ATTACHED WINTER FLORAL ASSEMBLAGES ON SAND FROM GRAND TRAVERSE BAY, LAKE MICHIGAN *

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Natural benthic substrates were collected beneath the ice of Grand Traverse Bay by divers on March 10, 1978 as part of a seasonal investigation of northern Lake Michigan benthic algae assemblages. Some of the samples from each selected depth between the surface and 32 m were examined using SEM. Natural substrates (silt, sand, pebbles, algae, shells) were field-fixed in glutaraldehyde, dehydrated, and critical point dried. Samples were sputter coated and examined with a Hitachi HHS-2R SEM operating at 20 kV.

Sand samples from depths of 2, 5, and 10 m supported large populations of live epilithic and epipelic diatoms, as well as green algae, bluegreen algae, and bacteria, as determined by light microscopy of wet mounts and SEM (Figs. 1 & 2). Particularly dominant diatoms in these assemblages are species from the genera <u>Achnanthes</u>, <u>Amphora</u>, <u>Cocconeis</u>, <u>Diatoma</u>, <u>Fragilaria</u>, Navicula, and Opephora.

Several attachment mechanisms to sand grains can be noted. <u>Opephora ansata</u> Hohn & Hellerman is an example of attachment by hard mucilaginous stalks and interconnection of sibling cells by mucilage pads present at terminal pore fields (Fig. 1). <u>Achnanthes clevei</u> Grunow, <u>Achnanthes clevei</u> var. rostrata Hustedt, and <u>Achnanthes exigua</u> Grunow attach by the soft mucilaginous coating of the raphe valve face (Fig. 2). <u>Nitzschia</u> sp. and <u>Opephora</u> sp. show less determinate attachment by soft mucous layers along girdle bands or valve surfaces (Fig. 2). <u>Anacystis</u> incerta Drouet & Daily and coccoid bacteria attach via fibrillar appendages (Figs. 1 & 2) as reported by Paerl (I). Bacilliform bacteria are scattered over the sand grains or form colonies, and they show irregular mucilaginous connections or no visible attachment mechanism (Figs. 1 & 2).

Chironomid larvae are common in some samples, and it is probable that small sand grains are scraped or ingested whole as a means of using these attached organisms for food.

The extensive growth observed on northern Lake Michigan sand confirms others' conclusions that sand is exploited as a preferred habitat by many members of the microflora (Ref. 2).

REFERENCES

- (1) H. W. Paerl, Microbial attachment to particles in marine and freshwater ecosystems, <u>Microbial Ecology</u> 2, 73 (1975).
- (2) P. S. Meadows & J. G. Anderson, Micro-organisms attached to marine and freshwater sand grains, <u>Nature</u> 212, 1059 (1966).

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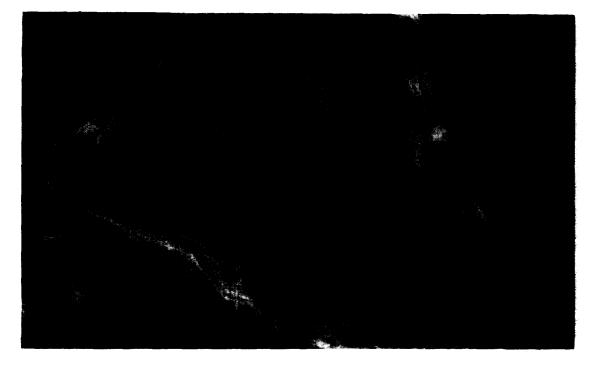


Fig. I SEM of sand from 2 m with attached <u>Opephora ansata</u> (0), <u>Anacystis incerta</u> (A), and bacilliform bacteria (B)



Fig. 2 SEM of sand from 5 m with attached <u>Achnanthes clevei</u> (C), <u>Achnanthes clevei</u> var. rostrata (R), <u>Achnanthes exigua</u> (E), <u>Opephora</u> sp. (S), and <u>Nitzschia</u> sp. (N)