshenkella* BORCHSENIUS and *Balanococcus* WILLIAMS,  
with a description of a new species (*Homoptera, Pseudococcidae*)**

[With 30 text-figures]

**Abstract.** Seven species assigned to *Kiritshenkella* BORCHSENIUS, 1948, and seven in *Balanococcus* WILLIAMS, 1960, are revised on the basis of literature data; a key to all species and brief descriptions are provided. *Kiritshenkella* seems to be a heterogenic assemblage, and species assigned to *Balanococcus* might be placed in *Kiritshenkella*, as well. A new species found in Roztocze (S-E Poland) — *Kiritshenkella lianae* — living in leaf sheaths of *Carex*, and showing some morphological similarities to *K. fushanensis* and *B. scirpi*, is described and illustrated.

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INTRODUCTION

Originally, the genus *Kiritshenkella* with a single species — *K. stataria* from Tadzhikistan — was defined as a pseudococcid with 6-segmented antennae, cerarii limited to anal lobes, reduced anterior ostioles, enlarged posterior

coxae provided with numerous translucent pores that transfer onto sternite, very short, disc-like tubular ducts forming marginal bands on dorsum and venter, numerous multilocular pores of the same arrangement, and trilocular pores forming longitudinal medial bands on both body surfaces (BORCHSENIUS 1948).

In 1962 WILLIAMS established a new genus — *Balanococcus* — with two species — *B. scirpi* (GREEN) and *B. boratynskii* WILLIAMS from England. Commenting upon this genus WILLIAMS noticed: “*Balanococcus* comes closest to *Kiritshenkella* but differs mainly in having the trilocular pores evenly distributed over the body, whereas one of the important characters of *Kiritshenkella* is the concentration of trilocular pores on the midline of both surfaces. Furthermore, there are in *Kiritshenkella* only posterior ostioles which are well developed, whereas *Balanococcus* possesses 2 pairs and these are poorly developed. Although the tubular ducts of both genera are similar, those of *Kiritshenkella* seem to be much flatter and are described as disc-like”. BORCHSENIUS examined the illustration of *B. scirpi* (type species) and advised on its differences with *Kiritshenkella* (WILLIAMS l.c.).

In 1964 MCKENZIE described a new species from Japan — *Balanococcus takahashii* — with the following comment: “On the first examination I thought *B. takahashii* might be assigned to the genus *Kiritshenkella* [...]. However, after the appearance of WILLIAMS’ (1962) monograph, the resemblance of this mealybug to [...] *Balanococcus* was quite obvious. [...] WILLIAMS [...] confirmed my belief. *B. takahashii* lacks the most striking character of *Kiritshenkella* — the concentration of trilocular pores on the midline on both dorsal and ventral surface”.

However, already in 1960 BORCHSENIUS described a pseudococcid from China — *Kiritshenkella yunnanensis* — with 2 pairs of cerarii; both anterior and posterior ostioles developed; trilocular pores absent except a few associated with spiracles, ostioles and cerarii; multilocular pores sparse and evenly distributed; tubular ducts with a very narrow oral collar and not disc-like. He also transferred to *Kiritshenkella* 5 other Chinese species — *K. lingnani* (FERRIS), *K. caudata* (BORCHSENIUS), *K. fushanensis* (BORCHSENIUS), *K. guandunensis* (BORCHSENIUS) and *K. ostiolata* (BORCHSENIUS) — some of which with 7-segmented antennae, lacking cerarii, trilocular pores entirely absent, etc.

Also in *Balanococcus* several species were described from the Far East and the Mediterranean region — *B. orientalis* DANZIG et IVANOVA, *B. borchsenii* DANZIG, *B. mediterraneus* KOZÁR and *B. caucasicus* DANZIG — with similar aberrations as mentioned above, and in addition with lacking dorsal multilocular pores, tubular ducts limited on dorsum to a few caudal segments, in some instances.

In the result, not only the limits between *Kiritshenkella* and *Balanococcus*, but also the distinction of the species assemblage placed in these genera, disappeared. A reduction of *Balanococcus* to synonyms of *Kiritshenkella*, and rede-

definition of the latter, do not solve the problem, however. *Balanococcus* is considered close to *Trionymus*, and DANZIG (1980) placed it in the *Pseudococcinae*. Some *Trionymus* are actually very similar to *Balanococcus* (and *Kiritshenkella*) considering the structure of tubular ducts and their distribution, arrangement of multilocular pores, structure of posterior coxae and others. On the other hand, some species placed in *Kiritshenkella* and *Balanococcus* have some features characteristic of the *Phenacoccinae*, e.g., the pink, orange and yellow body colours (remarkable, *Balanococcus scirpi* was originally described in *Ripersia*, a member of the *Phenacoccinae*). This subfamily includes also genera with disc-like tubular ducts, marginal arrangement of dermal pores, reduced ostioles, etc. Eventually, it should be remembered that several species placed in *Kiritshenkella* were originally established in *Pseudantonina*, a member of another pseudococcid group. Thus *Kiritshenkella* and *Balanococcus*, or some species assigned to them, may belong to different groups, the similarities of them being a result of adaptation to the same habitat (leaf sheath of grasses). It is clear from this discussion that a revision at a higher taxonomic level, involving numerous genera, is needed to elaborate a more natural classification of the grass-infesting pseudococcids.

In the present paper all species (i.e., 15, including the new one) originally described in *Kiritshenkella* and *Balanococcus*, or transferred later to these genera, are reviewed. *Pseudantonina sacchari* (GREEN) and *P. magnotubulata* BORCHSENIUS placed in *Kiritshenkella* by KOZÁR and WALTER (1985) are not included because this combination presumably is a mistake.

Four species infest *Cyperaceae*, the rest *Poaceae*. Six species (all *Kiritshenkella*) live in China; six species in the Euro-Siberian region, including Japan (one *Kiritshenkella*, the rest *Balanococcus*) and three species in the Mediterranean region (one *Kiritshenkella* and two *Balanococcus*).

The new species might have been placed either in *Kiritshenkella* or in *Balanococcus* — the trilocular pores form a median concentration, but are scattered also elsewhere, tubular ducts are provided with a large oral collar, but are not disc-like, posterior coxa is provided with very numerous translucent pores, but the basal ridge is complete, etc.; it has been assigned to *Kiritshenkella* mainly because this genus is older than *Balanococcus*.

#### KEY TO SPECIES OF *KIRITSHENKELLA* AND *BALANOCOCCUS*

1. Trilocular pores entirely absent . . . . . 2.
- Trilocular pores present; sometimes confined to ostioles and associated with cerarii and spiracles; or strongly sclerotized, of obscure structure . . . . . 4.
2. With a small circulus; posterior coxa significantly enlarged, with numerous translucent pores.  
. . . . . *K. guanduensis*.

