First report of *Brachypotherium* Roger, 1904 (Rhinocerotidae, Mammalia) in the Middle Miocene of Greece

George D. KOUFOS
Dimitris S. KOSTOPOULOS
Aristotle University of Thessaloniki, Department of Geology,
Laboratory of Geology and Palaeontology,
GR-54124 Thessaloniki (Greece)
koufos@geo.auth.gr
dkostop@geo.auth.gr

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ABSTRACT
The present article is dealing with some rhinocerotid teeth from the Middle Miocene mammal locality Chryssavgi (CHR), which is situated in the Mygdonia Basin (Macedonia, Greece). The material was incorrectly described earlier as *Diceros pachygnathus* (Psarianos, 1958) or *Dicerorhinus orientalis* (Dimopoulos, 1972) and considered as Late Miocene to Early Pliocene in age. The morphological characters of the CHR rhinocerotid and its comparison with the Eurasian ones indicate that it belongs to *Brachypotherium brachypus* (Lartet, 1851). The correlation of the studied material to the local stratigraphy, as well as to the micromammalian fauna, found in CHR, suggests a Late Astaracian age, MN 7+8. The presence of the taxon in CHR corresponds to first occurrence of *Brachypotherium* Roger, 1904 in Greece from where was previously unknown. The geographic and biostratigraphic occurrence of *B. brachypus* in the Eastern Mediterranean region is also discussed. The species is quite common in Turkey but rare in the Balkans, known from the localities of Ahmatovo, Bulgaria and Chryssavgi, Greece. It mainly occurs in the Late Orleanian to Astaracian of Eastern Mediterranean but there is an evidence for its Turolian presence in Ahmatovo, Bulgaria.

KEY WORDS
Middle Miocene,
Greece,
Brachypotherium,
description,
biostratigraphy,
biogeography.

RÉSUMÉ
Premier signalement pour Brachypotherium *Roger, 1904 (Rhinocerotidae, Mammalia) du Miocène moyen de Grèce.*
Quelques dents des rhinocérotidés de la localité à mammifères du Miocène moyen de Chryssavgi (CHR; bassin de Mygdonia, Macédoine, Grèce) sont étudiés. Le matériel a été décrit précédemment, de manière erronnée, comme *Diceros pachygnathus* (Psarianos, 1958) ou *Dicerorhinus orientalis* (Dimopoulos, 1972), daté à la fin du Miocène ou au début du Pliocène. Les caractères morphologiques et biométriques des dents de CHR et la comparaison avec des rhinocéros du Néogène d'Eurasie suggèrent leur appartenance à l'espèce *Brachypotherium brachypus* (Lartet, 1851). La mise en place du matériel dans l'échelle stratigraphique locale ainsi que sa corrélation avec la faune à micromammifères de CHR indiquent une âge d'Astaracien supérieur, MN7+8. La présence de ce taxon en CHR correspond à la première occurrence de *Brachypotherium* Roger, 1904 en Grèce, d'où il était auparavant inconnu. Les enregistrements géographique et biostratigraphique de *B. brachypus* en Méditerranée orientale sont également discutés. L'espèce est assez commune dans l'Orléanien supérieur-Astaracien de Turquie, mais rare dans les Balkans ; elle est connue, à l'exception de CHR, de la localité d'Ahmatovo en Bulgarie, mais y est cependant restreinte au Turolien.

MOTS CLÉS
Miocène moyen,
Grèce,
Brachypotherium,
description,
biostratigraphie,
biogéographie.

INTRODUCTION

Middle Miocene mammal localities are generally rare in the Eastern Mediterranean, especially in the Balkan Peninsula and their faunas are poor; there are more in Turkey and some of them include a rich fauna (Paşalar, Çandır, Inönu). Thus, our knowledge about the Middle Miocene mammal faunas of the Eastern Mediterranean is limited. On the contrary, the contemporaneous mammal faunas of Western and Central Europe are well known and rich. Therefore, any new information for the Middle Miocene mammal faunas of Eastern Mediterranean is important and increases our knowledge.

The Middle Miocene mammal localities of Greece are scanty, known mainly from the islands of Creta and Chios, as well as from Macedonia. The Middle Miocene mammal localities of Chios are situated near the village of Thymiana. Three different fossiliferous horizons have been recognized; two of them Thymiana-A, C include small mammals and the third one Thymiana-B has yielded large mammals. The biochronological data suggest a Late Orleanian (MN 5) age, while the magnetostratigraphy provides an estimated age of *c.* 15.5 Ma (Koufos 2013 and ref. cited). In the overview of the Rhinocerotidae Gray, 1821, Heissig (1989) referred some unpublished Dicerotini dental remains in Tobien's collection from Chios. The sole known locality of Crete Island, named Melambes, yielded few macromammals of doubtful age, comprising between the Middle Orleanian, MN 5 to the Early Vallesian, MN 9 (Koufos 2013 and ref. cited). The Cretan locality of Plakia or Plakias previously referred to the Late Astaracian, MN 7+8 (Koufos 2006) is now considered as Early Vallesian, MN 9 after a new collection and study of its micromammalian fauna (de Bruijn *et al.* 2012). The locality of Antonios is situated in Chalkidiki Peninsula (Macedonia, Greece) and has provided micro- and macro- mammals, indicating a Middle Orleanian age, MN 4/5 (Koufos 2008 and ref. cited). The second Middle Miocene locality from Macedonia is Chryssavgi (CHR), which provided a micromammalian fauna and few macromammals. In the present article some rhinocerotid dental remains from CHR are studied, providing information for the presence of brachypotheres in Greece, while their geographic and stratigraphic distribution in the Eastern Mediterranean is discussed.

