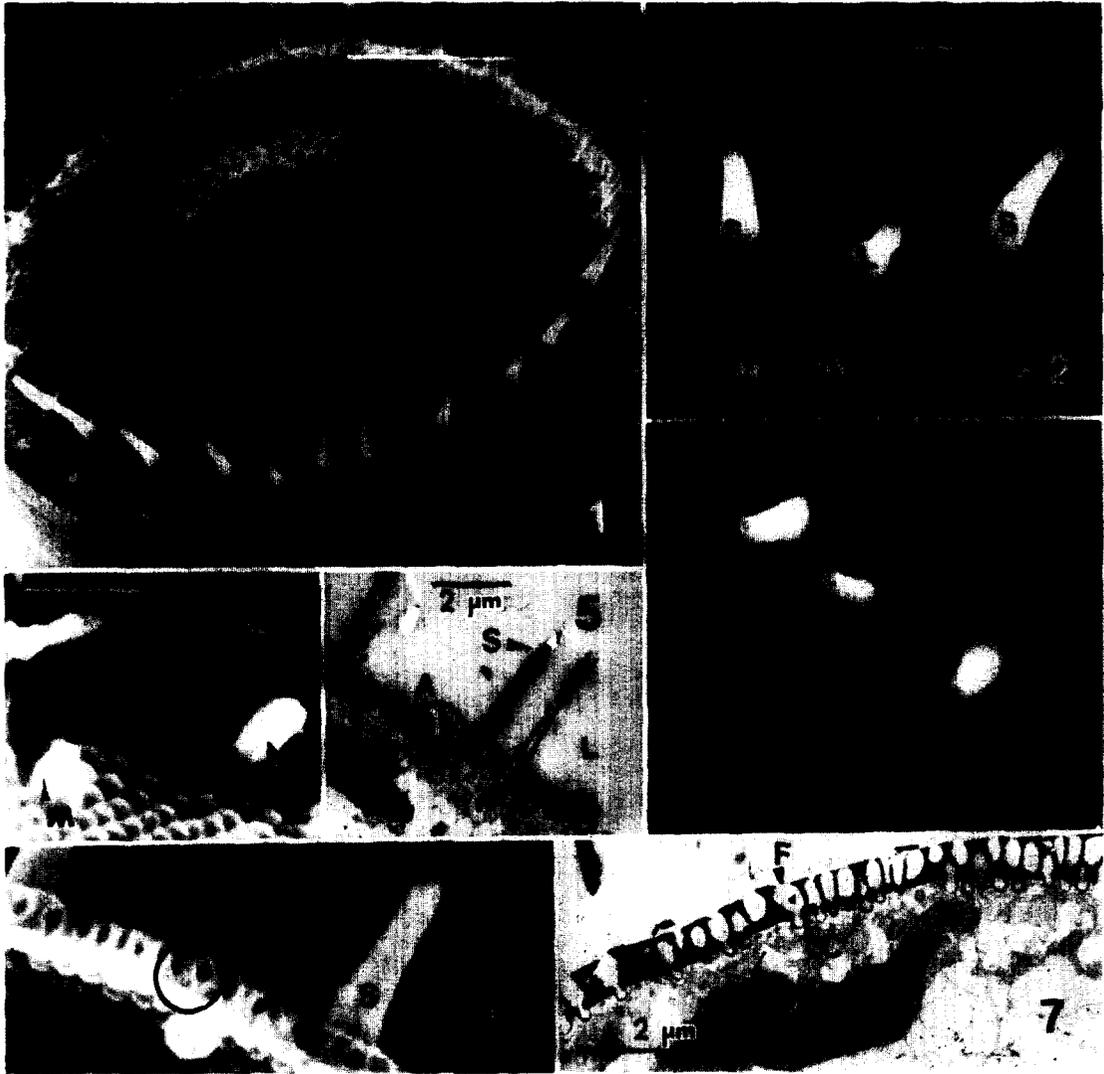


OBSERVATIONS ON THE VALVE MORPHOLOGY OF STEPHANODISCUS NIAGARAE EHR.  
(CENTRALES, BACILLARIOPHYTA)

Edward Theriot, Linda Sicko-Goad and Eugene F. Stoermer

Great Lakes Research Division, Univ. of Michigan, Ann Arbor, MI 48109

Stephanodiscus niagarae Ehr. was studied by scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Material for study was collected from Green Bay, Lake Michigan, Wisconsin, and Yellowstone Lake, Wyoming. Features of the valve visible in light microscopy (LM) but best defined by SEM and TEM include spines, arrangement of marginal and central strutted processes, labiate processes and areolae. The ribs between the fascicles are raised slightly; every second to third rib terminates in a robust, curved spine (Fig. 1). If the valve is viewed on the perivalvar axis, the insertion of spines appears submarginal due to the sloping valve mantle. Each spine is subtended by a rib which separates the spine from a marginal strutted process (MSP) (Fig. 2). Rarely spines or MSP occur alone and the intermediate rib is obliterated by areolae. The latter is illustrated in Fig. 3. Two to six labiate processes (LP) are inserted at the level of the spines and may be set at a slightly different angle than the spines (Fig. 1). An LP is shorter, thinner and generally less tapered than a spine. The regular arrangement of the ribs and fascicles is lost near the center of the valve. Groups of two or more areolae appear isolated from the rest by raised ribs in a reticulate pattern, giving the center of the valve a pocked appearance. As many as nine areolae may thus be isolated in the immediate center, forming a rosette. Not visible via LM are vertical grooves in the otherwise smooth strip around the bottom on the mantle and fine punctae at the top of the girdle band (Fig. 3). Viewing the internal surface of the valve reveals features visible only via SEM and TEM. The MSP each have three satellite pores while central strutted processes have two, rarely three. The labiate processes are indeed flattened structures greatly resembling protruding appressed lips (Fig. 4). The hollow nature of the labiate process is contrasted with the solid spines in TEM (Fig. 5). Both SEM and TEM reveal the loculate nature of the areolae. The foramen provides passage into a widened chamber with concave sides (Fig. 6 and 7). The chamber is closed at the internal surface of the valve by a convex cribrum.



- Fig. 1. *S. niagarae*; spine (S), labiate process (L), marginal strutted process (M), rib (R) and fascicle (F).
- Fig. 2. Close-up of spines, subtending rib (SR), marginal strutted process and labiate process.
- Fig. 3. Spine without subtending rib (arrow). Note the vertical grooves (G) in the valve.
- Fig. 4. Internal view of valve showing labiate process and marginal strutted process.
- Fig. 5. Thin section showing a hollow labiate process, a solid spine and areolae (A, circled) (TEM).
- Fig. 6. Close-up of broken valve demonstrating a labiate process, spine and areolae (SEM).
- Fig. 7. Thin section of valve illustrating areolar morphology. Foramen (F), chamber (CH) and cribra (C).