

Titanosaurian teeth from the Upper Cretaceous of “Lo Hueco” (Cuenca, Spain)



Verónica Díez Díaz ^{a,*}, Francisco Ortega ^b, José L. Sanz ^c

^a Universidad del País Vasco/Euskal Herriko Unibertsitatea, Facultad de Ciencia y Tecnología, Apdo. 644, 48080 Bilbao, Spain

^b Grupo de Biología Evolutiva, Facultad de Ciencias, UNED, Senda del Rey 9, 28040 Madrid, Spain

^c Unidad de Paleontología, Departamento de Biología, Universidad Autónoma de Madrid, 20049 Madrid, Spain

ARTICLE INFO

Article history:

Received 28 November 2013

Accepted in revised form 3 July 2014

Available online 26 July 2014

Keywords:

Titanosauria

Teeth

Upper Cretaceous

“Lo Hueco”

Spain

ABSTRACT

The Upper Cretaceous fossil site of “Lo Hueco” (Cuenca, Spain) has yielded two morphotypes of sauropod teeth referable to Titanosauria. One (“Lo Hueco” morphotype A) is composed of robust spatulate crown teeth. These teeth exhibit the same morphology and microwear patterns in the apical facet as teeth described from the Masecaps site (Upper Cretaceous of southeastern France). The second morphotype (“Lo Hueco” morphotype B) comprises gracile spatulate teeth similar to those of the French titanosaur genus *Atsinganosaurus*. However, further analysis of skeletal and cranial elements from “Lo Hueco” and its association with the described dental morphotypes will be needed to establish the degree of proximity between the Iberian and French taxa.

The presence of at least two more titanosaurian taxa in the Iberian Peninsula, besides the well-known species *Lirainosaurus astibiae*, corroborates the increase in the known diversity of the sauropod faunas from the Upper Cretaceous of the Ibero-Armorican Island suggested by previous studies on the biota of “Lo Hueco”. In addition, the microwear differences found in the apical wear facets of the two morphotypes could be explained as due to different diets. The absence of isolated pits and the orientational consistency of the scratches support the hypothesis of a non-selective diet on soft stems, as herbaceous plants, for the titanosaurs from “Lo Hueco”. However, the presence of a coarser pattern in morphotype B suggests a niche partition for both species.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

Teeth of adult titanosaurian individuals from the Upper Cretaceous of the Ibero-Armorican Island show high morphological divergence of the crowns between species, and therefore have great potential for use in identifying different taxa. So far, four titanosaurian crown morphotypes are well-known in south-western Europe (Díez Díaz et al., 2013): a gracile leaf-shaped morphotype (described for the French titanosaur *Ampelosaurus atacis*), a robust spatulate morphotype (applicable to several teeth from the French sites of Masecaps and Fox-Amphoux-Métisson), a gracile spatulate morphotype (described for the French taxon *Atsinganosaurus velauciensis*), and a cylindrical morphotype (described for the Iberian titanosaur *Lirainosaurus astibiae*).

At the Upper Cretaceous fossil site of “Lo Hueco” (Fuentes, Cuenca), a relatively large collection of sauropod titanosaur remains has been identified. Most of the bone material is under preparation, but it seems to cover a wider range of diversity than previously known from this group in the Iberian Peninsula. Teeth are not particularly abundant at the site, but different morphotypes have been identified, ranging from conical to slightly spatulate forms. As part of the approach to the titanosaurian diversity at the “Lo Hueco” fossil site, the aim of this work is to describe the different teeth morphotypes and to discuss variations derived from positional, ontogenetic, and taxonomic factors.

2. Geological context (Fig. 1)

All the described teeth come from the same levels of the “Lo Hueco” fossil site (Fuentes, Cuenca Province, Spain) belonging to the “Margas, Arcillas y Yesos de Villalba de la Sierra” Formation (Vilas et al., 1982). Sediments at “Lo Hueco” were deposited within a

* Corresponding author.

E-mail addresses: diezdiaz.veronica@gmail.com (V. Díez Díaz), fortega@ccia.uned.es (F. Ortega), dinoproyecto@gmail.com (J.L. Sanz).

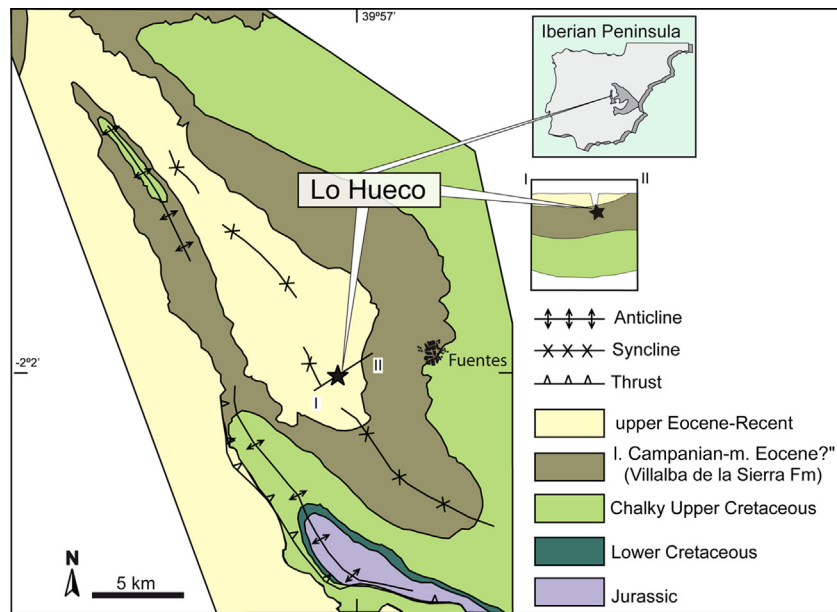


Fig. 1. Geographical and geological context of the Campanian–Maastrichtian “Lo Hueco” site (Fuentes, Cuenca, Spain). Simplified geological map in which the transect I → II allows locating the cross-section shown on the left. Modified from Barroso-Barcenilla et al., 2009.

coastal-continental environment, corresponding to a near-coast continental muddy flood plain crossed by distributary sandy channels, exposed intermittently to brackish or marine and freshwater flooding as well as to partial or total desiccation events (Barroso-Barcenilla et al., 2009; Cambra-Moo et al., 2013).