- With 4–5 large circuli; posterior coxa slightly enlarged, with a moderate or small number of pores . . . . . 3.
- 3. Cerarii lacking; posterior coxa with a few (about 7) translucent pores. . . . . *K. caudata*.
- Anal lobe cerarii consisting of 2 strong conical setae; posterior coxa with about 30 pores. . . . . *K. ostiolata*.
- 4. Trilocular pores associated only with cerarii, ostioles and spiracles. . . . . 5.
- Trilocular pores, sometimes represented by strongly sclerotized rings, present also on other body parts. . . . . 6.
- 5. Oral collar of tubular ducts very short, not exceeding  $\frac{1}{6}$  the tube length; posterior coxa very large with numerous pores; with one circulus. . . . . *K. yunnanensis*.
- Oral collar broad, occupying slightly less than  $\frac{1}{2}$  duct length; posterior coxa not enlarged, with a few pores at base; with 2 circuli. . . . . *B. mediterraneus*.
- 6. Supposed trilocular pores very strongly sclerotized, of indistinct structure; posterior coxa significantly enlarged, about 3 times as broad as others; normal tubular ducts absent. . . . . *K. lingnani*.
- Trilocular pores of normal pseudococcid structure; posterior coxa, although sometimes enlarged, does not exceed 1.5 times the width of other coxae; tubular ducts normal . . . . . 7.
- 7. Tubular ducts long, about 3 times as long as diameter of base, with broad oral collar that exceeds  $\frac{1}{2}$  duct length (Fig. 14). . . . . *B. takahashii*.
- Tubular ducts short, 2 times as long as diameter of base or shorter; breath of oral collar does not exceed  $\frac{1}{2}$  duct length, except when ducts are very short, disc-like (*K. stataria*). . . . . 8.
- 8. Tubular ducts disc-like, shorter than diameter of base. . . . . *K. stataria*.
- Tubular ducts longer than diameter of base. . . . . 9.
- 9. Multilocular pores absent from dorsum, except single ones on posterior abdominal tergites; very numerous trilocular pores associated with spiracles. . . . . 10.
- Multilocular pores present on all dorsum; trilocular pores not associated with spiracles or only in a small number . . . . . 11.
- 10. Multilocular pores entirely absent from dorsum, on venter confined to posterior abdominal sternites; dorsal tubular ducts only on head and on a few caudal tergites. . . . . *B. caucasicus*.
- A few multilocular pores present on 3 posterior abdominal tergites; dorsal tubular ducts form a marginal band around entire body. . . . . *B. orientalis*.
- 11. Dorsal multilocular pores form a narrow marginal band and are scattered on a few caudal segments, sporadically occurring also on other segments; trilocular pores scattered on all dorsum. . . . . 12.

- Multilocular pores abundant on all dorsum, forming marginal and transverse bands and groups; trilocular pores aggregated along midline of dorsum and venter . . . . . 14.
12. Body oval; posterior coxae markedly enlarged, with desintegrated basal ridge and translucent pores transgressing onto meta-sternite; anal lobe cerarii with 3 slender spines.  
 . . . . . *B. borchsenii*.
- Body elongate with subparallel sides; posterior coxa slightly enlarged, with a complete basal ring and a few pores; anal lobe cerarii with 2 conical spines.  
 . . . . . 13.
13. One pair of cerarii; circuli absent; on *Cyperaceae*.  
 . . . . . *B. scirpi*.
- Two pairs of cerarii; circuli 3 in number; on *Poaceae*.  
 . . . . . *B. boratynskii*.
14. Body elongate-oval; tubular ducts cylindrical, oral collar extending from orifice to about half length of duct (Fig. 18); trilocular pores not associated with spiracles, cerarii and ostioles; anterior ostioles absent; basal ridge of posterior coxae completely desintegrated; translucent pores on coxae and sternite; cerarian setae thin, needle-like; on *Poaceae*.  
 . . . . . *K. fushanensis*.
- Body parallel-sided; tubular ducts funnel-shaped, with oral collar formed at some distance from orifice (Fig. 30); trilocular pores associated with ostioles, cerarii and spiracles; anterior ostioles present; basal ridge of posterior coxae well developed, translucent pores only on coxae; cerarian setae conical on *Cyperaceae*.  
 . . . . . *K. lianae*.

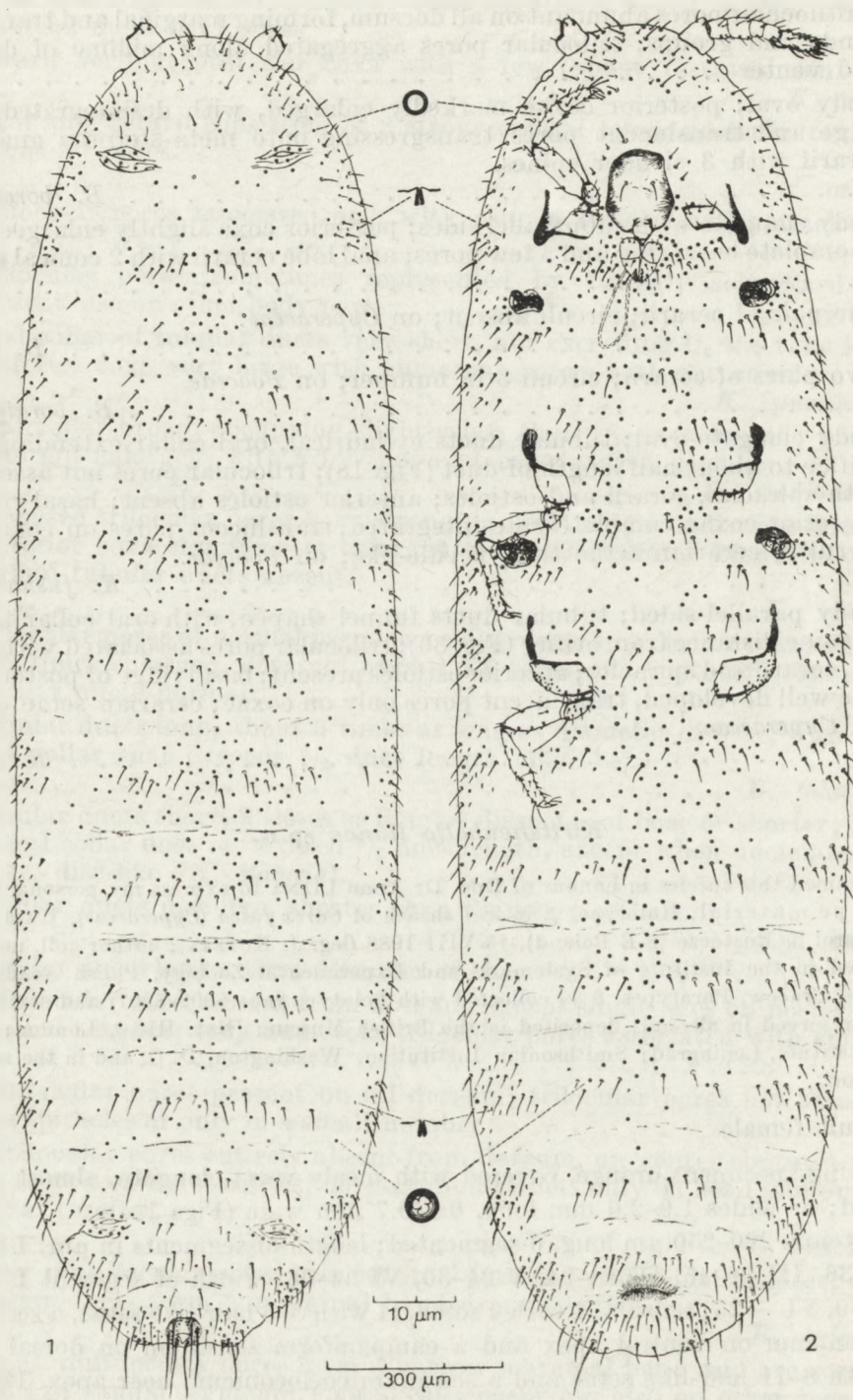
***Kiritshenkella lianae* sp.n.**

I named this species in honour of Doc. Dr Anna LIANA to express my personal regard. Type material: Holotype, ♀, in leaf sheath of *Carex fusca* (*Cyperaceae*), Huta Złomy near Narol in Roztocze (S-E Poland), 13 VIII 1986 (leg. J. KOTEJA); author coll. no. 8001, deposited in the Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Cracow. Paratypes, 6 ♀♀ collected with holotype (nos 8002–8007) and some specimens preserved in alcohol; deposited in the British Museum (Nat. Hist.), London; Zoological Institute, Leningrad; Smithsonian Institution, Washington, D. C. and in the author's collection.

