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ABSTRACT BOOK

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Short note on the Equidae of the Early Villafranchian site of Milia (Grevena, Macedonia, Greece)

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The Early Villafranchian fossiliferous site of Milia (Grevena) has been systematically excavated since 1996. It is characterized by the presence of incomplete Borson's mastodon skeletons. These include the longest tusks so far discovered in the world (4.39 m and 5.02 m) associated with the Auvergne's straight tusked mastodon. Fossil remains of rhinos, tapirs, suids, artiodactyls (cervids and bovids), carnivores, porcupine and turtles have also been excavated (Tsoukala 2000; Tsoukala et al., 2010; Guérin and Tsoukala, 2013).

The Milia hipparion collection consists of about one hundred specimens and includes: 21 isolated permanent upper cheek teeth and a single deciduous, 39 lower permanent cheek teeth and 2 deciduous either isolated or in mandible fragments and two isolated incisors. Postcranial specimens are rare and usually fragmented. Three complete metapodials and a talus comprise the best preserved specimens. Moreover, there are few rolled talus, fragments of lateral metapodials, femur, tibia, humerus, radius and ulna.

The Milia *Hipparion* s.l. is characterized by robust postcranial elements, highly plicated upper cheek teeth with isolated protocones; protocone index ranges between 20% and 30%; lingual side tends to be flat; hypoconal groove is mostly simple (without plications) and broad; mesostyle and parastyle often show grooves; enamel of lower cheek teeth appears to be crenulated; protostylids are commonly present with varying heights; metaconid is rounded to elliptical; metastylids are rounded to triangular; linguaflexids are mostly U-shaped. The highest values of hypsodonty index are 240 in lower, 207 in the upper premolars and 264 in the upper third molar. Tooth crowns reach 52 mm in the upper and 57 mm in the lower permanent cheek teeth. In the lower deciduous teeth the ectostylids are absent. The incisors are grooved.

Pliocene robust hipparions in Europe and Eastern Mediterranean are known by several specific names, among these: *H. gracile* Kaup, 1833; *H. gracile complicatum* Pirlot, 1956; *H. crassum* Gervais, 1859; *H. moriturum* Kretzoi 1954; *H. malustenense* Radulescu and Samson, 1967; *H. heintzi* Eisenmann and Sondaar 1998. These species and forms referred to as *H. cf. crassum* or *H. ex. gr. crassum* have been revised and united by Forstén (2002) as "the *Hipparion crassum* Group". This group corresponds to the *Hipparion* "morphotype" 4 according to Alberdi (1989). Moreover, Forstén concluded that at least two taxa within this group are recognized on the basis of dental morphology as well as the size and proportions of the limb bones. *H. crassum* has been identified at Late Ruscinian localities, including *H. moriturum* and *H. malustenense*. Forstén considered *H. heintzi* as "a geographic form". The second taxon, according to her revision, includes Early Ruscinian forms, dentally similar to *H. crassum* but showing a different postcranial morphology more similar to Turolian forms. Forstén also recognized a third heterogeneous *Hipparion* sp. but she did not name any taxon. Hipparions of the *H. crassum* Group are known from the Ruscinian, with a possible occurrence also in MN16 (Early Villafranchian) and succeeded by *Proboscideipparion rocinantis* in MN16-17.

In Greece, Pliocene hipparions are known from Maramena (MN13/14 boundary) with two species (Sondaar and Eisenmann 1995), Silata with *H. cf. mediterraneum* (MN13/14 boundary) (Koufos, 2006), Megalon Emvolon (MN15) with *H. cf. longipes*, Ptolemais lignites (MN15)

(Koufos 1982) and Apolakkia in Rhodes (MN15) with *H. crassum* (Benda et al., 1977).

The Milia hipparion is a member of the *Hipparion crassum* group based on its dental characteristics. Its limb size and proportions are comparable to the Late Ruscinian forms and, thus, the typical *Hipparion crassum*. There are, however, some postcranial characteristics (ongoing study) that appear to be significantly different from *H. crassum* at 95% level of significance: these are the larger anteroposterior diameter of the distal articular keel in third metatarsal and the longer metacarpals. This variation falls within the observed range and the 95% confidence interval of *H. heintzi*. The metacarpal height is slightly higher than the mean value plus two standard deviations and the observed range. Other measurements are far less than the range of two standard deviations from the mean values of Perpignan ($x \pm 2sd$), showing different proportions including small anteroposterior diameter of the proximal articular surface in the third metatarsal.

Further study of the Milia hipparion collection will enrich our knowledge about the terminal European hipparions due to the young age of the locality and the relative abundance of the fossil material.

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