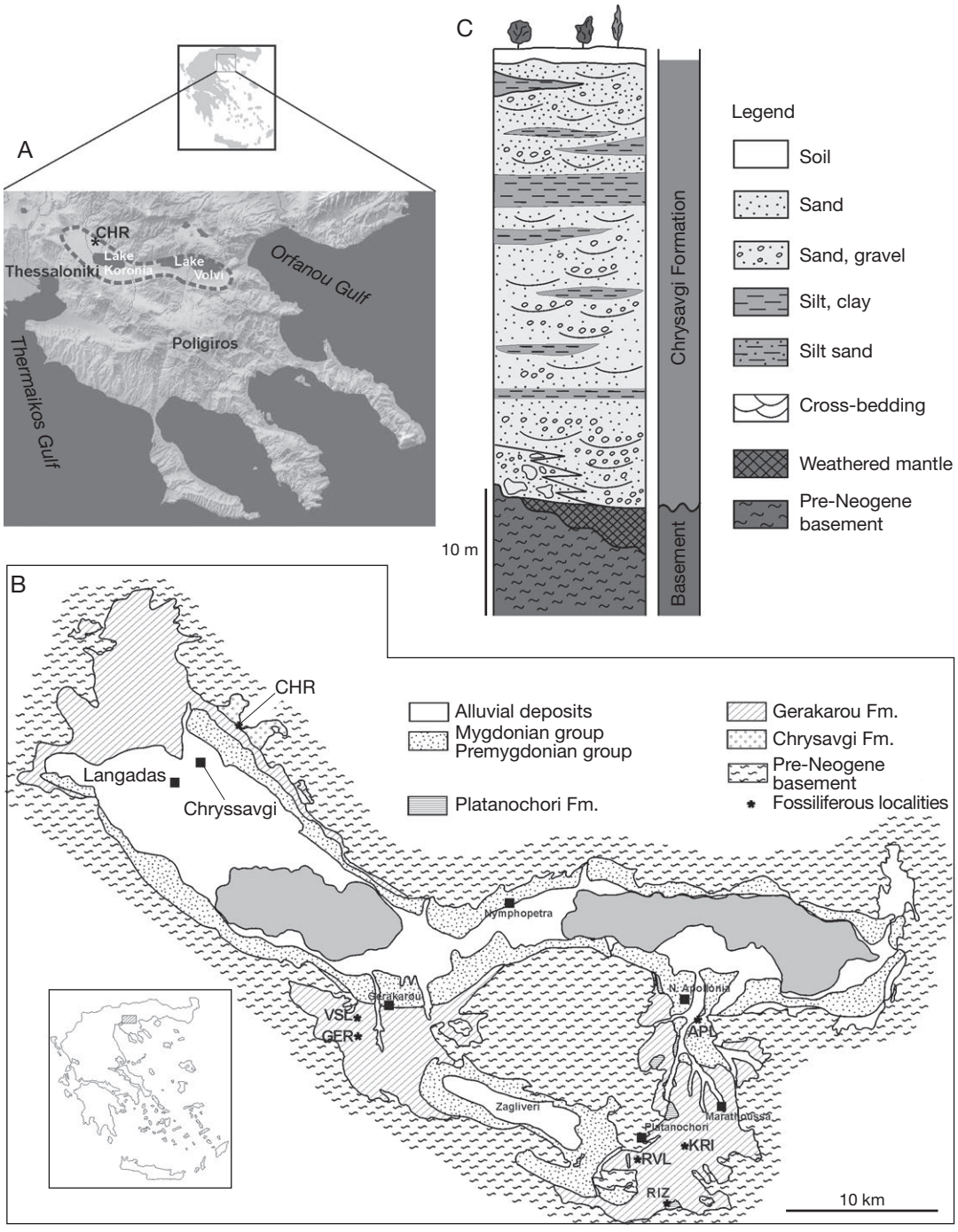

FIG. 1. — **A**, Geographic map of the area, indicating Mygdonia Basin and the fossiliferous site Chryssavgi (CHR), Macedonia, Greece; the map is taken from www.shaded-relief.com; **B,** geological map the Neogene-Quaternary lithostratigraphic units of the Mygdonia Basin (from Koufos *et al.* [1995]); **C**, synoptic stratigraphic coluMN of the Chryssavgi Formation (from Koufos *et al.* [1995]).

MATERIAL AND METHODS

The studied rhinocerotid teeth are housed in the Laboratory of Geology and Palaeontology, University of Thessaloniki (LGPUT) since the 1950's. According to our elder colleague Prof. L. Sotiriadis, the material was found in a clay pit, situated near the village Palea Chryssavgi, which is abandoned a long-time ago. In 1980 GDK started an investigation in the Mygdonia Basin (Fig. 1) in order to find fossils and to study the stratigraphy of the Neogene/Quaternary deposits. During this investigation the old clay-pit of Palea Chryssavgi was re-discovered and named Chryssavgi (CHR); it was partially filled up by debris but a large part of it was still open (Fig. 2A). Except of some identifiable bone fragments of large mammals (Fig. 2B-D), our efforts to find more were unsuccessful. However, washing sediments from the level with the large mammals we found micromammals, which were studied by Koliadimou (1996). The correlation of the studied rhinocerotid remains with this level is doubtful but there are some data, supporting this:
– the absence of other clay-pit in the area;
– the presence of small and large mammals in the same fossiliferous level (Fig. 2A);
– the similarity (lithology, colour) of the sediment's remains on the studied fossils with the fossiliferous bed;
– the similar fossilization and color of the studied fossils with those found in CHR;
– the thickness of the marly len, which does not exceed 10 m.

