



Prologue. Dinosaurs and associated biota: new discoveries and insights

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Received: 29 January 2024 / Accepted: 31 January 2024
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In September 2022, the IX International Symposium about Dinosaurs Palaeontology and Environment was held in Salas de los Infantes, a town in the province of Burgos, Spain. The first edition of the Symposium took place in 1999 and is triennial since 2001. The aims of the congress are: presentation and debate on the most recent advances in dinosaur palaeontology, application of new research technologies and everything that is related to the knowledge of the Mesozoic continental ecosystems in which the dinosaurs lived.

The *Jornadas* is a scientific event that has a double singularity. On the one hand, it is the only scientific meeting that takes place periodically in Spain and that has dinosaurs as the axis of its programming. Secondly, it is held in a rural town (Salas de los Infantes has a census population of 1970 inhabitants), where economic, scientific and technological resources are scarce in relation to the processes that are usually required for the development of projects of palaeontological research. As local institutions that work to protect the palaeontological heritage of that territory are the *Museo de Dinosaurios*/Dinosaur Museum (dependent on the Salas de los Infantes City Council), the *Colectivo Arqueológico y Paleontológico de Salas*/Salas Archaeological and Palaeontological Collective (CAS), and the *Fundación para el Estudio de los dinosaurios en Castilla y León*/Foundation for the Study of Dinosaurs in Castile and Leon. Along with them, other institutions participated in the organization

of the Symposium, such as the universities of Saragossa, Basque Country and Salamanca.

From Salas de los Infantes a varied activity is carried out around the Mesozoic heritage related to terrestrial ecosystems occupied by dinosaurs: research; recovery, protection and conservation; scientific dissemination; didactics for non-university students and university training. Likewise, commitment and social participation with this heritage has been encouraged among the population, through voluntary participation in excavations, postcard and photography contests, or sporting events with dinosaurs as a motivating theme.

The substrate of this varied and prolonged activity over time (the CAS/Collective was formed in 1975, the Dinosaur Museum was inaugurated in 2001), is the high number of palaeontological sites in the territory, which is geographically identified as Sierra de la Demanda on its south slope. The record of Mesozoic sites developed in previous years – completed in 2007—reached the number of 265 localities; of which 200 contain fossil remains of dinosaurs, other continental vertebrates and contemporary palaeoflora. Currently, a greater number of sites of this type are known, and several of them have been the subject of excavation campaigns. One of the results of the research activity on this heritage is the description of two genera and species of sauropod dinosaurs (*Demandasaurus darwini* and *Europatitan eastwoodi*), a genus and species of varanoid (*Arcanosaurus ibericus*), a genus and species of cryptodiran turtle (*Larachelus morla*), a new ichnogenus and ichnospecies sauropod (*Iniestapodus burgensis*), and a new clade of iguanodontian ornithopods (Rhabdodontomorpha). Even though it is a notable account of the diversity and uniqueness of the finds in this territory, a more exhaustive knowledge of the heritage wealth it contains can be established when action is taken in most of the recorded sites and the extensive collection of fossils pending of preparation is studied.

This special issue entitled “Dinosaurs and associated biota: new discoveries and insights” consists of seven articles that were presented during the 9th International

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Symposium about Dinosaurs Palaeontology and their Environment (*IX Jornadas Internacionales de Paleontología de Dinosaurios y su Entorno*) held in September 2022. The symposium welcomed more than a hundred people to Salas de los Infantes, including many young researchers in palaeontology (Fig. 1). During it, 42 contributions were presented in the form of plenary conferences and communications. These contributions represent a snapshot of the research that is currently being carried out on Iberian dinosaurs and associated biota. The full book of abstracts of the Symposium (Huerta et al., 2022) can be downloaded on the website of the Colectivo Arqueológico-Paleontológico Salense (C.A.S.), which was the organizer of the meeting (<https://dinosaurioscyl.blogspot.com/2022/09/despues-de-la-celebracion-de-las-ix.html>).

The articles published in this special issue talk about a wide range of topics, covering new information on dinosaurs and associated continental vertebrates—including turtles—from the Late Jurassic-Early Cretaceous of the Iberian Peninsula, as well as an overview about the study of non-avian dinosaur footprints.

Díaz-Martínez et al. (2024) have investigated the varied information provided by the palaeoichnology of dinosaurs. The authors analysed data and interpretations obtained in palaeoichnological studies and discuss the applications of this research in the knowledge about dinosaurs. The topics treated in this article form a wide repertoire: anatomy, locomotion and identification of the trackmakers, their palaeoichnology and autoecology (palaeopathology,

swimming, reproductive courtship, gregarious behaviors), palaeocommunities, predation and palaeoenvironments. Palaeoichnology is characterised as a necessary and significant complement to understanding the life of dinosaurs.

