

Original article

*Pelorovis howelli* nov. sp. (Mammalia, Artiodactyla):  
a new bovine from the Lower Pleistocene  
site of Aïn Hanech (El-Kherba locus), Northeastern Algeria

*Pelorovis howelli* nov. sp. (Mammalia, Artiodactyla) :  
Un nouveau bovini du site Pléistocène inférieur d'Aïn  
Hanech (locus d'El-Kherba), Algérie Orientale

Djillali Hadjouis<sup>a,\*</sup>, Mohamed Sahnouni<sup>b</sup>

<sup>a</sup> Laboratoire Départemental d'Archéologie du Val-de-Marne, 7-9, rue Guy Moquet, 94800 Villejuif, France

<sup>b</sup> CRAFT Research Center, Indiana University, and Stone Age Institute, 1392 W. Dittmore Road, Gosport (Bloomington) 47433, Indiana, USA

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**Abstract**

The archaeological investigations recently undertaken in the vicinity of the Lower Pleistocene site of Aïn Hanech led to the identification of additional Oldowan horizons and the discovery of new loci, among which was the locus of El-Kherba. Besides the lower Pleistocene faunal remains associated with Oldowan artifacts, the 1999 excavations, carried out at El-Kherba, exposed a bovine skull with complete horn cores. It belonged to a taxon never been previously encountered or described in the Plio-Pleistocene and Lower Pleistocene deposits of the Maghreb. It receives here its first description.

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**Résumé**

Les fouilles entreprises récemment dans le gisement oldowayen de l'Aïn Hanech (Sétif, Algérie Orientale), ont mis en évidence des faunes de vertébrés associées à une industrie lithique. Outre les restes fauniques du Pléistocène inférieur associés à des artefacts oldowayens, la campagne de 1999 a livré un massacre de bovini dont les chevilles osseuses sont complètes. Ce taxon jamais trouvé ni décrit auparavant dans les niveaux villafranchiens du Maghreb reçoit ici sa première description.

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**Keywords:** Maghreb; Algeria; Plio-Pleistocene and Lower Pleistocene; Bovids; *Pelorovis*; New species

**Mots clés :** Maghreb ; Algérie ; Plio-Pléistocène et Pléistocène inférieur ; Bovidés ; *Pelorovis* ; Nouvelle espèce

**1. Introduction**

Comprehensive investigations recently undertaken in the paleontological and archaeological area of Aïn Hanech in north-

eastern Algeria have delineated additional Lower Pleistocene horizons and have revealed new loci, including the locus of El-Kherba (Sahnouni, 1998). El-Kherba is situated 400 m south of the classic locality of Aïn Hanech near the town of El-Eulma (administrative province of Sétif) (Fig. 1). The locus of El-Kherba is a lateral extension of Aïn Hanech and is stratigraphically equivalent to it. The site of Aïn Hanech was formed within the Aïn Hanech Formation. Based mainly upon

\* Corresponding author.

E-mail address: [djillali.hadjouis@cg94.fr](mailto:djillali.hadjouis@cg94.fr) (D. Hadjouis).

