Fulgoromorpha and Cicadomorpha (Hemiptera) from the Palaeogene of France

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Palaeogene is the one of the crucial periods for the understanding of recent faunas origin and differentiation. After Mid-Cretaceous biotic crisis and profound re-organisation of the biosphere, followed by the catastrophic Cretaceous – Palaeogene bolide impact at 65.5 Mya (an acronym K-T boundary is often used), it was Palaeogene when the recent lineages of planthoppers and leafhoppers differentiated and widespread. The knowledge of the Palaeogene faunas and taxonomic diversity of Fulgoromorpha and Cicadomorpha was mainly based on the Eocene Baltic amber inclusions and imprints from the North America.

Two Palaeogene fossil localities in France are important to widen the knowledge of these insects – Lagerstätte Menat in Auvergne (South France) and Oise amber (Paris Basin). The sites present fossil faunas preserved in different conditions and originated from a different biota. Fossil Lagerstätte Menat is interpreted as a maar lake, created by volcanic activity, in the period of warm palaeoclimate, surrounded by forested area of the lake catchment. dominated by Lauraceae, Platanaceae and Fagales. Only a few species of planthoppers and singing cicadas were formally described from this site (Piton 1936, 1940; Szwedo et al. 2006). Fulgoromorpha re represented by *Rihana beauchampi* Piton, 1940, originally described as Cicadidae [sic!], but preserved too weakly to make the definitive familial placement; its hind leg basi- and midtarsomere are provided with a row of a dozen or so apical setae, which suggest its placement in Fulgoroidea. '*Dictyophara*' *scudderi* Piton, 1940 is a dictyopharid but must be placed in another genus. Placement of '*Hammapteryx*' *eocenicus* Piton, 1940 seems to be correct in Ricaniidae, but probably it should be moved from this genus. Two species described in the genus *Lithopsis* – *L. lineatus* Piton, 1940 and *L. punctinervis* Piton, 1940 are *incertae sedes* taxa, as the types seem to be lost, the latter is even a doubtful fulgoroid. A number of not described yet forms ascribable to Ricaniidae and Nogodinidae were found and these are under investigation. Single species of Cixiidae: Mnemosynini is described – *Mnasthaia arveniorum* Szwedo, Bourgoin et Lefebvre, 2006. Single species of Tettigarctidae, *Meuniera haupti* Piton, 1936 is reported placed in a tribe Meunierini (Boulard & Nel 1990; Shcherbakov 2009). Cercopoidea re represented by '*Aphrophora*' *maculata* Piton, 1940, but its familial placement remains unclear, as the type is very probably lost. Cicadellidae were reported as well: '*Bythoscopus*' *pulcher* Piton, 1940 and '*Tettigoniella*' *chazei* Piton, 1940. Unfortunately the types are lost and the subfamilial or tribal assignment of these fossils remains unclear.

Amber is known from several sites of the Paris basin since the beginning of the 19th century. This amber was produced by an angiosperm, unlike the Baltic amber of gymnosperm affinities. The tree supposed to produce this amber is named *Aulacoxylon sparnacense* Combes, 1907 of the order Fabales and family Caesalpiniaceae, tribe Detariae. Up to date only two genera of Cixiidae: Mnemosynini with three species were described from the Oise amber (Szwedo et al. 2006), i.e. *Mnaomaia bellovaciorum* Szwedo, Bourgoin et Lefebvre, 2006, *Stalisyne lutetiorum* Szwedo, Bourgoin et Lefebvre, 2006 and *S. veromanduiorum* Szwedo, Bourgoin et Lefebvre, 2006. The other planthoppers identified in Oise amber inclusions are representatives of the families Achilidae, Dictyopharidae, Lophopidae, Tropiduchidae, Ricaniidae and Nogodinidae. Inclusion of an achilid could be related to Plectoderini, therefore it is the oldest fossil record of this tribe, believed to be one of the most advanced. A new genus and species of a dictyopharid represents tribe Cladodipterini, recently limited in distribution to tropical zone of Central and South America, which give an interesting point to biogeographic discussions. Another new taxon represents Lophopidae, could be related to Sarebasa+ group as defined by Soulier-Perkins (2000). This group of genera is distributed in south-eastern Asia, reaching New Guinea and Australia. Presence of Lophopidae in the Palaeogene deposits of Europe is a challenge to proposed geotectonic

scenario of Lophopidae biogeography. Representatives of Ricaniidae are rarely found in fossil record, therefore the presence of a new taxon in the Palaeogene deposits of France is of great importance. This planthopper is related to genera of the *Pochazoides* group recently distributed in Madagascar and East Africa. These fossil are under investigation at the moment. Very particular extinct family of planthoppers is going to be described from Oise amber as well.

Regarding the Cicadomorpha, Cercopoidea and Membracoidea are known from this fossil site. Among Cicadellidae the subfamilies Ledrinae (nymph), Typhlocybinae: probably extinct tribe Protodikraneurini known from the Eocene Baltic amber, supposed Macropsinae, Mileewinae and Cicadellinae. Also some leafhopper nymphs presenting peculiar features were found but their precise taxonomic assignation is difficult. Single specimen of Cercopoidea, probably Cercopidae, was identified so far. The Cicadomorpha among Oise amber inclusions are overwhelmed by the various and differentiated planthoppers. Such pattern could be a result of real taxonomic composition of the habitat, but also could result from taphonomic reasons, and/or collecting/identifying bias. Most of the leafhoppers found in Oise amber calls for further investigations.

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