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Canis othmanii sp. nov. (Carnivora, Canidae) from the early Middle Pleistocene site of Wadi Sarrat (Tunisia)



Canis othmanii sp. nov. (Carnivora, Canidae) du site de Wadi Sarrat (Tunisie), base du Pléistocène moyen

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ABSTRACT

The North African fossil record of the family Canidae is scarce and scattered and for this reason poorly known. This is particularly true for the genus *Canis*, fossils of which only come from a few sites of Morocco and Algeria. Here, we provide the description of the first material of *Canis* from the early Middle Pleistocene site of Wadi Sarrat (Tunisia), recovered in association with other fossil mammal taxa and Acheulian lithic artifacts. A cranial specimen is described and compared to other fossil and extant canid species by anatomical and morphometric analyses. The specimen shows cranio-dental morphologies and proportions considerably different from other fossil and extant African canids. Remarkably, its proportions resemble more closely those of Eurasian Early-Middle Pleistocene taxa, e.g., *Canis mosbachensis* Soergel, 1925, although its principal morphological features cannot be referred to any of the known Eurasian taxa. Therefore, we suggest to ascribe this material to a new species of canid, *Canis othmanii* sp. nov. The presence of new species of *Canis* with Eurasian affinities in the northern part of the African continent has a high significance for the fossil record of this region, as well as strong implications on the paleobiogeography of canids during the Middle Pleistocene.

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R É S U M É

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Les fossiles nord-africains de la famille Canidae sont rares et dispersés, et pour cette raison mal connus. Cela est particulièrement vrai pour le genre *Canis*, dont les fossiles proviennent seulement de quelques sites marocains et algériens. Nous rapportons ici la description des premiers fossiles de *Canis* du Pléistocène moyen ancien de Wadi Sarrat (Tunisie), trouvés en association avec d'autres taxons de mammifères fossiles et d'industries lithiques Acheuléennes. Un spécimen crânien est décrit et comparé avec d'autres espèces de canidés fossiles et modernes, grâce à des analyses anatomiques et morphométriques. Le spécimen présente une morphologie crânio-dentaire et des proportions considérablement différentes de celles des autres canidés africains fossiles et modernes. Remarquablement, ses proportions se rapprochent plus étroitement de celles des taxons du Pléistocène inférieur–moyen d'Eurasie, par exemple *C. mosbachensis*, bien que ses principales caractéristiques morphologiques ne puissent être référées à aucun des taxons eurasiens connus. Par conséquent, nous suggérons d'attribuer ce matériel à une nouvelle espèce de canidé, *Canis othmanii* sp. nov. La présence de nouvelles espèces de *Canis* avec des affinités eurasiennes dans la partie nord du continent africain a une grande importance pour le registre fossile de cette région, ainsi que de fortes implications pour la paléobiogéographie des canidés durant le Pléistocène moyen.

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1. Introduction

The genus *Canis* appears in North America during the late Miocene (Miller and Carranza-Castañeda, 1998). The earliest Asian records of *Canis* spp. come from the Yushe Basin (Shanxi Province, China), identified by Tedford et al. (1991) as *Canis* cf. *etruscus*, date to approximately 3.4 Ma. Subsequently, the radiation and dispersion of canids was considerably rapid in the whole Eurasian continent, with various species that developed different dietary adaptations and different sizes (Sotnikova and Rook, 2010). In Europe, the earliest species described are *Canis etruscus* Major, 1877 and *Canis arvensis* Del Campana, 1913. They appeared in the continent around 2.0–1.8 Ma (Bartolini Lucenti and Rook, 2016; Cherin et al., 2014), thriving especially in its southern part. The latter taxon, in particular, displays morphometric feature and proportions close to the extant *Canis aureus*. The characteristics of its dentition testify to a generalized diet, probably comparable to that of the golden jackal. The phylogenetic relationships with other fossil species and modern taxa are still doubtful.

The first appearance of canids in North Africa is represented by a jaw fragment from the Mio-Pliocene deposit of Lissasfa (Raynal et al., 1999). Further evidence of mandibles and isolated teeth of medium-sized canids comes from the latest Pliocene deposits of Ahl-al-Oughlam in Morocco. Initially, they were ascribed to *Canis* sp. (see Geraads, 1997) and later to *Nyctereutes* (Geraads, 2008). A large canid, approximately the size of a wolf, was reported as *Canis africanus* in the early Early Pleistocene site of Ain Hanech, Algeria (Arambourg, 1979), although it was thereafter ascribed to *Lycaon lycaonoides* (Kretzoi, 1938) in Martínez-Navarro and Rook (2003). Apart from these, records of canids in North African Pleistocene sites are not well documented in literature. In recent years, the archeopaleontological study at the early Middle-Late Pleistocene site of Wadi Sarrat revealed the presence of large faunal assemblage, including a cranium of *Canis* from the

black level, in association with Acheulian lithic artefacts (Martínez-Navarro et al., 2014).

