

Short Note



New findings of *Stegotrabelodon syrticus* from the Late Miocene of Cessaniti, southern Italy

Marco Peter FERRETTI, Lorenzo ROOK, Giuseppe CARONE & Antonella Cinzia MARRA

M.P. Ferretti, Dipartimento di Scienze della Terra, Università di Firenze, Via La Pira 4, I-50121 Firenze, Italy; Scuola di Scienze e Tecnologie, Sezione di Geologia, Università di Camerino, Via Gentile III Da Varano, I-62032 Camerino (MC); marcopeter.ferretti@unicam.it
L. Rook, Dipartimento di Scienze della Terra, Università di Firenze, Via La Pira 4, I-50121 Firenze, Italy; lorenzo.rook@unifi.it
G. Carone, Civico Museo di Ricadi (MURI), via Strada Provinciale, I-89866 Santa Domenica di Ricadi (VV), Italy; p.carone@libero.it
A.C. Marra, Università di Messina, Dipartimento di Scienze Matematiche e Informatiche, Scienze Fisiche e Scienze della Terra, Viale Ferdinando Stagno d'Alcontres 31, I-98166 Messina, Italy; amarra@unime.it; *corresponding author*

This note describes new fossil remains of *Stegotrabelodon syrticus* Petrocchi, 1941 from the Neogene succession of Cessaniti, in the Monte Poro-Capo Vaticano area (Vibo Valentia, Calabria; Fig. 1). Cessaniti and the surrounding area released marine and terrestrial mammals, Late Miocene in age: *Metaxytherium serresii* Gervais, 1847, *Stegotrabelodon syrticus* Petrocchi, 1941, *Samotherium* cf. *boissieri* Forsyth-Major, 1888, *Bohlinia* cf. *attica* Matthew, 1929, Rhinocerotidae, and Bovidae (Ferretti et al., 2003; Marra et al., 2011).

The succession exposed at Cessaniti is made up of four units, representative of a marine transgression occurring during the Tortonian, followed by a Messinian regression (Gramigna et al., 2008).

Newly found fossils described in this note come from Unit 1 and Unit 2. Unit 1 is made up by black clays bearing *Crassostrea gryphoides* (von Schlotheim, 1813) and represents a marginal lagoon at the very base of the Cessaniti stratigraphic sequence, resting on the crystalline basement, while Unit 2 consists of gray sandstones lying above the previous unit through a sharp, erosional contact and contains a fully marine fauna, with extremely abundant echinoids, mainly belonging to the genus *Chlypeaster*.

MORPHOLOGICAL DESCRIPTIONS

Described specimens are housed at the Museum of Ricadi (Vibo Valentia; abbreviated as MURI), and at the Museum of Nicotera (Vibo Valentia; abbreviated as MN).

A molar fragment composed of two plate-like structure (Pl. 1, fig. 1a-b; MURI, Inventory Number 66[ces]VC7), comes from Gentile's Quarry (Cessaniti), three meters under the top of Unit 2 (Fig. 1). It is interpreted as a lower left m2 based on width, brachydonty and the curved outline of the tooth-base. The two plates are covered by a thick cement layer, which completely fill the interlophid. Occlusal wear on the anterior-most plate has partially removed the cement cover, exposing four enamel digitations, divided by a median sulcus. Each hemi-plates consists of a large lateral cone and two smaller median

conulets. There is no evidence of a posterior central conule on either plates. The shape of the plates, in occlusal view, is convex-convex. Though wear is at a very incipient state, there is not a clear distinction between the pre- and post-trite sides. Measurements are as following: breadth at first loph = 81 mm; breadth at second loph = 76 mm; height = 65 mm.

A heavily worn upper left DP4, provisionally stored in the MN collections recovered from Unit 1 at Forcone locality (Fig. 1), Cessaniti, has four plates and a distinct distal talon (Pl. 1, fig. 2; MN, Inventory Number MN07). The lingual (pre-trite) half of the tooth is more worn than the labial (post-trite) one. The enamel is thick and folded. Accessory conules are present in the interlophs.

Two incomplete humeri were retrieved: one unlabelled proximal portion from Cessaniti (Gentile's Quarry; Fig. 1) and a fragmentary specimen (Fig. 1; Pl. 1, fig. 4a-d; MURI, Inventory Number: 104[pap]VC2) from Zungri. Their bad state of preservation prevents any anatomical descriptions.

