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CENOMANIAN-TURONIAN MOSASAUROIDS FROM THE BOHEMIAN CRETACEOUS BASIN

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The Bohemian Cretaceous Basin (BCB) is an intracontinental depositional depression that extends from Brno in eastern Moravia, through Bohemia to the north and west of Prague, and across the Czech-German border into southern Saxony around Dresden. During the early Late Cretaceous, the BCB formed part of the continuous peri-Tethyan shelf of central and southern Europe, which was inundated by a northwesterly trending marine transgression extending between the Tethys Ocean and the Boreal North Sea Basin. Fossils of marine amniotes that inhabited this shallow epicontinental seaway have been documented for over 155 years, but have attracted little recent research attention in comparison to other more famous localities elsewhere. Despite this, a comprehensive reassessment of existing museum collections, together with new excavations, has identified a succession of diverse assemblages spanning the late Cenomanian through to Turonian-Coniacian boundary. Conspicuous amongst the remains are the isolated bones and teeth of primitive mosasauroids. The stratigraphically oldest of these specimens derive from the late Cenomanian Dölzschen Formation around Dresden in eastern Germany, and include small teeth and a bone fragment possibly representing the posterior condyle of a procoelous centrum. Unfortunately, only the indeterminate vertebral component is compatible with Mosasauroidea, the teeth probably being attributable to enchodontid teleosts. More clearly diagnostic are a partial dorsal vertebra, a well-preserved maxilla, and some isolated tooth crowns from early-late Turonian strata of the Bílá Hora, Jizera, and Teplice formations in the Bohemian region of the Czech Republic. The maxilla in particular displays a premaxillary contact that is situated anterior to the midline of the fourth maxillary tooth position, a characteristic trait of Tethysaurinae. The dorsal vertebra likewise manifests a tethysaurine-like dorsoventrally compressed, reniform condylar outline, but the articular face is sub-vertical thus resembling Dallasiaurus and derived mosasaurines. The identification of potential tethysaurines in the BCB is consistent with the hypothesized distributional restriction of early mosasauroids to a mid-low palaeolatitude, warm-water belt during the Turonian. Moreover, their sympatric occurrence with some of the last plesiosaurian megacarnivores warrants further investigation, especially in the light of possible ecomorph replacement by advanced mosasauroids later in the Cretaceous.
The depositional sequence within the BCB comprises the Peruc-Korycany Formation and laterally equivalent Dölzschen Formation of the Czech Republic and Germany; these record a transition from estuarine to littoral marine conditions during the early–late Cenomanian (Cech 2011). Establishment of a shallow seaway between the Boreal North Sea Basin and the Tethys Ocean in the lower-middle Cenomanian in Bohemia is in accord with the stratigraphic record of aquatic squamate fossils from the Bohemian Cretaceous Basin (BCB) in the Czech Republic and Germany. The BCB formed via intracontinental faulting of the Bohemian Massif during the middle Cretaceous (Ulíný 2001). Its extremities today extend from Brno in eastern Moravia, across northwestern Bohemia to the north and west of Prague, and over the German border into southern Saxon around Dresden (Fig. 1).

Mosasaur fossils from the BCB are very rare and have been recovered from commercially worked limestone quarries. Geinitz (1875) reported the stratigraphically oldest specimens in the late Cenomanian Dölzschen Formation of suburban Dresden, eastern Germany. These remains include small teeth and a bone fragment (Sak 1748) possibly representing the posterior condyle of a procoelous centrum (Fig. 2a, b). Unfortunately, only the indeterminate vertebral component is compatible with Mosasaurusidae; the teeth are probably attributable to echodontid leiodonts. Zábáčka (1895) noted possible lizard remains from Němčice in northern Bohemia, Czech Republic; however, these have likewise been reinterpreted as teleost fish (Ekrt 2012). Frisch (1905) introduced the historic mosasauric taxa Ctenosaurus lithodes and Humantasia inselii but these represent indeterminate plesiosaurs. Zábáčka (1965) presented the first definitive mosasaur from the BCB: a partial jaw from the Jizera Formation near Dolní Újezd in eastern Bohemia. More recently, Ekrt et al. (2001) and Wise et al. (2003) also figured an indeterminate mosasaur tooth from the Teplick Formation at Úpohlavy in northwestern Bohemia.