Nowadays, because of the scanty materials and scarce bibliographic references, the evolutionary history and biochronology of canids in North Africa are still matter of debate. In this study, we report the discovery and discuss the results of the analyses on the cranio-dental material of *Canis* from Wadi Sarrat, showing some interesting insights to the Pleistocene diversity of canids from this region.

2. Geological setting, paleontological and archeological record

The Wadi Sarrat basin is located in northwestern Tunisia, close to the Algerian border (Fig. 1). It has an extension of 2188 km² and an average altitude of 700 meters above sea level. It is oriented east-west and surrounded by calcareous mountains of Cretaceous (Aptian) and Eocene age. This sedimentary basin was formed at the end of the early Pleistocene and was endorheic, with a central hallow lake, during the middle Pleistocene.

The Wadi Sarrat Basin has a rich continental Pleistocene record. The fossil bed is situated within a more than 6 m thick palustrine black series of more than 5 km of exposure, and it is composed of conglomerates, gravels, sands, silts, and clays. Above a discontinuity, it is superposed by a brown sedimentary series dominated also by conglomerates, gravels, sands, and clays.

The partial cranium of *Canis* (OS10-02) was found in a conglomerate level, 4 m below the top of the Black series, close to the river bed, at 2 meters from the systematic excavation undertaken during years 2010, 2012 and 2014 (Martínez-Navarro et al., 2014).

The fossil assemblage of large mammals of Wadi Sarrat is dominated clearly by the record of abundant remains of a primitive *Bos primigenius*. The fauna from the early middle Pleistocene black level, dated 0.7 Ma, is composed by Suidae indet., *Hippopotamus* sp., *Bos primigenius*, *Gazella* sp.,

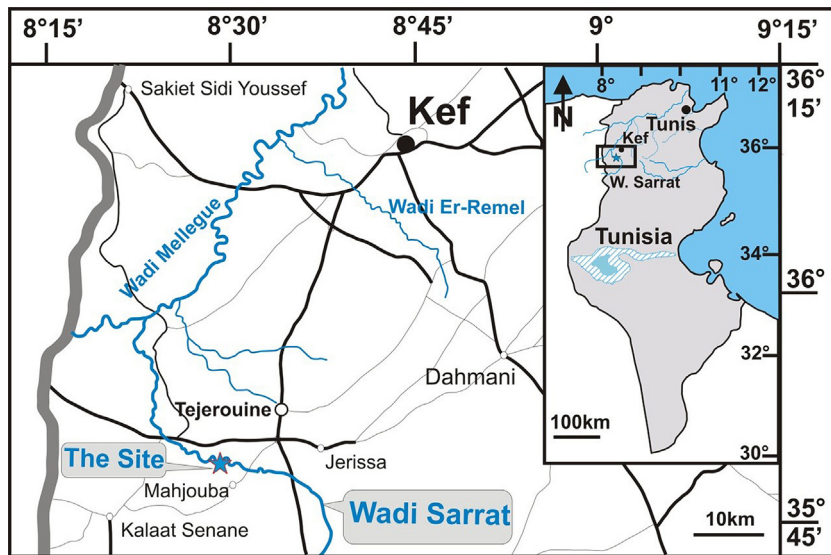


Fig. 1. Geographic localization of the Wadi Sarrat basin.

Fig. 1. Localisation géographique du bassin de Wadi Sarrat.

Ceratotherium simum and *Equus* sp.; in addition to these larger taxa, seven small mammals species have been determined (i.e. one of the order Eulipotyphla, *Crociodura* sp., and six rodents, *Mus* aff. *spretus*, *Mus* cf. *hamidae*, *Paraethomys* cf. *rbiae*, *Praomys* sp., *Meriones* sp. and *Eliomys* sp.), as well as also other small vertebrates such as one fresh water fish (Cyprinidae indet.), two anurans (the Alytidae *Discoglossus pictus* and the common toad, *Bufo bufo*), one terrapin (*Emys* sp. or *Mauremys* sp.), three squamates [an indeterminate small lacertid or scincid lizard, *Natrix maura* (Natricidae), and an indeterminate colubrid snake (Colubridae)], and one small-sized bird (Passeriformes indet.). Also there is a rich malacofauna assemblage, composed of six gasteropods (*Cerutuella virgata*, *Xerosecta cespium*, *Sphincterochila baetica*, *Helix melanostoma*, *Eobania vermiculata* and *Rumina decollata*) and only one bivalve (*Unio ravoisieri*) (see Karoui-Yaakoub et al., 2016; Martínez-Navarro et al., 2014; Mtimet et al., 2014).

