Zootaxa 3044: 65–68 (2011)
www.mapress.com/zootaxa/
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ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

The alleged Triassic palaeodictyopteran is a member of Titanoptera

DMITRY E. SHCHERBAKOV
Borissiak Paleontological Institute, Russian Academy of Sciences, Profsoyuznaya St. 123, 117647 Moscow, Russia.
E-mail: dshh@narod.ru

A sensational find of Palaeodictyoptera in the Mesozoic was recently reported from the Middle–Late Triassic of Central Asia (Ladinian–Carnian, Madygen Formation). The single, somewhat damaged wing described as *Liquia reliquia* was compared to nearly all possible groups of Pterygota and concluded to be an aberrant palaeodictyopteran with a concave MA (Béthoux *et al.* 2010). The venation of *Liquia* was interpreted correctly, but its taxonomic placement cannot be considered valid. Upon closer examination, the fossil immediately reveals its titanopteran affinities, resulting in the following synonymy: *Paratitan* Sharov, 1968 = *Liquia* Bethoux et al., 2010, **syn. nov.** (Titanoptera Paratitanidae); *Paratitan reliquia* (Bethoux et al., 2010), **comb. nov.** So far as known, no palaeodictyopteroids survived into the Mesozoic.

The order Titanoptera was established by Sharov (1968) for the families Mesotitanidae, Paratitanidae, and Gigatitanidae, based mainly on the Madygen material (Mesotitanidae are known also from the Middle Triassic of Australia). Up to now, 9 genera and 23 species of Titanoptera have been described from the Triassic, most of them from the Madygen Formation (Gorochov 2003). Gorochov (2001) included the Carboniferous protorthopteran family Geraridae in this order as a separate suborder, Gerarina. He also described the first Late Permian genus of the suborder Mesotitanina (Gorochov 2007) and hypothesized that extant Mantophasmatidae may be surviving members of Mesotitanina (Gorochov 2004). Recently a Jurassic genus of Mantophasmatidae in the subfamily Raptophasmatinae was discovered (Huang *et al.* 2008).

Classification of Titanoptera is based on the forewing, chiefly on its sound apparatus, developed in both sexes (Fig. 1). Hind wings of Mesotitanina (known for six of ten genera) are recognizable by the following combination of characters (vein nomenclature after Sharov, 1968, but "RP" is used instead of "RS"):

(1) Wings large to very large, 30–180 mm long; main veins not numerous, branched in distal half; cross-venation very dense; simple crossveins longer than interspaces in anterior and proximal parts; two to four cell rows between main veins in distal part; no individualized crossveins (but see character 7);
(2) Wing corrugation (fluting) well developed; Sc markedly concave, stronger than convex R–RA (more typical of Pterygota is the opposite: R–RA stronger than Sc); RA moderately convex; RP weakly concave (its stem rather neutral); MA1 and MA2 concave (MA is convex in Palaeodictyopteroidea); MP+CuA1 stem and posteriormost branch (CuA1) convex, other branches weakly concave; two following main veins (CuA2 and CuP) concave;
(3) Sc long, nearly reaching wing tip, ending free on wing margin (not braced to RA), subparallel to costal margin and RA or (*Mesotitanodes*, *Nanotitan*) arched forwards;
(4) R forked proximally; RA simple or (*Mesotitanodes*) with few apical branches; RP with several branches distally;
(5) M basally closely adjacent or contiguous to R and spaced from Cu–CuA;
(6) MA forked subbasally, close to separation of M and R; MA1 and MA2 usually simple, sometimes MA2 and rarely MA1 with few distal branches;
(7) MP+CuA1 with several distal branches, originating from two roots – from M via free MP base, and from CuA via free CuA1 base (often looking like strong oblique crossvein);
(8) CuA2 simple (branched in *Mesotitan*);
(9) Space between CuA1 and CuA2 narrow, narrower than space between CuA2 and CuP and usually narrower than space between MA2 and MP+CuA1;
(10) CuP with several apical branches (rarely simple – *Nanotitan magnificus*);
(11) 1A simple;
(12) Anal fan developed, most of its veins (branches of 2A) forked.

Accepted by E.C. Bernard: 22 Aug. 2011; published: 29 Sep. 2011