A nearly complete right second metacarpal (Pl. 1, fig. 3a-c; MURI, Inventory number: 33[ces]VC7) was recovered from Unit 2 at Forcone locality, Cessaniti (Fig. 1). The bone has fully fused epiphyses and is large, relatively short and stout. Measurements are as follows: greatest length = 190 mm; breadth of proximal end = 85 mm; breadth of proximal articular facet = 84 mm; breadth of diaphysis = 65 mm; depth of diaphysis = 53 mm; circumference of diaphysis = 230 mm; breadth of distal end = 105 mm; depth of distal end = 80 mm; breadth of distal articular surface of the trochlea = 85 mm.

A right incomplete femur, housed at MURI (Inventory number: 20[ces]VC6), was recovered in the Unit 2 at Cessaniti, Gentile's Quarry (Fig. 1; Pl. 1, fig. 5). The distal third of the bone is missing. The femur is stout and relatively short, with a complete ossification. The head is directed upward and only slightly medially on a very short neck. The greater trochanter is massive. Measurements are as following: length of the preserved specimen = 1000 mm; breadth of proximal end = 430 mm; breadth of caput femoris = 200 mm; depth of caput

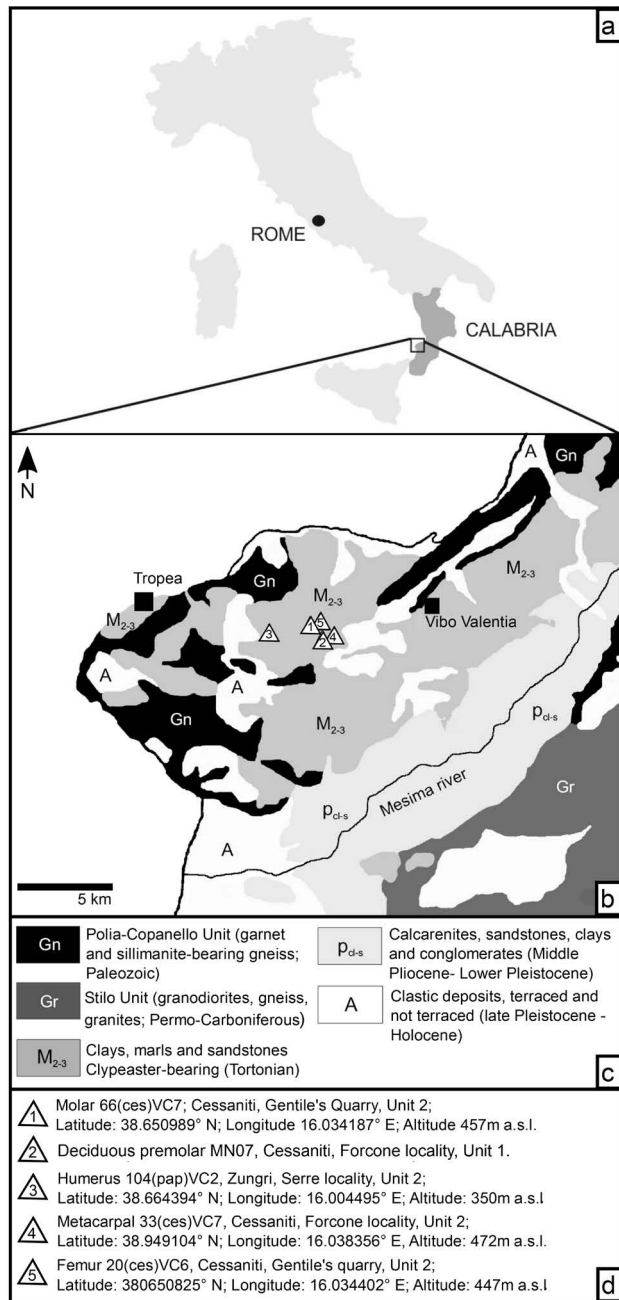


Fig. 1 - a) Geographical location of the studied area. b) Geological sketch map of the Cessaniti-Monte Poro-Capo Vaticano area with location of productive sites (triangles 1-5). c) Captions to lithologies represented in b. d) Captions to productive sites indicated in b.

femoris = 180 mm; smallest breadth of diaphysis = 190 mm; depth of diaphysis = 100 mm; circumference of diaphysis = 490 mm. The estimated greatest length of the bone, based on comparisons with other elephantoids, is 1390 mm and would indicate a shoulder height of ca. 3.5 m (Larramendi, 2016).

DISCUSSION AND CONCLUSIONS

The teeth are attributed to *Stegotetrabelodon* for their primitive elephantine traits such as the plate-like organization, convex-convex plate outline (Kalb & Mebrate, 1993), low crown, tetralophodont DP4, thick enamel and abundant cement. The post-cranial elements are markedly stout, indicating a primitive, "gomphotheroid" trait. The large size of the long bones is compatible with the large-sized *S. syrticus*, rather than with the smaller *S. orbus*.