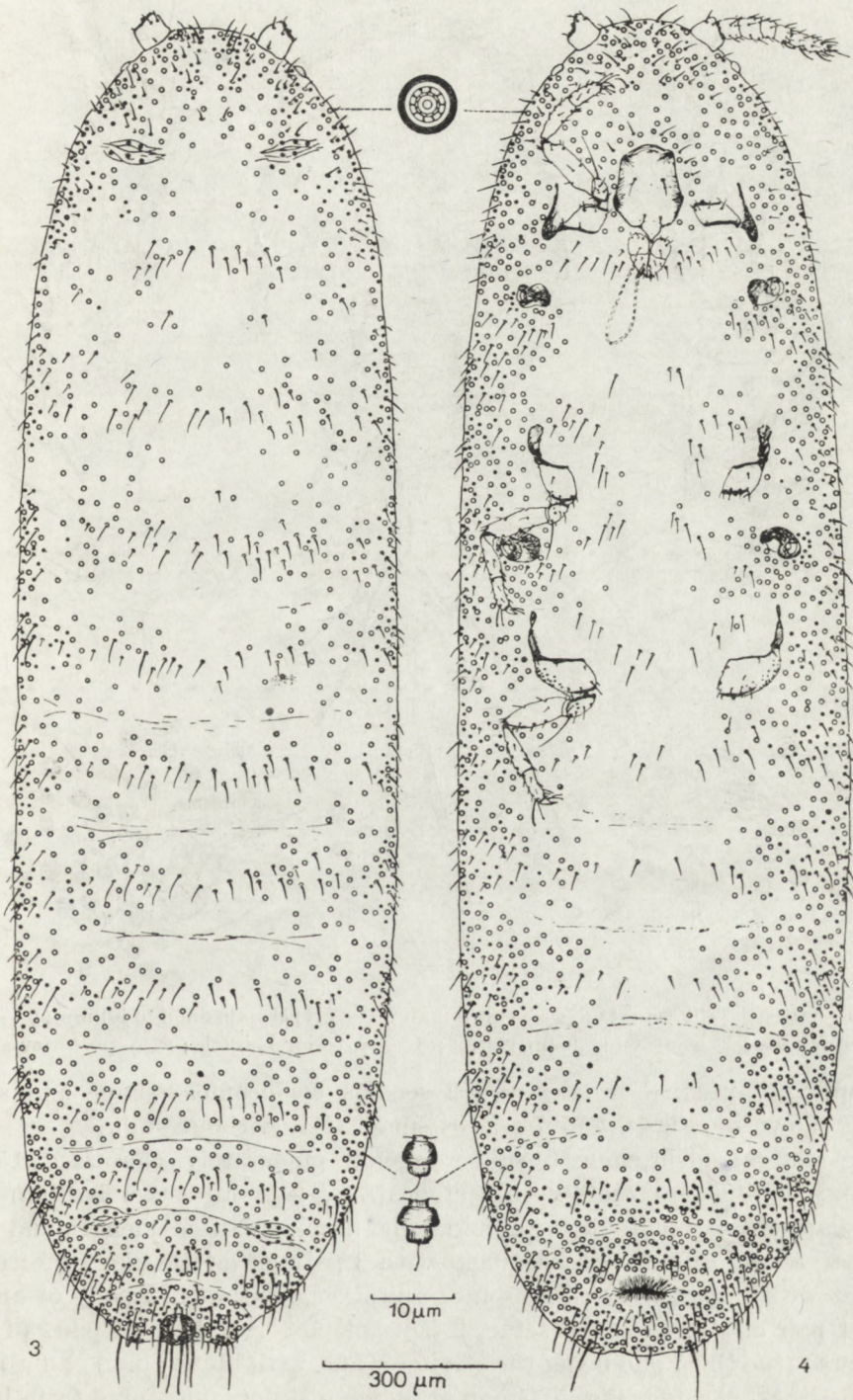
**Adult female**

Living specimens orange, covered with mealy wax; elongate, almost parallelsided; on slides 1.9–2.6 mm long, 0.5–0.7 mm wide (Figs 1–4).

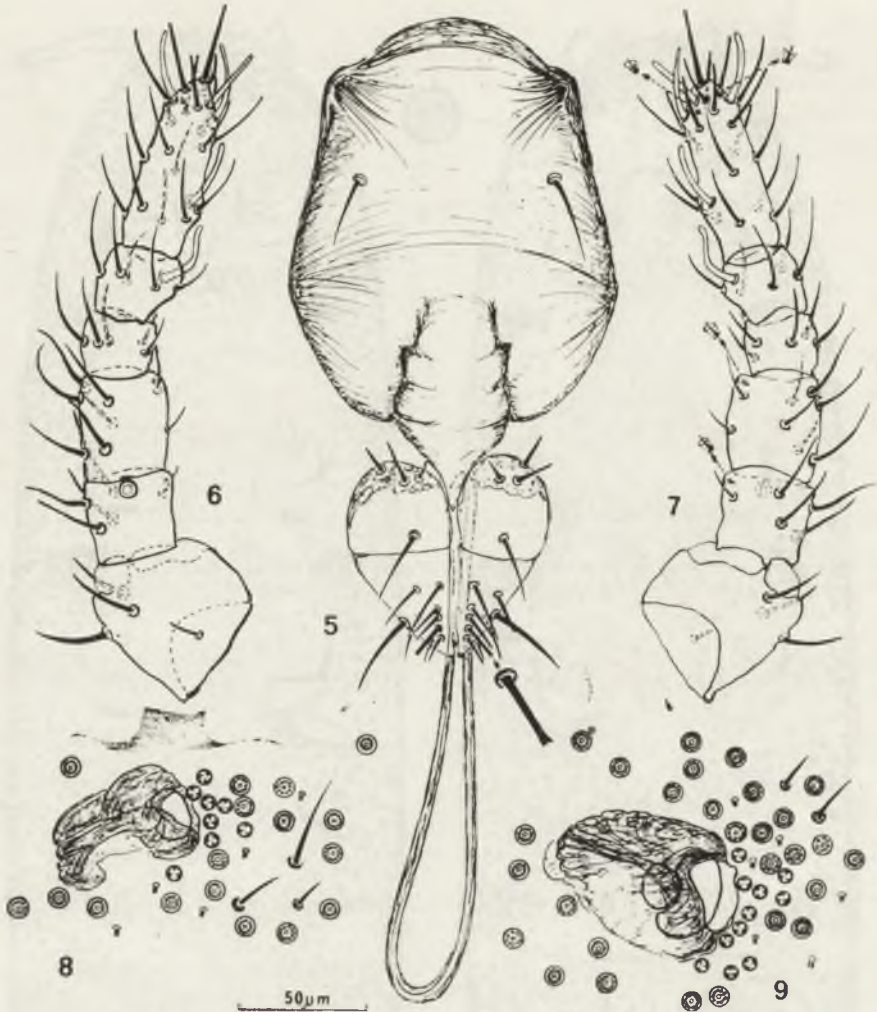
Antenna 220–250 μm long, 6-segmented; length of segments in μm: I 48–55, II 30–36, III 36–45, IV 18–24, V 24–30, VI 54–66; width of segment I — 48, II — 30, VI — 25; sensilla: I with 4 setae, II with 3–5 hair-like setae, a sensillum coeloconicum on ventral apex and a campaniform sensillum on dorsal apex, III with 8–11 hair-like setae and a sensillum coeloconicum near apex, IV with 5 hair-like setae and 2 minute intersegmental sensilla, V with 5 hair-like setae and an antennal bristle, VI with 10 hair-like setae in two whorls, 8 fleshy setae



Figs 1 and 2. *Kiritshenkella lianae* sp. n., adult female, distribution of trilocular pores, simple pores and microducts. 1 — on dorsum; 2 — on venter.



