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Inka minuta gen. et sp. n. (Homoptera, Coccinea) from Upper Cretaceous
Taymyrian amber

[With 1 Table and 48 Text-figures]

Abstract. *Inka minuta* gen. et sp. n. described on the basis of six alate males from the Taymyrian Upper Cretaceous amber (Santonian, ca. 85–87 mill. years) is similar to the extant *Eriococcidae* with which it shares the structure of head, antennae, legs, external genitalia, but differs in the presence of a central membranous area of scutum, characteristic of the *Kermesidae*, *Coccidae* etc. The remarkable long microtrichia on wings are unique among the scale insects. This, combined with other features, justified the erection of the family *Inkaidae*. The Mesozoic scale insect fossils are reviewed and briefly discussed.

INTRODUCTION

The information on Mesozoic coccids is scarce: two forms (impression fossils) have been described from Lower Cretaceous Siberian deposits (KOTEJA 1988d, 1989) and one from Upper Cretaceous Canadian amber (BEARDSLEY 1969). All these forms are members of the more primitive archeococcids (*Orthezioidea*). The discovery of neococcids (*Coccoidea*), represented by a few poorly preserved pseudo-coccid males and 6 eriococcid-like winged specimens, the latter being dealt with in the present study, provides important information on the phylogeny of the scale insects.

The Taymyrian amber, which contains numerous insect inclusions, is considered to be of Santonian (Upper Cretaceous) age, ca. 85–87 mill. years old. The most productive locality is Yantardakh ("Amber-Mount") situated on the left bank of the River Maymetch, Peninsula Taymyr, Khatanga Region, Northern Siberia (for more information see ZHERIKHIN and SUKACHEVA 1973, SCHLEE and GLÖCKER 1978, RASNITSYN 1980, and records cited herein). The amber pieces are very small.

2–5 mm, rarely exceeding 10 mm; embedded together with coal (perified wood) in sand. The amber (retinite) is reddish or yellowish-brown, transparent, with numerous air bubbles and fissures; although not very hard, it is fragile and easily springs into pieces at any attempt at cutting or polishing, thus requiring special care when preparing slides for microscopic examination. All the pieces received for study are icicles formed of distinct semiconcentric layers. The inclusions, except one, are embedded between these layers. Different optical properties of the neighbouring layers originated from hardening and shrivelling of the resin, and various light reflecting planes, air bubbles etc., make the examination difficult; in addition, the pieces tend to split along the fissures between the layers damaging the inclusion.

Among the inclusions received for study, two were already mounted in Canada balsam on a thick glass. To enable examination from both sides, they were remounted and embedded between two cover glasses. The other pieces were dissected (when necessary), polished, partly using of methods adapted for the Baltic amber, partly scratched by means of a new razor blade and embedded in balsam. In some instances the balsam penetrated the amber and impregnated the inclusion. The use of balsam preliminarily hardened by means of repeated heating (before embedding the amber) may protect the inclusion from balsam penetration (method elaborated after the Taymyrian inclusions had been embedded).

The inclusions were examined in changeable direct and transmission light, under magnification 100–600 ×. All drawings were made by means of a pentagonal prism. "Cocc" followed by a number refers to numerals of fossils in the "Catalogue of fossil scale insects" being prepared by the author.

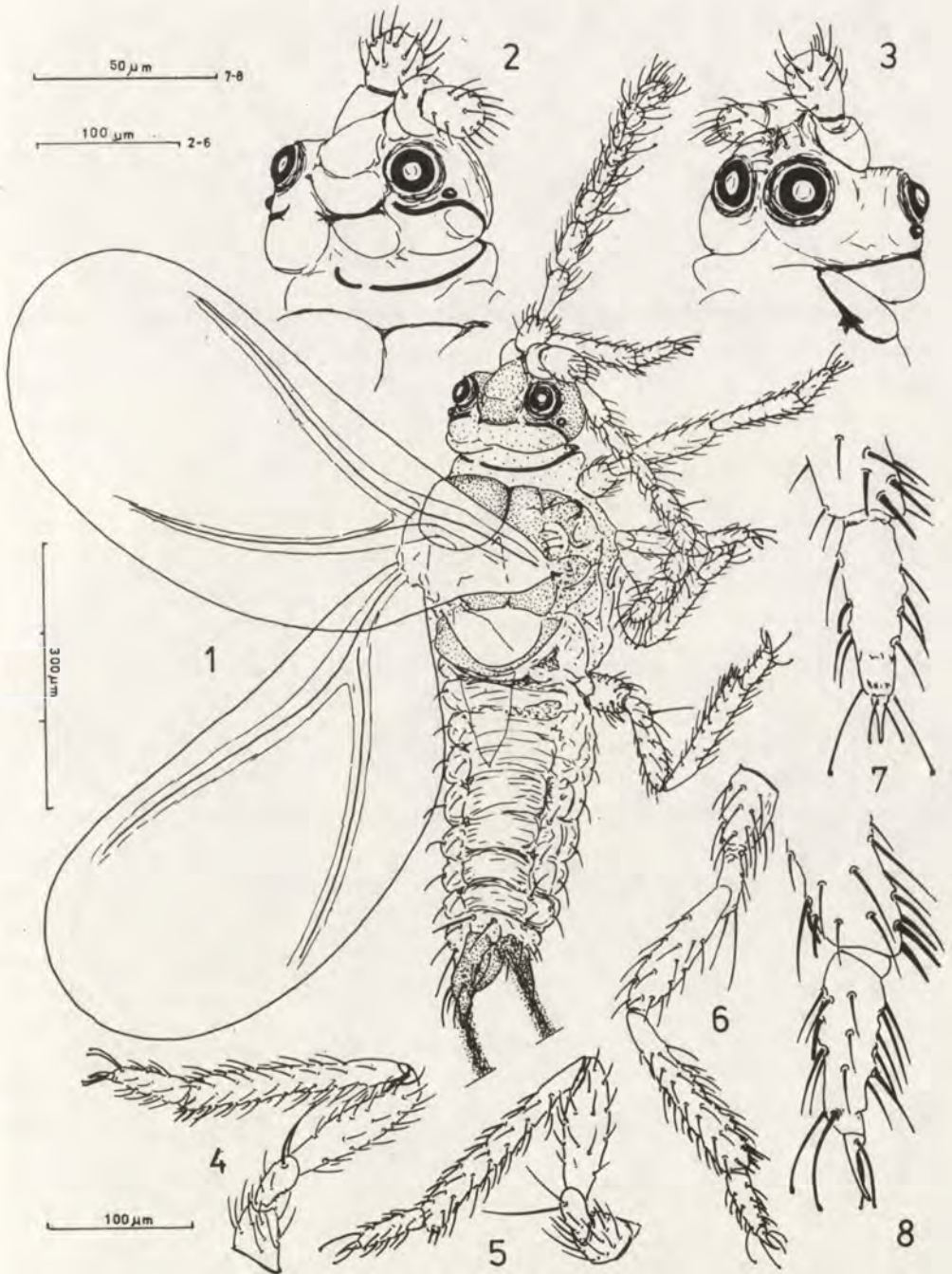
The material has been offered for study by the Paleontological Institute of the Academy of Sciences, Moscow. I am very grateful to the Staff of this Institute for their generous assistance, and particularly to Dr D. E. SHCHERBAKOV, Dr I. D. SUKACHEVA and Dr A. P. RASNITSYN who provided also valuable paleontological and technical information. I would like to express my sincere thanks also to Dr J. W. BEARDSLEY (College of Tropical Agriculture, Honolulu) for information on Canadian amber and discussion of various phylogenetic and paleontological questions.

Inkaidae fam. n.

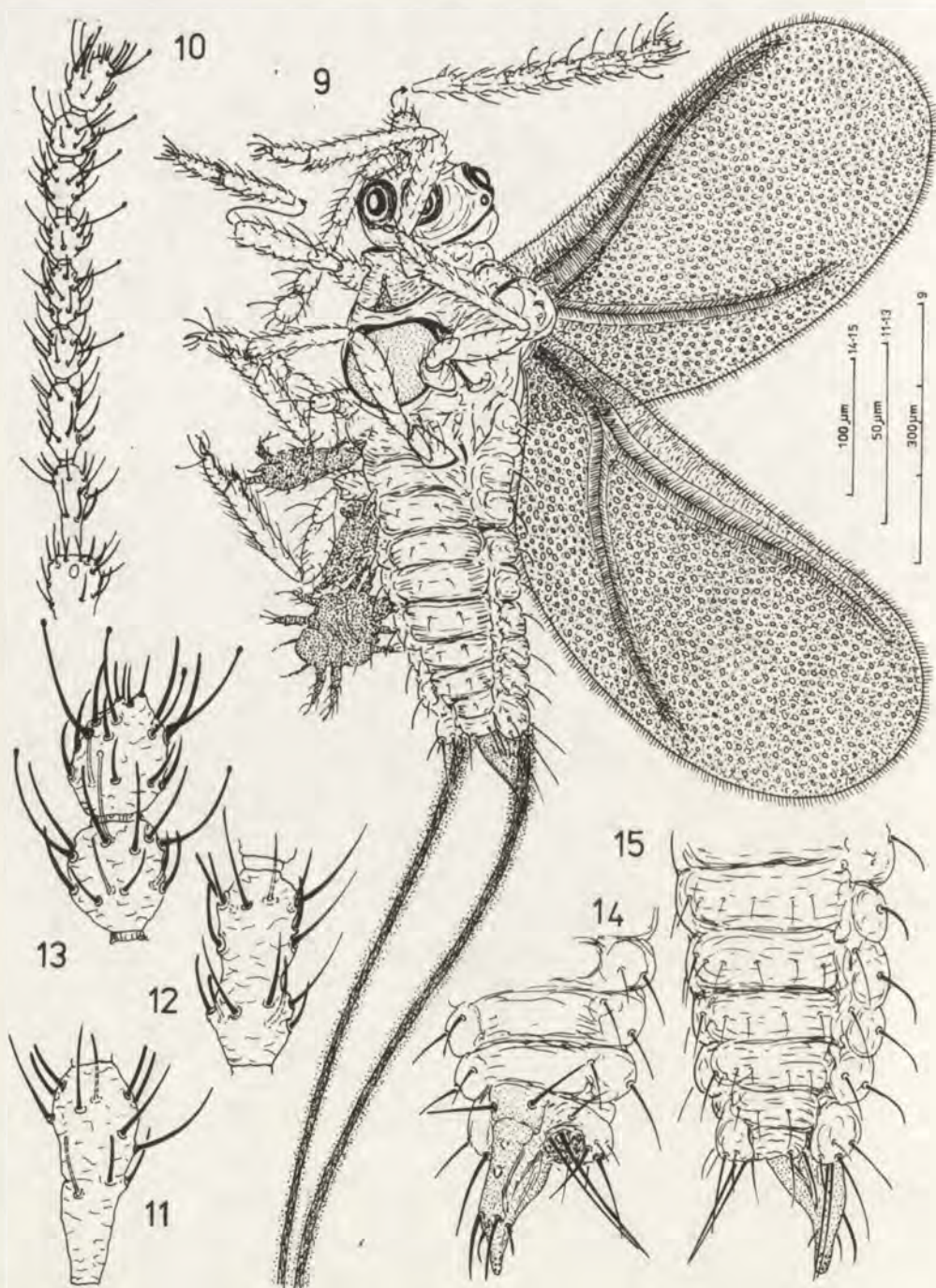
Type genus: *Inka* gen. n.