Based on these observations it is quite possible that the rhinocerotid teeth originate from the found fossiliferous level in the clay-pit.

The mandibular fragment CHR-502 was initially described as *Diceros pachygnathus* (Psarianos, 1958) by Psarianos (1958). Whether all the material was found together or not is unknown. The similar color, fossilization, attrition and size of the upper and lower teeth enforce the first possibility; for an unknown reason Psarianos (1958) did not include the upper teeth in his study. Fifteen years later the whole sample of the CHR rhinocerotid (mandibular fragment, three upper teeth and two rib-fragments) was described as *Dicerorhinus orientalis* (Dimopoulos, 1972) by Dimopoulos (1972).

During our study we found all the CHR material in the LGPUT collections except P4 (Dimopoulos 1972: taf. 1) and we realized that both older determinations are not correct. In the present article the CHR rhinocerotid is revised and tentatively placed in the new stratigraphic and biochronologic frame of the Mygdonia Basin. The material is measured with a digital caliper and all measurements are in mm. The used dental nomenclature is according to Peter (2002).

Abbreviations

L	length;
B_{ant}	breadth of the anterior lobe;
B_{post}	breadth of the posterior lobe.

STRATIGRAPHY AND LOCALITY

The CHR locality is situated in the Mygdonia Basin into a clay pit, near the village of Palea Chryssavgi about 30 km northeast of Thessaloniki (Fig. 1). The Mygdonia Basin is an East-West trending tectonic depression, situated in Central Macedonia, Greece (Fig. 1). The Neogene and Quaternary sediments, filling up the basin, are divided in two groups Premygdonian and Mygdonian. The Premygdonian Group includes the Neogene and Early Pleistocene deposits and it is divided in three lithostratigraphic units (Koufos *et al.* 1995).

Chryssavgi Formation

It is the older formation of the basin with a limited exposure in the northeastern part of the basin (Fig. 1B), where it directly overlies the basement. It mainly consists of alternated grey-white loose conglomerates and sands with silty-clayey lenses or lenticular intercalations; its thickness is estimated to 40-50 m. The lower part of the Chryssavgi Formation is dominated by coarse conglomerates with a diameter reaching 40 cm or more; however, a size decrease of the pebbles is observed from the bottom to the top of the formation. In the upper part of the formation the presence of silty-clayey and silty-sandy lenses or lenticular intercalations is