A combination of paleomagnetic data together with the record of small mammals from the black level of Wadi Sarrat at the locality, where the earliest *Bos primigenius* cranium and the *Canis* cranium were found, indicates that the site can be confidently dated to the base of the Middle Pleistocene, around ~0.7 Ma (Martínez-Navarro et al., 2014).

The climatic and paleoecological data are basically supported by the good record of reptiles, amphibians and mollusks. The presence of *Bufo bufo* indicates that the site of Wadi Sarrat was under the influence of a warmer climate and wetter than it is today, probably tropical hot and humid. Consequently, the fossil assemblage, considered as a whole, may suggest that the site was formed during a period of more humid and temperate climate than today. Such moister climatic conditions may be related to an interglacial period of the Middle Pleistocene (Martínez-Navarro et al., 2014; Karoui-Yaakoub et al., 2016).

Some lithic tools were recovered *in situ* (flakes, fragments of nucleus, etc.) during three seasons of systematic excavation in Wadi Sarrat. In the black level, associated with several fossil bones, including a craniums of *Bos primigenius* and *Canis*, evidence was found of a knapping strategy organized around the core's periphery. The lithic assemblage of core and the removed flakes, falls within the variability of the Mode 2 or Acheulian technological complex (Martínez-Navarro et al., 2014).

3. Materials and methods

The specimen OS10-02, included in this study, comes from the site of Wadi Sarrat and is housed at the Museum of the National Office of Mines (ONM), Tunis.

Comparative material of Early Pleistocene canids here considered are those held in the Museum of Natural Sciences of Florence (Geology and Paleontology Section) (Italy), and in the Institut Català de Paleontologia Miquel Crusafont (Campus de Universitat Autònoma de Barcelona, Cerdanyola del Vallès, Barcelona, Spain). Material of the following extant species housed in the Institut Català de Paleoecologia Humana i Evolució Social-IPHES (Tarragona, Spain) and in the "La Specola" Zoology Section of the Museum of Natural History of Florence were used for comparative purpose: *Canis aureus* Linnaeus, 1758, *Canis anthus* (Cuvier, 1820), *Lupulella mesomelas* (Schreber, 1775), *Lupulella adusta* (Sundevall, 1847), *Lycaon pictus* (Temminck, 1820), and *Canis lupus* Linnaeus, 1758. Moreover, additional comparison material of extant and fossil species was taken from literature (Bartolini Lucenti and Rook, 2016; Bartolini Lucenti et al., 2017; Cherin et al., 2014; Geraads, 2011; Geraads et al., 2004; Martínez-Navarro and Rook, 2003; Petrucci et al., 2012, 2013; Tedford et al., 2009; Werdelin and Lewis, 2005).

Table 1

Dimensions of two maxillary fragments of *Canis othmanii* sp. nov. (OS10-02). All measurements are in mm.

Tableau 1

Dimensions des deux fragments maxillaires de *Canis othmanii* sp. nov. (OS10-02). Toutes les mesures sont en mm.

	Right		Left	
	L	W	L	W
I 1	–	–	4,31	5,35
P 1	7,38	4,42	6,54	4,4
P 2	11,06	4,67	–	–
P 3	–	–	12,32	4,9
P 4	20,54	10,38	20,65	11,09
M 1	14,46	18,81	–	–
P 1-P 4	55,29	–	–	–

All measurements were made by a digital caliper (with approx. error of ± 0.05 mm). The photos were taken using a digital camera that has a resolution of 18 megapixels and selected photos were edited using Adobe Photoshop CS2.

In this study, we use log-ratio diagrams (Simpson, 1941; Simpson et al., 1960) in order to visualize in a clear and simple way the differences in size and proportions of the *Canis* material from Wadi Sarrat in comparison to extant and fossil canids from Eurasia and Africa. In these graphs, we

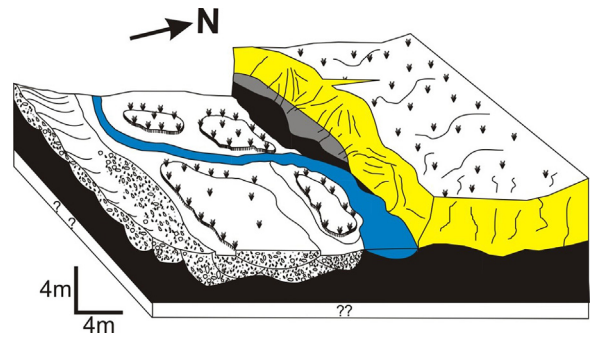


Fig. 2. Bloc diagram of the geologic layers present in the Wadi Sarrat site.
Fig. 2. Block diagramme des couches géologiques représentées dans le site de Wadi Sarrat.

plot log-transformed measurements of the taxon against those of a standard taxon (*C. lupus*). On the vertical axis, are reported the morphological descriptions, whereas on the horizontal axis there are the differences between values. We can therefore easily visualize the relative size differences of all taxa (corresponding to the distance between the reference taxon and other taxa).