The recovery of further remains of *Stegotetrabelodon* at Cessaniti, previously represented only by a mandible and associated tusk fragment from Unit 2 (Ferretti et al., 2003; Ferretti, 2008), strengthens the hypothesis of a connection of the Cessaniti area to North Africa in the Tortonian, probably during a phase of expansion of the Pikermian Biome into the African continent, as suggested by the occurrence of two giraffid taxa (*Bohlinia* cf. *attica* and *Samotherium* cf. *boissieri*) typical of the Greek-Iranian bioprovince (Marra et al., 2011).

The presence of *Stegotetrabelodon* from the Unit 1 to the upper part of Unit 2 is indicative of a relatively long persistence of the taxon in the area. Moreover, the occurrence in the Unit 1 allows to consider the very base of the Cessaniti stratigraphic succession not older than the first occurrence of the species, dated 7.5-8 Ma (Sanders et al., 2010).

ACKNOWLEDGEMENTS

Authors are deeply indebted to the Archeological Superintendence of Calabria for allowing the present study. Finds: University of Messina (PRA 2008-2009 assigned to ACM), Gruppo Paleontologico Tropeano.

REFERENCES

Ferretti M.P. (2008). Miocene proboscideans from Italy: African elements and palaeogeographic implications. *In* Salem M.J.,

