

The echinoid *Gauthieria alterna* from the uppermost Maastrichtian of Denmark

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The present record from the white chalk of Holtug (Stevns Klint, Sjælland) of the small, distinctive phymosomatid echinoid *Gauthieria alterna* (Kutscher, 1985) constitutes a notable addition to the latest Maastrichtian echinoid faunas in Denmark. Although both specimens available are crushed, preservation on the whole is better than the type material from the upper Lower Maastrichtian of Rügen (northeast Germany), and enables a more detailed description of the species, which was originally placed in *Hemithylus* Arnaud, 1896 but which is here transferred to the genus *Gauthieria* Lambert, 1888. One of the specimens preserves a single demipyramid and epiphysis of the lantern.

Key words: Echinoidea, Phymosomatidae, Maastrichtian, Denmark.

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Previous authors have shown the Late Maastrichtian echinoid faunas from Denmark to be fairly diverse (e.g. Ravn 1927, 1928), but subsequently it was pointed out that these were in need of a modern revision (e.g. Asgaard 1979; Gravesen 1979). As part of an exhaustive taxonomic treatment of Maastrichtian and Palaeocene echinoid faunas worldwide (Smith & Jeffery in press), such a revision will shortly be available. In anticipation of this, we here describe an apparently rare species of phymosomatid, *Gauthieria alterna* (Kutscher, 1985), from the white chalk at Holtug.

This species not only constitutes an interesting addition to the Late Maastrichtian echinoid faunas from Denmark, but the preservation of the two specimens available allows us to expand upon the original description of the taxon (Kutscher 1985). Following Smith & Wright (1996) and Smith & Jeffery (in press), we consider *Hemithylus* Arnaud, 1896 to be a junior synonym of *Gauthieria* Lambert, 1888, and transfer the present species to the latter genus.

The specimens before us were collected by Alice Rasmussen (Fakse) from the uppermost part of the latest Maastrichtian white chalk exposed in the abandoned quarry at Holtug on Stevns, 7 km north of Store

Heddinge, from within three metres below the K/Pg boundary. The latest Maastrichtian at this locality yields a fairly diverse echinoid fauna, the most conspicuous elements of which are *Tylocidaris* (*Oedematocidaris*) *baltica* (Schlüter, 1892), *Phymosoma granulatum* (Goldfuss, 1829), *Trochalosoma taeniatum* (von Hagenow, 1840), *Echinocorys* 'scutata' Leske, 1778, *Galerites* gr. *sulcatoradiatus* (Goldfuss, 1829) and *Conulus magnificus* (d'Orbigny, 1854).

The highest metres of the white chalk there have been assigned to the *stevensis-chitoniformis* brachiopod zone of Surlyk (1984) and to the zone of *Bellemnella* (*Neobellemnella*) *kazimiroviensis* (Skolozdrówna, 1932) by Christensen (1996, 1997a, b; see also Machalski 1996). This part of the section correlates with the uppermost Maastrichtian of the Bay of Biscay sections in southwest France and northern Spain, having both yielded the pachydiscid ammonite *Menuites terminus* (Ward & Kennedy, 1993) (see Birkelund 1993; Machalski & Jagt in press).

Both specimens are in the type collection of the Geological Museum (Copenhagen), prefix MGUH.

