

**TRIBUTE TO CHARLES DARWIN AND
BERNISSART IGUANODONS:**

**New Perspectives on Vertebrate Evolution and Early
Cretaceous Ecosystems**

BRUSSELS 2009

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LOWER CRETACEOUS DINOSAURS OF SPAIN: AN OVERVIEW BASED ON SKELETAL REMAINS

Xabier PEREDA SUBERBIOLA ¹, José Ignacio RUIZ-OMENACA ^{2,3},
José Ignacio CANUDO ³, Fidel TORCIDA ⁴, José Luis SANZ ⁵

¹ *Universidad del País Vasco/EHU, Facultad de Ciencia y Tecnología, Departamento de Estratigrafía y Paleontología, Apartado 644, 48080 Bilbao, Spain, xabier.pereda@ehu.es*

² *Museo del Jurásico de Asturias (MUJA), 33328 Colunga, Spain, jigrui@unizar.es*

³ *Grupo Aragosaurus (www.aragosaurus.com), Paleontología, Facultad de Ciencias, Universidad de Zaragoza, Pedro Cerbuna 12, 50009 Zaragoza, Spain, jicanudo@unizar.es*

⁴ *Colectivo Arqueológico-Paleontológico de Salas (C.A.S.), Museo de Dinosaurios, Plaza Jesús Aparicio 9, 09600 Salas de los Infantes, Burgos, Spain, secretaria@colectivosalas.com*

⁵ *Unidad de Paleontología, Departamento de Biología, Universidad Autónoma de Madrid, c/Darwin 2, 28049 Cantoblanco, Madrid, Spain, dinopepelu@gmail.com*

The Lower Cretaceous formations of Spain (mainly the Wealden facies [Valanginian-Barremian] and those correlated with the Urgonian deposits [Barremian-Aptian]; the Purbeck facies [Tithonian-Berriasian], which include the Jurassic-Cretaceous transition, are not considered here) have yielded abundant dinosaur remains. The fauna consists of theropods, sauropods, thyreophorans and ornithopods; seven genera and species defined in Spain are exclusively known in this country. The Spanish record is one of the best known in Europe, only surpassed in biodiversity by the classical dinosaur sites of England. Although the earliest dinosaur remains from the Early Cretaceous of Spain were described in the 1870s, the first fieldworks were not undertaken until the 1920s. Most of the meaning discoveries have been made in the last 25 years.

The most significant Spanish locality is the *Konservat-Lagerstat* of Las Hoyas (Cuenca). Other important sites include those of Salas de los Infantes (Burgos), Galve (Teruel), Morella and Cincorres (Castellón). Golmayo (Soria), Igea (La Rioja), El Montsec (Lleida), Castellote, Josa and Peñarroya de Tastavins (Teruel), and Uña (Cuenca) have also yielded relevant dinosaur specimens. With the exception of El Montsec (Pyrenean Realm), all the others mentioned belong to the Iberian Chain (Camerons Basin, Maestrazgo Basin, Central and SW Iberian Chain). Dinosaur tracksites, very abundant in the Cameros Basin, are not taken into account here.

Ornithopods are the most abundant and diversified dinosaurs from the Early Cretaceous of Spain. Iguanodontoids consists of *Iguanodon bernissartensis* and *Iguanodon (Mantellisaurus) cf. atherfieldensis* from Castellón, Cuenca, Teruel and Burgos, and a new genus and species yet undescribed from Teruel. Other Spanish material is provisionally referred to as *Iguanodon* sp. or as Iguanodontoidea indet. "Hypsilophodontids" are represented by *Hypsilophodon*-like and *Othnielia*-like forms from Burgos, Castellón, La Rioja and Teruel. Dryosaurids includes *Valdosaurus* sp. and "*Camptosaurus*" *valdensis* from Burgos and Teruel.

Among theropods, the ornithomimosaur *Pelecanimimus polyodon* and the enantiornithine birds *Iberomesornis romerali*, *Concornis lacustris*, *Eoalulavis hoyasi* are known from Cuenca, and the enantiornithine *Noguerornis gonzalezi* from Lleida. Indeterminate enantiornithine specimens have also been found in the same sites. Spinosauroids include *Baryonyx*-like and indeterminate baryonychine material from Burgos, La Rioja, Teruel and Castellón. In addition, other theropod taxa have been described in the Spanish record: allosauroids, carcharodontosaurids, dromaeosaurids, *Paronychodon*-like and *Richardoestesia*-like, most of them on the basis of isolated teeth.

The sauropod association is dominated by titanosauriforms. *Tastavinsaurus sanzi* and tentatively *Aragosaurus ischiaticus* are regarded as basal somphospondylians. The presence of a member of Titanosauria in Teruel needs to be confirmed on the basis of more complete material. Basal titanosauriforms are represented by indeterminate brachiosaurids from Castellón and "*Pleurocoelus*" *valdensis* teeth from Teruel. Teeth similar to those of *Euhelopus* have also been described in Teruel. The only non-titanosauriform sauropods are a rebbachisaurid diplodocoid from Burgos (that probably represents a new genus and species) and teeth of "*Oplosaurus armatus*" from Teruel.

Finally, the thyreophorans consists of the ankylosaur *Polacanthus* sp. from Burgos, Castellón and Soria, and indeterminate stegosaurs from Burgos and Teruel.

The dinosaur associations of the Early Cretaceous of Spain are singular and complex. These faunas are of particular palaeobiogeographical interest on account of the special location of the Iberian Plate to provide a better knowledge of the connections between the Laurasian and Gondwanan landmasses during the Early Cretaceous.

Key words: Dinosaurs, Early Cretaceous, Valanginian-Aptian, Spain