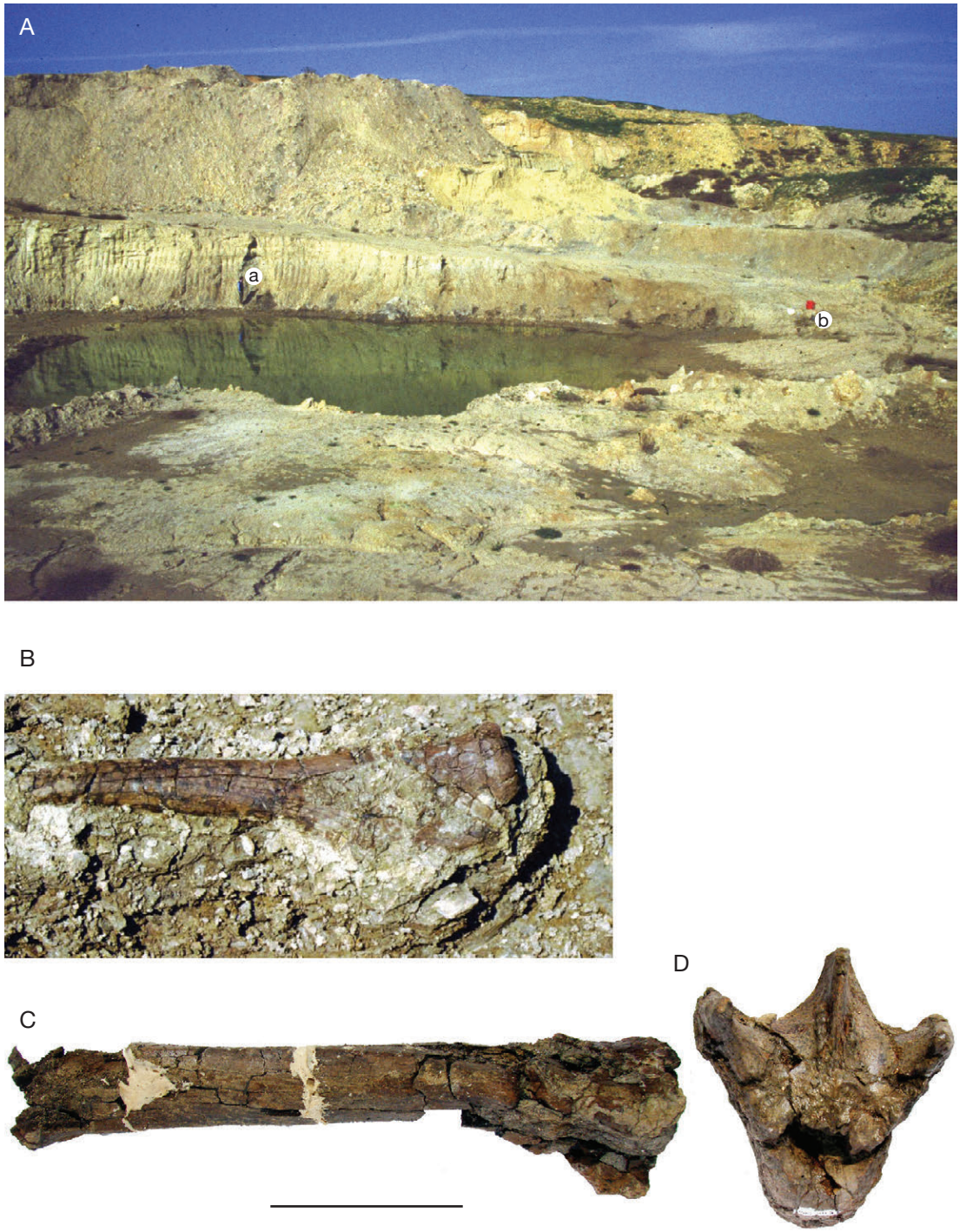

FIG. 2. — **A**, Locality Chryssavgi (CHR), indicating the position where small (**a**) and large (**b**) mammals were found; **B**, **C**, undetermined tibia found in the position **b**, *in situ* (**B**) and after preparation (**C**); **D**, undetermined vertebra found in the position **b**. Scale bar: 10 cm.

more frequent. A synoptic stratigraphic column of the Chryssavgi Formation is given in Figure 1C.

Gerakarou Formation

It is extended in the whole area of the Mygdonia Basin (Fig. 1B) and consists of red-brown sands, gravels, sandy-silts and clays, having a thickness of more than 100 m. The study of a large mammal fauna found in the upper part of the formation suggests an earliest Pleistocene age (according to the new division of Quaternary).

Platanochori Formation

Its outcrops are small and restricted to the south-eastern part of the Mygdonia Basin (Fig. 1B). It mainly consists of sands, sandstones, conglomerates, silty-sands, silts, clays, marls, marly limestones with a thickness varying from 10-20 m. It is dated to the upper part of the Early Pleistocene.

The Mygdonian Group consists mainly of lacustrine thin-bedded and fine sediments. In the upper part of the group there are occurrences of sandstones, gravels, sands and travertines. The group is dated from the Middle Pleistocene to the Holocene.

SYSTEMATIC PALAEONTOLOGY

Order PERISSODACTYLA Owen, 1848
Family Rhinocerotidae Gray, 1821

Genus *Brachypotherium* Roger, 1904

Type species. — *Rhinoceros goldfussi* Kaup, 1834.

Brachypotherium brachypus (Lartet, 1851)

Type locality. — Sansan, France, Early Astaracian, MN 6.

Locality. — Chryssavgi, CHR, Macedonia, Greece (Fig. 1).

Age. — Late Astaracian, MN 7+8 (Middle Miocene)

Material. — Right M3, CHR-500; fragment of a left M1,2, CHR-501; left mandibular fragment with m2-m3, CHR-502.

Measurements

M3: L = 52.1, B = 60.8;
m2: L = 52.3, B_{ant} = 32.5, B_{post} = 32.2;
m3: L = 54.0, B_{ant} = 31.3, B_{post} = 29.5.

Description

M3 (Fig. 3D-F)

It is worn with triangular occlusal outline and thick enamel; a relatively shallow parastyle furrow separates the paracone from the parastyle; large protoloph almost perpendicular to the lingual margin of the tooth; large protocone with deep mesial and distal protoconal furrow; elongated and narrow ectometaloph with slightly convex profile; presence of crochet and antecrochet; absence of crista; deep and open lingually medisinus with strong cingulum; strong mesial cingulum in the lingual half of the tooth; strong distal cingulum in the base of the hypocone.

M1-2 (Fig. 3A-C)

Although CHR-501 is referred by Dimopoulos (1972) it is not described; it is worn lacking its mesial part. The preserved part of the ectoloph is flattened and bears a distinct cingulum; presence of crochet and antecrochet; absence of crista; well developed distal hypoconal furrow; narrow and open lingually medisinus with cingulum in its entrance; large hypocone; the post-fossette is restricted to a small pit, closed distally by the strong distal cingulum.

m2-m3 (Fig. 4A-C)

The teeth are worn with similar length and thick enamel; shallow buccal groove distinguishing the two lobes; small paralophid extending lingually at about the middle of the trigonid's breadth; angular hypolophid extending lingually more than the metalophid; small, narrow and V-shaped trigonid valley; its mesial border consists of a weak cingulum running disto-lingually from the paralophid's top to the tooth base; large, deep, U-shaped and open lingually talonid valley; clear buccal cingulum in the mesial lobe descending from the top of the paracone to the base of the protoconid; weak distal cingulum.

