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B. Javor: MICROBIOLOGY OF SOLAR SALT PONDS

Solar salt ponds are shallow ponds of brines that range in salinity from that of normal seawater (3.4 percent) through NaCl saturation. Some salterns evaporate brines to the potash stage of concentration (bitterns). All the brines (except the bitterns, which are devoid of life) harbor high concentrations of microorganisms. Oligotrophic brines, ranging from ca. 2X to 4X seawater, have thick bottom mat communities whereas very eutrophic systems harbor dense planktonic populations or benthic and planktonic microbial communities. Gypsum precipitates as grains or solid rock in brines that are concentrated ca. 4X to 7X from seawater. Planktonic populations dominate these brines perhaps because mat-forming communities cannot develop due to rapid burial by CaSO_4 . The diversity of eukaryotes decreases with increasing salinity, and only one metazoan thrives in 20 percent NaCl brine (the brine shrimp *Artemia salina*). In NaCl-saturated brines, which harbor plankton only, the microbiota consists of the green alga, *Dunaliella*, halobacteria, and some moderately halophilic bacteria. Population densities increase with increasing brine concentration in NaCl-saturated brines, but this increase may be due to passive concentration as a result of evaporation. The bitterns may be devoid of life because concentrations of essential ions are too high or too low, or because the low water activity of such brines (less than 68 per cent) precludes life.

Borowitzka, L.J., 1981. The microflora: adaptations to life in extremely saline lakes, *Hydrobiologia*, 81:33-46.

Carpelan, L.H., 1957. Hydrobiology of the Alviso salt ponds, *Ecology*, 38:375-390.

Cohen, Y., Krumbein, W.E., and Shilo, M., 1977. Solar Lake (Sinai). 2. Distribution of photosynthetic microorganisms and primary productivity, *Limnol. Oceanog.*, 22:609-620.

Davis, J.S., 1978. Biological communities of a nutrient salina, *Aquat. Bot.*, 4:23-42.

Hermann, A.G., Knake, D., Schneider, J., and Peters, H., 1973. Geochemistry of modern seawater and brines from salt pans: main components and bromine distribution, *Contrib. Mineral. Petrol.*, 40:1-24.

Javor, B.J., 1983. Planktonic standing crop and nutrients in a saltern ecosystem, *Limnol. Oceanog.*, 28:153-159.

- Javor, B.J., 1984.** Nutrients and ecology of the western salt and Exportadora de Sal saltern brines. In *Sixth Symposium on Salt*, (in press).
- Kushner, D.J., 1978.** Life in high salt and solute concentrations: halophilic bacteria. In *Microbial Life in Extreme Environments*. (D.J. Kushner, ed.), Academic Press, New York, pp. 317-368.
- Nissenbaum, A., 1975.** The microbiology and biogeochemistry of the Dead Sea, *Microb. Ecol.*, 2:139-161.
- Post, F.J., 1977.** The microbial ecology of the Great Salt Lake, *Microb. Ecol.*, 3:143-165.