Two articles dealing with sauropod dinosaurs are part of this volume. On one side, Torcida-Fernández Baldor et al. (2024) provide new information about the sauropod fauna of the Rupelo Formation (Tithonian–Berriasian). A brachiosaurid was previously identified at the Valdepalazuelos-Tenadas del Carrascal site, but there is a greater diversity of sauropods, which is based on semi-articulated remains found in a rich bonebed. A dentary fragment with alveoli preserving erupted teeth provides information about the dental replacement process. In addition, there are several isolated teeth showing different degrees of wear. The morphology of the teeth is consistent with that of a basal Macronaria close to *Camarasaurus*. This would imply the presence of at least two distinct macronarians in the Jurassic-Cretaceous transition of the Cameros Basin.

Besides, Medrano-Aguado et al. (2024) studied the palaeodiversity of sauropods in the Blesa Formation of Teruel. This unit is one of the richest formations of the Barremian of the Iberian Peninsula. At least thirty-two vertebrate taxa have been identified to date in the La Cantalera sites. Sauropods are a minor component of the fossil associations in number of fossils, but the authors identified the presence of two titanosauriform taxa, including

Fig. 1 Participants in the 9th International Symposium about Dinosaurs Palaeontology and their Environment held in September 8–10 in Salas de los Infantes (Burgos, Spain)



a member of Euhelopodidae and a Titanosauriformes taxon that seems distinct from those known in other Iberian sites. Diplodocimorph and titanosaurian remains are apparently absent in the Blesa Formation.

Two articles are focused on ornithopod dinosaurs from the Early Cretaceous of Iberia. García-Cobeña et al. (2024) described new fossils (vertebral centra) of a large styracosternan ornithopod from the El Castellar Formation (upper Hauterivian-lower Barremian) of Teruel. These remains closely resemble others related to the species *Iguanodon galvensis*. The authors also provide an overview of the dinosaur fauna based on fossils found in this unit of the Maestrazgo Basin in Teruel. Large styracosternans coexisted with small basal ornithopods, huge sauropods, spinosaurids and small coelurosaurians among theropods, and thyreophorans such as ankylosaurs. All were inhabitants of ancient ecosystems developed in coastal wetland systems during the Early Cretaceous. The dinosaur composition of the El Castellar Formation of Teruel is roughly similar to that of other synchronous areas of the Iberian Peninsula and Europe at this time.

Escanero-Aguilar et al. (2024) reported the discovery of skull material (premaxillary, dentary and a set of isolated maxillary and dentary teeth) from a site near Salas de los Infantes (Burgos) that is ascribed to the upper Barremian-Aptian Castrillo de la Reina Formation. The character combination observed in the specimen is unknown in other styracosternan ornithopods; however, the fragmentary nature of the fossils advises against the erection of a new taxon. A preliminary phylogenetic analysis suggests that the Salas ornithopod is a basal hadrosauriform more derived than Iguanodontidae. This find provides new information of the ornithopod diversity from the Cameros Basin and extends the Iberian record of non-hadrosaurid styracosternans.

Puértolas-Pascual et al. (2024) documented a new vertebrate site in the Jurassic-Cretaceous transition of Ágreda (Soria). The Ribota site shows the highest concentration of macrovertebrate remains of the Tithonian-Berriasian (Matute Formation) within the eastern Cameros Basin. A preliminary study of part of the palaeontological collection has allowed the identification of at least five different taxa, including Halecomorphi and Neoglyngimoan fishes, Goniopholididae crocodyliforms, Testudinata turtles and Pterodactyloidea pterosaurs. The fossil association is dominated by aquatic and amphibian vertebrates; it is interpreted as formed by attrition processes in a lacustrine environment. The Ribota site shows a great potential for further discoveries and provides interesting data about the faunal ecosystems from the Jurassic-Cretaceous transition of the Iberian Peninsula.

With regard to the Iberian turtle record, Pérez-García et al. (2024) provide new data on the shell anatomy of the paracryptodiran turtle *Selenemys lusitanica* on the basis of specimens from the Upper Jurassic Lusitanian Basin

coming from both the Leiria District and the Lisboa District of Portugal, which include the most complete shell of the species. The authors consider *Selenemys lusitanica* to be a member of the stem turtles Pleurosternidae (and not belonging to Compsemeydidae), being the oldest European representative of the clade. Pleurosternids are one of the most diverse turtle lineages in the Upper Jurassic and Lower Cretaceous of Europe (also present in North America).

Last, we hope that these articles will inspire new palaeontological research and that the collective of young researchers present at Salas de los Infantes and other similar congresses will continue to make important contributions to the palaeontology of dinosaurs and their associated fauna and flora based on the study of the Iberian fossil record.

Acknowledgements We would like to thank Drs José López-Gómez and Javier Martín-Chivelet, editors-in-chief of *Journal of Iberian Geology*, for providing us the opportunity to publish this special issue and for their helpful assistance. Special thanks to all the authors for their contributions to this volume and also to the specialists that have participated in the review of the manuscripts. We are also grateful to all the people who have contributed to the organization of the Symposium and to the publication of this volume. Our hope is that the *Jornadas* of Salas de los Infantes continue to be as successful in the future.

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