Figs 3 and 4. *Kiritshenkella lianae* sp. n., adult female; distribution of multilocular pores and tubular ducts (trilocular pores associated with cerarii, ostioles and spiracles — minute white circles — are also drawn). 3 — on dorsum; 4 — on venter.

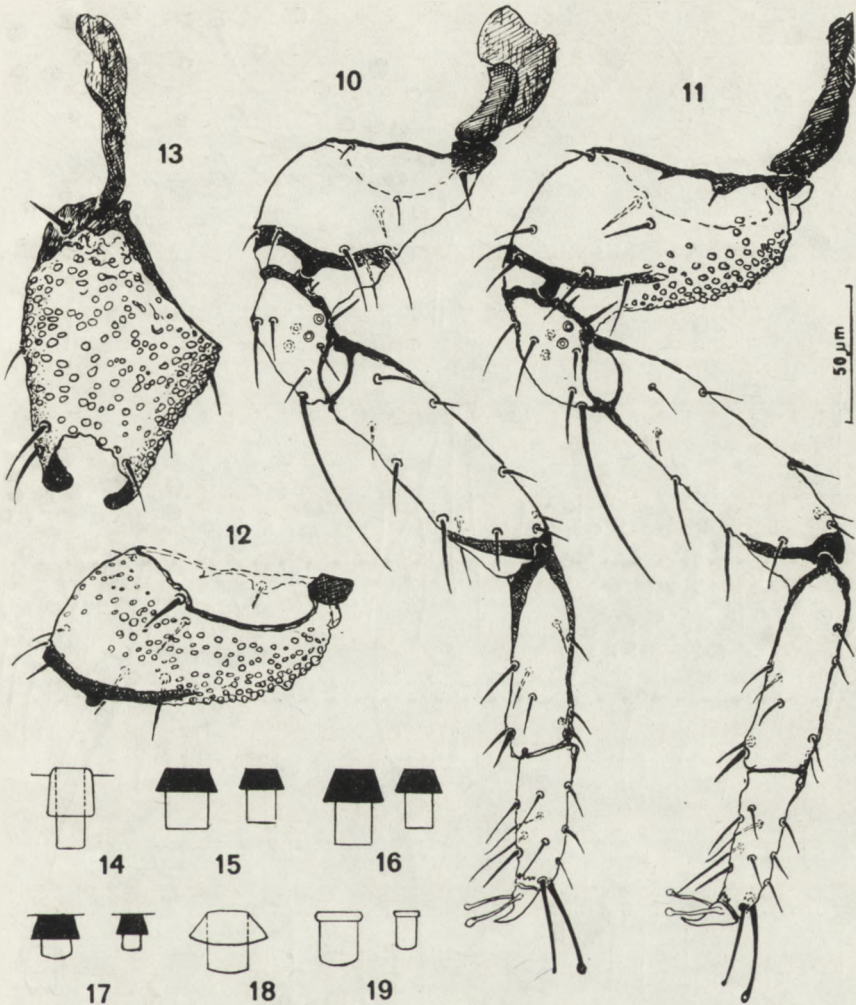


Figs 5–9. *Kiritschenkella lianae* sp. n., adult female; 5 – clypeo-labrum and labium; 6 – antenna from dorsum; 7 – antenna from venter; 8 – anterior spiracle; 9 – posterior spiracle.

near apex, 4 antennal bristles and 2 sensilla coeloconica (shape and size of sensilla shown on Figs 6 and 7). Eyes small, flat, without stalk.

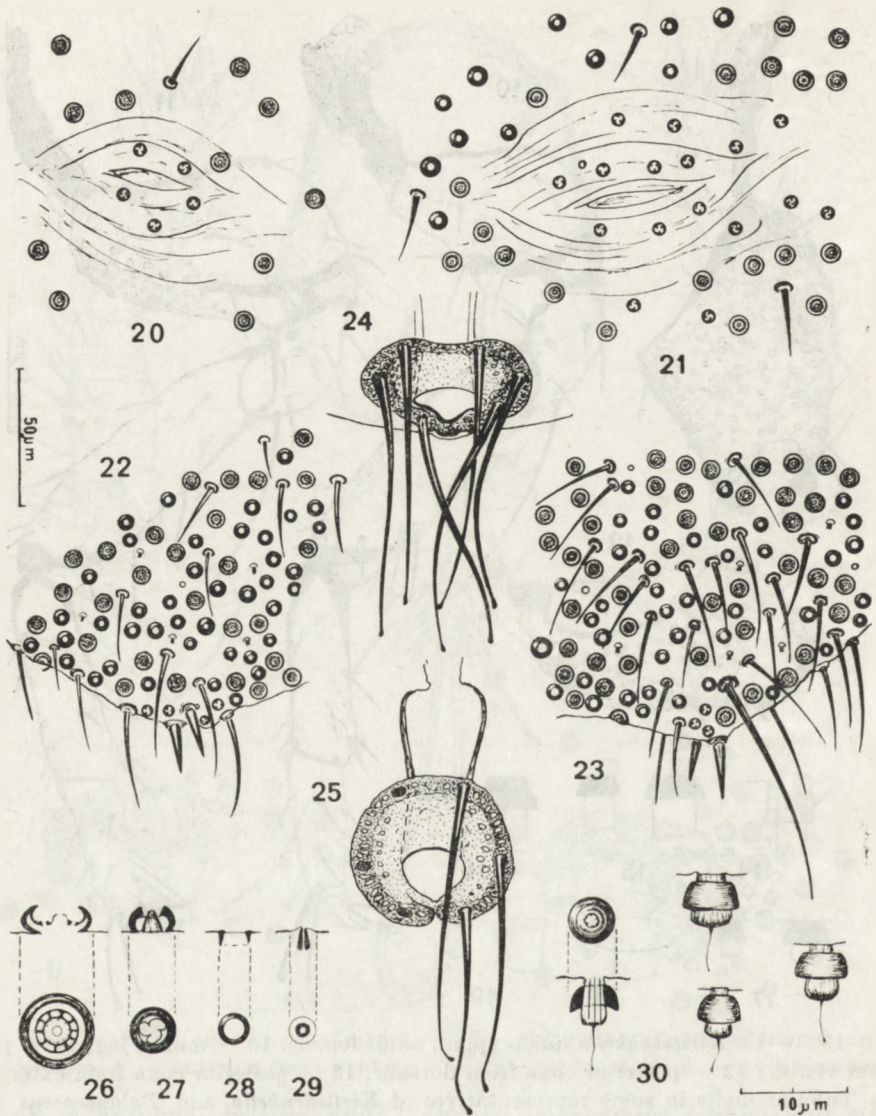
Clypeolabral shield elongate-subpentagonal, moderately sclerotized, 150–160  $\mu\text{m}$  long, 100–120  $\mu\text{m}$  wide, with 2 clypeal and 2 labral setae. Labium short, heart-shaped, 3-segmented (basal and medial segments fused); length and width subequal, about 70  $\mu\text{m}$ ; basal segment with 3 pairs of needle-like setae; medial segment with a pair of hair-like setae; apical segment with 2 pairs of anterior setae, 1 pair of strong lateral setae, 2 pairs of posterior setae, 4 pairs of subapical setae (the third one being the strongest and with blunt apex) and a pair of very small apical setae (Fig. 5). Loop of piercing stylets (measured from base of labium) 170–200  $\mu\text{m}$  long, i.e., about 2.5 times as long as labium.