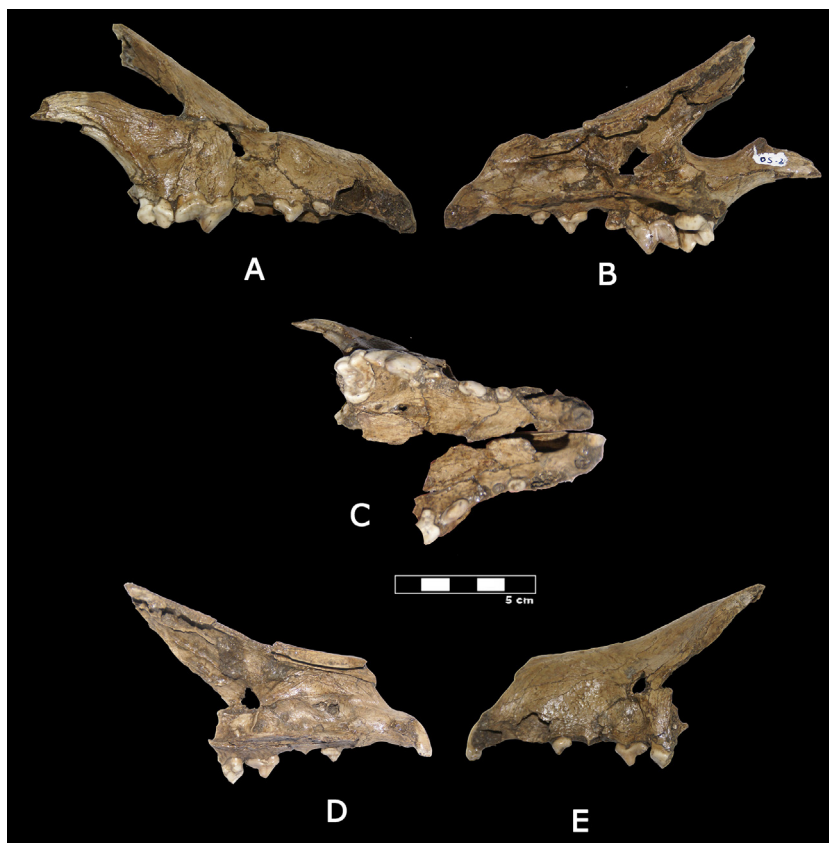


Fig. 3. Cranium (OS10-02) of *Canis othmanii* sp. nov.: A: right lateral view (published in Fig. 2A of Martínez-Navarro et al., 2014); B: right medial view; C: occlusal view; D: left medial view; E: left lateral view. The scale bar equals 5 cm.

Fig. 3. Crâne (OS10-02) de *Canis othmanii* sp. nov.: A: vue latérale droite (publiée sur la Fig. 2A de Martínez-Navarro et al., 2014); B: vue médiale droite; C: vue occlusale; D: vue médiale gauche; E: vue latérale gauche. L'échelle représente 5 cm.

3.1. Abbreviations

3.1.1. Cranial and dentognathic abbreviations

P1, first upper premolar; **P2**, second upper premolar; **P3**, third upper premolar; **P4**, fourth upper premolar; **M1**, first upper molar; **M2**, second upper molar.

3.1.2. Institutional and collection

FSB, Faculty of Science of Bizerte, Tunisia; IGF, Museum of Natural History, Geology and Paleontology section, University of Florence (Italy); IPHES, Institut Català de Paleoecologia Humana i Evolució Social, Tarragona, Spain; MZUF, Museum of Natural History, “La Specola” Zoology section, University of Florence (Italy); ONM, National Office of Mines, Tunisia; OS, Wadi Sarrat.

4. Systematic paleontology

Order Carnivora [Bowditch, 1821](#)

Suborder Caniformia [Kretzoi, 1938](#)

Family Canidae [Fischer, 1817](#)

Subfamily Caninae [Fischer, 1817](#)

Tribe Canini [Fischer, 1817](#)

Genus *Canis* [Linnaeus, 1758](#)

Canis othmanii sp. nov.