Diagnosis: Neococcids of eriococcid branch; with two pairs of simple eyes; moniliform terminal part of antennal flagellum; well developed, subrectangular medial membrane of scutum; short, transverse scutellum; short, compact, conical penial sheath devoid of ventral setae; with very long microtrichia on whole wing membrane; of Upper Cretaceous age; monotypic.

The fossils bear numerous specialized features met in some recent advanced groups (*Kermesidae*, *Coccidae*, *Asterolecaniidae*, *Lecanodiaspididae*); on the other hand, the general appearance, the structure of head and antennae, external



Figs 1-8. *Inka minuta*, gen. et. sp. n. ♂, Cocc 172, holotype; 1 - dorsal aspect (wing sculpture and microrichia omitted); 2, 3 - head dorsal and ventral; 4-6 - fore-, mid- and hind-legs; 7 - apex of tibia and tarsus, ventral; 8 - the same, side view.



Figs 9-15. *Inka minuta*, gen. et sp. n. ♂, Cocc 172, holotype; 9 - ventral aspect (no attention has been given to accuracy of drawing of the mites near hind-legs); 10 - antenna; 11, 12 - first and second flagellar segments; 13 - two terminal flagellar segments; 14 - apex of abdomen, dorsal; 15 - the same, ventral (wax secretions omitted).

genitalia, etc., correspond with those in the *Eriococcidae*, and the very long microtrichia make them distinct from all other described groups. Presumably they belong to a rather small, highly specialized group that derived from the eriococcids in Mid-Mesozoic and died out in Late Cretaceous or Early Tertiary. For both morphological and ecological reasons it is very unlikely that these coccids are ancestors of any extant advanced neococcids. First, these groups are more primitive than *Inka* with respect to at least some features; second, the progress of the neococcids is apparently associated with the success of the angiosperms, whereas *Inka* seems to have been confined to some Mesozoic gymnosperms. However, it should be emphasized that the Lower Cretaceous forms already mentioned are very similar to the recent *Matsucoccidae* and *Xylococcidae*, thus the longevity of at least some coccids cannot be excluded. (See also "Discussion").

Inka gen. n.

Etymology: *Inka* (*Irena*) is the name of my daughter.

Type species: *Inka minuta* sp. n.

Diagnosis: Eriococcid-like, small; head heart-shaped in dorsal view, subrotund in lateral view; two pairs of simple eyes and one pair of lateral ocelli; midcranial ridge absent dorsally; dorsomedial plate strong, with well developed postoccipital ridge; antenna 10-segmented, flagellum proximally filiform, distally moniliform; apical segment acute, but not pyriform, with 4 needle-like terminal setae; capitate setae on 6–7 flagellar segments; prescutum subrectangular, bulged, with well developed prescutal sutures (ridges); scutum with a rectangular, well developed medial membrane; mesosternum without medial longitudinal ridge, with very long setae; wing without anal lobe; haltere absent; legs short, with long setae; tarsus 2-segmented; claw without a denticle; tarsal and unguis digitules well developed, apically knobbed; abdomen broad, flat, with few setae; segment VIII with a pair of remarkable long dorsal setae and pleural lobes with 5–6 setae, one very long; glandular pouch well developed, with 2 setae; penial sheath conical, solid, apically tapered and rounded; style slightly bent downwards, with 2 pairs of latero-dorsal setae inserted near apex, without ventral setae; aedeagus parallelsided, short, slightly bent, with obliquely truncate apex; Upper Cretaceous (Santonian) Taymyrian amber; presumably associated with gymnosperms; monotypic.

Inka minuta sp. n.

Holotype: Cocc 172, alate male, No. 3311/584 (1971); Paleontological Institute, Academy of Sciences, Moscow; Taymyrian amber, coll. in Yantardakh (Taymyr Nat. Distr., Khatanga Region) on left bank of the river Maymetch; Upper Cretaceous (Santonian) deposits; Upper part of the Khetsk formation.

Originally amber piece $3 \times 3 \times 3 \text{ mm}^3$, yellowish brown; 20.III.1987 polished to $3 \times 3 \times 0,5 \text{ mm}^3$ and embedded in balsam. Specimen embedded within one layer of resin, thus not obscured by light reflecting planes; well preserved, can be examined in laterodorsal and lateroventral aspects. Three adult mites located between posterior legs of the coccid.

Paratypes: The remaining 5 specimens, all alate males, collected with the holotype and preserved in the Paleontological Institute, Moscow, are designated as paratypes.

Cocc 171; No. 3311/583 (1971); originally $12 \times 6 \times 4 \text{ mm}^3$, containing also a specimen of *Diptera*; 20.III.1987 dissected; piece with the coccid polished to $1.2 \times 1.2 \times 0.3 \text{ mm}^3$ and embedded in balsam. Specimen relatively well preserved; may be examined in laterodorsal and lateroventral aspects; it is the smallest specimen within the series.

Cocc 174; No. 3311/586 (1971); originally $6 \times 5 \times 5 \text{ mm}^3$; specimen embedded between two layers of resin; to avoid a very likely splitting of the inclusion, amber polished only from one side; this plane covered with balsam and a cover glass, 9.V.1987. Antennae, head and thorax can be examined in dorsal view; abdomen veiled by right wing; ventral face not accessible because of thick layer of resin with numerous bubbles and light reflecting planes.

Cocc 175; No. 3311/587 (1971); originally $6 \times 3 \times 2 \text{ mm}^3$; 20.III.1987 polished to $2.2 \times 1.5 \times 0.8 \text{ mm}^3$ and embedded in balsam. Specimen in poor condition, embedded between two layers of resin among fissures; a series of light reflecting planes almost perpendicular to the frontal plane makes the examination very difficult. Within several weeks the balsam penetrated the amber and impregnated the specimen; the fissures disappeared, but also some cuticular structures became invisible.

Cocc 178; No. 3130/175 (1970); when received for study $3 \times 2 \times 1 \text{ mm}^3$, embedded in balsam between a thick basic glass and a cover glass; specimen partly impregnated with balsam (resin?). 20.III.1987 removed from balsam, polished to $1.3 \times 0.9 \times 0.4 \text{ mm}^3$ and embedded between two cover slips. After some weeks the balsam penetrated further parts of the specimen which can be examined from sides; minute details difficult to see.

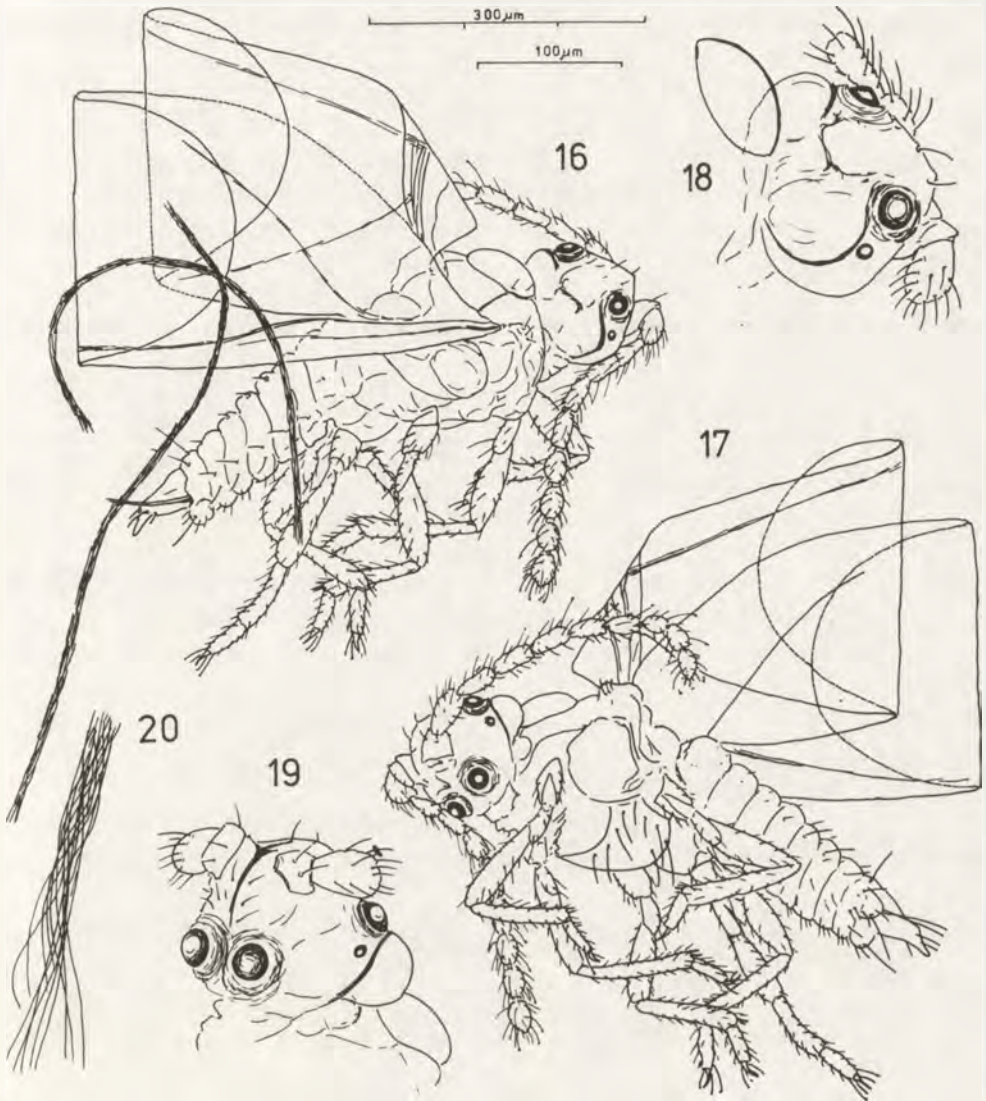
Cocc 179; No 3130/176 (1979); when received for study $5 \times 3 \times 1 \text{ mm}^3$, embedded in balsam with Cocc 178 on one basic glass. 20.III.1987 removed and polished to $3 \times 2 \times 1$. Specimen very poorly preserved, crumpled, in part desiccated and affected by putrefaction: completely impregnated with balsam (resin?); little can be seen.