The faunal assemblage, palynological data, and stratigraphical context suggest a late Campanian–early Maastrichtian age for the site (Ortega et al., 2008; Barroso-Barcenilla et al., 2009; Peyrot et al., 2013). Vertebrates are represented by actinopterygian (mainly lepisosteiformes) and teleostean fishes, amphibians, pleurodiran and pancryptodiran turtles, squamate lizards, eusuchian crocodiles, and dinosaurs such as euornithopods (rhabdodontids), theropods (mainly dromaeosaurids), and titanosaurian sauropods (Ortega et al., 2008). The most abundant dinosaur record at “Lo Hueco” consists of titanosaurs (Ortega et al., 2008). The site has provided thousands of isolated bones and more than twenty sets representing the partial skeletons of several individuals. Moreover, cranial remains have also been recognized, both isolated and associated with partial skeletons. At the moment, analysis of the variability of different sets of samples (cranial bones, caudal vertebrae, appendicular elements) indicates at least two species of titanosaurs that seem to have a relatively high morphological variability. One species is a robust titanosaur having similarities to others from the Ibero-Armorican Island, whereas the other one is a slender titanosaur with exclusive features (Ortega, 2013). Analysis of the braincase morphologies also reveals two morphotypes, one having similarities with *Ampelosaurus* (Knoll et al., 2013a) (a titanosaur previously known from the French Upper Cretaceous), and a second one, still undescribed in detail (Knoll et al., 2013b). Noteworthy is the absence, at the moment, of elements referable to the genus *Lirainosaurus*, the most commonly cited titanosaurian taxon from the Iberian Peninsula.

Sauropod teeth are not particularly common at the site compared with other taxa such as theropods and crocodiles. In addition, unfortunately, no sauropod teeth collected could be associated with cranial or postcranial remains of any of the individuals recognized at the fossil site.

3. Material and methods

The samples consist of 25 isolated teeth remains (HUE-30, 90, 540, 685, 702, 1125, 1212, 1636, 2687, 3793, 3891, 4040, 4148, 4723, 4893, 5498, 5575, 5809, 6155, 6809, 6889, 6942, 7041, 8013, 8743). The description of the elements followed the dental terminology proposed by Upchurch and Barrett (2000), and Smith and Dodson (2003) (e.g. labial, lingual, mesial, and distal). Where possible, both the Slenderness Index (SI: ratio of crown height to maximum mesio-distal width) (Upchurch, 1998) and the Compression Index (CI: ratio of the maximum labio-lingual width to the maximum mesio-distal width of the crown) (Díez Díaz et al., 2013) was calculated on the adult teeth (Table 1).

Table 1

Measurements of the twenty-five titanosaurian teeth from the Upper Cretaceous of the “Lo Hueco” fossil site (Cuenca, Spain). The highlighted specimens belong to morphotype A, the others belong to morphotype B of the crown. The last three specimens with an asterisk are the teeth that cannot be assigned to any of these morphotypes. Abbreviations: Ø m-d: maximum mesiodistal width; Ø lb-ln: maximum labiolingual width; SI: slenderness index (Upchurch, 1998); length of the tooth crown divided by its maximum mesiodistal width; CI: compression index (Díez Díaz et al., 2013); maximum labiolingual width divided by the maximum mesiodistal width of the crown.

	Crown length	Ø m-d	Ø lb-ln	SI	CI
HUE-90	4.60	1.05	0.90	4.38	0.86
HUE-685	3.70	1.10	0.65	3.36	0.59
HUE-1212	–	1.05	0.70	–	0.67
HUE-1636	–	0.95	0.55	–	0.58
HUE-3793	–	1.00	0.70	–	0.70
HUE-4723	2.30	0.75	0.50	3.07	0.67
HUE-6155	1.89	0.55	0.39	3.44	0.71
HUE-6809	1.90	0.50	0.40	3.80	0.80
HUE-8743	–	1.00	0.70	–	0.70
HUE-540	1.70	0.42	0.45	4.05	1.07
HUE-2687	2.50	0.50	0.41	5.00	0.82
HUE-4040	–	0.60	0.35	–	0.58
HUE-4148	1.98	0.50	0.40	3.96	0.80
HUE-6942	2.40	0.48	0.39	5.00	0.81
HUE-7041	1.45	0.40	0.30	3.63	0.75
HUE-5498*	–	0.30	0.25	–	0.83
HUE-5809*	–	0.25	0.20	–	0.80
HUE-6889*	0.95	0.21	0.18	4.52	0.86

Download English Version:

<https://daneshyari.com/en/article/4747047>

Download Persian Version:

<https://daneshyari.com/article/4747047>

[Daneshyari.com](https://daneshyari.com)