Discussion

The mandibular fragment CHR-502 was described as *Diceros pachygnathus* by Psarianos (1958: 306,

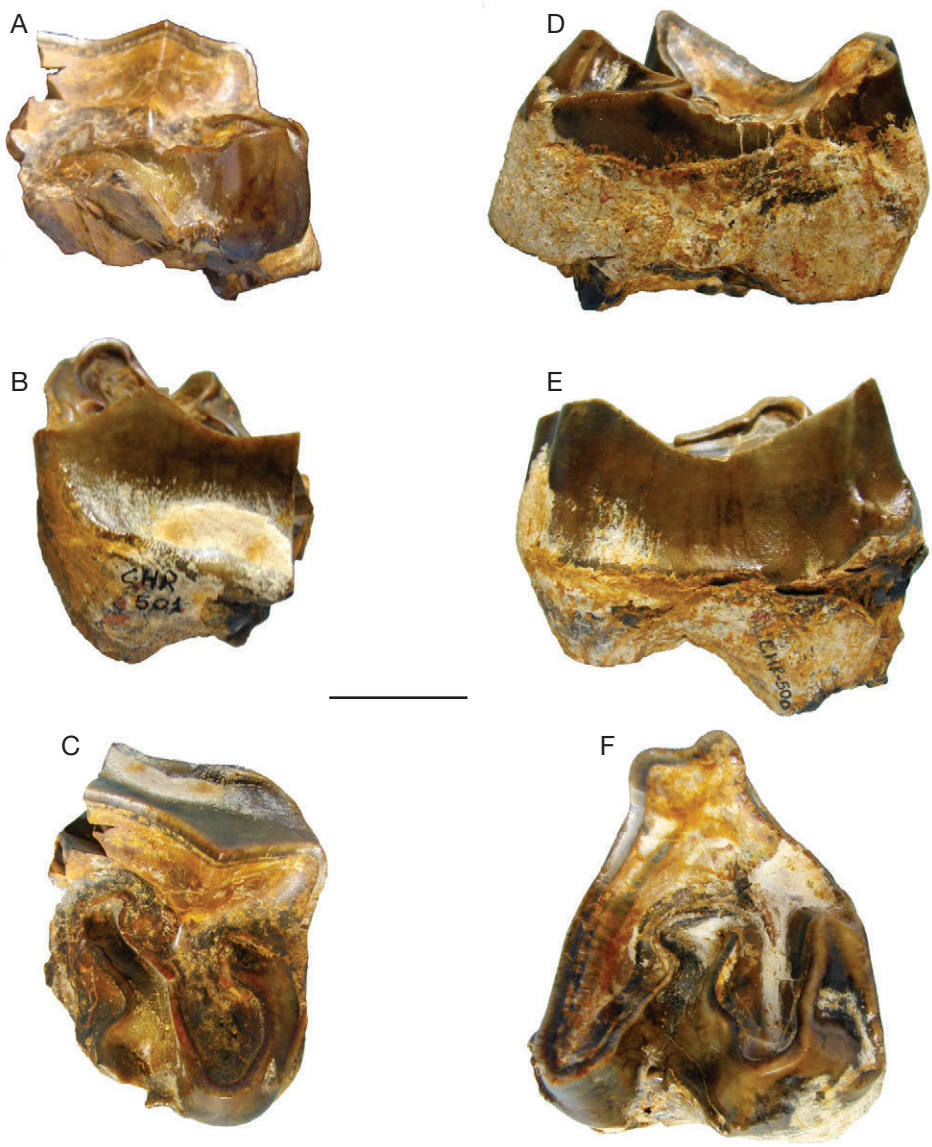

FIG. 3. — *Brachypotherium brachypus* (Lartet, 1851), Chryssavgi, CHR, Macedonia, Greece; Late Astaracian, MN 7+8 (Middle Miocene); **A**-**C**, left M1, 2, CHR-501 in lingual (**A**), labial (**B**) and occlusal (**C**) views; **D**-**F**, right M3, CHR-500, in mesial (**D**), distal (**E**) and occlusal (**F**) views. Scale bar: 2 cm.

abb. 1) and considered different from *Brachypotherium brachypus* because of its smaller dimensions, absence of buccal cingulum and enamel morphology without, however, more explanations for the last character. Later, the mandibular fragment CHR-502 and some other upper teeth from CHR were attributed to *Dicerorhinus orientalis* (Dimopoulos 1972). The CHR material is mentioned as Rhinocerotidae indet. in the review of the large mammal succession of Greece, as well as in that of the Miocene rhinoceroses of Greece (Bonis & Koufos 1999; Giaourtsakis 2003). In

the revision of the Neogene mammal faunas of Greece the CHR rhinocerotid is reported for first time as *Brachypotherium* sp. (Koufos 2006).

Both previous studies of the CHR rhinocerotid imply a Late Miocene age (Psarianos 1958; Dimopoulos 1972). Two main rhinos are known from the Late Miocene of Greece "*Diceros*" *neumayri* (Osborn, 1900) often called *Ceratotherium neumayri* or *Diceros pachygnathus* and *Dihoplus pikermiensis* (Toula, 1906); the former species is the most common. A direct comparison of the studied material with that of "*Diceros*" *neumayri* from Axios Valley (Macedonia, Greece) suggests that the latter species differs from the CHR sample, having more buccally projected parastyle in the M3, absence of distal hypoconal furrow, deeper buccal groove in the lower molars, longer paralophid, absence of cingulum in the lower teeth and more hypsodont teeth. Based on the dental description and illustrations of Giaourtsakis *et al.* (2006) and Geraads & Spassov (2009) for *Dihoplus pikermiensis* it differs from the CHR material, having somewhat smaller dental size, less flattened ectoloph, a trend for separation of the protocone from the protoloph, weaker or absent cingulum in the medisinus of the M3, longer paralophid, lower molars with well developed buccal groove which continues down to the crown basis and absence of cingulum and cement. Therefore both older determinations must be abandoned.