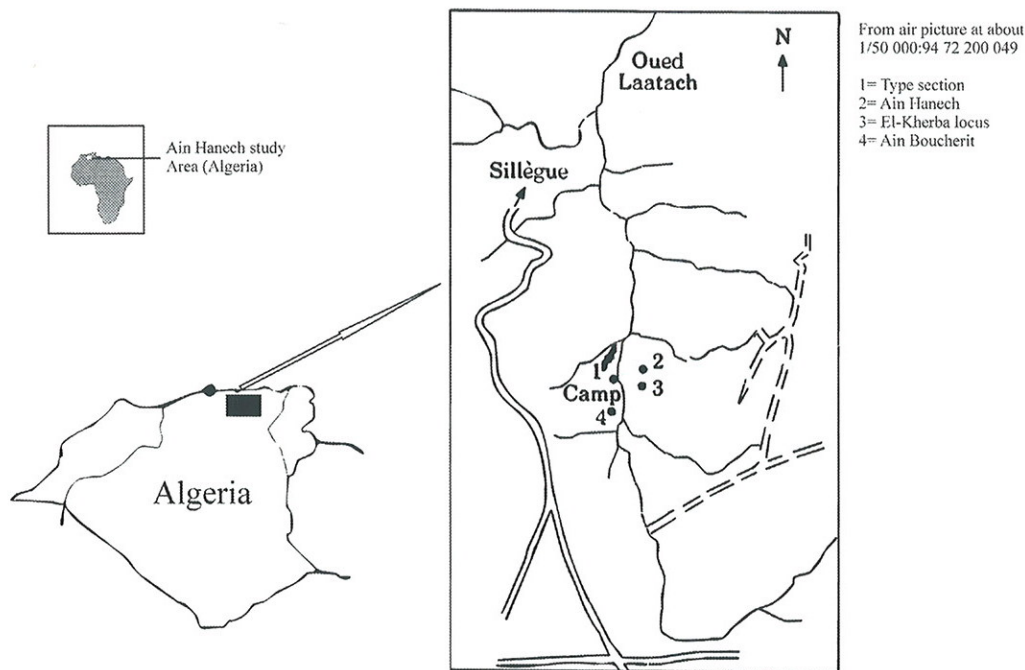


Fig. 1. Geographic location of Ain Hanech site (Northeastern Algeria).  
Fig. 1. Situation géographique du site de l'Ain Hanech (Algérie Orientale).

direct altimetric evidence, the site is correlated with Unit T of that formation (Sahnouni and Heinzelin, 1998). Taking into account the Villafranchian character of the associated vertebrate fauna, Unit T is dated paleomagnetically to the Olduvai subchron ca. 1.77 my (Sahnouni et al., 1996; Sahnouni and Heinzelin, 1998; Sahnouni et al., 2002, 2004).

In addition to a Lower Pleistocene fauna, the excavations exposed a bovine cranium with complete horn cores associated with Oldowan artifacts. Faunal species of biostratigraphic interest include *Elephas moghrebiensis*, *Equus numidicus*, *E. tabeti*, *Kolpochoerus* cf. *heseloni*, and *Sivatherium maurusium*. Preliminary data indicate that Ain Hanech site represents a location for meat acquisition by early hominids. This paper provides the original description of the bovine taxon from the Lower Pleistocene deposits of the Maghreb.

## 2. Systematic paleontology

Family BOVIDAE Gray, 1821

Sub-Family BOVINAE Gray, 1821

Tribe BOVINI Gray, 1821

Genus *Pelorovis* Reck, 1928

**Type-species:** *Pelorovis oldowayensis* Reck, 1928.

**Type species diagnosis:** Gentry and Gentry, 1978.

*Pelorovis howelli* nov. sp.

**Holotype:** A cranium preserving the upper part of the frontal, parietals, and complete horn cores measuring 1 m; stored in the National Museum of Sétif, Algeria, under the catalogue number: Ain Hanech, KH99-L24-48 (Fig. 2).

**Type locality and Horizon:** Ain Hanech (El-Kherba locus) (Guelta Zergua, Sétif, Algeria). Ain Hanech Formation, Unit T Upper.

**Age:** Lower Pleistocene.

**Etymology:** Neither this species (*Pelorovis howelli*) nor the one with which it shares affinities (*Pelorovis oldowayensis*) have previously been recovered in North Africa. The species is named in honor to Professor Clark Howell.

**Diagnosis:** A small-sized *Pelorovis* with long and divergent horn cores that are fairly well preserved, spanning 1 m from tip to tip; differs from all other species of its genus by a large spacing between the horn cores at their insertion; from *Pelorovis kaisensis* in that the horn cores first curve backward in the frontal plane overhanging the occipital surface, and then diverge outward and finally forward, the apex being oriented upward; from *Pelorovis oldowayensis* by its smaller horn cores with a single spiral tight forward and extremities oriented upward; from *Pelorovis antiquus* by its smaller size and by horn cores with an entirely different orientation; from *Pelorovis turkanensis* by a larger spacing between the horn cores at their insertion and by lacking longitudinal keels.