Description

The description has been based on all available material. Some quantitative data for each specimen are given in Table 1. Also numerous drawings of the inclusions give an idea of the variability of the (hypothetical) species. The terminology and the pattern of description follow those proposed by AFIFI (1968) for *Pseudococcidae* and *Eriococcidae*.

Body small, robust, 660–820 μm long, 180–240 μm wide, about 200 μm high at mesothorax; wing expanse 1320–1750 μm ; legs and antennae short; waxy tail rods about as long as the body or slightly longer.

Head heart-shaped in dorsal view, rounded in lateral aspect, 120–150 μm long (from apex to neck constriction), 150–180 μm wide, about 150 μm high. Midcranial ridge, if present, cruciform, very short dorsally; ventrally longer, presumably extending to ocular sclerite. Dorsomedial plate well defined, posteriorly bordered with a strong postoccipital ridge, with the lateral extremities sharply bent backwards. Preocular and postocular ridges widely separated medially, but the latter almost touching the postoccipital ridge. Additional ridges between postocular and cervical ridges, and preoral ridges not visible.

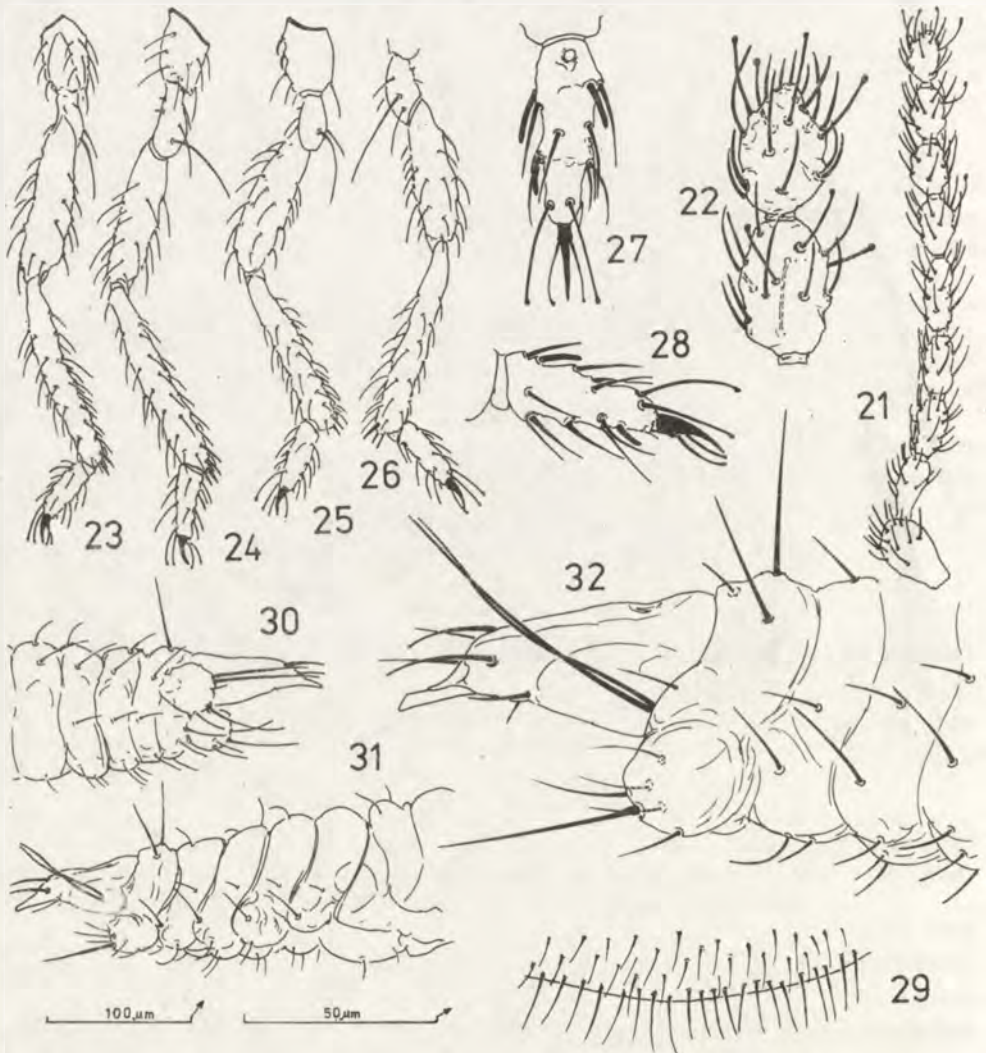


Figs 16–20. *Inka minuta*, Cocc 171 ♂, paratype; 16 – dorsal aspect (waxy tail rods detached from body); 17 – ventral aspect (note the very long setae on mesosternum); 18, 19 – head, dorsal and ventral; 20 – piece of tail rod showing its filamentous structure.

Dorsal simple eyes projecting beyond the margin of head in dorsal view; their corneae 25–30 μm in diameter, separated by 65–90 μm. Ventral eyes of the same diameter or very slightly smaller, about 25 μm apart. Lateral ocelli situated below dorsal simple eyes, close to the postocular ridges. Ocular sclerites presumably moderately sclerotized. Genae slightly sclerotized. A few (2–4) dorsal setae at the

head apex, and perhaps 6–8 ventral setae on both sides of the midcranial ridge. Genal setae not noticed.

Antennae 10-segmented (sporadically one antenna with 9 segments), 420–500 μm long, i.e., longer than half body length and about as long as the legs. Scape cylindrical, wider (35–45 μm) than long (about 30 μm), presumably with 3 or 4 setae. Pedicel broadly club-shaped, 50–60 μm long, 25–40 μm wide, with a dorsal cupola and 15–20 setae (including fleshy and hair-like ones), much shorter than



Figs. 21–32. *Inka minuta*, Cocc 171 ♂, paratype; 21 – antenna; 22 – two apical flagellar segments; 23–26 – left and right fore-legs, mid-leg and hind-leg, respectively; 27 – tarsus, dorsal; 28 – tarsus, side view; 29 – wing edge with microtrichia; 30, 31 – apex of abdomen in laterodorsal and lateroventral aspects; 32 – the same, enlarged.

segment width. First flagellar segment (III) 55–60 μm long, 12–20 μm wide, with 10–12 fleshy and hair-like setae, the former being shorter than the segment width, the latter slightly longer. Segments IV–VI cylindrical, 40–55 μm long, about 12 μm wide, sometimes clearly binodose, with 13–16 fleshy and hair-like setae; segment VI always with 1 or 2 capitate setae; these sometimes also on segments IV and V. Segments VII–X barrel-shaped or spherical, 30–45 μm long, 25–30 μm wide; terminal segment tapered apically and pointed, but not clearly pear-shaped as in the eriococcids; these segments with 10–15 setae, including 2 or 3 hair-like setae (sometimes not distinguishable), 1 antennal bristle (on segments VIII and IX) and 2–4 capitate setae. Apical segment with 3 antennal bristles, 7 fleshy setae, 4 capitate setae and 4 short needle-like apical setae. In the *Eriococcidae* studied so far, there is 1, rarely 2 (*Gossyparia*) short hair-like “apical setae” (AFIFI 1968). The minute basiconic or coeloconic sensilla, as well as the intersegmental sensilla described in scale insects (KOTEJA 1980) have not been found in the fossils under study.

Prothorax separated from head by a deep cervical constriction. The former shrivelled in all specimens, so that the prescutum approaches the head, but the pronotal ridge and the cervical + propleural sclerite are well developed and visible in some specimens. Prosternum and the transverse prosternal ridge also noticed in some inclusions. Prosternal setae not observed.

Prescutum subrectangular, with rounded sides (prescutal ridges), bulged; 60–

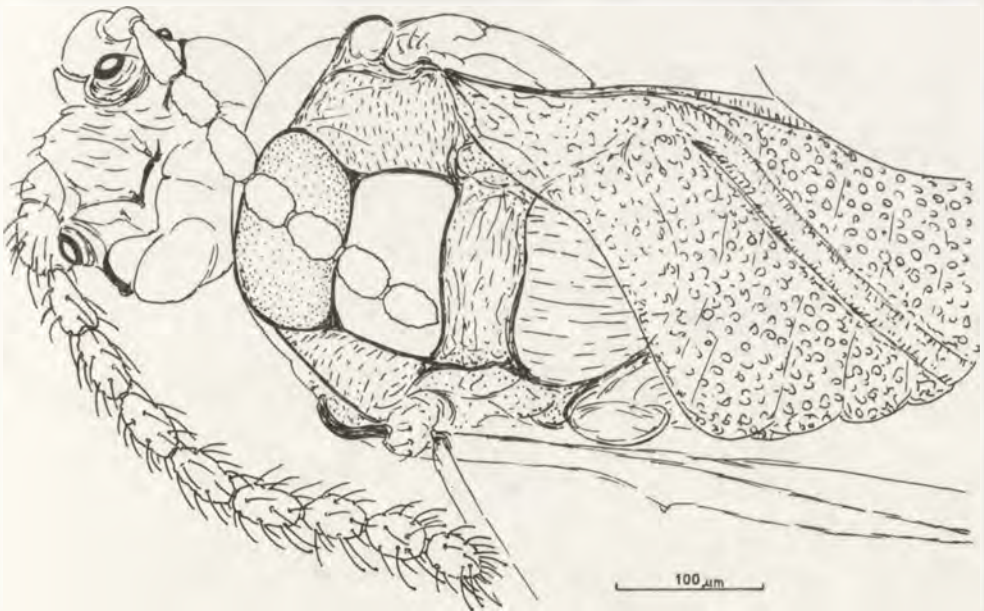


Fig. 33. *Inka minuta*, Cocc 174 ♂, paratype; head and thorax, dorsal (abdomen veiled by wing; right antenna deprived of setae to show the structure of mesothorax).