Holotype: Cranium with both palates OS10-02, with right maxillary fragment preserving P1–P2, distal part of the P3 and P4–M1 and left maxillary preserving I1, P1, P3, and the mesial portion of P4.

Biometric data of the holotype: see [Table 1](#).

Derivatio nominis: it is dedicated to the discoverer of the fossil and the site, Abdelhak Othmani, who together with his family are long-time owners of the land where the site of Wadi Sarrat is located, and have been great supporters of this research.

Type locality: the early Middle Pleistocene black level of Wadi Sarrat; UTM coordinates: X 0454811, Y 3963837; Kef province, Tunisia ([Fig. 2](#)).

4.1. Description

Cranium. OS0-02 ([Fig. 3](#)) shows exclusively the maxillae, both palates and the long right nasal bone. It is small but robust. In lateral view, the skull profile seems to be quite steep, and the maxillo-frontal suture seems very high. The palate seems to be rather wide.

Upper dentition. The only incisor preserved is a robust and wide I1. Its occlusal surface is worn. Both canines are missing, but their alveoli show a rather consistent mesio-distal enlargement (e.g., the alveolus of the left canine is 12.8 mm long). The first upper premolar is single-rooted, has a conical crown and a quite elongated talon. It is low-crowned and enlarged bucco-lingually. The P2 is elongated mesio-distally and does not present any distal accessory cusp. The P3 is slightly longer than the P2 and it presents a small distal accessory cusp behind the protocone. The right P3 is broken and the mesial alveolus shows signs of reabsorption. In the upper carnassial, the protocone slightly

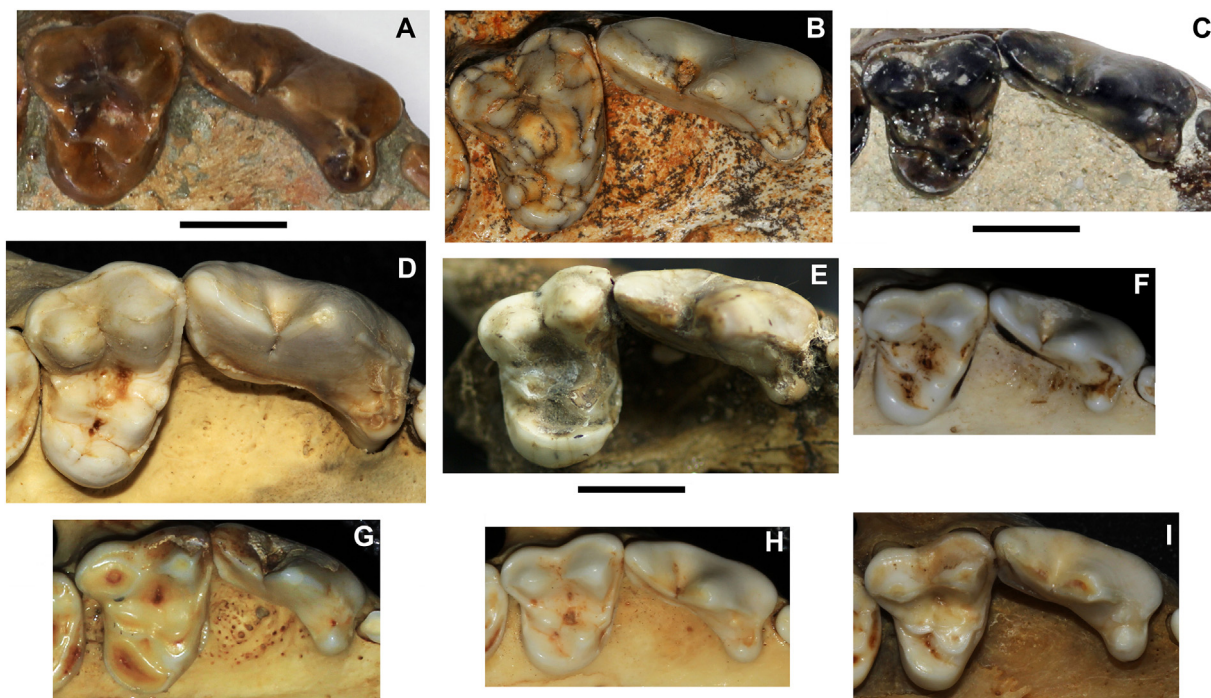


Fig. 4. The upper carnassial and M1 of some extant and fossil species. A. *C. etruscus* (IGF 12867V). B. *C. mosbachensis* (DE 2 ac). C. *C. arnensis* (IGF 7919V). D. *C. lupus* (MZUF 11874). E. *C. othmanii* (OS10-02). F. *C. anthus* (MZUF 1842). G. *L. adusta* (MZUF 8496). H. *L. mesomelas* (MZUF 1898). I. *C. aureus* (MZUF 11880). The scale bar equals 1 cm.

