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REGULAR AND FLEXIBLE METHODS OF INCREASE IN THREE SILURIAN RUGOSE SPECIES OF *STAURIA* AND *CERIASTER*

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Colonial corals give rise to descendants by asexual reproduction, producing offsets by division of parent corallites during parricidal increase. Ezaki and Yasuhara (in press) show several features essential to division in *Stauria favosa*. Division site and mode of subsequent septal insertion (sites, order, polarity) are strictly regulated in *S. favosa*. However, there are few studies to show whether these regular modes of division are found in other species.

Modes of division were examined thoroughly in 1) a second species of *Stauria*, *S. qijiangensis* and 2) *Ceriaster guanyinqiaoensis*. In *S. qijiangensis*, site of division appears to be variable. Tripartite increase occurs in nearly half of the sample, followed in order by quadripartite, pentapartite, and bipartite increase. Tripartite increase characteristically occurs on the left and right alar planes, together with the cardinal area. Bipartite increase follows one of two patterns: 1) even division, utilizing two alar septa, or 2) uneven division, using the cardinal and one of the alar septa. In *C. guanyinqiaoensis*, quadripartite increase is overwhelmingly present, followed by tripartite, pentapartite, and bipartite, respectively. In tripartite increase, corallites are divided to include both the cardinal-counter plane and one alar septum, or else a left and right alar area with the cardinal septum. In bipartite increase, corallites are divided either on the cardinal-counter plane or at the cardinal and one of the alar septa. The frequency of occurrence is quite different in each species.

Division occurs in a regular manner in that parent corallites in most cases give rise to daughter corallites by using some of the parental protosepta. Either cardinal or alar septa or both of them are involved in division. However, there are significant variations in the sites of division and their frequency of occurrence, leading to differences in numbers of daughter corallites produced at each division.

Three species of Silurian *Stauria* (*S. favosa* and *S. qijiangensis*) and *Ceriaster* (*C. guanyinqiaoensis*) exhibit a unique cross-shaped axial structure formed by axial connection of four dilated protosepta, the loci of division, where parent corallites are ordinarily divided into daughters. Protosepta are the first established in offset corallites, maintaining polarity identical to the parental, and metasepta are subsequently inserted at four specific sites in corallites, following Kunth's rule. Each corallite thus has an inflexible mode of division in terms of polarity and septal insertion.

Each module contributes greatly to flexibility of growth mode by immediately regulating possible sites of division, directly affecting the number and diameter of daughter corallites produced in one division event. It is probable that corallites adopted strategies suitable for fluctuating environments as constituents members of colonies, by regulating sites of division, in addition to the essential modes of division, quickly and flexibly.

Reference

Ezaki, Y. and Yasuhara, Y. (in press) Regular and flexible modes of division and hystero-ontogenetic growth in the Silurian rugose coral *Stauria favosa*. Palaeontology.

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