Figs 10-19. 10-13. *Kiritshenkella lianae* sp. n., adult female. 10 - middle leg; 11 - posterior leg from venter; 12 - posterior coxa from dorsum; 13 - posterior coxa from exterior edge. 14-19. Tubular ducts in some representatives of *Kiritshenkella* and *Balanococcus* redrawn from original papers in the same scale (actual sizes of ducts were not available). 14 - *Balanococcus takahashii*; 15 - *B. orientalis*; 16 - *B. caucasicus*; 17 - *B. scirpi*; 18 - *Kiritshenkella fushanensis*; 19 - *K. yunnanensis*.

Legs very short in comparison with body, 330-370  $\mu\text{m}$  long (posterior legs being slightly longer than others). Coxa 50-60  $\mu\text{m}$  long, of about the same width, with 8-10 short setae; posterior coxae enlarged, 60-65  $\mu\text{m}$  long, 70-90  $\mu\text{m}$  wide, with numerous small translucent pores that cover  $\frac{1}{3}$  of its ventral surface and almost entire dorsal surface; coxal ridge well developed, narrow (Figs 10-13). Trochanter+femur 140-155  $\mu\text{m}$  long, about 30  $\mu\text{m}$  wide; trochanter with 2 needle-like basal setae and 5 apical setae, the longest  $\frac{3}{4}$  the femur length,



Figs 20-30. *Kiritshenkella lianae* sp. n., adult female. 20 - anterior ostiole; 21 - posterior ostiole; 22 - anal lobe from venter; 23 - anal lobe from dorsum; 24 - anal ring in natural position; 25 - anal ring on strongly compressed slide; 26 - multilocular pore; 27 - trilocular pore; 28 - simple pore; 29 - microduct; 30 - various tubular ducts.

and with 4 circular cupolae; femur with 9-11 setae. Tibia 70-85  $\mu\text{m}$  long, about 25  $\mu\text{m}$  wide, with 8-9 setae (including two strong apical spurs). Tarsus 54-60  $\mu\text{m}$  long, about 20  $\mu\text{m}$  wide, with 7-9 setae. Claw strong, about 20  $\mu\text{m}$  long (tarsus with claw about as long as tibia). Tarsal digitules asymmetrical, but both knobbed, 25-35  $\mu\text{m}$  long. Ungual digitules subequal, knobbed, about 25  $\mu\text{m}$  long.

Spiracles invaginated, provided with strong sclerotizations; anterior peritre-

me about 25  $\mu\text{m}$  in diameter, posterior one about 35  $\mu\text{m}$ ; 3–12 trilocular pores associated with each spiracle, those at posterior ones usually more abundant (Figs 8 and 9).

Anal lobes slightly protruding, with ventral apical seta 80–100  $\mu\text{m}$  long (Fig. 23). Anal ring located apically, circular, 55–60  $\mu\text{m}$  in diameter, broad, with an outer row of oval pores and a few pores in an incomplete inner row, with 6 setae 65–110  $\mu\text{m}$  long, all knobbed apically (Figs 24 and 25). Both anterior and posterior ostioles developed, associated with several trilocular pores (Figs 20 and 21). Circulus absent. Only anal lobe cerarii present, consisting of 2 conical setae 12–17  $\mu\text{m}$  long, and 3–7 trilocular pores (Fig. 22).

Body setae strong at base, hair-like pointed, 10–13  $\mu\text{m}$  long, at posterior body margin up to 40  $\mu\text{m}$  long; similar on dorsum and venter; sparse, forming transverse segmental rows, being more abundant at body margin (Figs 1–4, 22 and 23).

Multilocular pores 6.5–7.5  $\mu\text{m}$  in diameter, with about 10 loculi, forming broad transverse bands on all tergites and sternites; the number of pores increases towards body margin where longitudinal lateral bands are formed, and decreases towards midline of body; sparse or absent in central parts of thorax and anterior abdominal segments (Figs 3 and 4).

Swirled trilocular pores 4.2–4.8  $\mu\text{m}$  in diameter, form broad bands along midline of dorsum and venter (sparse or absent on posterior abdominal segments) and are associated with spiracles, ostioles and cerarii; single pores occur also on body margin (Figs 1 and 2).

Circular single pores 2.2–2.5  $\mu\text{m}$  in diameter, randomly scattered on all body. Microducts about 3  $\mu\text{m}$  long, 1.5  $\mu\text{m}$  in diameter, with orifice on top of a membranous tubercle, form segmental marginal groups on dorsum and venter and are scattered on ventral face of thorax (Figs 1, 2, 28, 29).

Tubular ducts variable in size, 4–6  $\mu\text{m}$  long, 2.3–3  $\mu\text{m}$  in diameter at outer orifice and 3.5–6  $\mu\text{m}$  at broadest part of oral collar. The tubes, subpentagonal in cross-section (or provided with 5 delicate longitudinal ridges) broaden towards inner end, the bottom of which being rounded and more strongly sclerotized than the tube, and provided with a thin filament attached, presumably, at its center. Oral collar knob-like, very strongly sclerotized and formed in some distance from the orifice; the width of collar constitutes about half of the duct length (Fig. 30). Ducts very abundant, forming lateral groups on each segment; on posterior abdominal segments the groups extend towards the midline of body forming transverse bands; the smallest ducts, although present elsewhere on the body, are aggregated mainly in the central parts of posterior abdominal tergites and sternites (Figs 3 and 4).

#### Biology and distribution

*Kiritshenkella lianae* lives deeply in leaf sheaths of *Carex fusca*. It has been found on the edge of a bog among *Sphagnum*. Specimens collected in mid-

-August were in the last larval and pupal instars, from which adult females and males emerged after a few days in the laboratory.

The species has been found only in one site, Huta Złomy, about 15 km from Narol, Southern Roztocze (S-E Poland).

#### Affinities

Taking into account the host plant (*Cyperaceae*), habitat (swamps, bogs), distribution (Europe) and to some extent also morphology, the new species may be related with *Balanococcus scirpi* from British Isles. These species differ in the structure of tubular ducts (Figs 17 and 30), size of appendages, abundance and distribution of all dermal glands. However, it is also similar to some Asiatic members of *Kiritshenkella*.

#### Note

The minute circular simple pores scattered over dorsum and venter have been described and illustrated, as yet, only in *Balanococcus takahashii*, whereas the microducts, quite evident at higher magnification (about 1000 ×) have not been mentioned in any species. Presumably both occur in all *Kiritshenkella* and *Balanococcus*, but have been overlooked.

### REVIEW OF SPECIES

All species originally described or subsequently transferred to *Kiritshenkella* and *Balanococcus* are reviewed in chronological order. Characteristics that accompany each species have been taken from literature records (text and drawings) and arranged according to an uniform scheme. Unimportant information has been omitted; discordances between various data are pointed, but lacking data are not commented (some original species descriptions are extremely meager).

#### *Kiritshenkella stataria* BORCHSENIUS, 1948

BORCHSENIUS 1948: 583; 1949: 166; 1960: 931.

Body pink, almost parallelsided, clearly segmented, with broad anal lobes; up to 6 mm long, 2.2 mm wide. Antenna 6-segmented, about 225 μm long. Loop of piercing stylets 2.5 times as long as labium. Femur 140 μm, tibia 100 μm, tarsus 60 μm long; unguis slightly expanded apically, longer than claw. Posterior coxa enlarged, basal ridge desintegrated; numerous large pores on coxa and metasternum. Anal ring circular, very broad, with 2 outer and 1 inner rows of pores and 6 setae 125–180 μm long. Anterior ostioles absent, posterior large. Circulus absent. One pair of cerarri with thin, almost hair-like setae 19 μm long, 7–8 auxiliary setae and 2 pores. Ventral apical seta 135 μm.

