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MICROSCOPIC MICROBIALITE TEXTURES AND THEIR COMPONENTS IN THE LOWER DEVONIAN LAGOONAL FACIES OF THE FUKUJI FORMATION, CENTRAL JAPAN

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Calcimicrobes and microbialites are known to have been volumetrically significant and especially abundant in the Devonian reefs (Webb, 1996). The calcimicrobe *Girvanella* is comparatively abundant in the Devonian lagoons. However, few microbial details are known in Lower Devonian lagoonal environments. The lagoonal facies is typically developed in the Lower Devonian Fukuji Formation (Lochkovian to Emsian) and exhibits varied microbialite textures (Ezaki & Adachi, 2000).

The Fukuji Formation is restricted to the Hida „Gaien" Terrane, Central Japan. The carbonate successions contain well-preserved and diversified skeletal metazoans, such as rugose and tabulate corals, stromatoporoids and brachiopods, together with calcimicrobes (e.g., *Girvanella*, *Rothpletzella*, *Wetheredella* and *Renalcis*). Three types of microfacies are distinguished: 1) stromatoporoid-coral bindstone/bafflestone; 2) bioclastic floatstone/ wackestone; and 3) bioclastic packstone/rudstone. Stromatolitic, thrombolitic and leiolitic textures are formed in each microfacies by three principle components; peloids, micrites and calcimicrobes. Skeletal components occasionally serve as substrates for encrustation of microbialites, when sheet-like to domal and oncoidal growth fabrics are produced, ranging from only a few millimeters to several centimeters thick. The relative abundance of calcimicrobes is not high (average 4%), but *Girvanella* is predominant and is closely related to the formation of varied microbialite textures. *Girvanella* occasionally exhibits stromatolitic textures by its accumulations of different sizes of filaments and densities. Additionally, *Girvanella* relates to thrombolitic textures by being partly tangled with each other, and/or leiolitic textures by being densely packed, respectively. Accumulations and partial aggregations of peloids and micrites exhibit in some cases stromatolitic and thrombolitic textures where *Girvanella* is involved. Small intraskeletal cavities (cryptic spaces) formed by tabulate corals and brachiopods, however, include rare calcimicrobes and bioclasts, and are filled with well sorted mini-peloids that show limited, thrombolitic and leiolitic textures. In such sheltered microenvironments, microbial components and textures are quite different from those of open spaces. Similar features are also known from the ancient and modern reef cavities where peloids are generated by bacterial activity (e.g., Reitner, 1993).

In the Lower Devonian lagoonal facies concerned, it is emphasized that *Girvanella* as a cyanobacterium played an important role in the generation of varied microbialite textures. However, other bacterial activities also might have contributed greatly to the formation of microbialite textures as suggested by examples in cryptic spaces. The differences in microenvironments and resultant microbialite textures have not yet been fully examined in the lagoonal environments. Further research is necessary to elucidate microbialite varieties according to differences in microenvironments and to establish precise relations between their components and textures in different lagoonal settings during Devonian time.

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