

SYSTEMATIC PALEONTOLOGY

Family Permosialidae Martynov, 1928

Genus *Permosialis* Martynov, 1928*Permosialis ualentovae* Novokshonov et Zhuzhgova, sp. nov.

Plate 10, fig. 2

Etymology. In honor of N.B. Ualentova.

Holotype. PIN, no. 1366/349, well-preserved, nearly complete forewing (negative impression); Kirov region, Malmyzh district, left bank of the Kityak River opposite the village of Bol'shoi Kityak; Upper Permian, Kazanian, Belebei Formation.

Description (Fig. 6a). The shape of the forewing is typical of the genus. There are five or six SC branches and three RS branches; the apices of RS1 and RS2 are weakly curved anteriorly. M and CuA have a typical structure. Near its apex, CuP curves posteriorly fairly abruptly. The general color of the membrane is fuscous, and six subequal pale spots with darkened rims are clearly visible; the spots of the central pair are the most closely spaced and those of the distal pair are the least closely spaced (it is quite possible that, in the missing apical part of the wing, there were one or two similar "ornaments").

Measurements, mm: length of incomplete holotype forewing, 14; full length about, 16.

Comparison. Easily distinguishable from all known species in the bright ocellate spots on the membrane.

Remarks. The vital color of the forewing pattern in *P. ualentovae* sp. nov. is unknown; in any case, however, this color pattern should not be regarded as cryptic, because it does not imitate flowers or other objects and produces no effect of the disrupted contour; thus, it gave no protection even if the animal was motionless. It is highly doubtful whether such coloration was aposematic, as in the ocellate hawkmoth, which in repose resembles a dry leaf but, when disturbed, raises the forewings to expose the hindwings, which are pink with a large black-and-blue ocellate spot on each (Shvanvich, 1949). In *P. ualentovae* sp. nov., the bright pattern could not be hidden, being on the forewings. Because of their comparatively small sizes, it is unlikely that permosialids were a sought-after prey for terrestrial insectivorous vertebrates, in contrast to large orthopterans (Gorokhov, 1989), and the ocellate spots most probably had nothing to do with avoiding attack by other predators (spiders, centipedes, and some insects). Most probably, the pattern was associated with the sexual dimorphism necessary for the attraction of a mate

and sex and species recognition (males are usually more colorful in this case). Recall that the holotype wing of *P. ualentovae* sp. nov. is distinctly smaller than the other *Permosialis* forewings from the same locality; thus, if we assume that, in all species of this genus, females were distinctly larger than males, then the *P. ualentovae* holotype is a male forewing.

In this case, there is no pressing need to give separate species names to two additional *Permosialis* forewings from the same locality (Fig. 6b) that differ in their larger size (forewings 21–22 mm long), pale membrane, and different color pattern (four small dark spots of various shapes in the central wing area forming an interrupted transverse line; two small similarly pigmented spots near the apices of CuP and A₁; a transversely arcuate series of small pale spots nearer to the wing apex) and may belong to females of *P. ualentovae* sp. nov.

In addition, the same collection contains a hindwing showing no differences from the hindwings of other *Permosialis*; its full length is 13 mm—thus, it is quite possible that it belongs to a male—and the membrane is pale, with an arcuate transverse dark band nearer to the apex. We believe that all four wings belong to the same species.

Material. In addition to the holotype, paratypes PIN, nos. 1366/379, 1366/463 (forewings of females?), and 1366/382 (hindwing of a male?) from the same locality.

Permosialis triassica Novokshonov et Zhuzhgova, sp. nov.

Plate 10, fig. 3

Etymology. From the Triassic Period.

Holotype. PIN, no. 2555/2066, moderately well preserved incomplete forewing (part and counterpart), coloration apparently not preserved; Kyrgyzstan, Osh region, Batken district, Madygen; Middle or Upper Triassic, Madygen Formation.

Description (Fig. 6c). Forewing. There are at least six anterior SC branches. There are three RS branches, all arched toward R and with apices that are slightly curved posteriorly. CuA forks at the same level as M.

Measurements, mm: length of holotype fragment, 13; full wing length, about 17.

Comparison. In the characteristic shape of the SC and RS branches, it is most similar to *P. mongolica* (Storozh.) from the Upper Permian of the Bor-Tolgoi locality in Mongolia, but it differs from the latter in the much smaller size (17 mm instead of 25–30 mm); from

Explanation of Plate 10

Fig. 1. *Palaeomantina pentamera* A. Rasnitsyn, 1977, specimen PGU no. 2/307, incomplete, partly superimposed fore- and hindwings (positive impression).

Fig. 2. *Permosialis ualentovae* Novokshonov et Zhuzhgova, sp. nov., holotype PIN, no. 1366/349, incomplete forewing (negative impression).

Fig. 3. *Permosialis triassica* Novokshonov et Zhuzhgova, sp. nov., holotype PIN, no. 2555/2066, incomplete forewing (positive impression).

P. nana (Storozh.), a possible male of *P. mongolica*, it differs in its more inclined SC branches and the different curvature of the RS branches.

Remarks. The wing seems to have been almost unaffected by the rock matrix deformation.

Material. In addition to the holotype, possibly also specimens PIN, nos. 2555/2067, 2555/2068, and 2069/3582 (in much poorer states of preservation) from the same locality.

ACKNOWLEDGMENTS

We are greatly indebted to Prof. A.P. Rasnitsyn (Paleontological Institute of the Russian Academy of Sciences) for the opportunity to study the material from PIN and for comments on an earlier draft.

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