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First fossil chewing louse from the Lower Cretaceous of Baissa, Transbaikalia (Insecta, Pediculida = Phthiriaptera, Saurodectidae fam.n.)

Первый ископаемый пухоед из нижнего мела Байсы , Забайкалье (Insecta, Pediculida = Phthiriaptera, Saurodectidae fam.n.)

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КЛЮЧЕВЫЕ СЛОВА: пухоеды, нижний мел, птерозавры, эктопаразиты.

ABSTRACT. Saurodectidae fam.n. is described in chewing lice (Philopterina = Mallophaga) and, tentatively, in Philopteroidea (= Ischnocera), basing on *Saurodectes vrsanskyi* gen. et sp.n. from the lower Lower Cretaceous of Transbaikalia. It combines some extravagant specialisations with unique plesiomorphies, and demonstrate features attesting the fossil as one more possible ectoparasite of pterosaurs.

РЕЗЮМЕ. Описаны Saurodectidae fam.n. и *Saurodectes vrsanskyi* gen. et sp.n. из нижнего мела Забайкалья в составе подотряда пухоедов (Philopterina = Mallophaga) и, предположительно, надсемейства Philopteroidea (= Ischnocera). Ископаемое сочетает необычные специализации и уникальные плезиоморфии и демонстрирует признаки, свидетельствующие о возможном эктопаразитизме на птерозаврах.

Wingless arthropod ectoparasites of verebrates (ticks, lice, fleas) are extremely rare as fossils. Particularly so are lice which are known outside Quaternary only as unidentified eggs attached to mammal hairs and so inclused in the Late Eocene Baltic amber [Voigt, 1952]. The more so unexpected was discovery of the insect of unmistakable chewing lice appearance, albeit large and otherwise distinctive in the Early Cretaceous marls of Zaza Formation in the famous Baissa locality in Transbaikalia. Baissa deposits are supposedly correlable to the Berriasian Stage, lowermost in the Cretaceous [Rasnitsyn *et al.*, 1998].

Order Pediculida Leach, 1815 = Phthiriaptera Haeckel, 1896

Suborder Philopterina Burmeister, 1838
= Mallophaga Nitzsch, 1818

?Superfamily Philopteroidea Burmeister, 1838
(= Suborder Ischnocera Kellogg, 1896)

Family Saurodectidae Rasnitsyn et Zherikhin, **fam.n.**

DIAGNOSIS. Size large. Head with large dorsal anterolateral sclerotisations reminding internal eye apodemes but lacking apparent central opening and possibly with more or less normally developed eyes (something like a group of some a dozen of ommatidia can be seen at the head next to the base of the left lateral process; Fig. 1, *om?*), with long cephalic lateral processes possibly corresponding to hypertrophied trabeculae and serving as antennal guards (no doubtless antenna preserved, though there is something like two very narrow antennal segments near anterobasal margin of a process; Fig. 1, *ant?*). Mandibles at rear head margin, short, oriented mediocaudad, probably vertical in life position (no palps preserved). Thorax about as long as abdomen, with propleura small but well defined, lateral, distant of head (thus hardly cervicalia). Legs slender, weak; coxae elongate, all serial and contralateral ones well spaced, oriented posteromedially; femora and tibiae slender, many times longer than wide, with all tarsi one-segmented, one-clawed. Mesothoracic spiracle not at all shifted toward prothorax, metathoracic one well developed, placed at about midlength of hind coxa. Abdominal spiracles 3–6 well developed, 7–8 rudimentary. Abdominal apex attenuate, with genitalic(?) structures extending. Cuticle lacking conspicuous sclerotisation except for head, propleura and legs, as well as of any conspicuois vestiture, probably much distensible, with no intersegmentary bondaries seen even in lateral abdominal contour.

GENERA INCLUDED. Type genus only.

TAXONOMIC POSITION. Attribution to the chewing lice is based on the following considerations. Combination of the chewing mandibles, complete loss of wings, and one-segmented tarsus excludes Gryllones (= Polyneoptera), Cimicida (= Hemiptera), Thripida (= Thysanoptera) and Libelluliformes s.l. (= Odonata + Ephemeroptera, except for the youngest instars lacking wing pads and segmented tarsus), and adult Scarabaeiformes (= Oligoneoptera). Absence of the caudal appendages further excludes Lepismatona (= Thysanura s.l.) and, together with large size — youngest Libelluliformes. Far lateral position of coxae distinguishes the fossil in comparison from Psocida. The adult-like leg which is sharply bent downward (inward) in the knee articulation and distinctly angled outward (upward) in the tibiotarsal articulation, and with long, slender femur and tibia, is not at all characteristic of the larval holometabolans. This leaves us only with Pediculida s. l. (= Anoplura + Mallophaga), and particularly with the latter subgroup that retains the chewing mandibles. The characteristic general appearance of the fossil indicates chew-

