

## The Triassic radiolarian genus, *Triassocrucella* gen. nov. and the Jurassic *Hagiastrum* Haeckel, 1882

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**ABSTRACT**—The Triassic *Hagiastrum* species described by Kozur & Mostler (1978) and Pessagno (in Pessagno *et al.*, 1979) do not belong to this genus in the restricted sense of Baumgartner (1980). Some can be assigned to *Crucella* Pessagno, 1971 but for the majority of these species a new genus, *Triassocrucella* gen. nov. is introduced. The taxonomic position of *Hagiastrum* Haeckel, 1882 is discussed.

### INTRODUCTION

Following on from the excellent revision of the Jurassic and Cretaceous hagiastrids and patulibracchiids by Baumgartner in 1980, a revision of the Triassic patulibracchiids is now necessary. Hagiastrids are still unknown in the Triassic.

Several Triassic *Hagiastrum* species have been described by Kozur & Mostler (1978) and Pessagno (in Pessagno *et al.*, 1979). Since the emendation of *Hagiastrum*, however, by Baumgartner in 1980 none of these species can remain within the genus.

Baumgartner (1980) tentatively placed all these Triassic “*Hagiastrum*” species in *Crucella* Pessagno, 1971, but according to Pessagno (1971) *Crucella* has rays with tapering tips that have only one prominent spine at the tip of each ray. In contrast, most of the Triassic 4-rayed patulibracchiids have bulbous tips with 3 to 4 spines. Moreover, most of the *Crucella* species have a patagium that is never present in the Triassic species. The Triassic “*Hagiastrum*” species (with the exception of *Hagiastrum longispinosum* Kozur & Mostler, 1979) are therefore regarded as representatives of a new genus, *Triassocrucella* gen. nov. Only *Hagiastrum longispinosum* is placed in *Crucella* Pessagno, 1971.

### SYSTEMATIC DESCRIPTIONS

Superfamily Trematodiscacea Haeckel, 1862 emend.  
Kozur & Mostler, 1978

Family Patulibracchiidae Pessagno, 1971 emend.  
Baumgartner, 1980

Subfamily Patulibracchiinae Pessagno, 1971 emend.  
Baumgartner, 1980

Genus *Triassocrucella* gen. nov.

**Type species.** *Hagiastrum baloghi* Kozur & Mostler, 1978 (Pl. 1, figs. 3, 6).

**Derivation of name.** The similarity to *Crucella* and the occurrence in the Triassic.

**Diagnosis.** Four-rayed Patulibracchiinae lacking a brachiopyle. Distal ends of the rays bulbous with central and lateral spines, patagium absent. Cross-section of the rays circular, elliptical or sometimes rounded rectangular. Surface of rays with irregular, sometimes also sublinear, arrangement of pores and nodes.

Internal structure consists of uniform spongy network, irregularly arranged in the central area. Meshwork of rays arranged in layers parallel to the equatorial plane.

**Horizon.** Middle and Upper Triassic.

**Remarks.** The following species are included within this genus:

*Hagiastrum baloghi* Kozur & Mostler, 1978  
*Hagiastrum carnicum* Kozur & Mostler, 1978  
*Hagiastrum goestlingense* Kozur & Mostler, 1978  
*?Hagiastrum obesum* Kozur & Mostler, 1978  
*Hagiastrum triassicum* Kozur & Mostler, 1978  
*Hagiastrum angustum* Pessagno, 1979

The genus *Crucella* always has tapering tips to the rays with a strong single central spine. This is also true for all *Crucella* species described from the Lower Jurassic of Turkey by De Wever (1981). As already pointed out by Pessagno (1971), however, this morphology of the rays should be regarded as a distinctive feature of *Crucella*. *Pobum* De Wever, 1981 from the Lower Jurassic of Turkey is similar to *Triassocrucella* but it possesses a patagium, a brachiopyle and the rays are almost quadrate in cross-section.

*Hagiastrum* Haeckel, 1882 emend. Baumgartner, 1980 and all other 4-rayed hagiastrids described by Baumgartner (1980) are quite distinct from *Triassocrucella* on internal features and outer sculpture.

Baumgartner (1980) could not find any *Hagiastrum sensu* Baumgartner in the Jurassic of Europe but according to Rüst (1885), all *Hagiastrum* species, including its type species *H. plenum* Rüst, 1885 are frequent in the European Tethyan Jurassic. As Baumgartner has investigated far richer radiolarian material from the European Tethyan Jurassic than Rüst, it seems clear that *Hagiastrum* Haeckel, 1882 (in the sense defined by its type species *H. plenum*) was not correctly defined by Baumgartner (1980).

Pessagno (1977) placed forms later regarded as *Tetradityma pseudoplana* Baumgartner, 1980 (the type species of *Tetradityma* Baumgartner, 1980) in *Hagiastrum plenum* Rüst, 1885. It is possible that this specific identification was incorrect as pointed out by Baumgartner himself (1980). *Tetradityma pseudoplana* is very similar to *Hagiastrum egregium* Rüst, 1885 (synonymous with *H. cf. egregium* Rüst, 1885 *sensu* Parona, 1890). This species shows the same pore-beam pattern as *Tetradityma pseudoplana* and it is only distinguished from it by its larger size. However, the size measurements are often clearly wrong in Rüst's papers and the specimen figured by Parona (1890) is clearly smaller.

Apart from the problems of the synonymy, it seems highly probable that *Hagiastrum plenum*, *H. egregium* and *Tetradityma pseudoplana* belong in the same genus *Hagiastrum* Rüst, 1885 emend. Because this genus includes the type species of both *Hagiastrum* Haeckel, 1882 and *Tetradityma* Baumgartner, 1980, the latter should be regarded as the junior synonym of *Hagiastrum* Haeckel, 1882 emend. The *Tetradityrinae* Baumgartner, 1980 should similarly be regarded as the junior synonym of the *Hagiastrinae* Riedel, 1971 emend.

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## Explanation of Plate 1

Figs. 1, 4. *Triassocrucella goestlingensis* (Kozur & Mostler, 1978), Göstling, sample Y 6 (see Kozur & Mostler, 1978), Upper Cordevolian (Upper Triassic) ( $\times 167$ ). From Kozur & Mostler, 1978.

Fig. 2. *Crucella squama* (Kozlova), Lower Jurassic of Turkey ( $\times 500$ ). From De Wever, 1981.

Figs. 3, 6. *Triassocrucella baloghi* (Kozur & Mostler, 1978), Göstling (Austria), sample Y 6 (see Kozur & Mostler, 1978) ( $\times 167$ ). From Kozur & Mostler, 1978.

Fig. 5. *Pobum infinitum* (Pessagno & Poisson, 1981), Lower Jurassic of Turkey ( $\times 200$ ). From De Wever, 1981.

