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BIOMETRIC ANALYSIS OF CORALLITE SIZE IN THE COLONIAL RUGOSAN *CRENULITES*

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Corallite size is an important criterion for species distinction and recognition in colonial corals. Diameter has commonly been used to represent corallite size. Different values, however, may result from the varying conventions that previous workers have employed for size measurement and for the selection of corallites to be measured. Compounding this problem, the methodology used in many studies is unspecified. We agree with workers who consider corallite area to be a more constrained, reproducible parameter that better reflects the dimensions of the organism. It has become common to measure 20 corallites for adequate representation of a corallum. Recently, however, it has been suggested that 20 mature corallites (having six or more sides) in a contiguous area should be measured. It was thought that data for mature corallites could be grouped because corallites with six and more sides did not differ significantly in size. The present study evaluates and further refines methodologies for biometric analysis of corallite size, based on the cerioid rugosan *Crenulites* from the Upper Ordovician Selkirk Member, Red River Formation, at Garson, southern Manitoba, Canada. The objective is to develop a standardized technique yielding tightly constrained values for the characterization of coralla and distinction of taxa.

Six coralla were selected for detailed study. For each corallum, a block was cut parallel to the growth direction from both the central axis and peripheral margin. For each block, a transverse polished section was prepared of each well-preserved high-density and low-density cyclomorphic band. Each section was scanned to produce a digital image. Using image analysis software, the areas of 20 mature corallites were measured for each section. In addition, the number of neighbors in contact with each corallite (polygonality) was recorded.

Statistical analysis demonstrated that corallite area generally increases with increasing polygonality. Corallite frequency within each polygonality class varies among sections in a corallum, and thus, mean corallite size is also variable. Six-sided corallites are in equilibrium and are usually the most frequently represented class. In order to reduce variability among sections, data collection from this class alone is recommended. Comparison of mean areas of six-sided corallites among all sections in each block revealed values identified as anomalously low or high. In order to confine the data set to sections representing normal growth, we recommend that anomalous values be excluded from further analysis. Also, because anomalous values were commonly found in basal and top portions of coralla, these portions can be excluded to expedite data collection. Data from all remaining non-anomalous sections can be combined to yield a larger sample and an overall mean value of corallite area that is representative of each block. Comparison of these values between blocks for each corallum revealed that, where the mean areas differ significantly, the value for the peripheral-margin block was greater. Therefore, we recommend that analysis be confined to central-axis blocks.

In this study, we distinguished two species of *Crenulites* from the Selkirk Member; one characterized by large corallite size and low intraspecific variability, the other by relatively small corallites and higher variability. The refined biometric methodology permits efficient, reproducible and consistent measurement of corallite size, yielding large data sets with minimal variation for comparison of coralla and for species distinction.