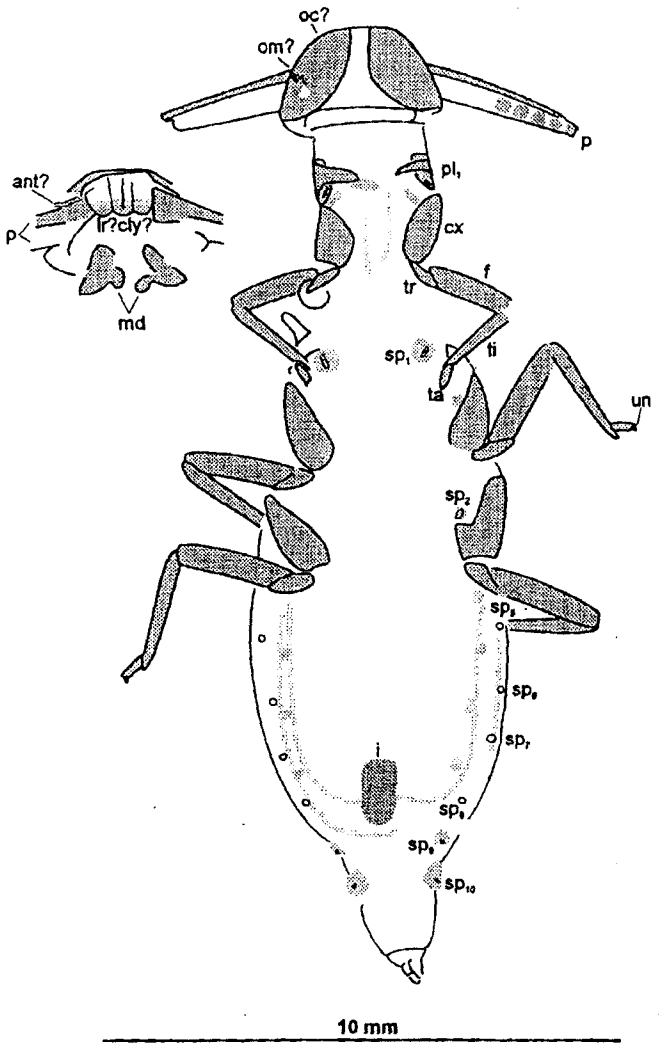

Fig. 1. *Saurodectes vrsanskyi* sp.n., holotype, general view and, left, head from below; ant? — possibly a part of antenna, cx — coxa, f — femur, i — dark, apparently structurless intestine contens, lr?cly? — fore boundary of mouth cavity made of either labrum or clypeus (or both), md — mandible, oc? — eye-like sclerotisation, om? — possible ommatidia, p — lateral head process (trabecula?), pl_1 — propleuron, sp_1, sp_2 — meso- and metathoracic spiracles, respectively, sp_3 — sp_{10} — spiracles of 3rd to 8th abdominal segments, respectively, ta — tarsus, ti — tibia, un — claw.

Рис. 1. *Saurodectes vrsanskyi* sp.n., голотип, общий вид и, слева, голова снизу. Условные обозначения: ant? — возможно, часть антенны, cx — тазик, f — бедро, i — темное, внешне бесструктурное содержимое кишечника, lr?cly? — переднее обрамление ротовой впадины, образованное наличником, верхней губой или ими обоими, md — мандибула, oc? — глазоподобная склеротизация, om? — возможно, омматидии, p — боковой вырост головы (трабекула?), pl_1 — проплевра, sp_1, sp_2 — средне- и заднегрудное дыхальце, соответственно, sp_3 — sp_{10} — дыхальца 3–8-го брюшного сегмента, соответственно, ta — лапка, ti — голень, un — коготок.

ing lice as well.

Within chewing lice, mandibles directed vertical are the diagnostic character of the ischnocerans, and the absence of apparent impression for short, clavate antenna, as characteristic for the amblycerans, could support this inference if proved correct. Long legs remind Haematomyzidae, but this is most probably a symplesiomorphy. Numerous unique characters known for no other lice question the ischnoceran attribution seriously. Nevertheless, it is accepted preliminary until more information is available.