Body setae 20–40  $\mu\text{m}$  long, numerous on body margin and posterior abdominal segments, sparse elsewhere.

Trilocular pores form longitudinal bands on middorsum and midventer; on dorsum their number increases from prothorax to VI sternite; on venter pores most abundant on midabdomen. Multilocular pores form a broad band along body margins and are irregularly scattered over all body, being particularly numerous on posterior abdominal sternites.

Tubular ducts very short, almost disc-like, 4  $\mu\text{m}$  in diameter; form marginal bands together with multilocular pores and transverse, medially interrupted rows on posterior abdominal tergites and sternites.

Host: In leaf sheaths of *Calamagrostis*, *Phragmites*, *Sorghum*, *Erianthus* (*Poaceae*).

Distribution: Central Asia (several localities in Tadjikistan).

*Kiritshenkella lingnani* (FERRIS, 1954)

FERRIS 1954: 54 (*Pseudantonina*); BORCHSENIUS 1958: 158; 1960: 932.

Body elongate-oval, 3.25 mm long. Antenna 7-segmented. Legs small; posterior coxae about 3 times as broad as others, and short, with greater part of their surface membranous and beset with pores (these present also on sternum; on drawing). Anal ring large, broadly sclerotized; setae about 3 times as long as diameter of ring. Anterior ostioles absent; posterior ones very small, distinct. Circulus absent. Cerarii absent, on anal lobes replaced by a pair of very long setae. Apical seta (on drawing) about  $\frac{1}{2}$  as long as anal ring setae. Dorsal setae small and sparse, except 3–4 posterior abdominal segments where they become numerous, long and slender.

Trilocular pores replaced by circular pores which consist merely of a small sclerotized ring; abundant on posterior portion of abdomen and in lateral regions (on drawing they form also a concentration on midline of dorsum). FERRIS (1954) assumes that some of the pores may be actually trilocular, but the strong sclerotization of the ring obscures this. Multilocular pores scattered over all dorsum and venter.

FERRIS (l.c.) claims that "there are no tubular ducts of any kind", but adds that some of the circular pores "have the appearance of giving rise to an extremely minute duct with a sclerotized inner extremity, but it is beyond the ordinary powers of the microscope to determine this". The supposed tubular ducts and trilocular pores are not distinguished on drawing and in description.

Host: Unknown.

Distribution: S China (Canton).

*Kiritshenkella caudata* (BORCHSENIUS, 1958)

BORCHSENIUS 1958: 157 (*Pseudantonina*); 1960: 932.

Body elongate, tapering towards anterior body end: anal lobes poorly deve-

loped; 2.4–3.0 mm long, 0.7–1.1 mm wide. Antenna 6-segmented, 162–185  $\mu\text{m}$  long. Loop of piercing stylets 3–4 times as long as labium. Posterior coxa enlarged, with desintegrated basal ridge; with a few but very large pores that occur also on sternite. Anal ring with a row (2 rows on drawing) of elongate pores and 6 setae about 80  $\mu\text{m}$  long. Anterior ostioles absent; posterior ones very small but distinct. Circuli 5 in number, anterior the largest. Cerarii absent. Ventral apical seta 75  $\mu\text{m}$  long. Body setae numerous and long on anal lobes, numerous and small on body margins, sparse and small on remaining surface.

Trilocular pores entirely absent.<sup>5</sup>

Multilocular pores form broad bands along body margin, transverse groups and bands on posterior abdominal sternites and are scattered on all dorsum and venter (absent near circuli).

Tubular ducts interspread with multilocular pores in marginal band and form transverse groups and bands on posterior abdominal sternites, in front of multilocular pore bands; the number of pores increases towards caudal end.

Host: Unidentified *Poaceae*.

Distribution: S-E China (Kwantung Prov.).

*Kiritshenkella fushanensis* (BORCHSENIUS, 1958)

BORCHSENIUS 1958: 158 (*Pseudantonina*); 1960: 931.

Body yellowish in alcohol; elongate oval; anal lobes poorly developed (on drawing absent); 3.3–3.9 mm long, 1.5–1.7 mm wide. Antenna 6-segmented, 170–200  $\mu\text{m}$  long. Loop of piercing stylets 2 times as long as labium. Posterior coxa 1.5 times as broad as others, basal ridge reduced, translucent pores numerous on coxa and sternite. Anal ring circular, broad, with numerous pores and 6 setae about 175  $\mu\text{m}$  long. Anterior ostioles absent, posterior ones small and indistinct. Circulus absent (on drawing present). Cerarii indistinct, consisting of 2 very slender setae and multilocular pores. Ventral apical seta 100–120  $\mu\text{m}$  long. Body setae variable, longest abundant on caudal segments.

Trilocular pores described in the original paper as very strongly sclerotized of obscure structure, 3  $\mu\text{m}$  in diameter; in the paper of 1960 (on drawings and key) presented as typical pseudococcid trilocular pores; form a narrow band along midline of dorsum and large transverse segmental groups on venter (opposite conditions are shown on the drawing in the paper of 1960); not associated with cerarii, spiracles and ostioles.

Multilocular pores form a broad band along body margin and irregular transverse bands and rows on all tergites and sternites.

Tubular ducts short, slightly longer than broad at base (on drawings), with large oral collar not reaching  $1/2$  duct length; intermingled with multilocular pores (also forming transverse rows on abdominal sternites; on drawing).

Host: Undetermined *Poaceae*.

Distribution: S-E China (Kwantung Prov.).

*Kiritshenkella guandunensis* (BORCHSENIUS, 1958)

BORCHSENIUS 1958: 159 (*Pseudantonina*); 1960: 932.

Body oval, 3.5 mm long, 1.8 mm wide. Loop of piercing stylets 2 times as long as labium. Posterior coxa significantly enlarged, basal ridge reduced; translucent pores large and numerous. Anal ring broad, with 2 rows of oval pores and 6 setae 110  $\mu\text{m}$  long. Anterior ostioles absent, posterior ones small. Circulus oval, small. One pair of cerarii, with 2 strong conical setae.

Trilocular pores entirely absent. Multilocular pores in broad marginal band, transverse rows and bands on posterior abdominal sternites, in groups near spiracles and sparsely scattered on remaining surface.

Tubular ducts very short, almost disc-like, with very large oral collar; distributed among multilocular pores in marginal band and form transverse rows and bands, sometimes interrupted medially, on posterior abdominal tergites and sternites.

Host: Undetermined *Poaceae*.

Distribution: S-E China (Kwantung Prov.).

*Kiritshenkella ostiolata* (BORCHSENIUS, 1958)

BORCHSENIUS 1958: 160 (*Pseudantonina*); 1960: 932.

Body yellowish in alcohol, oval, anal lobes poorly developed; 4 mm long, 2 mm wide. Antenna 6-segmented, about 140  $\mu\text{m}$  long. Posterior coxa with large pores, basal ridge reduced. Anal ring broad, with numerous round pores and 6 setae about 100  $\mu\text{m}$  long. Anterior ostioles absent; posterior ones very small. Circuli 4-5 in number, posterior the largest. One pair of cerarii with 2 stout conical setae 10-12  $\mu\text{m}$  long, 1 auxiliary seta and 2 multilocular pores. Ventral apical seta 95-135  $\mu\text{m}$  long. Body setae small and sparse, more numerous and larger on two posterior abdominal segments.

Trilocular pores entirely absent. Multilocular pores 6  $\mu\text{m}$  in diameter, forming broad bands along body margins, transverse bands on two last abdominal sternites and are scattered on all body.