70 μm long, about 120 μm wide. Medial membranous area of scutum rectangular, with delicate longitudinal folds, 55–65 μm long (in Cocc 171 much shorter), 115–130 μm wide. Scutellum transverse, short, rather of the eriococcid than the pseudococcid type; but neither scutellar ridge nor foramen could be observed; 48–60 μm long (much smaller in Cocc 171) and about 120 μm wide. Mesosternum trapezoidal, without medial ridge; reliable measurements difficult to obtain, presumably 100–140 μm long, about 160 μm wide; furca normal. Mesopostnotum well developed; membrane separating it from scutellum about 100 μm long. Pleural region of mesothorax and the metathorax difficult to study. The following setae

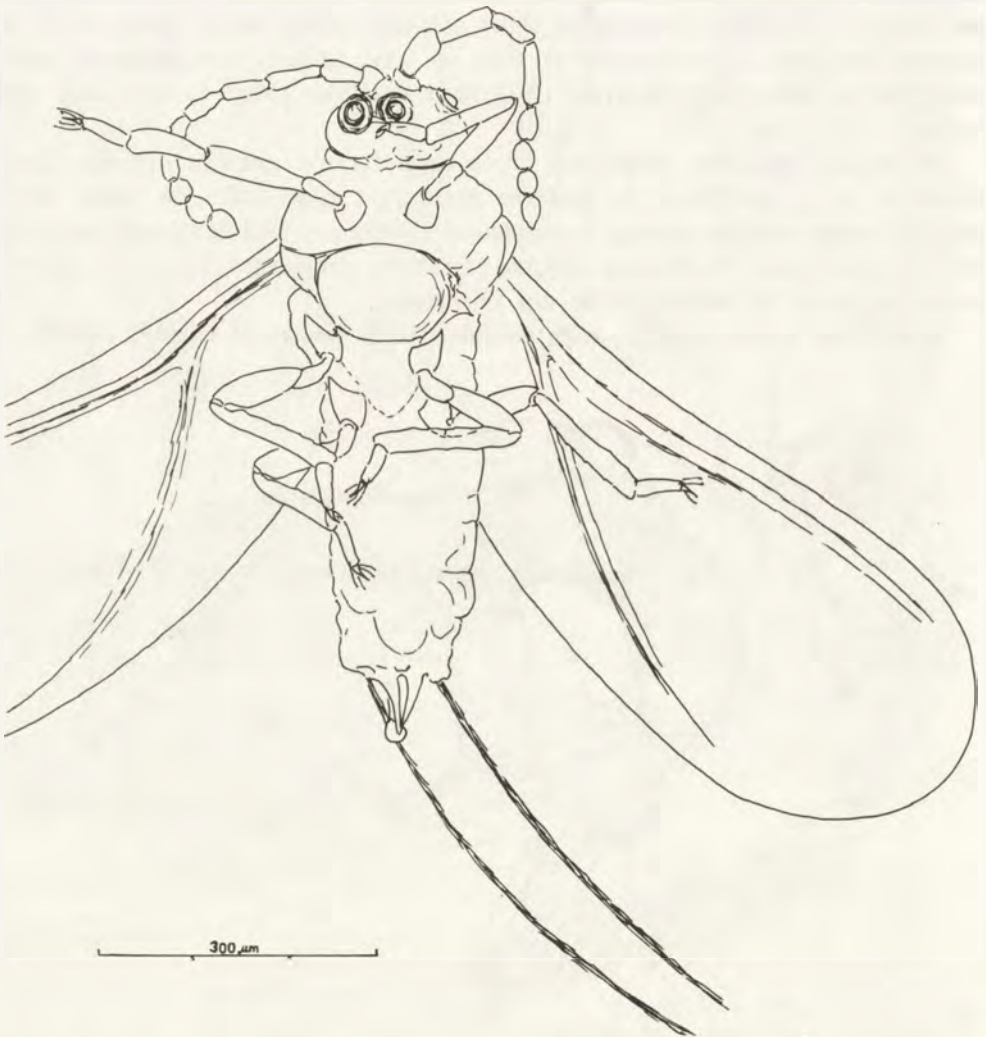
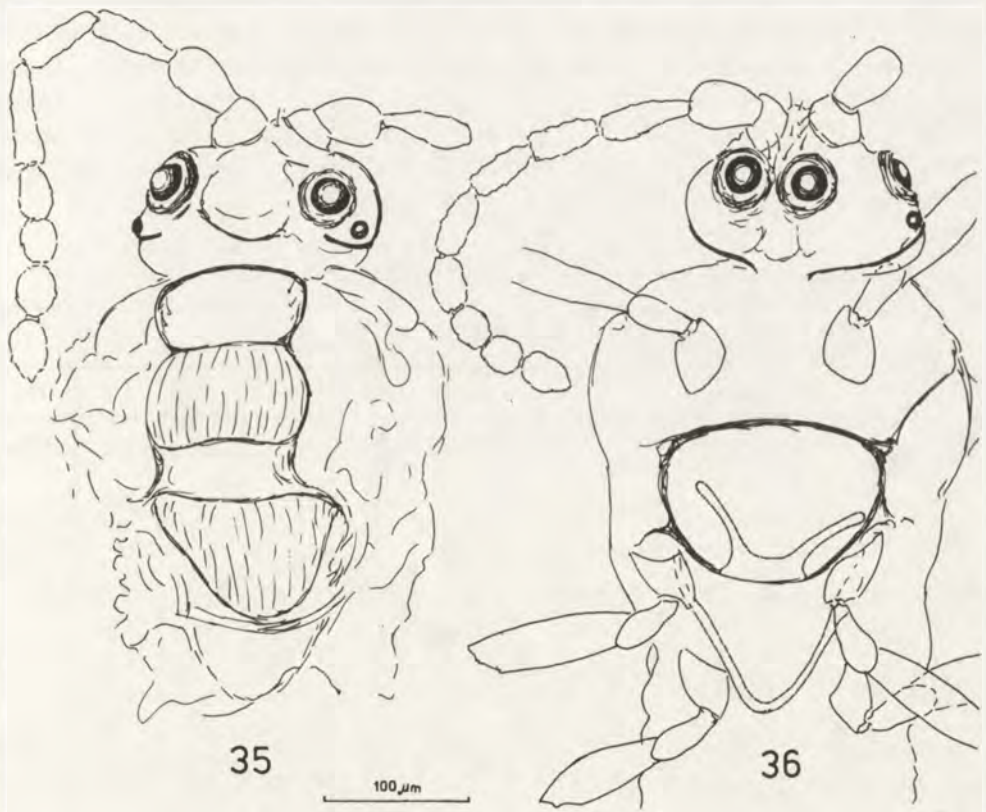


Fig. 34. *Inka minuta*, Cocc 175 ♂, paratype; ventral aspect.

have been observed: 2 pairs on prescutum, 2–4 pairs on tegulae, and several (about 12 in Cocc 171) very long, ca. 60 μm , setae on mesosternum.

Wings of normal neococcid structure, 570–750 μm long, 270–330 μm wide; width : length ratio 1 : 2.1–1 : 2.3; with distinct subcostal and cubital ridges, without anal lobes; all wing disc in tubercular sculpture (folds) arranged in regular rows, covered with remarkably long microtrichia, on wing edges 14–19 μm . Alar setae and sensilla not observed. Halteres absent (among eriococcids halteres are reduced in *Ovaticoccus*, but anal lobes are present; AFIFI 1968).

Legs short, rather robust, with all joints well developed; 370–470 μm long, posterior ones being slightly longer than the rest. Coxa 55–60 μm long, 35–40 μm wide, with at least 15 setae, apical ones longer than coxa width. Trochanter indistinctly constricted; proximal part much smaller than the distal one, with 2 needle-like basal setae and perhaps 3 pairs of campaniform sensilla; distal part with about 5 setae, of which the 2 apical ones as long as, or longer than, the trochanter (in eriococcids the setae are undifferentiated and much shorter than the



Figs 35, 36. *Inka minuta*, Cocc 175 ♂, paratype; 35 – head and thorax, dorsal (left antenna 9-segmented); 36 – the same, ventral (furca and mesopostnotum drawn with broken line).

trochanter, except *Gossyparia*, in which one apical seta is longer than the rest; AFIFI 1968). Combined length of trochanter and femur 120–150 μm , latter about 30 μm wide, with about 20 setae, including fleshy and hair-like ones. Tibia 130–170 μm long, about 25 μm wide, with 35–40 setae as long as the segment width and 2–4 strong apical spurs. Tarsus 50–60 μm long, 15–18 μm wide; 2-segmented; distal segment with a dorsal cupola near base and 11–14 setae, including 2 or 3 fleshy setae; tarsal digitules well developed, with apical knobs, about 20 μm long. Claw broad at base, abruptly tapered, slightly curved, without teeth; about 25 μm long; unguis slender, apically knobbed, about as long as the claw.

Abdomen broad, flattened dorso-ventrally, with well developed pleural lobes of segment VIII; sclerites not recognized. Setae: 1 pair of dorsal setae on each segment, those on segment VIII conspicuous, more than 40 μm long (feature shared with eriococcids); 2 or 3 pairs of ventral setae; 1 or 2 pairs of pleural setae up to 35–40 μm , but 5–7 pairs on segment VIII, 40–80 μm long, i.e., about half length of the glandular pouch setae. Glandular pouch well developed, with numerous pores and 2 setae 80–130 μm long. Genital segment of eriococcid type. Penial sheath 90–100 μm long, 40 μm wide at base and 40 μm high (smaller in Cocc 171); in dorsal view uniformly tapering to a narrow, rounded tip; in lateral view apical part (style) also uniformly tapered and curved downwards. Anal opening at about $\frac{1}{3}$ the length of the sheath. Setae: 1 pair of dorsal setae, 30–40 μm long, 1 pair of similar lateral setae, both inserted at the base of style and extending beyond its apex; ventral setae not noted. A group of cupolae on apex of the style. Aedeagus

Table 1. Some quantitative characteristics of *Inka minuta* sp. n. ♂. Head numerals refer to specimens. All dimensions in μm

Characteristics	171	172	174	175	178	179
Body: length	640	750	—	700	830	660
width	160	220	300	250	—	—
height	—	—	—	—	200	—
Wing: length	570	640	750	720	—	730
width	270	280	360	310	330	330
Waxy tail rod: length	780	720	1120	720	—	570
Head: length	140	115	150	100	120	—
width	150	160	180	150	—	—
height	—	—	—	—	140	—
Prescutum: length	42?	—	70	60	70	70
width	—	—	130	—	—	—
Membraneous area of scutum: length	40	—	65	55	55	—
width	—	—	110	130	—	—
Scutellum: length	35	—	55	50	65	50
width	—	—	120	120	—	—