BIOLOGY. The proposed taxonomic position of the new family suggests permanent ectoparasitism of homoiotherm amniots characteristic of all living chewing lice. Additionally, some characters strongly indicate adaptation for hairs rather than feathers. The most important is the single-clawed tarsus which is known only for the mammal parasites: Ambrocomophagidae, Gyropidae, Trichodectidae, Haematomyzidae, while the two-clawed tarsus is more characteristic of bird parasites (Menoponidae, Ricinidae, Philopteridae, Laemobothriidae, Heptapsogastridae) but also found in some mammalian parasites: Trimenoponidae, Trichophilopteridae and most Boopiidae [Emerson, Price, 1985; Price, Graham, 1997]. However, very large size of the present fossil (much more than that of the largest living chewing lice parasitising eagles) rules out the small Early Cretaceous mammals as possible hosts, thus leaving only reptiles as the hosts, because some of Mesozoic reptiles, and particularly pterosaures, are known to be hairy. Bakhurina and Unwin [1995] reject Sharov's [1971] claim that the pterosaur wing membrane was covered with dense fur but agree that the body was hairy: this infer the pterosaurs still more similar to bats for the ectoparasites. Baissa deposits have already yielded several comparatively large insects suspicious to be ectoparasites of the pterosaur wing membrane [Ponomarenko, 1976, Rasnitsyn, 1992]: the present fossil well may be one more example. Single-clawed tarsus indicating hair rather than feather specialisation is in accord with the pterosaur hypothesis. Cephalic processes that make their owner awkward in walking suggest living on a surface with the hair cover either very sparse or very short: this further agrees with the pterosaur hypothesis, for their wing membrane, like that of bats, most probably met at least one of these condition. In turn, living on the wing membrane of a

flying reptile permits to explain the very burial of *Saurodectes*, like *Saurophthirus*, in the deposits where the absolute majority of the insect fossils are either flying or aquatic forms.

Genus *Saurodectes* Rasnitsyn et Zherikhin, **gen.n.**

TYPE SPECIES *S. vrsanskyi* sp.n.

DIAGNOSIS. Head hemispherical in outline, wider than prothorax but narrower than mesothorax, with eye-like structures occupying its entire sides and much of front and leaving narrow (almost 0.1 head width) interspace. Head lateral processes long wedgeshaped, thickened along fore margin. Mouth cavity margined rostrally with wide trilobate structure (clypeus, labrum or both). Mandibles short, looking rather irregular in outline (probably because of incomplete preservation). Prothorax about as long as meso- and metathorax combined, propleura rather small, ovate, with more narrow lobe directed medially. Fore trochanter very narrow (or infuscated only ventrally), femur and tibia of similar length, each shorter than head wide, somewhat longer than respective coxa, tarsus shorter than trochanter, claw very short. Abdomen wider but not longer than thorax, with narrow 'tail' taking more than 0.25 its length, spiracle 7 (first rudimentary one) at tail base. Small apical (genitalic) structure subdivided transversally, at least in part.

SPECIES INCLUDED. Type species only.

ETYMOLOGY. Genus named after sauros, Greek for lizard, and dectes, Greek for "one who bites", in allusion to the hypothesised habits.

Saurodectes vrsanskyi Rasnitsyn et Zherikhin, **sp.n.** Figs. 1–2.

HOLOTYPE PIN 4210/7056; part and counterpart of the complete insect; left bank of Vitim River in Transbaikalian Russia, 3 km downstream from the former lodge Baissa, bed 35, 45 air km upstream from Romanovka Village, impressed in marl of Zaza Formation of probably Berriasian Stage (lowermost Lower Cretaceous); collected by Peter Vrsansky of the field group, Paleontological Institute, Russian Academy of Sciences, 1998.

DESCRIPTION (Figs. 1, 2). Head width almost 1.5 times length, lateral processes about as long as head wide, pronotum 0.8 times as wide as head, 0.6 times as mesothorax and 0.5 as abdomen wide. Propleuron shorter than fore coxa, its median process about as long and ca. 0.3 as wide as propleura long. Proportions of fore coxa, trochanter, femur, tibia and tarsus is 17: 10: 24: 27: 7, same for mid leg 25: 12: 29: 31: 7, same for hind leg 24: 12: 31: 33: 8. Length of body 18.5 mm, width of head 3.1, with lateral processes 8.5, length of fore, mid and hind tibiae 1.7, 2.2 and 2.4 mm, respectively.

ETYMOLOGY. The species is named after collector.

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Fig. 2. *Saurodectes vrsanskyi* sp.n., holotype, general view photograph (x 9.2).

Рис. 2. *Saurodectes vrsanskyi* sp.n., голотип, общий вид, фото (x 9,2).

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