According to Guérin (1980: 202) the genus *Brachypotherium* is characterized by large teeth, brachyodont cheek teeth (especially the upper ones) and strong buccal cingulum in the upper cheek teeth. Heissig (1972: 79) refers that the molars of *Brachypotherium* are brachyodont with strong cingula in the upper and weak buccal groove in the lower ones. Geraads & Spassov (2009: 110) mention the brachyodont molars, the absence of crista, the weak crochet and antecrochet, as well as the slightly pinched protocone and hypocone in the molars for *Brachypotherium*. The studied teeth have similar characters and can be referred to this genus.

Brachypotherium is well known from the Miocene of Central and Western Europe, by two species *B. brachypus* (Lartet 1851) and *B. goldfussi* (Kaup, 1834); the previous taxon includes the Middle Miocene and the latter one the Late Miocene brachypotheres (Cerdeño 1993; Cerdeño & Nieto 1995; Antoine *et al.* 1997, 2000). The distinction of the two species is difficult as their differences are not clear (Guérin 1980). The dental proportions, brachyodonty, frequency of the buccal cingulum and the virtual absence of the buccal groove of the lower teeth distinguish *B. goldfussi* from *B. brachypus* (Guérin 1980). The studied lower molars are characterized by a weak but clear buccal groove, a mesio-lingual cingulum and a well developed mesio-buccal one, as well as different proportions from *B. goldfussi*. The m2 and m3 of *B. brachypus* seem to be more robust than those of *B. goldfussi.* The index L × 100/B is at mean 62.2 versus 59.1 for the m2 and 56.3 versus 50.5 for the m3 in *B. brachypus* and *B. goldfussi* respectively (the dental measurements of the two species are taken from Cerdeño [1993] and Guérin [1980]). In the CHR-502 teeth this index is 62.3 and 58.5 respectively, being closer to those of *B. brachypus* (for the calculation of the index the large anterior breadth is taken, when it is given). *B. brachypus* is well-known from Western Europe (Ginsburg & Bulot 1984; Cerdeño 1993; Cerdeño & Nieto 1995; Antoine *et al.* 1997, 2000; Ginsburg 2001). Roman & Viret (1934), describing the material from the French locality La Romieu, mentioned the presence of a remarkable lingual cingulum, a well developed crochet and antecrochet and absence of the crista in the upper molars, as well as the absence of buccal groove and a well developed buccal cingulum in the lower teeth; all these characters are present in the studied teeth. Likely the CHR dental morphology fits well with the Bezian material of *B. brachypus* (Ginsburg & Bulot 1984: 359, pl. III, figs 2-5). In the revision of the Middle Miocene French brachypotheres Cerdeño (1993) mentioned that the upper molars of *B. brachypus* have well developed crochet, variable size or absence of crista and elongated ectometaloph in the M3. The CHR teeth fit morphologically with the French *B. brachypus* having similar dimensions (Fig. 5).

In the Eastern Mediterranean *B. brachypus* is known mainly from Turkey. Its presence is