Table 1 – continued

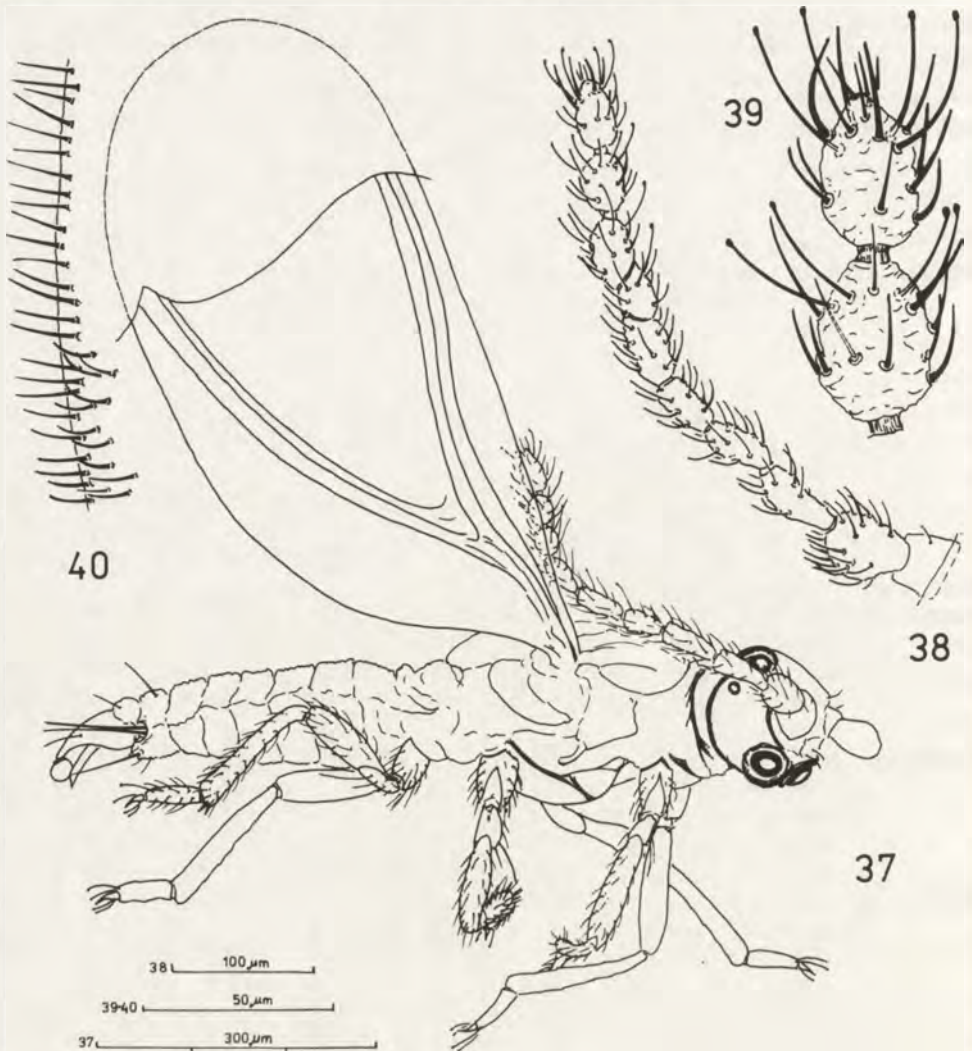
Characteristic	171	172	174	175	178	179
Mesosternum: length	90	100	100	95	140	150
width	–	–	160	160	–	–
Penial sheath: length	90	100	–	90	100	90
width	–	40	–	40	–	–
height	35	–	–	–	50	50
Antenna: length of segments I	30	–	42	30	30	–
II	42	60	54	48	54	–
III	54	60	54	60	60	–
IV	48	54	54	48	54	–
V	48	42	54	48	54	54
VI	42	42	54	42	48	48
VII	42	36	54	42	48	48
VIII	36	30	48	30	42	40
IX	36	30	42	30	42	40
X	36	36	42	36	42	45
total	410	420	500	410	470	–
Legs: length of segments; claw ca. 25 µm						
Anterior leg: coxa	54	54	–	–	60	–
trochanter + femur	126	138	–	138	150	138
tibia	132	150	–	144	162	162
tarsus	48	51	–	–	54	54
total	380	410	–	–	440	–
Middle leg: coxa	48	60	–	–	66	60
trochanter + femur	120	126	–	142	138	138
tibia	132	150	–	150	156	168
tarsus	48	51	–	–	60	57
total	370	410	–	–	440	450
Posterior leg: coxa	54	60	–	–	66	–
trochanter + femur	126	138	–	138	144	150
tibia	138	150	–	156	162	180
tarsus	48	51	–	–	54	60
total	380	420	–	–	440	–

parallelsided, slightly bent, with obliquely truncate apex; presumably slightly longer than half length of the penial sheath.

Paleontological data as given for the genus.

Note

Joined inclusions of various animals in the same amber piece may be pure accidents; sometimes they may result from the preferred place and time of resin exudation and, perhaps rarely, may have biological reasons, e.g., the shared embedding of predator and its prey, a pair in copula, mother with her new-born larvae (the latter observed in *Newstedia*; KOTEJA and ŽAK-OGAZA 1988), and minute arthropods on their “vehicles”, for example, *Mallophaga* on *Diptera*. The



Figs 37-40. *Inka minuta*, Cocc 178 ♂, paratype; 37 - lateral aspect (left legs deprived of setae; left wing omitted); 38 - right antenna with abnormal segmentation; 39 - two apical flagellar segments; 40 - wing edge with microtrichia.

joined inclusion of the coccid male Cocc 172 with the *Acarina* presumably represents such an instance. This assumption is based on the intimate embedding of the mites between the legs of the coccid and on the behaviour of these animals which use insects for dispersal (personal information of Mr. Jerzy MAGOWSKI, Poznań). I do not remember whether anybody noticed coccids carrying other insects or mites.

DISCUSSION

Relationships

A. *Microtrichia*. The most remarkable feature of *Inka* are the microtrichia. These minute hairs that densely cover all the wing membrane, being slightly longer on the edges than on the remaining surface, occur in all the neococcids (*Coccoidea*) studied (GHAURI 1962, GILIOME 1967, AFIFI 1968, and many others) and in the *Phenacoleachiidae* (KOTEJA 1986b); in the archeococcids (*Orthezioidea*) they have not been observed, in any case, never described. Unfortunately, because of the minute size and the presumed overall presence, they were hardly mentioned, and their drawing provided by HOY (1954) for *Eriococcus orariensis* is perhaps the only one in the recent literature. The examination of specimens of various groups at hand reveals that the length of the microtrichia does not depend on the wing size, varying between 2 and 10 μm . In *Inka* they reach nearly 20 μm on the posterior wing edge and, associated with the relatively small wing, are striking at first sight. Since in the primitive groups (*Putoidae* and *Phenacoleachiidae*) the microtrichia are medium-sized, their elongation in *Inka* may be regarded as a derived condition.

B. *Medial membrane of scutum*. The presence of microtrichia as well as many other characteristics indicate that *Inka* is a member of the neococcids. In this group, the scutum may have two forms — either it is sclerotized (usually strongly) throughout, or the medial part, subrectangular in shape, forms a membranous foramen provided with strong lateral ridges that connect the prescutum to the scutellum. The former condition occurs in the following groups:

Putoidae; *Puto mexicanus* examined. No information exists on *P. antennatus* and *P. yuccae* briefly described by REYNE (1954) and BEARDSLEY (1962), respectively, and *Macrocerococcus superbus* (SCHMUTTERER 1952, TEREZNIKOVA 1975); however, males in the latter are larviform with significantly modified thorax.

Pseudococcidae; ŠULC (1943, 1944), SCHMUTTERER (1952), GILIOME (1961), AFIFI and KOSZTARAB (1967), AFIFI (1968), MILLER (1975), VINIS and KOZÁR (1981) and a number of other papers that provide more or less detailed information on about 50 species. AFIFI (1968) noticed a longitudinal narrow membranous strip in the midline of scutum in most pseudococcids he studied.

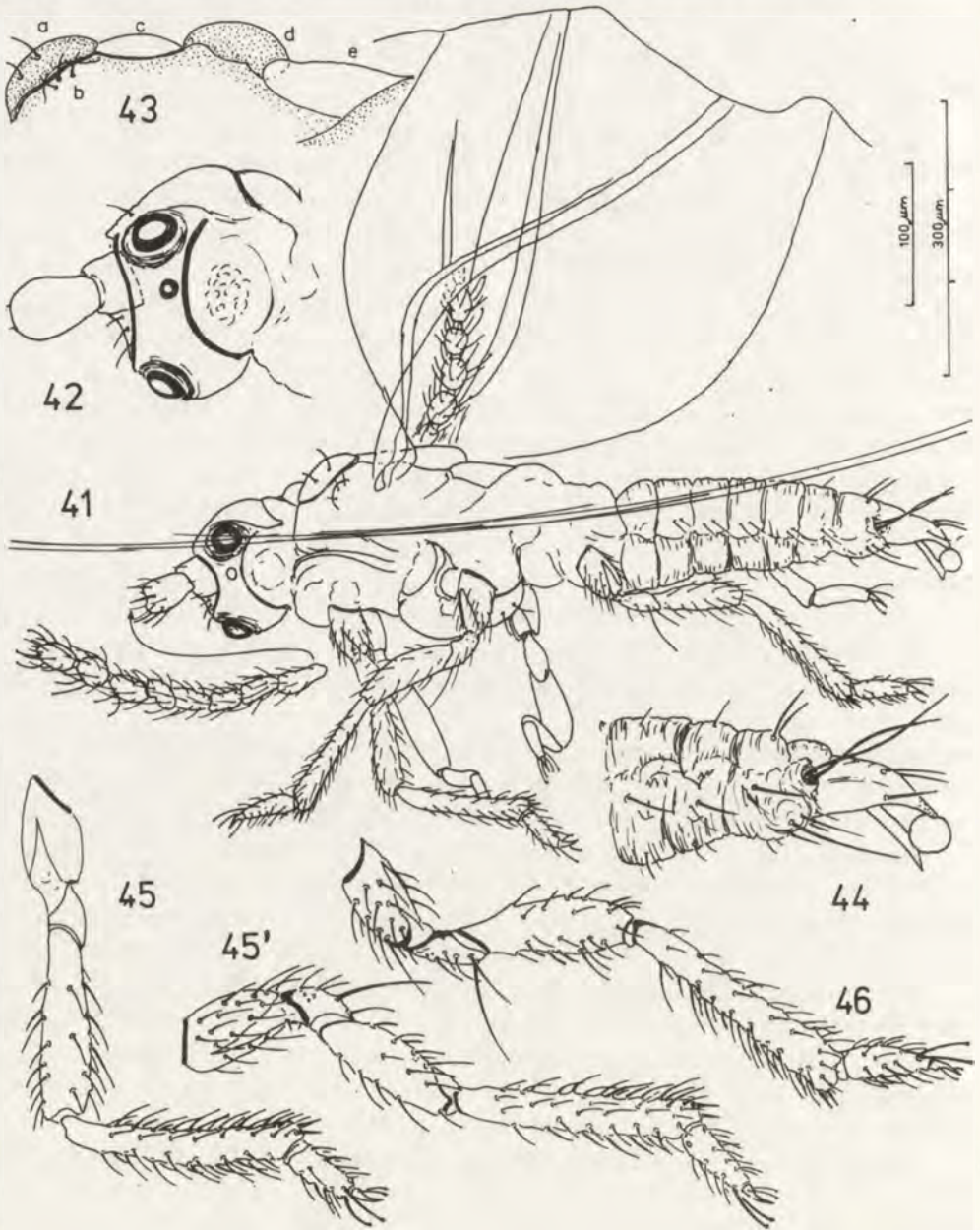
Eriococcidae; GOUX (1936, 1948), HOY (1954), JANCKE (1955), DZIEDZICKA (1961), AFIFI and KOSZTARAB (1967), AFIFI (1968), PATEL (1971), MILLER and GONZALEZ (1975).