Fig. 4. Carnassière supérieure et M1 de quelques espèces fossiles et modernes. A. *C. etruscus* (IGF 12867V). B. *C. mosbachensis* (DE 2 ac). C. *C. arnensis* (IGF 7919V). D. *C. lupus* (MZUF 11874). E. *C. othmanii* (OS10-02). F. *C. anthus* (MZUF 1842). G. *L. adusta* (MZUF 8496). H. *L. mesomelas* (MZUF 1898). I. *C. aureus* (MZUF 11880). Les échelles correspondent à 1 cm.

projects mesially compared to the mesial border of the tooth. The metastylar blade is rather low and elongated mesio-distally. The P4 shows a strong lingual cingulum. The M1 is elongated bucco-lingually with a rather enlarged and rounded talon, which is poorly arched distally. The paracone and the metacone are almost equal in size. On the mesio-buccal margin, the parastyle is prominent. On the talon, the well-developed metaconule and the worn protocone and protoconule are evident. The hypocone is only slightly individualized from the lingual cingulum.

The measurements are shown in the Table 1.

4.2. Morphological comparisons

The P4 presents an individualized protocone, which projects slightly beyond the mesial margin of the tooth, unlike *C. aureus*, *C. anthus*, *L. mesomelas* or *C. lupus*. This feature also contrasts with the condition seen in European Early Pleistocene canids like *Canis mosbachensis* Soergel, 1925 from Pirro Nord, Cueva Victoria and Untermassfeld or with *C. arnensis* and *C. etruscus* from Upper Valdarno, where the protocone lies at level of the mesial margin of the P4 or is placed more lingually. The mesial projection of the P4 protocone is similar to that of *L. adusta*, but the latter canid has a stouter protocone compared to that of

the *Canis* specimen from Wadi Sarraat. The metastylar blade is elongated mesio-distally, similar to *C. arnensis*, although the paracone is higher than in that species (Bartolini Lucenti and Rook, 2016).

The M1 is particular in shape as its talon is large mesio-distally and not arched backwards as in other extant or fossil canids (see Fig. 4). Moreover, the mesio-distal breadth of the trigon is similar to that of the talon, whereas in modern species the talon is generally narrower (see Fig. 4). In this regard, the canid from Wadi Sarraat is closer to *C. mosbachensis* from Pirro Nord, although the M1 of the latter species shows other features (e.g., the larger paracone compared to the metacone; a round and large protocone basin; a prominent cingulum in the mesial and distal side of the tooth; see Bartolini Lucenti et al., 2017) which cannot be found in OS10-02. The metaconule of the M1 is particularly well developed and larger-based compared to the modern African canids (i.e. *C. anthus*, *L. mesomelas*, *L. adusta*), the golden jackal (*C. aureus*) and the European fossil species *C. etruscus*, *C. mosbachensis* and *C. arnensis*.

Canis othmanii sp. nov. lacks all the hypercarnivorous features shared by wild dog-like canids (e.g., *Lycaon lycaonoides*, *Cuon alpinus*, *Canis africanus*) like the bucco-lingual enlargement of the P4; the strongly larger paracone of the M1 compared to the metacone; the short talon of