Tubular ducts short, about 5.5  $\mu\text{m}$  in diameter (i.e., slightly smaller than multilocular pores), with oral collar broader than  $1/2$  duct length (on drawing); arranged in marginal band; number of pores increasing towards posterior body end.

Host: On stem of *Phragmites* (*Poaceae*).

Distribution: China.

*Kiritshenkella yunnanensis* BORCHSENIUS, 1960

BORCHSENIUS 1960: 932.

Body pinkish-yellow or yellow; elongate oval; anal lobes slightly protruding;

2.6–4.1 mm long. Antenna 6 or 7 segmented. Spiracles associated with a few (1–3) trilocular pores. Posterior coxa significantly enlarged, with numerous pores, but with distinct basal ridge. Anal ring subhexagonal, moderately broad, with 2 rows of large oval pores and 6 setae. Anterior and posterior ostioles well developed. Circulus transversely subrectangular, medium sized. Two pairs of cerrarii;  $C_{18}$  with 2 slender conical setae, some auxiliary setae and 6–10 trilocular pores;  $C_{17}$  with 1–2 slender setae and 2–3 trilocular pores. Ventral apical seta as long as anal ring setae. Body setae small and very sparse (on drawing).

Trilocular pores associated only with cerarii and spiracles. Multilocular pores sparsely and evenly distributed over all body, somewhat more abundant near vulva.

Tubular ducts short, with a very narrow oral collar not exceeding  $\frac{1}{8}$  duct length (on drawing), of two sizes; large ducts form marginal groups and transverse rows on posterior abdominal segments; small ducts very sparse, scattered on posterior sternites.

Host: In leaf sheath of undetermined *Poaceae*.

Distribution: S-W China (Yunnan Prov.).

*Balanococcus scirpi* (GREEN, 1921)

GREEN 1921: 192 (*Ripersia*); WILLIAMS 1962: 17; DANZIG and IVANOVA 1976: 76; DANZIG 1983: 517.

Body pink; elongate, sides subparallel, posterior end rounded; 3.5 mm long. Antenna 6-segmented, 150–190  $\mu\text{m}$  long. Trochanter+femur 130  $\mu\text{m}$  long, tibia+tarsus 105–130  $\mu\text{m}$ ; posterior coxa not enlarged, with complete basal ridge (on drawing), with a few pores. Anal ring with 2 rows of pores and 6 setae. Anterior and posterior ostioles represented by mere slits without pores. Circulus absent. One pair of cerarii, with 2 conical setae and about 4 trilocular pores. Ventral apical seta shorter than anal ring setae. Body setae small, pointed, sparse, tending to be more numerous towards margins.

Trilocular pores on dorsum sparse and evenly distributed, on venter in transverse segmental bands in median area, a few pores associated with spiracles.

Multilocular pores on dorsum in a narrow marginal zone, more abundant on head and posterior abdominal segments, some extending on medial area of abdomen; on venter forming a wide marginal band and transverse rows on posterior abdominal sternites, and scattered on head.

Tubular ducts short, oral collar large, occupying about half total length of duct; of two distinct size types; large ducts sparse on dorsum, a few on margin of head and abdominal segments, some also on medial part of posterior abdominal tergites; on venter of the same distribution as that of the multilocular pores; small ducts in medial area of three posterior abdominal sternites.

Host: At base of stems of *Trichophorum caespitosum* (*Cyperaceae*).

Distribution: Europe (British Isles, England).



*Balanococcus boratynskii* WILLIAMS, 1962

WILLIAMS 1962: 15; MCKENZIE 1964: 219; DANZIG 1980: 186; KOZÁR 1983: 140; KOTEJA 1986: 217.

Body elongate, with almost parallel sides, anal lobes moderately developed; 3.5 mm long. Antenna 6-segmented, 260–310  $\mu\text{m}$  long. Trochanter + femur 190–220  $\mu\text{m}$ , tibia + tarsus 220–240  $\mu\text{m}$  long. Posterior coxa slightly enlarged, with complete basal ridge (on drawing), with a few pores. Anal ring with 2 rows of pores and 6 setae. Ostioles poorly developed, with 1–3 trilocular pores on each lip. Circuli 3 in number, small, the posterior the smallest. Two pairs of cerarii;  $C_{18}$  with 2 slender conical setae, 1 auxiliary seta and 5–6 trilocular pores,  $C_{17}$  usually with a single conical seta and 1–3 trilocular pores. Ventral apical seta slightly shorter than anal ring setae. Body setae short and slender, rather numerous, on ventral face of head and abdomen tending to be longer.

Trilocular pores evenly distributed on dorsum and venter; groups of pores associated with spiracles (on drawing).

Multilocular pores abundant on dorsum and venter, in broad marginal bands and in transverse rows on posterior abdominal segments.

Tubular ducts of one size, short, with large collar occupying slightly less than  $1/2$  duct length; on dorsum and venter interspersed with multilocular pores in marginal bands, a few scattered on head; on abdomen the transverse rows of ducts are situated anterior to the bands of multilocular pores.

Host: In leaf sheaths of *Deschampsia caespitosa* and *Festuca* sp.

Distribution: Europe (British Isles, England; Poland; N-W part of USSR), Far East (Primorye).

Note: Specimens described by DANZIG (1980) from the Far East are different from those from England. The antenna is drawn as having 7 segments (condition met also in Poland). The circuli are very small and their number varies between 1 and 3. Multilocular pores are extremely sparse on dorsal surface — only about 6 pores are shown on the entire marginal band on one body side, on head, thorax and anterior abdominal segments being almost entirely absent. Tubular ducts have a variable diameter.

*Balanococcus takahashii* MCKENZIE, 1964

MCKENZIE 1964: 217.

Body oval, anal lobes not developed: 2.1–3.0 mm long, 1.4–1.8 mm wide. Antenna usually 6-segmented. Posterior coxa enlarged, with incomplete basal ridge (on drawing) and numerous conspicuous translucent pores, distributed also on sternum. Anal ring with 2 rows of pores and 6 setae. Anterior and posterior ostioles well developed, with trilocular pores on their lips. Circulus

transversely oval, medium-sized. One pair of cerarii, with very slender conical setae, without auxiliary setae and concentration of trilocular pores. Apical seta about as long as anal ring setae. Body setae sparse, all short and slender.

Trilocular pores sparse, evenly distributed on dorsum and venter, some associated with spiracles (on drawing), absent from two posterior abdominal sternites.

Multilocular pores sparse on dorsum — a few on head and in lateral groups or transverse bands on four posterior abdominal tergites; on venter forming a broad submarginal band and double transverse bands on posterior sternites.

Tubular ducts described as "short and with a large oral collar". It appears from the drawing that they are the longest in all *Kiritshenkella* and *Balanococcus* if width: length ratio (1 : 2.5) is considered; usually the ducts are only slightly longer than their diameter, and the diameter of oral collar is greater than length of duct (Figs. 14–19). On dorsum tubular ducts limited to lateral groups on 4 posterior abdominal tergites; on venter more abundant, forming groups and bands on abdominal segments and scattered on thorax; absent from head.

Host: In leaf sheaths of *Zoysia tenuifolia* (*Poaceae*).

Distribution: Japan (Honshu, Saitama Pref.).

Note: *Balanococcus takahashii* is the only species in which minute, circular simple pores, scattered on dorsum and venter, have been described and illustrated.

#### *Balanococcus orientalis* DANZIG et IVANOVA, 1976

DANZIG and IVANOVA 1976: 76; DANZIG 1978: 7; 1980: 186; 1985: 116.