Apiomorphidae; THERON (1968).

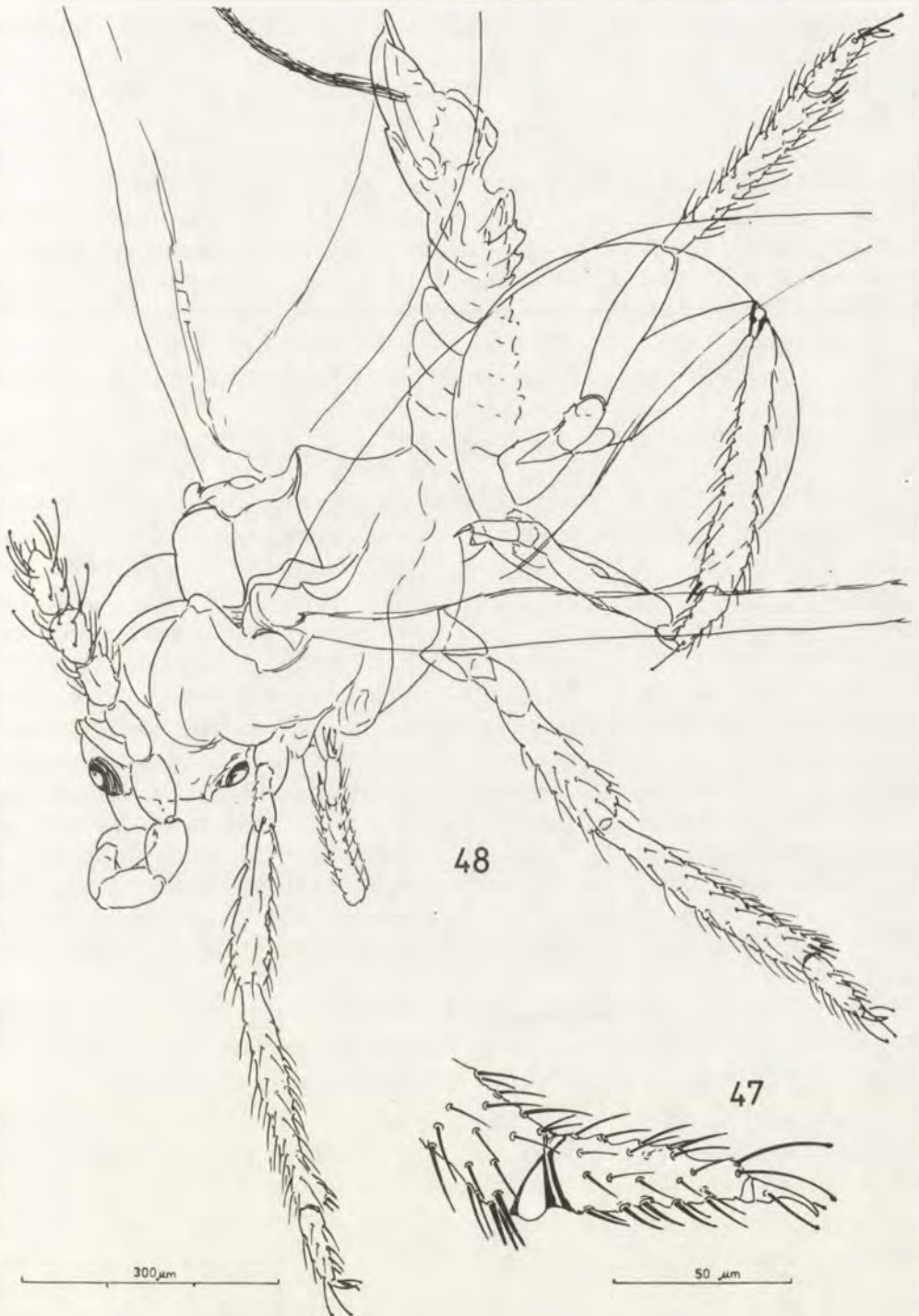
Opisthoscelis; THERON (1968).

Stictococcidae; RICHARDS (1971). The medial part of scutum is weakly sclerotized and sculptured in a different pattern than the lateral parts, but there are no traces of any sutures or ridges between the central and the marginal parts.

Conchaspidae; MAMET (1954), AFIFI (1969).



Figs 41–46. *Inka minuta*, Cocc 178 ♂, paratype; 41 – lateral aspect, 42 – head, side view; 43 – prescutum (a), tegula (b), median membrane of scutum (c), scutellum (d) and membrane between scutellum and mesopostnotum (e) in profile view; 44 – apex of abdomen, side view; 45–46 – fore-, mid- and hind-legs, respectively.



Figs 47, 48. *Inka minuta*: 47 – Cocc 178 ♂, paratype, apex of tibia and tarsus in lateral view; 48 – Cocc 179 ♂, paratype, dorsal aspect of body affected by desiccation and putrefaction (right antenna omitted).

Diaspididae; THERON (1958), BUSTSCHIK (1958), GHAURI (1962) and numerous other records providing information on about 100 species.

The scutum is disjoined medially by a large subrectangular membrane in: *Kermesidae*; KUWANA (1931), BORCHSENIUS (1960), KOTEJA and ŽAK-OGAZA (1972), HAMON, LAMBDIN and KOSZTARAB (1976).

Lecanodiaspididae; GILIOMEE (1967b), AFIFI and KOSZTARAB (1969).

Coccidae; ŠULC (1932), PESSON (1941), BORCHSENIUS (1957), GILIOMEE (1967a), KOTEJA (1966, 1969, 1970), KOTEJA and ROŚCISZEWSKA (1970), HEIDEL and KÖHLER (1979) and others. The central membrane is very distinctive in this family and is illustrated in almost all papers dealing with males.

Aclerididae; LA FACE (1915), MCCONNELL (1954), HOWELL (1976).

Asterolecaniidae; RUSSEL (1941), JANCKE (1955), GILIOMEE (1968), MILLER and LAMBDIN (1978).

In other neococcid groups the males are wingless (larviform), e.g., in the *Phoenicococcidae*, *Halimococcidae*, or absent (unknown), e.g., in *Cryptococcus*, *Kuwanina*, *Beesonia*; finally, descriptions of some groups in which males were observed or mentioned, were unavailable, e.g., *Dactylopiidae*, *Cerococcidae*¹ (mentioned by ŠULC 1953, AFIFI and KOSZTARAB 1967 and WILLIAMS (1969) and *Tachardiidae* (MAHDIHASSAN 1931, MISRA 1931). However, all these groups are extremely specialized with respect to their morphology and biology, thus their close relationship with the Cretaceous coccid in question is very unlikely.

THERON (1958) considered the solid sclerotized scutum throughout to be a primary (plesiomorphic) mesothoracic structure, whereas both GILIOMEE (1967) and AFIFI (1968) regarded it as a specialized (apomorphic) one. The latter, apparently erroneous, view arose from the misinterpretation of the evolution of chromosome systems in the neococcids (see also NUR 1980) and the phylogenetic position of *Steingelia*. The central part of scutum might have become membraneous at least 2 or 3 times — in the *Kermesidae* and in the coccid and asterolecaniid branches. To assume a monophyletic origin of the medial membrane in the neococcids, also a common ancestor of the coccid and asterolecaniid stocks and the *Kermesidae* must have been postulated.

Inka has a well defined medial membrane, presumably with strong lateral ridges. Thus, with respect to this feature, it could be considered as a member of the coccid or asterolecaniid branches, or as a relative of the *Kermesidae*.

C. Genital segment. In the recent neococcids the membraneous area of scutum is associated with elongation and sclerotization of the penial sheath. The latter is an obvious adaptation to the changes of the female body, and the co-

¹ Some months after the manuscript of the paper had been submitted for publication I received from Dr Michael KOSZTARAB (Blacksburg, Virginia) an incomplete specimen of *Cerococcus indicus* (MASKELL). The mesoscutum bears a subrectangular membrane medially, and the flagellar segments are cylindrical, of the pseudococcid or coccid type.

occurrence of these two phenomena is an accident or "general specialization" and cannot be interpreted in causal terms. The conditions in *Conchaspidae*, *Diaspididae*, *Stictococcidae* etc. (sclerotized scutum and elongated penial sheath) support this opinion. On the other hand, the adaptation to the modified female body (or behaviour) may be effected by elongation of pregenital segments (e.g., in *Apiomorphidae*). *Inka* reveals unique conditions by the combination of the membranous central part of scutum with the eriococcid genital segment.

D. Other eriococcid features. In addition to the structure of the genital segment, *Inka* shares with eriococcids several other characteristics, listed below (only those used by AFIFI 1968, to separate *Eriococcidae* and *Pseudococcidae* are considered):

- postoccipital ridge well developed,
- flagellum moniliform, terminal segments barrel-shaped (present also in *Kermesidae*),
- scutellum transverse, short (present also in several other neococcids),
- trochanter with the basal part shorter than the apical one,
- tarsal and unguis digitules knobbed (also in some other neococcids),
- claw short, broad at base, abruptly tapering,
- abdominal segment VIII with reduced number of dorsal setae (observed also elsewhere),
- glandular pouch with 2 setae (common feature in neococcids),
- prescutum about as long as the medial part of scutum.

E. Conclusions. *Inka* seems to be a close relative of the Mesozoic *Eriococcidae*; it reached a high level of morphological specialization and presumably became extinct before the Tertiary. It is very unlikely that any of the recent neococcids might have derived from this group, because all have some features more primitive than *Inka*, for instance, the *Kermesidae*, which share with this fossil form several characteristics, have numerous simple eyes.