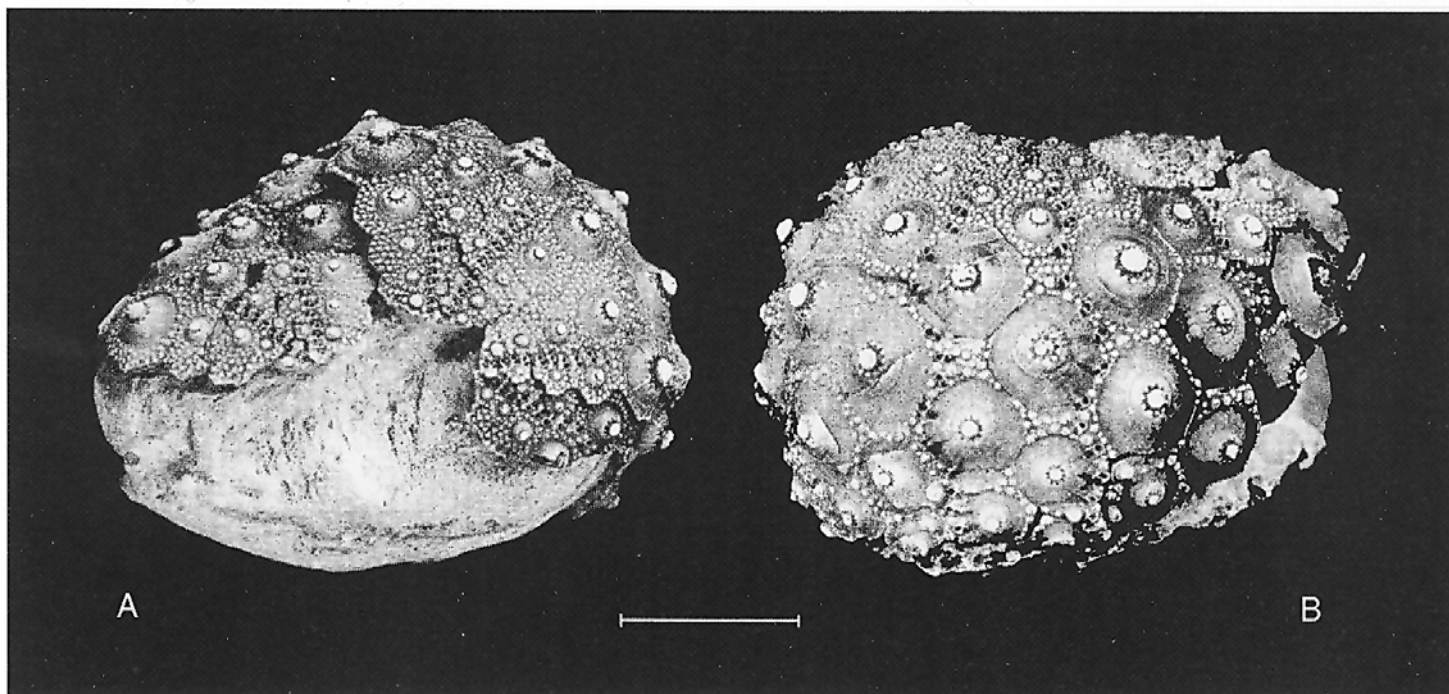


Fig. 1. *Gauthieria alterna* (Kutscher, 1985), adapical view (A) and lateral view (B) of MGUH 24556, from the uppermost Maastrichtian of Holtug (Sjælland). Scale bar equals 5 mm.

Systematic palaeontology

Family Phymosomatidae Pomel, 1883

Genus *Gauthieria* Lambert, 1888, p. 7

Type species. – *Cyphosoma radiatum* Sorignet, 1850, p. 28, by original designation (= *Hemithylus* Arnaud, 1896, p. 8; type species *Thylechinus rejaudryi* Cotteau, 1894, by original designation).

Gauthieria alterna (Kutscher, 1985)

Pl. 1, figs 1–6; Figs 1A–B

*1985 *Hemithylus alternus* Kutscher, p. 239, Pl. 1, figs 11, 12; Pl. 3, figs 5–12.

Type. – Holotype is specimen no. 1493/1 in the Kutscher Collection (Sassnitz-Lancken, Rügen), illustrated by Kutscher (1985, Pl. 3, figs 5–11) from the upper Lower Maastrichtian of the Wittenfelde quarry (Rügen, northeast Germany).

Material. – Two specimens from Holtug, Stevns Klint: MGUH 24556 and 24557 (ex Alice and Henning Rasmussen Collection, Fakse).

Description. – Both specimens are fragmentary and crushed, having suffered from sediment compaction. However, in (estimated) height and diameter they are closely comparable to the holotype from Rügen. Details of test ornament in the Holtug material are better preserved than in the holotype and allow the species to be more fully characterised as follows:

The rather inflated test is up to 15 mm in diameter, is tall in lateral aspect, with height up to 10 mm (i.e. two thirds of test diameter); the ambitus lies at mid-height. Neither of the specimens preserves plates of the relatively small, pentagonal, apical disc which deeply notches interambulacra.

At the ambitus, ambulacra are c. 30% of test diameter in width; they taper strongly adapically and adorally. Primary tubercles are very large ambitally, where they occupy more than half the width of the ambulacra, and alternate. The ambulacra consist of trigeminate and quadrigeminate compound plates. There are only few, small secondary tubercles and granules separating successive ambulacral tubercles at the ambitus and none at all perradially. Pore pairs are widely separated and arranged into arcs at the ambitus. Intercalated in the ambulacra between the compound plates are simple elements.

Ambitally, the width of the interambulacra corresponds roughly to that of the ambulacra. Plates are taller than wide at the ambitus, where they alternate, and have circular to elliptical areoles. Mamelons, especially the adoral ones, are relatively small. There are only few, small secondary tubercles and granules separating successive interambulacral tubercles and a single row perradially. Miliary granulation is densest adapically, without a naked zone. Secondary tubercles are best developed subambitally. The peristome is comparatively small deeply invaginated and has moderately developed buccal notches. Pore pairs near the peristome are almost vertical in position. During preparation it appeared that this specimen preserved a single demipyramid and epiphysis of the lantern.