**Description:** Even though the parts comprising the face, the back, and the base of the cranium are not preserved, the fairly well preserved horn cores allow us to describe this bovine and to show its affinities and dissimilarities with others from Africa and Eurasia. The cranium has a relatively narrow and bulging frontal region and a narrow occipital region that lacks a supra occipital crest. Although the boundary between the peduncles and the beginning of the horn cores is no longer visible, the peduncles seem very short. The dorsoventral compression of the horns is important in the two first thirds of their maximum dimension, (150 mm × 119 mm at the base) and





Fig. 2. Holotype of *Pelorovis howelli*, KH99-L24-48, complete horn cores; (A) Upper frontal view of the frontal and horn cores showing all the characteristics of a fossil buffalo, including the orientation, curvature, and spiral shape of the horns. These features are shared with *P. oldowayensis*. However, there are details that make this new taxon original, such as separation of the horns at their insertion, bulging of the frontal, and less expanding horn cores than the Olduvai buffalo; (B) Anterior-distal view of the left horn core, showing the dorso-ventral flatness of the horn at its beginning and center, as well as the forward curvature of the tip. Photo © M. Sahnouni.

Fig. 2. Holotype de *Pelorovis howelli*, KH99-L24-48, chevilles osseuse complètes ; (A) Le frontal et ses chevilles osseuses de corne en vue frontale supérieure, montre toutes les caractéristiques d'un buffle fossile dont l'orientation, la courbure et la spiralisation se rapprochent du buffle d'Olduvai bien que certains détails font l'originalité de ce nouveau taxon : légère séparation des chevilles à leur insertion, frontal gonflé, envergure moins importante que celle de *P. oldowayensis*; (B). Détail de la cheville osseuse gauche en vue antéro-distale montrant l'aplatissement dorso-ventrale de la cheville à son départ et en son milieu et la courbure de la pointe vers l'avant.

Table 1

Measurement of the horn cores. [() = estimate]

Mensurations des chevilles osseuses. [(] = estimation]

Anatomical features	Measurements (mm)
Distance posterior edge–frontal–nasal suture	(230)
Frontal height	(200)
Width above the orbits	(270)
Distance parietal–posterior edge of the frontal	(70)
Space between the horn cores at the base	64
Anterior-posterior diameter (APD) × Dorso-ventral diameter (DVD) at the base of the horn cores	150 × 119
Anterior-posterior diameter (APD) × Dorso-ventral diameter (DVD) at the middle of the horn cores	130 × 90
Horn cores span (from tip to tip)	1000
Divergence angle of the horn cores at the base	91°

(130 mm × 90 mm at the middle) (Table 1). The compression becomes oval in the final third, just as the horns curve forward and upward. The divergence angle of the horn cores is about

90°. No keel or true angulations are observable on this specimen. There is a keel in the anterior-inferior region whose path is visible from the orbital summit (assuming that the horns are inserted just behind them) until the tips. The strong grooves, which generally are visible on the horn cores of buffalos, are here absent. However, it is highly probable that this absence is only due to the alteration of some portion of the bone surface.

### 3. Comparison and discussion

There is no similarity to the three bubaloides bovines previously recovered in the Plio-Pleistocene sites of Aïn Boucherit and Aïn Hanech (Arambourg, 1979). In the first, *Bos palaethiopicus* from Aïn Boucherit, in addition to the presence of a high supra occipital crest overhanging the occipital surface, the horns are of smaller size, are slightly compressed dorsoventrally at the base (72 mm × 54 mm), and are clearly sub-



circular in its middle. A second specimen was recovered with a more marked elliptic cross-section (103 mm × 73 mm at the base and 59 mm × 43 mm 10 cm from the end). In the second bovine, *B. bubaloides* from Aïn Hanech, the bases of the horn cores are distantly inserted one from each other on a smooth surface and are transversally less convex. The elliptic cross-section is smaller as well (104 mm × 83 mm at the base) (Arambourg, 1979). The third bovine, described by Arambourg at Aïn Hanech (Arambourg, 1979) is *B. praeaffricanus* which Geraads (1981) showed that was about the same species that *B. bubaloides*. In addition, Geraads and Amani (1998) think that *B. praeaffricanus* would be the same individual that *B. bubaloides* and name it *Pelorovis praeaffricanus*. *P. howelli* is notably marked by bigger horn cores curvature in half circle, whereas in *P. praeaffricanus* they form a largely more open and more loose arc. Moreover, it is worthwhile to point out the presence in the North African Lower Pleistocene, of not a single buffalo but the probable coexistence of two bovine lineages, which *P. howelli* would be North African.