State of the Mesozoic scale insects

About 200 Tertiary scale insect fossils that represent almost all extant families are known. Some of them have already been described and named, e.g., *Matsucocidae* (KOTEJA 1984, 1986), *Ortheziidae* (KOTEJA 1987 and records cited herein), *Eriococcidae* (KOTEJA 1988a, 1988c), *Kermesidae* (KOTEJA 1988b). It became obvious, that the radiation of the scale insects must have occurred prior to the Eocene time. Most entomologists believed the divergence had taken place in the Late Cretaceous, and only a few, e.g., BORCHSENIUS (1958) placed it as early as in the Carboniferous and Permian times (for discussion see KOTEJA 1985). However, paleontological evidence was lacking to support any of these suggestions.

The Mesozoic scale insects have been discovered quite recently. *Mesococcus*

asiatica BECKER-MIGDISOVA, 1959, a minute, larviform impression from Upper-Triassic deposits is controversial (BEARDSLEY 1969, SCHLEE in HENNIG 1981). Even if this fossil actually is a scale insect, it tells little about the state and diversity of the coccids in the Mesozoic time because it is impossible to indicate any recent group with which it could be related. Several other Permian and early Mesozoic fossils originally affiliated with the scale insect branch have been transferred to other groups (HENNIG 1981, and records cited herein). Undoubted scale insects are the following fossils:

Baisococcus victoriae KOTEJA, 1989, impression of one alate male from Siberian Lower Cretaceous deposits, close to the extant *Xylococcidae*.

Eomatsucoccus KOTEJA, 1988, represented by 2 species (4 male impressions) of the same Siberian deposits; the preserved cuticular remnants of these fossils are almost identical with the Tertiary and contemporary *Matsucoccidae*.

Electrococcus canadensis BEARDSLEY, 1969, a single inclusion of an alate male in Upper Cretaceous Canadian amber; considered to be allied to the recent *Pityococcidae* (there are a few other inclusions, not yet examined, which may belong to the same group; prof. J. W. BEARDSLEY, personal communication).

A few unnamed forms in the Canadian amber, different from *Electrococcus* (prof. J. W. BEARDSLEY, personal communication).

Inka minuta gen. et sp. n., male inclusions in Upper Cretaceous Taymyrian amber; presumably a specialized, extinct group related to *Eriococcidae*.

Two unnamed male inclusions in poor condition from the above deposits; close to *Pseudococcidae* (unpublished).

The following statements, conclusions and suggestions may be drawn on the basis of these fossils:

1. The species in question must have been very abundant and/or the conditions of their fossilization and preservation were favorable because $\frac{4}{5}$ Lower Cretaceous fossils are *Eomatsucoccus* (also in the Tertiary ambers matsucoccids constitute $\frac{1}{2}$ of the inclusions), $\frac{3}{5}$ of the Canadian inclusions belong to *Electrococcus* and in the Taymyrian ambers 6 inclusions are *Inka*, the remaining two, presumably congeneric, are pseudococcids.

2. The above data and some other evidence (KOTEJA 1985) indicate that the Mesozoic coccids lived on gymnosperms.

3. All the Mesozoic forms are comparable with the extant ones, i.e., they are "true" coccids, and must be regarded as specialized; they do not show any features unknown in the contemporary fauna, except perhaps the very long microtrichia in *Inka* (apparently a specialized characteristic).

4. The presence of well defined *Matsucoccidae* and *Xylococcidae* in the Lower Cretaceous deposits indicates that at least these groups acquired their contemporary morphological structure in the Mid-Mesozoic, and since they cannot be taken as ancestors of any of the known extant scale insects, we must assume that several other archeococcids (*Ortheziidae*, *Monophlebidae*, *Steingeliidae* etc.) existed in that

time. The presence of the much derived archeococcid – *Electrococcus* – in the Upper Cretaceous time confirms this suggestion.

5. The first neococcids appeared, i.e., were found, in an Upper Cretaceous amber. However, although highly specialized, they belong to the most primitive neococcid branches – the *Pseudococcidae* and *Eriococcidae*. It is very likely that representatives of other, more modern lineages (*Coccidae*, *Asterolecaniidae*, *Diaspididae*) will be discovered elsewhere in the Cretaceous deposits.

6. The size reduction is considered to be one of the most striking evolutionary trends in the scale insects. This belief is only in part justified because a significant size increase can be observed in several evidently derived groups (e.g. *Kermesidae*, *Coccidae*; KOTEJA 1985). However, there is no doubt that some primitive archeococcids, e.g., the *Monophlebidae*, the largest scale insects, must have been as large as, if not larger than, the extant forms, in the past. This obvious resolution has not been confirmed by the paleontological data – the Mesozoic fossils are smaller than an “average” present day scale insect.

7. The size of the amber fossils is limited by the amber pieces, and since the Mesozoic ambers are very small (from their origin or as a result of disintegration) we will learn only minute, and apparently also derived, forms. The hope is thus in the impression fossils. On studying the Lower Cretaceous fossil scale insects I am personally optimistic about the future success of the coccid paleontology. There are only three problems to overcome – to get more fossils, to put them in right hands and to study more extensively and more accurately the recent males.

REFERENCES

- AFIFI S. A. 1968. Morphology and taxonomy of adult males of the families *Pseudococcidae* and *Eriococcidae* (*Homoptera: Coccoidea*). Bull. Brit. Mus (Nat. Hist.), Ent., London, Suppl. 13, 210 pp.
- AFIFI S. A. 1969. Systematic status of the family *Conchaspidae*, based on males of *Conchaspis lata* HEMPEL (*Homoptera: Coccoidea*). Bull. Va. Polytechn. Inst. Res. Div., Blacksburg, 36: 25–37.
- AFIFI S. A., KOSZTARAB M. 1967. Studies on the morphology and taxonomy of the males of *Antonina* and on one related genus (*Homoptera: Coccoidea: Pseudococcidae*). Bull. Va. Polytechn. Inst. Res. Div., Blacksburg, 15: 1–43.
- AFIFI S. A., KOSZTARAB M. 1969. Morphological and systematic studies on the adult males of some species of *Lecanodiaspis* (*Homoptera: Coccoidea: Lecanodiaspididae*). Bull. Va. Polytechn. Inst. Res. Div., Blacksburg, 3: 1–23.
- BEARDSLEY J. W. 1962. Descriptions and notes on male mealybugs (*Homoptera: Pseudococcidae*). Proc. Hawaii ent. Soc., Honolulu, 17 (1959): 199–243.
- BEARDSLEY J. W. 1969. A new fossil scale insect (*Homoptera: Coccoidea*) from Canadian amber. Psyche, Cambridge, Mass., 76: 270–279.
- BORCHSENIUS N. S. 1957, *Coccidae*, in: Fauna SSSR, Nasekomye nobotnye, t. IX. Moskva–Leningrad, 494 pp.
- BORCHSENIUS N. S., 1958. Ob evolucii i filogenetičeskikh svjazjah *Coccoidea* (*Insecta, Homoptera*). Zool. Ž., Moskva, 37: 765–780.

- BORCHSENIUS N. S. 1960. *Kermesidae, Asterolecaniidae, Lecanodiaspididae, Acleridae*, in: Fauna SSSR, Nasekomye hobotnye, t. VIII. Moskva-Leningrad, 283 pp.
- BUSTSIK T. N. 1958. K sravnitel'noj morfologii samcov ščitovok (*Homoptera, Coccoidea, Diaspididae*). Tr vsesojuz. ent. Obšč., Moskva, **46**: 162-268.
- DZIEDZICKA A. 1961. Studia nad morfologią i biologią lysika, *Gossyparia spuria* (MOD.) (*Homoptera, Coccoidea*). Fragm. faun., Warszawa, **9**: 203-219.
- GHAURI M. S. K. 1962. The morphology and taxonomy of male scale insects (*Homoptera: Coccoidea*). Brit. Mus. (Nat. Hist.), London, 221 pp.
- GILIOREE J. H. 1962. Morphological and taxonomic studies on the males of three species of the genus *Pseudococcus* (*Hemiptera: Coccoidea*). Ann. Univ. Stellenbosh, (A), **6**, **36**: 241-296.
- GILIOREE J. H. 1967a. Morphology and taxonomy of adult males of the family *Coccidae* (*Homoptera: Coccoidea*). Bull. Brit. Mus. (Nat. Hist.), Ent., London, Suppl. **7**, 168 pp.
- GILIOREE J. H. 1967b. The morphology and relationships of the male of *Lecanodiaspis elytopappi* MUNTING and GILIOREE (*Homoptera: Coccoidea*). J. ent. Soc. Sth. Africa, Pretoria, **30**: 185-197.
- GILIOREE J. H. 1968. Morphology and relationships of the male of an *Asterolecanium* species (*Homoptera: Coccoidea: Asterolecaniidae*). J. ent. Soc. Sth. Africa, Pretoria, **31**: 287-308.
- GOUX L. 1936. Deux *Eriococcus* nouveau des environs de Marseille. Bull. Soc. zool. France, Paris, **61**: 344-356.
- GOUX L. 1948. Étude d'un *Eriococcus* nouveau de Camargue. Bull. Mus. Hist. nat. Marseille, **8**: 5-16.
- HAMON A. B., LAMBDIN P. L., KOSZTARAB 1976. Life history and morphology of *Kermes kingi* in Virginia (*Homoptera: Coccoidea: Kermesidae*). Bull. Va. Polytechn. Inst. Res. Div., Blacksburg, **111**: 1-23.
- HEIDEL W., KÖHLER G. 1979. *Toumyella cubensis* sp. n. (*Hemiptera, Coccinea, Coccidae*) eine Schildlaus in kubanischen Zitruskulturen. Zool. Anz., Leipzig, **1979**: 132-144.
- HENNIG W. 1981. Insect phylogeny, John Willey and Sons, Chichester...Toronto, 514 pp.
- HOY J. M. 1954. A new species of *Eriococcus* TARG. (*Hemiptera, Coccidae*) attacking *Leptospermum* in New Zealand. Trans. roy. Soc. New Zealand, Auckland, **82**: 465-474.
- HOWELL J. O. 1976. The adult male of *Aclerda tilliandsiae*: morphology and systematic significance. Ann. ent. Soc. America, Columbia, Ohio, **60**: 885-888.
- JANCKE G. D. 1955. Zur Morphologie der männlichen Cocciden. Z. angew. Ent., Hamburg, **37**: 265-314.
- KOTEJA J. 1966. Studies on morphology and biology of *Luzulaspis frontalis* GREEN (*Homoptera, Coccoidea*). Pol. Pismo ent., Wrocław, **36**: 17-43.
- KOTEJA J. 1969. *Psilococcus parvus* BORCHSENIUS (*Homoptera, Coccoidea*) - morphology, biology and taxonomy. Acta zool. crac., Kraków, **14**: 21-41.
- KOTEJA J. 1970. Systematic position of the genus *Vittacoceus* BORCHSENIUS (*Homoptera, Coccoidea*). Pol. Pismo ent., Wrocław, **40**: 223-231.
- KOTEJA J. 1974. On the phylogeny and classification of the scale insects (*Homoptera, Coccinea*). Acta zool. crac., Kraków, **19**: 267-325.
- KOTEJA J. 1980. Campaniform, basiconic, coeloconic and intersegmental sensilla on the antennae in the *Coccinea* (*Homoptera*). Acta biol. crac., Kraków, **22**: 73-88.
- KOTEJA J. 1984. The Baltic amber *Matsucoccidae* (*Homoptera, Coccinea*). Ann. zool., Warszawa, **37**: 437-496.
- KOTEJA J. 1985. Essay on the prehistory of the scale insects (*Homoptera, Coccinea*). Ann. zool., Warszawa, **38**: 461-503.
- KOTEJA J. 1986a. *Matsucoccus saxonicus* sp. n. from Saxonian amber (*Homoptera, Coccinea*). Dtsch. ent. Z., Berlin, N. F., **33**: 55-63.
- KOTEJA J. 1986b. Morphology and taxonomy of male *Ortheziidae* (*Homoptera, Coccinea*). Pol. Pismo ent., Wrocław, **56**: 323-374.
- KOTEJA J. 1987. *Protorthesia aurea* gen. et sp. n. (*Homoptera, Coccinea*). Pol. Pismo ent., Wrocław, **57**: 33-41.