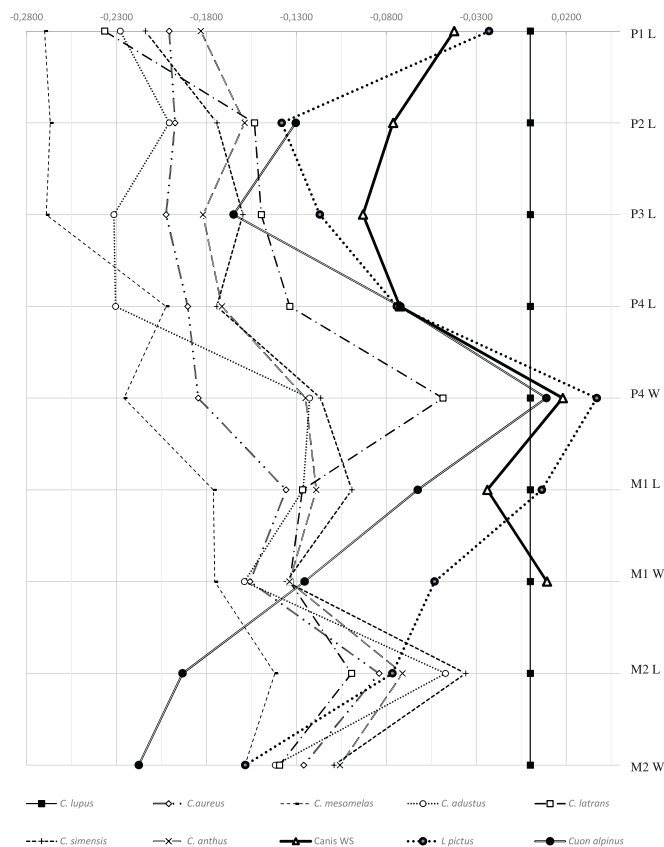


Fig. 5. Log-ratio diagram based on log-transformed mean dental measurements of extant species of *Canis* and *C. othmanii*. *C. lupus* is used as a reference. Tooth measurements taken into consideration are shown on the right side.

Fig. 5. Diagramme *log-ratio* basé sur les mesures dentaires log-transformées des espèces modernes de *Canis* et *C. othmanii*. *C. lupus* est utilisé comme référence. Les mesures dentaires prises en compte sont montrées sur le côté droit.

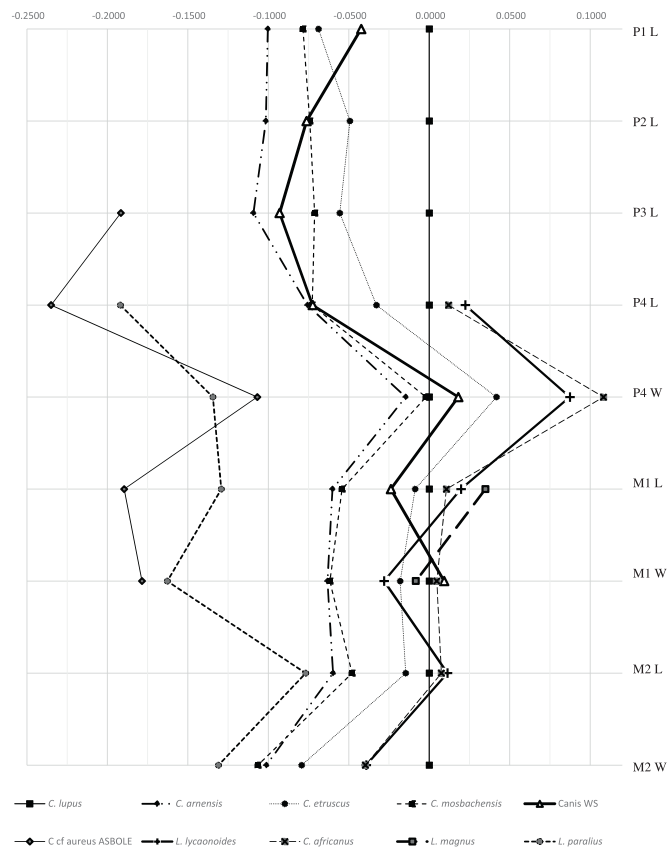


Fig. 6. Log-ratio diagram based on log-transformed mean dental measurements of extant species of *Canis* and *C. othmanii*. Tooth measurements taken into consideration are shown on the right side.

Fig. 6. Diagramme log-ratio basé sur les mesures dentaires log-transformées des espèces modernes de *Canis* et *C. othmanii*. Les mesures dentaires prises en compte sont données sur le côté droit.

the M1 with large protocone and hypocone and a reduced metaconule.

4.3. Morphometric analyses

The morphometric analysis of the dentognathic material of *Canis othmanii* sp. nov. (Figs. 5 and 6) shows important differences with the extant African *L. adusta*, *L. mesomelas*, *C. anthus* and Eurasian *C. aureus*. In fact, its size stands in the middle between that of modern *C. lupus* and that of the smaller jackals, as can be seen from the log-ratio diagram in Figs. 5 and 6. An attribution to the coeval *Lycaon lycaonoides* can be ruled out as the size and proportions of the latter taxon are considerably larger than the African species here considered (Fig. 6). The same can be said about *L. pictus* and *Cuon alpinus*.

As far as African fossil taxa are concerned, the Early Pleistocene *Lupulella paralius* (Geraads, 2011) is smaller, with proportions more similar to modern species, particularly *L. adusta*. In fact, *Lupulella paralius* could represent an early form of this modern jackal. The species *C. africanus* (considered here as separate taxon as in Geraads, 2011, although Martínez-Navarro and Rook, 2003 deemed it as part of *L. lycaonoides*) has proportions very close to *L. lycaonoides* and, as *Lycaon magnus* (Geraads, 2011), is

considerably larger than the canid from Wadi Sarrat. It also shows numerous morphological differences. *Canis* cf. *aureus* from Asbole (see Geraads et al., 2004) is much smaller in its dental proportions than the species from Wadi Sarrat. The upper dental proportions are, by all means, closer to the Eurasian stock of fossil canids like *C. arnensis*, *C. etruscus* and *C. mosbachensis*.