Table 2 provides the horn core morphological characteristics of known *Pelorovis* and *Syncerus* species. There is some morphological resemblance between this proposed new species and *Pelorovis oldowayensis* Reck, 1928 from Bed II (SHK, BK II) and Bed IV (Olduvai Gorge, Tanzania) and *Pelorovis turkanensis* Harris, 1991 (KNM-ER 524, 2079, 718, 530 from Koobi Fora Member of the Koobi Fora Formation, Kenya), regarding horn core insertion, its curvature and spiral. In *P. oldowayensis*, besides the similar backward and outward curvature and the similar spiraling of the horns forward, the horns are close together at their insertion. However, details clearly distinguish the Aïn Hanech bovine from the Olduvai specimen, particularly the closeness of the horn cores at their base. However, in the Algerian specimen, the cores are spaced about 4–6 cm apart, roughly like in *Ovis antiqua*, in some caprids, and also in *P. turkanensis*. There is no separation in *P. oldowayensis*. In addition, horn curvature of *P. howelli* begins at the base with a more pronounced roundness, which results in less divergence, whereas in the Olduvai specimen the curvature appears at this level to be less abrupt. Therefore, the spiral curvature is tight in *P. howelli* and open in *P. oldowayensis*. *P. howelli* is

also different from *P. oldowayensis* found in Ubeidiya (Bar Yosef and Goren-Inbar, 1993; Tchernov and Guérin, 1986), by horns that are very close to each other and are less arched than in both Olduvai and Aïn Hanech specimens. Although there are similarities with *P. turkanensis* Harris, 1991 (large divergence of horn cores, horns curvature backward, narrow cranium at the frontal region, bulging frontal, very elevated horn cores tips, and a tight spiraling), *P. howelli* is different by a larger spacing between the horn cores at their insertion and by the absence of longitudinal keels. *P. oldowayensis*, *P. turkanensis*, and *P. howelli* possess horn cores that curve forward in a single spiral.

Compared with earlier African bovines, *P. howelli* presents few similarities with *Ugandax gauthieri* Cooke and Coryndon, 1970 from Kazinga (Uganda) despite its Pliocene age, particularly regarding horn spacing and their less marked divergence. However, the horns remain very little compressed in *Ugandax*. In *Simatherium kohllarseni* Dietrich, 1942 from Laetoli (Tanzania), the other Pliocene bovine, the horns are inserted far apart and do not show spiral, just as in *Simatherium demissum* Gentry, 1980, 1987 from Langebaanweg. *Simatherium shungurensis* Geraads, 1995, a bovine with a long face and wide frontal, presents very backwardly inclined but less divergent horns, long and spindly with loose double spiraling (Geraads, 1995). Importantly, Gentry (1967) considers that although it differs in some of its morphology, the genus *Simatherium* is the ancestor of *Pelorovis*.

Morphological differences with other East and South African fossil buffalos are equally important. *Pelorovis kaisensis* Geraads and Thomas, 1994 (Kaiso, Uganda) is much closer to the cranial morphologies of *Syncerus antiquus* from Olduvai, whose horns are transversally oriented (Geraads and Thomas, 1994), and are slightly similar to those of *Syncerus* sp. from the Omo Valley in Ethiopia (Gentry, 1985). In *Bubalus nilsoni* Lönnberg, 1933 or *Bubalus bainii* Seeley, 1891 the horn cores are backwardly oriented and slightly downward as observed in *Syncerus antiquus*. Thus, on these grounds *P. howelli* is distinct from *P. kaisensis*.

Regarding the Maghrebian Upper Pleistocene bovines (the holotype from Constantine area # 6854, a second specimen

Table 2

Comparative horn cores morphological features of *Pelorovis* and *Syncerus*Comparaison des caractéristiques morphologiques des chevilles osseuses de *Pelorovis* et *Syncerus*