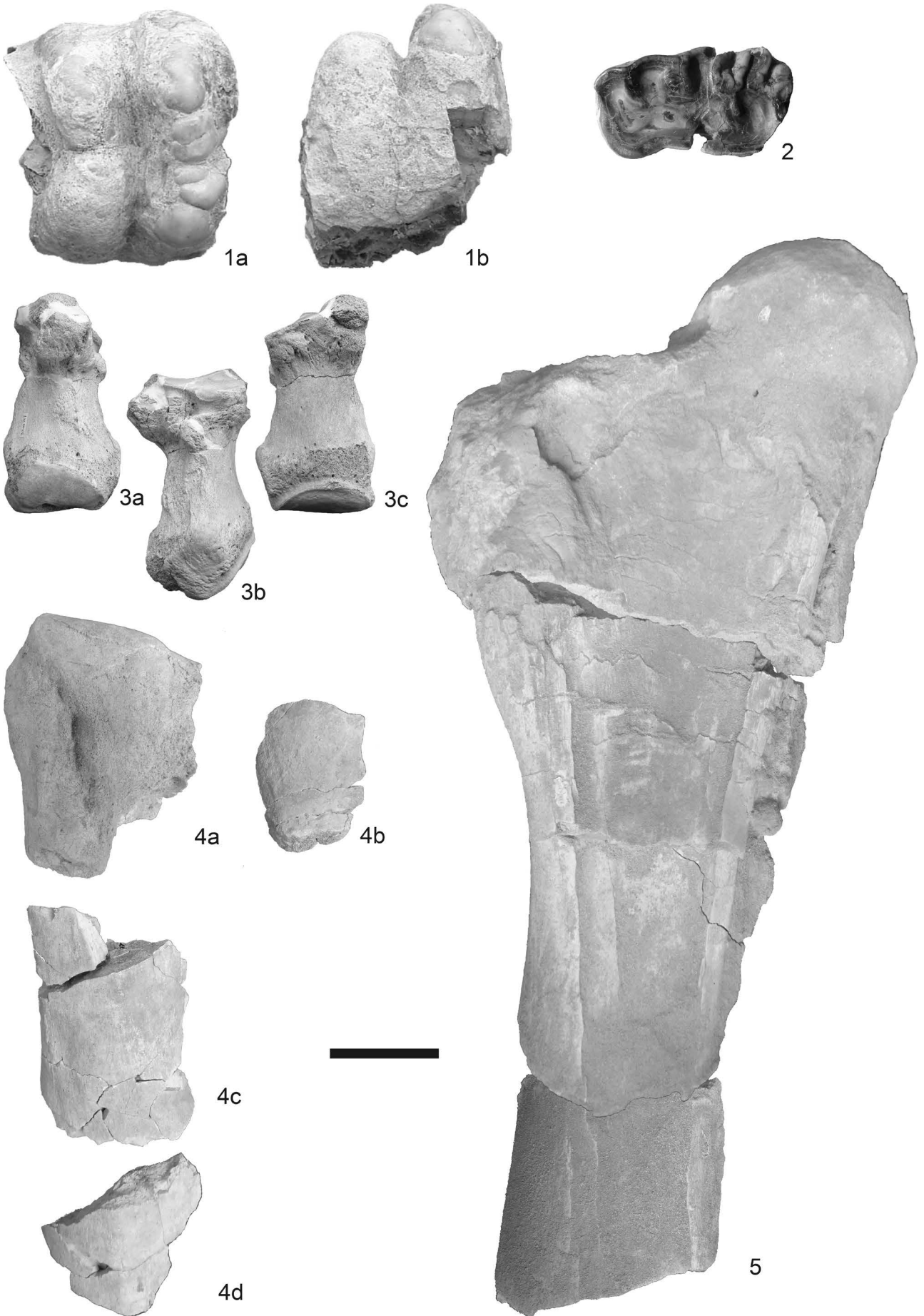
EXPLANATION OF PLATE 1

New findings of *Stegotetrabelodon syrticus* Petrocchi, 1941 from the Cessaniti area.

Figs 1-5 - *Stegotetrabelodon syrticus* Petrocchi, 1941.

- 1 - Molar (Inv. Num.: 66 [ces]VC7) in occlusal (a) and labial (b) views.
- 2 - Deciduous premolar (Inv. Num.: MN07) in occlusal view.
- 3 - Metacarpal (Inv. Num.: 33[ces]VC7) in dorsal (a), lateral (b) and ventral (c) views.
- 4 - Humerus fragments (Inv. Num.: 104[pap]VC2) in physiological position (a-d).
- 5 - Femur (Inv. Num.: 20[ces]VC6) in anterior view.

Scale bar corresponds to 5 cm for figs 1 and 2 and to 10 cm for figs 3-5.



- El-Arnauti A. & El Sogher Saleh A. (eds), *The Geology of East Libya*, 3: 325-334.
- Ferretti M.P., Rook L. & Torre D. (2003). *Stegotrabelodon* cf. *syrticus* (Proboscidea, Elephantidae) from the Upper Miocene of Cessaniti (Calabria, southern Italy) and its bearing on Late Miocene paleogeography of central Mediterranean. *Journal of Vertebrate Paleontology*, 23: 659-666.
- Forsyth-Major C.J. (1888). Sur un gisement d'ossements fossiles dans l'île de Samos, contemporain de l'âge de Pikermi. *Comptes Rendus de l'Académie des Sciences*, 107: 1178-1182.
- Gervais F.L.P. (1847). Observations sur les mammifères fossiles du midi de la France. Deuxième partie. *Annales des Sciences Naturelles (Zoologie)*, (ser. 3) 8: 203-224.
- Gramigna P., Guido A., Mastandrea A. & Russo F. (2008). The paleontological site of Cessaniti: a window on a coastal marine environment of seven million years ago (Southern Calabria, Italy). *Geologica Romana*, 41: 25-34.
- Kalb J.E. & Mebrate A. (1993). Fossil elephantoids from the hominid-bearing Awash Group, Middle Awash Valley, Afar Depression, Ethiopia. *Transactions of the American Philosophical Society*, 83: 1-110.
- Larramendi A. (2016). Shoulder height, body mass and shape of proboscideans. *Acta Palaeontologica Polonica*, 61: 537-574.
- Marra A.C., Solounias N., Carone P. & Rook L. (2011). Palaeogeographic significance of the giraffid remains (Mammalia, Arctiodactyla) from Cessaniti (Late Miocene, Southern Italy). *Geobios*, 44: 189-197.
- Matthew W.D. (1929). Critical observations upon Siwalik mammals. *Bulletin du Muséum National d'Histoire Naturelle*, 56: 437-560.
- Petrocchi C. (1941). Il giacimento fossilifero di Sahabi (Cirenaica). *Bollettino della Società Geologica Italiana*, 60: 107-114.
- Sanders W.J., Gheerbrant E., Harris J., Saegusa H. & Delmer C. (2010). Proboscidea. In Werdelin L. & Sanders W.J. (eds), *Cenozoic Mammals of Africa*, University of California Press: 161-251.
- von Schlotheim E.F. (1813). Beiträge zur Naturgeschichte der Versteinerungen in geognostischer Hinsicht. In Leonhard C.C. (ed.), *Leonhard's Taschenbuch für die gesammte Mineralogie mit Hinsicht auf die neuesten Entdeckungen*, Series 1: 1-134.

Manuscript received 15 April 2016

Revised manuscript accepted 6 March 2017

Published online 10 May 2017

Editor Raffaele Sardella