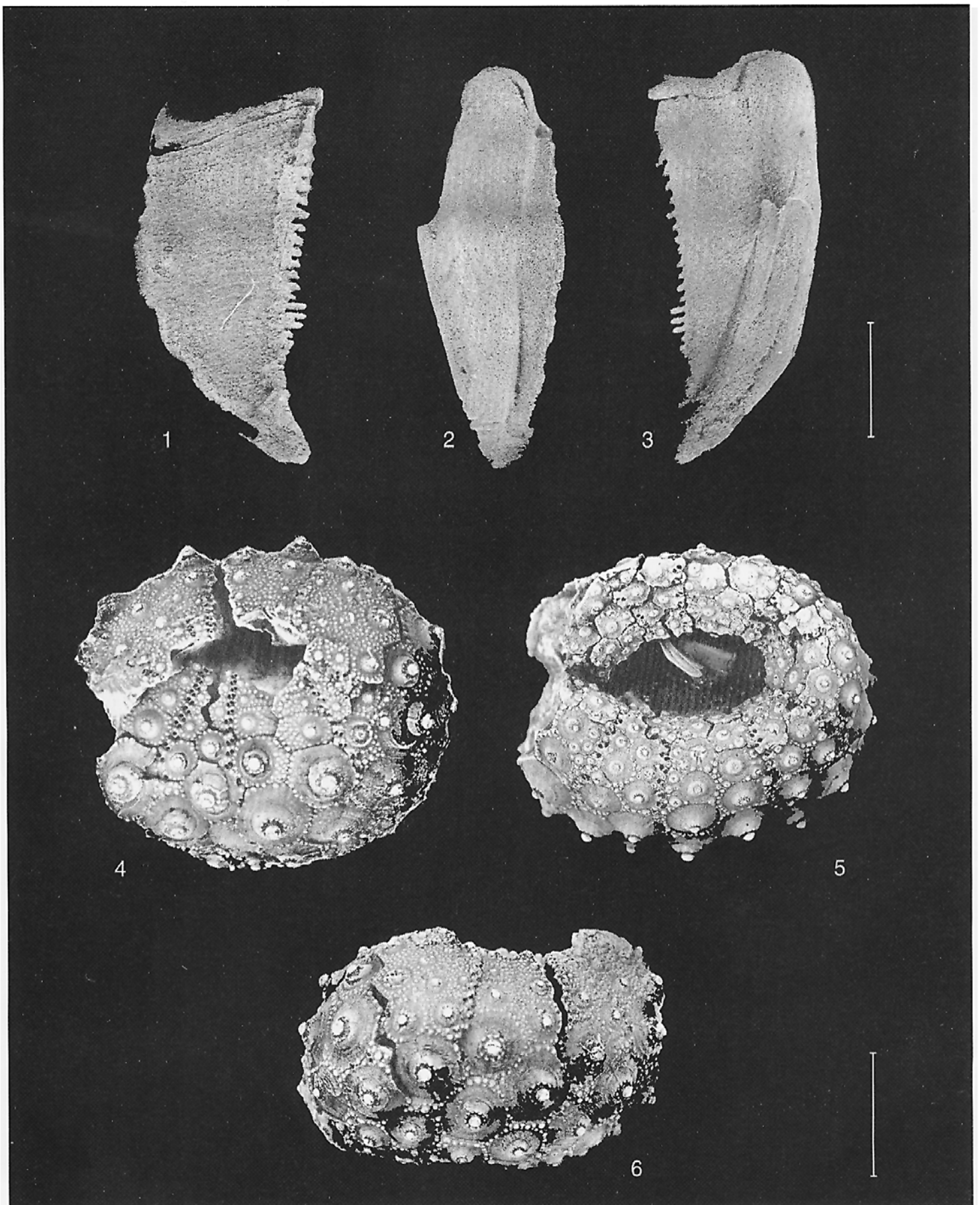


Plate 1
 Figs 1–6. *Gauthieria alterna* (Kutscher, 1985). Figs 1–3 isolated demipyramids/epiphysis, scale bar equals 1 mm. Figs 4–6 adapical, oral and lateral views of MGUH 24557, from the uppermost Maastrichtian of Holtug (Sjælland), scale bar equals 5 mm.

Stratigraphic distribution. – The type material from Rügen is of late Early Maastrichtian age (*Belemnella sumensis*, *cimbrica* and *fastigata* Zones, sensu Schulz 1979; see Herrig et al. 1996). Smith & Jeffery (in press) record material from the Lower Maastrichtian (unspecified) of Mangyshlak and Kopet Dag (Kazakhstan). The present records thus present a considerable stratigraphic range extension.

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Dansk sammendrag

To nyfundne eksemplarer af det phymosomatoide søpindsvin, *Gauthieria alterna* (Kutscher, 1985) beskrives for første gang fra danske Øvre Maastrichtien kridtaflejringer. De danske eksemplarer er, skønt noget sammenpresset, bedre bevaret end typematerialet fra Nedre Maastrichtien kridtlagene på Rügen, hvilket har givet mulighed for at henføre dem til slægten *Gauthieria* i stedet for *Hemithylus*, som oprindeligt gjort hos Kutscher, 1985. En halv pyramide og epifyse, tilhørende tandapparatets 'Aristoteles lygte' er fripræpareret.

Arten *G. alterna* forekommer ligeledes i Nedre Maastrichtien lag i Kazakhstan, og udviser derfor såvel geografisk som stratigrafisk en betragtelig udbredelse.

De danske fund stammer fra de øverste 3 meter af skrivekridtet under Maastrichtien/Danien grænsen i det nedlagte kridtbrud ved Holtug, Stevns Klint.

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