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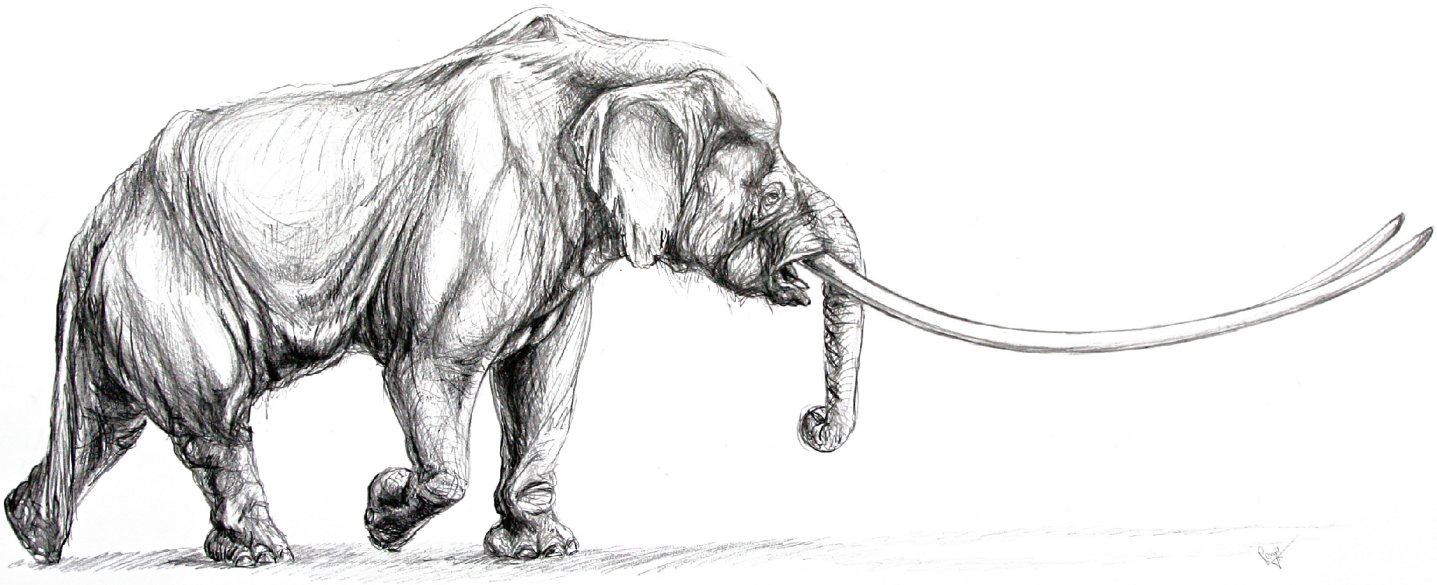

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ABSTRACT BOOK

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A reappraisal of the straight-tusked elephant from Grotte Santo Stefano (Viterbo, central Italy) kept in the Museum of Palaeontology of Sapienza University of Rome (Italy)

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A nearly complete skeleton of *Palaeoloxodon antiquus* was restored and mounted in the 70's at the Museum of Palaeontology of Rome (Sapienza University), where is still kept. The skeleton was found in the early 1950s in late Middle Pleistocene diatomaceous layers outcropping near the village of Grotte Santo Stefano (Viterbo, central Italy (Fig. 1). According to recent reconstructions and mapping of Quaternary volcanic terrains, the diatomaceous layers are interbedded within the pyroclastic succession of the Montefiascone volcanic complex (Vulsini Volcanic District) (226.6 ± 14.9 ka; see Palladino et al., 2010 and references therein). The fossiliferous deposit was the same outcropping at Campo del Gallo (or del Gatto), on the left side of the Fosso Fonte Campanile stream, where in the 40s nearly two completed skeletons, one of *Palaeoloxodon antiquus* (c.p. no. 1; C.E. no. 3544, Doria Museum of Natural History, Genova) preciously described by Trevisan (1948), the second of *Bos primigenius* (Museum of Palaeontology, Sapienza University of Rome), were found (Trevisan, 1948; Rozzi and Palombo, 2013). In the *Palaeoloxodon* skeleton exhibited in Rome (Fig. 2), the skull, dorso-ventrally deformed, was substituted by a model reconstructed on the basis of the biometry of the original one and the general shape of skulls of Italian adult straight-tusked elephants. The postcranial skeleton is nearly complete, thought a few carpal and tarsal bones are missing. The sexual dimorphic traits shown by both elephants found in the Grotte Santo Stefano area (biometry and morphology of skull, molariform teeth, tusks, atlas, epistroheus and pelvis) were already discussed by Palombo and Villa (2003). The skeleton kept in Rome was identified as a male, as confirmed by the ratio between the maximum diameter of the pelvic aperture and the minimum width of the shaft of the ilium, which has been proved to differentiate male from female in fossil specimens (Lister, 1996). The value (1.65) falls in the range of variation of *P. antiquus* males from Neumark Nord 1 (Germany) (Marano and Palombo, 2013).

