

## MORPHOLOGICAL VARIATION WITHIN SALINE AND FRESHWATER STRAINS OF *FISTULIFERA SAPROPHILA*

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*Fistulifera saprophila* has been reported from highly enriched rivers of Europe and North America as well as from coastal waters and inland saline lentic waters. The species has been studied as a possible biofuels candidate for many years, and was one of the species of greatest promise in the biofuels effort led by the Aquatic Species Program of the Solar Energy Research Institute (SERI) in the mid-1980's. In recent biofuels-from-algae work in our lab it has again been demonstrated to be a species of promise. The work conducted in the 1980's was based on populations isolated from coastal oceanic waters (lagoons, estuaries, wetlands), inland saline lakes, and other saline lentic habitats. The strains examined in this project had relatively high salinity tolerance (optimum growth in water of 25-40 mS•cm<sup>-1</sup> conductivity). The morphology of 14 of these strains was documented in a series of TEM micrographs taken at the time but never reported in the literature. Recent isolations of *Fistulifera saprophila* were made from freshwater rivers in Ohio and Texas. The purpose of this study was to examine all of these populations with intent to answer the question whether the saline-habitat populations could be the same species as the freshwater populations. The two recent freshwater populations were compared to the one surviving (SERI strain) in SEM and TEM. All strains showed high morphological similarity. Ultrastructural details of the fistula, striae, raphe, axial area and valve margin are identical. The width of the valve exclusive of the marginal extensions differs slightly between saline populations (1.4-2.4 µm) and freshwater populations (2.3-3.4 µm), the striae counts, while overlapping, differ slightly (saline populations 65-80 in 10 µm, freshwater populations 46-70 in 10 µm). The difference in physiology and morphology indicate genetic separation between saline and freshwater populations, but at present it is not possible to separate these populations clearly into separate species. We conclude that more evidence (physiological, molecular sequence) is needed to demonstrate that the saline and fresh populations represent separate monophyletic species.