



REMARKS ON THE REGULAR ECHINOIDS
IN THE UPPER MAASTRICHTIAN
AND LOWER DANIAN OF DENMARK

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Our knowledge of the regular echinoids in the Maastrichtian and Danian deposits of Denmark is much in need of revision. The last comprehensive monograph is now 51 years old (Ravn, 1928). Since then, work on the regular echinoids of the Maastrichtian and Danian of Denmark (and Sweden) has mainly been concentrated on the species of *Tylocidaris* in the Danian. Among these studies should be mentioned Brotzen (1959) on the evolution of *Tylocidaris* species in the Danian of Limhamn (Southern Sweden) and the works by Nielsen (1938) and Wind (1953, 1954). A preliminary, annotated list by S. Bo Andersen (1973, unpublished) of the regular echinoids of the Danish Maastrichtian represents the latest survey of this animal group in the Danish white chalk.

According to our present knowledge the following regular echinoids seem to be frequent in the Danish Upper Maastrichtian:

Species of *Stereocidaris* belonging to the group of *S. pistillum* and *S. hagenowi* (including *S. bolli*)
Tylocidaris subvesiculosa (= *Stereocidaris subvesiculosa*)
Tylocidaris baltica
Phymosoma spp.
Gauthieria pseudoradiata

To these can be added the rare (or very rare):

Stereocidaris faujasi
Temnocidaris sp. (referred to *T. danica* by S. Bo Andersen, 1973)
Araeosoma mortenseni
Asthenosoma (?) *striatissimum*
Salenia pygmaea and *S. scutigera*
Salenidia anthophora

To the fauna of the Danish Maastrichtian (and Danian) can further be

added the genus *Palaeodiadema* which is being studied at present (S. Bo Andersen, pers.comm.).

Contrasting the regular echinoid fauna of the Upper Maastrichtian with that of the lower Danian, only conditions in Eastern Denmark (Sjælland) are so far reasonably well known. Ødum (1926) presented information on many lower Danian localities in Western Denmark (Jylland), but before our picture of the regular echinoids in the lower Danian of Jylland is complete, we need two things: 1) a taxonomical revision of the Jylland material and 2) a detailed analysis of faunal composition versus facies.

Looking at conditions on Sjælland, the Fish clay in Stevns Klint contains locally many remains of regular echinoids, no doubt all of them redeposited from the upper Maastrichtian. The same is found in the Fish clay at Karlstrup (Kagstrup), also in Eastern Sjælland. In the Cerithium limestone in Stevns Klint regular echinoids are rare or absent. In contrast, the lower Danian bryozoan limestone on top of the Cerithium limestone is rich in regular echinoids, the most frequent of these being:

species of *Tylocidaris* (mainly the two zonal fossils *T. oedumi* and *T. abildgaardi*)

Typocidaris rosenkrantzii

Typocidaris danica

Temnocidaris danica

Phymosoma sp. (or spp.)

Less frequently found is a species of *Salenia/Salenidia*. This faunal assemblage is found in Stevns Klint and Karlstrup.

Judging the change in the fauna of regular echinoids at the Maastrichtian/Danian boundary in Denmark it would seem from the information so far available that this is mainly a change at the species level, whereas the genera seem to cross the boundary rather unaffected. It remains for future work to assess the validity of this picture.