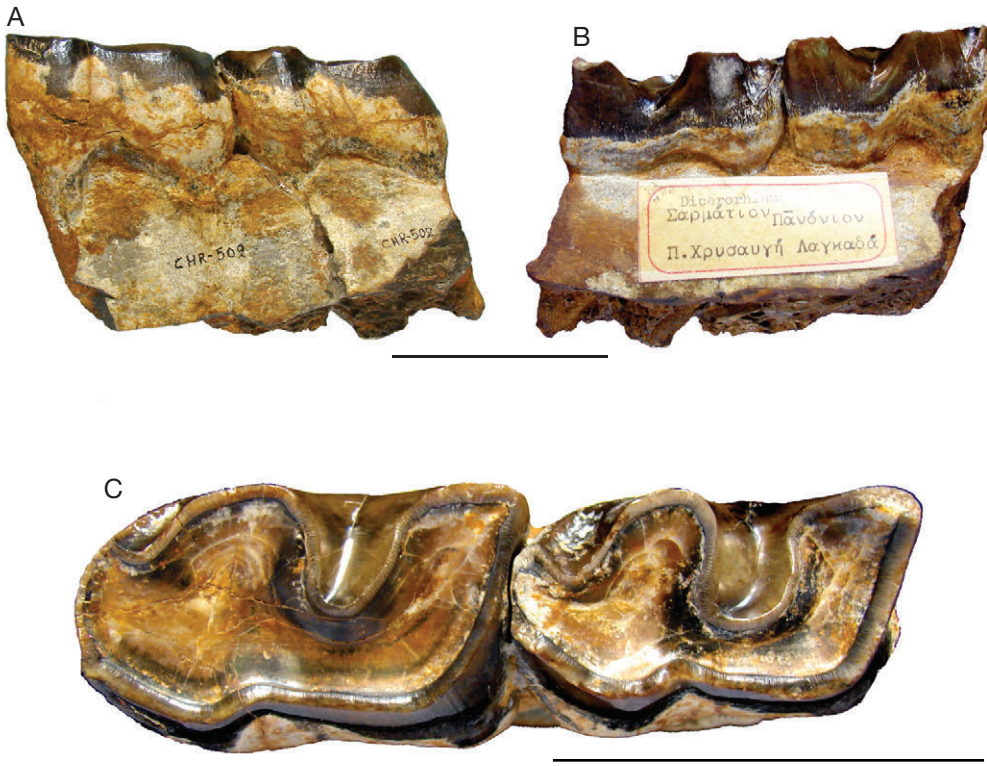

FIG. 4. — *Brachypotherium brachypus* (Lartet, 1851), Chryssavgi, CHR, Macedonia, Greece; Late Astaracian, MN 7+8 (Middle Miocene): left mandibular fragment with m2-m3, CHR-502 in labial (**A**), lingual (**B**) and occlusal (**C**) views. Scale bars: 5 cm.

originally mentioned by Heissig (1976), who described some material (mainly isolated teeth) from various Middle Miocene localities. Based on the descriptions and figures of Heissig (1976), the CHR material is morphologically and metrically (Fig. 5) similar to that from Turkey. The species is also reported by some isolated teeth from Paşalar (Fortelius 1990); they are morphologically and metrically (Fig. 5) similar to the studied material. Some postcranials of *B.* cf. *brachypus* are also mentioned from the locality of Çandır (Geraads & Saraç 2003). Except these Middle Miocene occurrences, *Brachypotherium* is also reported from the Late Miocene of Bulgaria. The anterior part of a skull from Ahmatovo and a juvenile skull from Kalimantsi are referred to this genus (Geraads & Spassov 2009). The Ahmatovo teeth differ from the studied ones having slightly pinched protocone and hypocone in the molars, weaker crochet and antecrochet, absence of crista and reduced cingula (Geraads & Spassov 2009). The authors mentioned the similarities of the Ahmatovo skull with the African brachypotheres and *B. perimense* (Falconer & Cautley, 1847) from Siwaliks, contrary to the European material of the genus.

Two brachypotheres are known from the Middle Miocene of Siwaliks, Pakistan: *B. perimense* (Falconer & Cautley 1847) and *B. fatehjangense* (Pilgrim, 1910). Based on the descriptions of Colbert (1935) and Heissig (1972) *B. perimense* differs from CHR in the less pinched protocone, the deeper parastyle in the M3, the deeper buccal groove in the lower molars, the narrower lower teeth (Fig. 5) and the relatively more hypsodont teeth. The other Siwaliks brachypothere *B. fatehjangense* is considered as being very close to *B. brachypus*

(Antoine *et al.* 2000), but Khan *et al.* (2010) separate it from *B. brachypus* by the presence of a deep buccal groove in the lower molars, the absence of crista in the upper molars, the presence of a buccal and lingual cingulum and the larger dimensions. The size of the CHR M3 is larger than *B. fatehjangense* and well distinguished from this taxon (Fig. 5).

Two brachypotheres are reported from Africa, *B. snowi* Fourtau, 1918 and *B. lewisi* Hooijer & Patterson, 1972; a third species *B. heinzelini* Hooijer, 1963, known from Eastern and South Africa, must be restricted to the type specimen, while the rest material referred to it can be included to *B. snowi* (Geraads 2010). The species *B. snowi* is characterized by large size (larger than *B. brachypus*), absence of cingulum, moderately developed antecrochet and very shallow buccal groove in the lower molars (Geraads 2010) and differs from the studied material and *B. brachypus.* The other African taxon *B. lewisi* is much larger than *B. brachypus* and the studied teeth are well separated from it (Fig. 5).

AGE OF THE CHRYSSAVGI *BRACHYPOTHERIUM*

The age of the CHR rhinocerotid material was considered as Late Miocene to Early Pliocene for a long time (Psarianos 1958; Dimopoulos 1972); this dating was based on its incorrect determination. The re-discovery of the locality, as it was mentioned, led to the recognition of a fossiliferous horizon with small and large mammals from which the studied material possibly comes. The collected micromammals were studied by Koliadimou (1996) and include the following taxa: cf. *Schizogalerix* sp., *Desmanodon minor* Engesser, 1980, *Alloptox* sp. (aff. *anatoliensis*), *Prolagus* n. sp. (Koliadimou 1996), *Myomimus* sp., *Byzantinia bayraktepensis* Unay, 1980, *Megacricetodon minor* (Lartet, 1851). The fauna is compared with some Turkish Middle Miocene faunas, as the corresponding ones from Greece are lacking. Based on the micromammalian fauna it is proposed a Late Astaracian age (MN 7+8), (Koliadimou 1996; Koliadimou & Koufos 1998). *Megacricetodon* Fahlbusch, 1964 is absent in the Bayraktepe-1 fauna, while its last record in Turkey is reported from the MN 7+8 (Ünay *et al.* 2003). Thus, the CHR age is certainly Middle Miocene. The great similarity of the CHR *Megacricetodon* with *M. minor* from La Grive, France (Koliadimou 1996) indicates a correlation of the Chryssavgi fauna with MN 7+8. *Byzantinia bayraktepensis* is the most primitive species of the genus, known from the Late Astaracian Turkish locality Bayraktepe-1 (Ünay & de Bruijn 1984). In a revision of all Anatolian Neogene faunas with micromammals Bayraktepe-1 is included to the zone H of the rodent succession, which is correlated with MN 7+8; the zone H is characterized by the presence of *B. bayratepensis* (Ünay *et al.* 2003). The great similarity of the CHR *Byzantinia* with that from Bayraktepe-1 (Koliadimou 1996) suggests a similar age.