- KOTEJA J. 1988a. Two new eriococcids from Baltic amber (*Homoptera, Coccinea*). Dtsch. ent. Z., Berlin, N. F., **35**: 405-416.
- KOTEJA J. 1988b. *Sucinikermes kulickae* gen. et sp. n. (*Homoptera, Coccinea*). Pol. Pismo ent., Wrocław, **58**: 525-535.
- KOTEJA J. 1988c. *Eriococcid crawlers* (*Homoptera, Coccinea*) from Baltic amber. Pol. Pismo ent., Wrocław, **58**: 503-524.
- KOTEJA J. 1988d. *Eomatsucoccus* gen. n. (*Homoptera, Coccinea*) from Siberian Lower Cretaceous deposits. Ann. zool., Warszawa, **42**: 141-163.
- KOTEJA J. 1989. *Baisococcus victoriae* gen. et sp. n. (*Homoptera, Coccinea*) - a Lower Cretaceous coccid. Acta zool. crac., Kraków, **32**: 93-105.
- KOTEJA J., ROŚCISZEWSKA M. 1970. Revision of the genus *Parafairmairia* COCKERELL (*Homoptera, Coccoidea*). Pol. Pismo ent., Wrocław, **40**: 233-265.
- KOTEJA J., ŻAK-OGAZA B. 1972. Morphology and taxonomy of the male *Kermes quercus* (L.) (*Homoptera, Coccoidea*). Acta zool. crac., Kraków, **17**: 193-215.
- KOTEJA J., ŻAK-OGAZA B. 1988. *Newsteadia succini* sp. n. (*Homoptera, Coccinea*) from Baltic amber. Ann. zool., Warszawa, **41**: 329-334.
- KUWANA I. 1931. The genus *Kermes* of Japan. Bull. Min. Agric. Forest., Dept. Agric. Sci., Tokyo, **2**: 15-29.
- LA FUCE L. 1915. Alcune osservazione morfologiche a biologische sull'*Aclerda berlesii* BUFFA (ROMA). Atti r. accad. dei Lincei, Rend. (ser. 5), Roma, **24**: 768-771.
- MAHDIHASSAN S. 1931. The males of lac and pseudolac insects. Z. wiss. Zool., Leipzig, **138**: 371-385.
- MAMET R. 1954. A monograph of the *Conchaspidae* GREEN (*Hemiptera, Coccoidea*). Trans. roy. ent. Soc. London, **105**: 189-239.
- MC CONNEL H. S. 1954 (1953). A classification of the coccid family *Acleridae* (*Homoptera: Coccoidea*). Bull. Md. Agric. Exp. Sta., College Park, Md., **A-75**, 121 pp.
- MILLER D. R. 1975. Revision of the genus *Heterococcus* FERRIS with a diagnosis of *Brevennia* GOUX (*Homoptera: Coccoidea*). Techn. Bull. U.S. Dept. Agric., Washington, DC, **1497**: 1-61.
- MILLER D. R., GONZALEZ R. H. 1975. A taxonomic analysis of the *Eriococcidae* of Chile. Rev. Chilena Ent., Santiago, **9**: 131-163.
- MILLER D. R., LAMBDIN 1978. A new genus and two new species of asterolecaniid scale insects on palm from Columbia and Trinidad (*Homoptera: Coccidea: Asterolecaniidae*). Proc. ent. Soc. Washington, **80**: 240-263.
- MISRA A. B. 1931. On the internal anatomy of male lac insect *Laccifer lacca* KERR (*Homoptera, Coccidae*). Proc. zool. Soc. London, **4**: 1359-1381.
- NUR U. 1980. Evolution of unusual chromosome systems in scale insects. Cytogenetics, London, **10**: 97-117.
- PATEL J. D. 1971. Morphology of the gum tree scale *Eriococcus orariensis* MASKELL (*Homoptera: Eriococcidae*) (with notes on its life history and habits near Adelaide, South Australia. J. Australian ent. Soc., Brisbane, Queensland, **10**: 43-56.
- PESSON P. 1941. Description du male de *Pulvinaria mesembryanthemi* VALLOT et observations biologique sur cette espèce (*Hemipt., Coccidae*). Ann. Soc. ent. France, Paris, **110**: 71-77.
- RASNITSYN A. P. 1980. Proishozhdenie i evolucija perepončatokrylyh nasekomyh. Izd. Nauka, Moskva, 190 pp.
- REYNE A. 1954. A redescription of *Puto antennatus* SIGN. (*Homoptera, Coccidae*). Meded. Leyden Riskes Mus. nat. Hist. Zool., Leyden, **32**: 291-324.
- RICHARD C. 1971. Contribution à l'étude morphologique et biologique des *Stictococcinae* (*Hom., Coccoidea*). Ann. Soc. ent. France, Paris (n. ser.), **7**: 571-609.
- RUSSEL L. M. 1941. A classification of the scale insects genus *Asterolecanium*. Misc. Publ., U.S. Dept. Agric., Washington, DC, **424**: 319 pp.
- SCHLEE D., GLÖCKER W. 1979. Bernstein, Bernsteine und Bernstein-Fossilien. Stuttg. Beitr. Naturk., Stuttgart, (C), **8**: 1-72.

- SCHMUTTERER H. 1952. Die Ökologie der Cocciden (*Homoptera, Coccoidea*) Frankens, p. I. Z. angew. Ent., Hamburg, **33**: 369–420.
- ŠULC K. 1932. Československé druhy rodu puklice (gen. *Lecanium. Coccidae, Homoptera*). Práce morav. přírod. Společ., Brno, **7**: 1–134.
- ŠULC K. 1943. Zevni morfologie, metamorfosa a běh života červce *Phenacoccus uceris* SIGN. (*Coccoidea*). Práce morav. přírod. Společ., Brno, **15**: 1–52.
- ŠULC K. 1944. Zevni morfologie, metamorfosa a běh života červce *Peukinococcus* n. gen. *piceae* LÖW 1883 (*Coccoidea*). Práce morav. přírod. Společ., Brno, **16**: 1–50.
- ŠULC K. 1953. Zevni morfologie, metamorfosa a běh života červce *Cerococcus cycliger* GOUX. Rozpravy II. tř. České Akademie, Praha, **62**: 1–18.
- TEREZNIKOVA E. M. 1975. *Ortheziidae, Margarodidae, Pseudococcidae*, in: Fauna Ukrainy, t. 20, vyp. 18. Kiev, 295 pp.
- THERON J. G. 1958. Comparative studies on morphology of male scale insects (*Hemiptera: Coccoidea*). Ann. Univ. Stellenbosh, (A 1), **34**: 1–71.
- THERON J. G. 1968. Studies on the morphology and relationships of male *Apiomorpha* and *Opisthoscelis* (*Hemiptera: Coccoidea*). Australian J. Zool., Melbourne, Victoria, **16**: 87–99.
- VINIS G., KOZÁR F. 1981. Polymorphism of the male of *Polystomophora ostiaphurima* KIRITCHENKO, 1940 (*Homoptera, Coccoidea*). Föl. ent. hung., Budapest, **42**: 209–221.
- ZHERIKHIN V. V., SUKACHEVA I. D. 1973. O melovyh nasekomonosnyh „jantarjah” (retinitah) severa Sibirii, in: Voprosy paleontologii nasekomyh. Dokl. na 24-om ežegod. čtenii pamjati N. A. Cholodkovskovo, Moskva, **24** (1971): 3–48.

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STRESZCZENIE

[Tytuł: *Inka minuta* gen. et sp. n. (*Homoptera, Coccinea*) z górnokredowego bursztynu tajmyrskiego]

Inka minuta gen. et sp. n. opisany na podstawie 6 inkluzji skrzydlatych samców z bursztynu tajmyrskiego (Santon, Górna Kreda, ok. 85–87 mln. lat) jest zbliżony do współczesnych *Eriococcidae*, zwłaszcza w budowie głowy, czułków, odnóży i zewnętrznych narządów kopulacyjnych, ale różni się od nich zasadniczo obecnością prostokątnej błony w środkowej części tarczy (błona ta występuje u *Kermesidae, Coccidae* etc.). Cechą wyróżniającą tę skamieniałość od wszystkich dotychczas znanych czerwców są wyjątkowo długie mikrotrichia. Ta i inne cechy skłoniły autora do ustanowienia rodziny *Inkaidae* fam. n.

W pracy zamieszczono przegląd i krótkie omówienie mezozoicznych skamielin czerwców.

[Заглавие: *Inka minuta* gen. et sp. n. (*Homoptera*, *Coccinea*) из верхнемелового янтаря с полуострова Таймыр]

Inka minuta gen. et sp. n., описанный на основании 6 инклюзий крылатых самцов из таймырского янтаря (Сантон, Верхний Мел, около 85-87 млн. лет), сходен с современными *Eriococcidae*, особенно строением головы, усиков, конечностей и наружных половых органов. Но отличаются от них коренным образом наличием прямоугольной перепонки в средней части щитка (такая перепонка имеется у представителей *Kermesidae*, *Coccidae* и др.). Признак, который отличает рассматриваемых ископаемых от всех известных до настоящего времени щитовок — это исключительно длинные микротрихии. Эта особенность, как и другие признаки, склонили автора к описанию нового семейства *Inkaidae* fam. n. В работе содержится обзор и краткое обсуждение мезозойских окаменелостей щитовок.