<i>Pelorovis</i> , <i>Syncerus</i> species	Horn core morphological features
<i>P. oldowayensis</i> , Olduvai	Medium-sized horn cores, curvature backward and outward, then single curvature with loose spiral forward; the horns are close to each other at their insertion with round to oval cross-section.
<i>P. oldowayensis</i> , Ubeidiya	Large horns, larger than those of the type species; curvature backward and outward, then forward; loose spiral.
<i>P. turkanensis</i>	Smaller horn cores than those of the type species; curvature backward and divergent outward; tight single spiral forward, tips oriented upward; horns are distant from each other at their insertion; presence of longitudinal keels; weak to strong dorsoventral compression.
<i>P. kaisensis</i>	Medium-sized horn cores, straight, with transversal orientation, slightly curved backward from their beginning, the tips are oriented upward and forward; loose double torsion; absence of keels; weak dorsoventral compression.
<i>S. antiquus</i>	Very large horn cores (3 m on the Djlefa, Algeria, specimen), oriented backward and downward; loose curvature upward at mid-distance of the horn cores; the horn cores are distantly inserted to each other; strong dorsoventral compression with triangular section; presence of one or two keels.
<i>P. howelli</i> nov. sp	Horn cores slightly smaller than those of the type species, probably of similar size to those of <i>P. turkanensis</i> ; curvature backward and divergent outward from the insertion; single spiral tight forward, tips oriented upward; short peduncles; medium to strong dorsoventral compression in the first two third; and absence of keels.



from Constantine as well, and the one from Djelfa), the very expanded horns are oriented downward and outward with a curvature upward that starts at mid-distance of the horns. On the specimen from Djelfa (*Bubalus antiquus* Duvernoy, 1851) (right horn core measuring 1.5 m), only two anterior spaced keels are observable.

We have concluded (Hadjouis, 1985, 2002, 2003, 2005) along with others (Geraads, 1992; Klein, 1994; Peters et al., 1994) that all the specimens previously identified as *Pelorovis antiquus* should be included in *Syncerus*. Therefore, *Syncerus antiquus complexus* nov. sp. Hadjouis (Hadjouis, 2002) from the Algerian site of Phacochères, appears more differentiated based on its larger size than the extant *Syncerus caffer* but smaller than all of the ancient Maghrebian buffalos.

With regard to the western European Villafranchian bovines, *P. howelli* diverges from the cranial morphology of *Leptobos* sensu stricto. In *Leptobos (Leptobos) elatus* (Croizet and Pomel, 1853) from Boulade (Etouaires site, Puy-de-Dôme, France), the horns present a double curvature slightly oriented downward and transversally, and then upward and forward; diverging from each other, and separated by the development of a supra occipital crest (Duvernois, 1990). Whilst in *Leptobos (Smertiobos) etruscus* (Faconer, 1859) from Val Darno (Italy), the horn cores are subcircular and situated in the frontal plane, and oriented backward and outward (Duvernois, 1990; Duvernois and Guérin, 1989).

Lastly, *Leptobos faconeri* Rüttimeyer, 1877–1978 from Siwaliks (India) also shows notable differences. The horn cores are markedly divergent at the base and go toward the facial plane with a subcircular cross-section and/or are compressed dorsoventrally.

#### 4. Conclusion

The Aïn Hanech horn cores described here do not completely match any of the known Plio-Pleistocene and Pleistocene bovines of the Maghreb. Although these cores conform to the generic characters of *Pelorovis*, especially those of the type-species of *P. oldowayensis* and *P. turkanensis* (curvature of the horns backward and outward, single spiraling forward, extremities oriented upward, and dorsoventral flatness), they also differ in other characters (horn cores inserted less closely together, a bulging frontal in the supra-orbit region, and absence of keels).

According to a cladistic phylogeny of the bovines that used mainly cranial characters, *Pelorovis* is linked to the African buffaloes in a new sub-tribe named Eubovini (Geraads, 1992). African buffaloes are monophyletic and have a Eurasian origin. Based on this phylogeny, we assign the new Algerian taxon to the genus *Pelorovis*. Its presence in North Africa and Middle East supports its Eurasian migration.

Although the Aïn Hanech and Olduvai buffalos belong to the same genus, neither form is thought to be ancestral to the ancient Maghrebian buffalos (Hadjouis, 2002). These latter are rather being linked to *Syncerus*. However, *Ugandax*, even though it is on the *Syncerus* lineage, could represent an accep-

table ancestor of Aïn Hanech bovine. What is to be said about *P. kaisensis* in relation to *P. antiquus*, whose general form and horn core insertion of Kaiso specimen resemble the *antiquus* form? More evidence is needed to address this question.

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