Brachypotherium brachypus has a great biostratigraphic distribution in the Western Europe extended from MN 4 to MN 7+8 (Ginsburg & Bulot 1984; Cerdeño 1993; Antoine *et al.* 2000). In Eastern Mediterranean the species is mainly known, from Turkey presented in the localities of Paşalar and Çandır (Heissig 1976; Fortelius 1990; Geraads & Sarac 2003); their age is debated being considered either as MN 5 or MN 6 (Begun *et al.* 2003; van der Made 2003). The species is also reported from the locality Sinap 24A (Inönu I), dated to MN 6 (Fortelius *et al.* 2003). *B. brachypus* is also present in the Turkish localities Catakbağyaka (MN 6 to MN 7+8), Sofça (MN 7+8), Demirci (MN 5-MN 7+8) Pismankőy (MN 7+8) and Tüney (MN 6), (Sickenberg 1975; Heissig 1976; Sen *et al.* 1998; Saraç 2003). Therefore *B. brachypus,* although its poor material has a great stratigraphic expansion in the Eastern Mediterranean, extended from MN 5 to MN 7+8. Its presence in the locality CHR can suggests a similar age for the locality. Taking in mind the age of the micromammals found in the locality, as well as the strong possibility that the studied rhinocerotid's material comes from the same fossiliferous level, it is quite possible to suppose for it a Late Astaracian (MN 7+8) age.

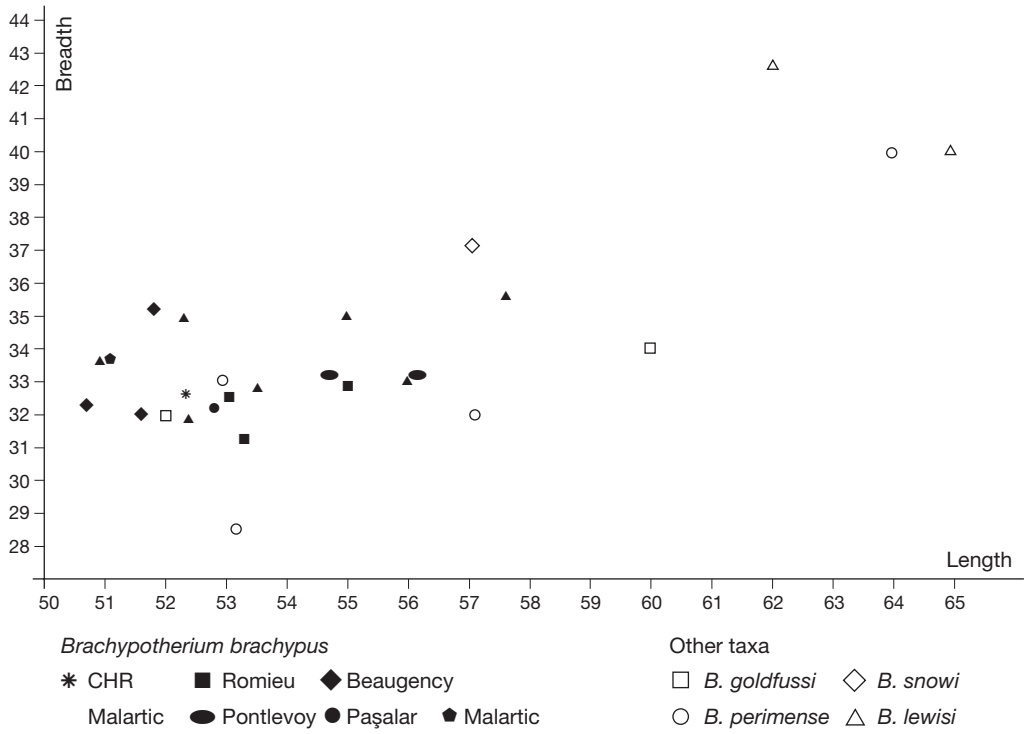

FIG. 5. — Plot comparing the length versus breadth of the m2 of *Brachypotherium* Roger, 1904 from various localities (dimensions in mm); the dental measurements are taken from Colbert (1935), Heissig (1972, 1976), Hooijer & Patterson (1972), Fortelius (1990) and Cerdeño (1993).

CONCLUSIONS

The morphological characters of the rhinocerotid dental remains from CHR, such as the flattened ectoloph, the elongated ectometaloph in the M3, the presence of crochet and antecrochet, the shallow buccal groove in the lower molars and the brachyodonty, as well as the dental size and proportions coincide with those of *B. brachypus* and allow its attribution to this species. In Eastern Mediterranean *B. brachypus* is known from MN 5 to MN 7+8. The study of the CHR micromammals suggests a Late Astaracian (MN 7+8) age and a similar age is the most possible likely for the CHR *B. brachypus.* The brachypotheres were unknown in Greece and their presence in the Chryssavgi fauna represents their first occurrence in the area.

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