5. Discussion

5.1. Taxonomic remarks on *Canis othmanii* sp. nov.

The morphometric and anatomical features of *Canis othmanii* sp. nov., show on the one hand, significant distinction from the modern *L. adusta*, *L. mesomelas*, *C. aureus* and *C. anthus* (e.g., larger size; shape of the P4 protocone; length of the M1). On the other hand, we observe that the new species does not possess peculiar hypercarnivorous dental adaptations such as *Canis (Xenocyon) ex gr. falconeri* (sensu Sotnikova, 2001), *L. lycaonoides* and modern *L. pictus* do have.

From our analyses, it is clear that size and proportions of the teeth of *C. othmanii* sp. nov. are closer to those of the European Early-Middle Pleistocene fossil canids (i.e. here *C. arnensis* and *C. etruscus* from Olivola and Upper

Valdarno and *C. mosbachensis* from Pirro Nord, Untermassfeld and Cueva Victoria) rather than to other African fossil and extant species, as shown in Figs. 5 and 6. Nevertheless, the dental morphology of *C. othmanii* shows peculiarities, which cannot be found in other Villafranchian and Epivillafranchian species of both Africa and Eurasia.

5.2. History of Eurafrikan canids

At present, the knowledge of the history and the pattern of the dispersion of Canidae in Africa is scarce, due to several issues, such as the reduced number of sites with canids, their scattered distribution in the continent, number of fossils, etc. (Geraads, 2008; Werdelin and Dehghani, 2011). The first attested record in the African continent is nowadays that of *Canis* sp. A from South Turkwel (Kenya), dated approximately between ca 3.58 and 3.2 Ma (Werdelin and Lewis, 2000, 2005). Fossil materials of *Lupulella adusta* are reported from the 3-million-years-old South African site Makapansgat 3 (Ewer, 1956). The characteristic of the upper second molar (M2) and the relative elongation of both molars of *Lupulella adusta* are similar to some material fragments reported from early Early Pleistocene site of Ain Boucherit (Algeria), dated to 2.3 Ma (Arambourg, 1979). A large jackal-like form is also mentioned in several sites in the Late Pleistocene in Morocco, e.g., Dar es Soltane, Doukkala II (Michel and Wengler, 1993), Zourah Cave (Aouraghe, 2000) and Cap Achakar (Ouachau and Amani, 2002). From the Early Pleistocene site of Aïn Hanach (ca. 1.8 Ma), a maxilla of the large canid *Canis* cf. *atrox* (Arambourg, 1979) has been recovered. This specimen has then been assigned to the genus *Lycaon* by Martínez-Navarro and Rook (2003).

According to Geraads (2008), the first record of a living canid in North Africa appears only in the late Middle Pleistocene site of Sidi Abderrahmane (Morocco). The author assigns this material to *C. aureus*, as it “cannot be separated from” this taxon.

The recovered fauna from Wadi Sarrat site is particularly similar to that living in the various extant environments of East Africa, given that some of these taxa are still existing there today.

The material of *Canis* from Wadi Sarrat possess peculiar features and proportions, which are unique among North African canids; this suggests an attribution of the specimen OS10-02 to a new species of *Canis*.

The record in North Africa of a canid with morphometric affinity to Eurasian taxa is, for now, unprecedented for this age and, therefore, this has important implications for the latest early-middle Pleistocene biogeography of canids, not only of Africa but also of the circummediterranean regions, as well as of the entire Eurasia, testifying to the increasing trend of radiation and rapid dispersion of *Canis* spp. in the late Villafranchian/Epivillafranchian (Sotnikova and Rook, 2010).

6. Conclusion

The early Middle Pleistocene mammal assemblage from Wadi Sarrat is similar to that reported from other coeval sites of North Africa, where the genus *Canis* has been known

since the late Pliocene. The morphological and morphometric analyses of the specimen OS10-02 show the closer similarity of this canid to Eurasian Early Pleistocene taxa rather than to North African ones, other African species of the fossil record or to the extant *C. anthus*, *C. aureus*, *L. mesomelas*, *L. adusta* and the modern *Canis lupus*. For these reasons, we ascribe Wadi Sarrat material to *Canis othmanii* sp. nov. The record of a new taxon in a North African deposit with Eurasian affinities, during the Middle Pleistocene, opens an unprecedented scenario on the evolutionary history, biogeography and dispersion of canids in the Old world.

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