Ecology & Evolution | Oct 30, 2026 | 5 min read | By Bryan White

Paludohadros proudlovii: New Early Cretaceous Iguanodontian Dinosaur Identified After 25 Years in London Museum Vaults

Paleontology * Dinosaurs * Iguanodontia

For a quarter of a century, the fossilized skull bones, vertebrae, and limb elements of a five-meter-long herbivorous dinosaur sat cataloged as an unremarkable specimen inside the collections of the Natural History Museum, London . Unearthed in July 2001 during a Geologists' Association field excursion at the Smokejacks Brickworks (Ewhurst Works) near Ockley in Surrey, England, the bones had originally been assumed to belong to one of Europe's familiar Early Cretaceous plant-eaters, Iguanodon or Mantellisaurus .

Now, in a comprehensive taxonomic study published in the Journal of Systematic Palaeontology (DOI: 10.1080/14772019.2026.2726221), a team led by Ricardo J. Sacamoto , Jeremy A. F. Lockwood , Paul M. Barrett , and Susannah C. R. Maidment has demonstrated that the specimen -- cataloged under accession number NHMUK PV R 16396 -- represents an entirely new genus and species of early-diverging hadrosauroid dinosaur: Paludohadros proudlovii .

From Surrey Clay Pit to Taxonomic Breakthrough

The holotype skeleton of Paludohadros proudlovii was recovered from the Upper Weald Clay Formation , a sequence of non-marine mudstones, siltstones, and sideritic ironstones deposited approximately 125 million years ago during the Barremian stage of the Early Cretaceous. During the Barremian, southern England formed part of the Weald Basin, a warm, low-relief wetland plain braided by meandering rivers, muddy freshwater lagoons, and seasonal marshes.

Remarkably, the 2001 excavation site at Smokejacks Brickworks lay only about 100 meters from the clay pit where amateur fossil collector William Walker discovered the giant claw of the holotype of the fish-eating spinosaurid theropod Baryonyx walkeri (NHMUK PV R 9951) in 1983. The new dinosaur's binomial name reflects both its paleoenvironment and the human history of the quarry: the genus name Paludohadros combines the Latin palus ("marsh" or "swamp") with the Greek hadros ("stout" or "bulky," a standard root for hadrosauroid ornithopods), while the specific epithet proudlovii honors Will Proudlove , the late quarry manager of Smokejacks Brickworks who championed paleontological fieldwork at the site before passing away at age 35 shortly before the July 2001 dig.

| Taxonomic / Stratigraphic Parameter | | Holotype Data & Diagnostic Value (Paludohadros proudlovii) | | Comparative British Wealden Context |

| Holotype Accession ID | | NHMUK PV R 16396 (Partial skull, axial column, girdles & limbs) | | Excavated July 2001; housed at Natural History Museum, London |

| Stratigraphic Horizon & Age | | Upper Weald Clay Formation -- Early Cretaceous (Barremian, ~125 Ma) | | First valid iguanodontian species named from the Weald Clay

Formation |

| Type Locality | | Smokejacks Brickworks (Ewhurst Works), Surrey, England | | ~100 m from the 1983 Baryonyx walkeri (NHMUK PV R 9951) type site |

| Ontogenetic Stage & Body Size | | Subadult (~5 m body length; estimated mass 1.5-2.0 metric tons) | | Mature adults projected at ~8-10 m, intermediate between Mantellisaurus and Iguanodon |

| Diagnostic Dental & Postcranial Characters | | Dentary crowns with two secondary lingual ridges + accessory ridges; expanded ischial boot; proximal tibial bosses | | Distinguishes taxon from Valanginian Barilium / Hypselospinus and Vectis/Wessex Mantellisaurus |

Dismantling a Century-Old "Wastebasket Taxon"

Why did a distinct five-meter skeleton remain unrecognized in one of the world's premier museum collections for 25 years? Throughout the nineteenth and twentieth centuries, British vertebrate paleontology treated almost every large ornithopod bone recovered from the Wealden strata of southern England as belonging to one of two catch-all species: the robust Iguanodon bernissartensis or the more gracile Mantellisaurus atherfieldensis . In systematic biology, such overly broad groupings are known as wastebasket taxa -- convenient pigeonholes that mask true evolutionary diversity because historical type specimens lacked detailed comparative redescriptions.

Over the past decade, researchers at the Natural History Museum and the University of Portsmouth launched a systematic campaign to re-examine every historical Wealden iguanodontian skeleton bone by bone. When Sacamoto and colleagues inspected NHMUK PV R 16396 , several skull fragments remained encased in hard sideritic matrix. Using high-resolution X-ray micro-computed tomography (micro-CT) led by imaging specialist Brett Clark, the team digitally stripped away the rock to reconstruct the fragile cranial bones and unerupted replacement teeth in three dimensions without risking mechanical damage.

Osteological Autapomorphies and Hadrosauroid Phylogenetics

The micro-CT reconstructions and postcranial measurements revealed a mosaic of anatomical traits (autapomorphies) found in no other known iguanodontian:

* Multiridged Dentary Tooth Enamel: Unlike Mantellisaurus and Iguanodon , whose lower jaw (dentary) teeth typically display a primary median carina flanked by a single secondary ridge on the tongue-facing (lingual) surface, the dentary teeth of Paludohadros proudlovii possess two prominent secondary vertical ridges alongside a variable series of finer accessory ridges that increased occlusal shearing area for grinding tough Early Cretaceous horsetails, ferns, and conifers.

* Lower Jaw and Surangular Architecture: The surangular bone at the rear of the mandible exhibits a distinct lateral shelf and foramen arrangement that modified the leverage of the jaw adductor musculature.

* Appendicular and Pelvic Specializations: In the postcranial skeleton, the humerus displays a strongly inflected deltopectoral crest for forelimb weight-bearing, the

ischium terminates in a heavily expanded distal "boot," and the proximal tibia bears pronounced bony bosses for knee ligament attachment.

Osteohistological indicators and incomplete neurocentral suture fusion across the vertebrae show that the five-meter holotype individual (NHMUK PV R 16396 , weighing an estimated 1.5 to 2.0 metric tons) was still a growing subadult at the time of death, suggesting fully grown adults likely reached 8 to 10 meters in length. Phylogenetic parsimony and Bayesian analyses place Paludohadros proudlovii near the base of Hadrosauroidea -- the evolutionary lineage of advanced iguanodontians that ultimately gave rise to the Late Cretaceous "duck-billed" hadrosaurids.

Resolving the Weald Basin Ecosystem

Before the formal description of Paludohadros proudlovii , a puzzling geographic and stratigraphic gap existed in Britain's Early Cretaceous dinosaur record. Older Valanginian rocks (~140-133 Ma) in Sussex had yielded basal iguanodontians such as Barilium dawsoni and Hypselospinus fittoni , while younger Barremian-Aptian strata on the Isle of Wight (the Wessex and Vectis Formations) had recently produced a burst of new genera including Brighstoneus simmondsi (2021) and Comptonatus chasei (2024). Yet the intervening Barremian Weald Clay Formation of Surrey and Sussex -- famous for the apex predator Baryonyx walkeri -- lacked a single validly named herbivorous iguanodontian species of its own.

By establishing Paludohadros proudlovii as the first valid iguanodontian taxon from the Weald Clay Formation, the study demonstrates that distinct sub-basins across southern England hosted rapidly evolving, ecologically partitioned communities of large ornithopod herbivores -- and underscores how modern micro-CT imaging continues to uncover new dinosaur species inside legacy museum collections.

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