Here we present and discuss further data giving information on the age and body size of this individual. We estimated the age on the basis of data in literature (Laws, 1966, Roth and Shoshani, 1988, Lee et al., 2012) and personal observations on eruption and degree of wear of lower and upper molariform teeth of several African and Indian elephants of different ages. In the specimen from Grotte Santo Stefano kept in the Museum of Paleontology of Rome, the penultimate upper and lower molariform teeth (M2) has 9 plates in wear , while the last (M3) only 3. Extant elephants about 30-37 years old show a similar wear-stage, though the large size of straight-tusked elephants might suggest a slightly older age for the Grotte Santo Stefano specimen. An ontogenetic age of about 35-40 year is consistent with the degree of ossification shown by scapula, pelvis and long bones.

We calculated the height at the shoulder by adding the functional length of each foreleg bone. The value obtained of about 3.50 m, is consistent with the value of about 3.65 m calculated by means of the Osborn's (1942) equation based on the length of the scapula. As for the body-mass, the peculiar dental anatomy and replacement pattern of elephantids makes it imperative to focus on either the shoulder height or long bones dimensions (Roth, 1990; Christiansen, 2004; Palombo and Giovinazzo, 2005). A body mass of about 10 tons was estimated for the skeleton mounted in Rome by using the equations with the lowest predictive errors among those based on dimensions measurable on the best preserved bones (e.g., height at the shoulder, pad circumference, maximum length of the humerus, radius, femur and tibia; circumference and antero-posterior diameter of femur and humerus), and then by averaging all the obtained body masses. However,

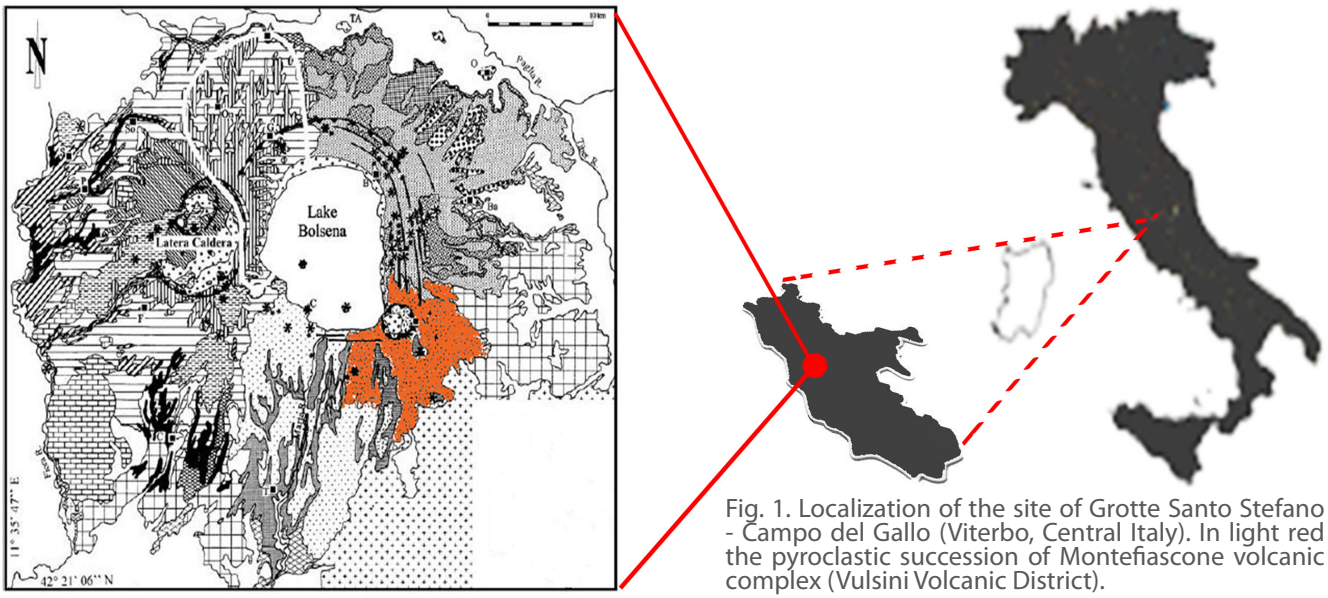

Fig. 1. Localization of the site of Grotte Santo Stefano - Campo del Gallo (Viterbo, Central Italy). In light red the pyroclastic succession of Montefiascone volcanic complex (Vulsini Volcanic District).

Fig. 2: The skeleton of *Palaeoloxodon antiquus* found in the early 50s in the diatomaceus deposits outcropping at Grotte Santo Stefano - Campo del Galo (courtesy of the Museum of Palaeontology, Sapienza University of Rome).

it is worth noting that the values obtained by means of the height at the shoulder (9.957 kg) and the maximum length of humerus (9.929 kg), radius (9.039 kg) and femur (8.724 kg) are consistent with each other, while those obtained by using the minimum circumference (16.725 kg) and transversal breadth (5.304 kg) of the ulna diaphysis respectively over- and under-estimate the actual body mass of the studied specimen.

All in all, and in spite of the not robust, only gently curved tusks, the body size of the straight-tusked elephant from Grotte Santo Stefano mounted in the Museum of Paleontology of Sapienza University of Rome falls in the range of variation of adult males of European straight-tusked elephants.

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