Body pinkish; subparallelsided, caudal end rounded; 4 mm long. Antenna 7-segmented. Spiracles associated with very large groups of trilocular pores (on drawing). Posterior coxa enlarged, with complete basal ridge and translucent pores. Ostioles well developed, with trilocular pores (on drawing). Circulus absent. One pair of cerarii, with 2 conical setae and 5–6 pores. Ventral apical seta shorter than anal ring setae.

Trilocular pores evenly distributed on all dorsum and venter, concentrated near spiracles (on drawing).

Multilocular pores on dorsum very sparse, a few on margins of posterior abdominal segments; on venter forming transverse rows and bands on posterior abdominal sternites.

Tubular ducts of various diameter, oral collar shorter than  $1/2$  duct length; large ducts form marginal bands on dorsum and venter, small ones transverse rows on posterior abdominal sternites and are scattered among large ducts.

Host: In leaf sheaths of *Carex macrocephala* and *Carex* sp.

Distribution: Far East (Sakhalin; Irkuck Prov.; N Korea).

*Balanococcus borchsenii* DANZIG, 1983

DANZIG 1983: 516.

Body oval, with slightly protruding anal lobes; 3 mm long. Antenna 7-segmented. Spiracles with a few trilocular pores (drawing). Posterior coxa enlarged, with reduced basal ridge and translucent pores distributed also on sternite. Anterior and posterior ostioles present, with some pores (drawing). One pair of cerarii, with 3 slender setae, 1 auxiliary seta and some trilocular pores. Circulus absent. Anal lobe seta about as long as anal ring setae. Body setae sparse, minute (on drawing).

Trilocular pores sparsely and evenly scattered on all body (on drawing).

Multilocular pores scattered on dorsum; on venter form a marginal band and are scattered on remaining surface.

Tubular ducts of variable size; form transverse segmental rows on dorsum; on venter in marginal bands and transverse rows on some abdominal sternites; small ducts very scarce, scattered elsewhere.

Host: *Koeleria gracilis* (Poaceae).

Distribution: Far East (Primorye).

*Balanococcus mediterraneus* KOZÁR, 1983

KOZÁR 1983: 140.

Body elongate, parallelsided; anal lobes absent; 3–4 mm long, 1–1.5 mm wide. Antenna 6-segmented, 240–250  $\mu\text{m}$  long. Loop of piercing stylets shorter than labium (on drawing much longer than labium). Spiracles associated with 2–5 trilocular pores. Anterior leg 360–380  $\mu\text{m}$ , midleg 420  $\mu\text{m}$ , posterior one 450–480  $\mu\text{m}$  long. Posterior coxa slightly enlarged, with a few large pores at base. Anal ring oval, narrow, with two rows of large pores and 6 setae 110–130  $\mu\text{m}$  long. Ostioles small, with 1–3 trilocular pores on each lip. Circuli oval, 60  $\mu\text{m}$  in diameter, 2 in number. One pair of cerarii, with 2 strong conical setae, 1–3 auxiliary setae and 1–2 trilocular pores. Body setae long and numerous (on drawing short and sparse).

Trilocular pores confined to cerarii, ostioles and spiracles, very few in number.

Multilocular pores evenly distributed on dorsum and venter, sparse, somewhat more abundant on body margin and caudal end.

Tubular ducts of two sizes; short, with large oral collar occupying nearly  $1/2$  duct length. Large ducts form marginal bands on both body surfaces, transverse rows on abdominal sternites and are scattered on dorsum; small ducts sparse, on three posterior abdominal sternites.

Host: In leaf sheaths of *Poa pratensis* (Poaceae).

Distribution: Europe (S Yugoslavia).

*Balanococcus caucasicus* DANZIG, 1985

DANZIG 1985: 116.

Body elongate, almost parallelsided, without anal lobes; 4 mm long. Antenna 7-segmented. Spiracles associated with large groups of trilocular pores (on drawing). Posterior coxa not enlarged, with complete basal ridge (on drawing), with large pores (very small on drawing). Anterior and posterior ostioles present, with 4 pores on each lip (on drawing). Circulus absent. One pair of cerarii, with 2 conical setae and 2 pores.

Trilocular pores evenly distributed on dorsum and venter, numerous near spiracles (on drawing).

Multilocular pores in transverse rows and bands on 3–4 posterior abdominal sternites.

Tubular ducts of two sizes, with oral collar shorter than  $1/2$  duct length. Large ducts form marginal groups and rows on 3 posterior abdominal tergites, a few present on head margin; on venter in a marginal band and in segmental transverse rows on abdominal sternites; small ducts extremely sparse, present on VI and VII abdominal sternites.

Host: In leaf sheaths of *Carex* sp. (*Cyperaceae*).

Distribution: Europe (N Caucasus).

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## STRESZCZENIE

[Tytuł: Przegląd rodzajów *Kiritshenkella* BORCHSENIUS i *Balanococcus* WILLIAMS (*Homoptera, Coccinea, Pseudococcidae*) z opisem nowego gatunku]

Praca zawiera przegląd, opisy i klucz do 14 gatunków zaliczanych dotychczas do rodzajów *Kiritshenkella* BORCHSENIUS, 1948 i *Balanococcus* WILLIAMS, 1962. Z zestawionych danych morfologicznych, biologicznych i geograficznych wynika, że rodzaje te, zwłaszcza pierwszy, mogą być taksonami sztucznymi, obejmującymi gatunki nawet z odrębnych podrodzin. Z drugiej strony niektóre gatunki wydają się być blisko spokrewnione. Rozstrzygnięcie tych trudności będzie możliwe po precyzyjnym zdefiniowaniu wyższych taksonów (podrodzin, plemion) w obrębie *Pseudococcidae*.

*Kiritshenkella lianae* sp. n. żyje w pochewkach liściowych turzycy *Carex fusca*. Ostatnie linienie samicy i wylot samców nastąpiły w połowie sierpnia (1986). Stwierdzono tylko jedno stanowisko na skraju torfowiska przejściowego w Hucie Złomach na zachód od Wielkiego Działu (Roztocze Południowe). Gatunek ten podobny jest pod względem morfologicznym do *Balanococcus scirpi* (GREEN) z Anglii i *Kiritshenkella fushanensis* BORCHSENIUS z Chin; różni się od wszystkich dotychczas opisanych gatunków budową gruczołów cylindrycznych.

## РЕЗЮМЕ

[Заглавие: Обзор родов *Kiritshenkella* BORCHSENIUS и *Balanococcus* WILLIAMS (*Homoptera, Coccinea, Pseudococcidae*) с описанием нового вида]

Работа содержит обзор, описания и ключи к 14 видам, причисляемым до настоящего времени к родам *Kiritshenkella* BORCHSENIUS, 1948 и *Balanococcus* WILLIAMS, 1962. Из сопоставления морфологических, биологических

и географических данных следует, что эти роды, особенно первый, могут быть искусственными таксонами, охватывающими виды, принадлежащие даже к отдельным подсемействам. С другой стороны некоторые виды, как кажется, могут быть близкородственными. Разрешит эти трудности можно будет лишь после точной дефиниции высших таксонов (подсемейств, племен) в пределах *Pseudococcidae*.

*Kiritshenkella lianae* sp. n. живет в пазухах листьев осоки, *Carex fusca*. Последняя линька самок и вылет самцов наблюдался в середине августа (1986). Констатировано только одно местонахождение на краю переходного торфяника в Гуте Зломах, на запад от Велького Дзяла (Южные Розточа). Морфологически вид сходен с *Balanococcus scirpi* (GREEN) из Англии и *Kiritshenkella fushanensis* BORCHSENIOUS из Китая; отличается от всех описанных до настоящего времени видов строением цилиндрических желез.

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