

SALVINIACEAE FLOATING FERN FAMILY

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Annual or perennial floating aquatic herbs, sometimes stranded on mud, heterosporous. ROOTS absent. STEMS usually pinnately branched, often breaking apart with age, with multicellular hairs. LEAVES in whorls of 3 per node; dimorphic, 2 of them floating, green, the other submersed, nonphotosynthetic. FLOATING LEAVES sessile or short-petiolate, simple, the venation densely reticulate without free included veinlets, the abaxial (submersed) surface with multicellular hairs similar to those of the stem especially in the proximal portion, the adaxial (emergent) surface with dense, complex, branched multi-cellular hairs consisting of a main column (interpreted as a papilla by some authors) terminated with 4 multicellular branches. SUBMERSED LEAF short- to long-petiolate, dissected into a root-like network of fibrous veins. SORI borne in sporocarps on short stalks along the submersed leaf. SPOROCARPS of 2 types on the same plant, each consisting of sporangia enclosed in a membranous indusium, some of these with 10 or more megasporangia, each containing 1 megaspore, others with numerous microsporangia, each with 64 microspores. SPORANGIA thin-walled, lacking an annulus, breaking open irregularly through decay. SPORES trilete, globose, relatively smooth-walled, megaspores large (0.3–0.5 mm) much larger than the dust-like (18–32mm) microspores. GAMETOPHYTES reduced, developing inside the spores, the archegonia and antheridia protruding from the spore wall. $X = 9$. —1 genus, ca. 10 spp., mostly tropical, N. Amer. to S. Amer., Eur., Asia, Afr.

Salvinia Ség. Floating Fern, Water Spangles

Characters of the family. (for A. W. Salvini, Italian botanist).

Salvinia molesta D.S. Mitch. (burdensome or annoying). Giant Salvinia, Kariba Weed (Fig. 3). —STEMS with dense dark multicellular hairs. FLOATING LEAVES 0.8–3.0 cm long, the blade elliptic-ovate to oblong-ovate and relatively flat in young plants, oblong-ovate to suborbicular and somewhat folded along the midrib in mature plants, shallowly notched at the tip, cordate at the base, the

venation obscure, the adaxial trichomes to 2 mm long (Fig. 2), the 4 apical branches fused at the tip, creating the impression of an egg-beater or cage. SUBMERGED LEAVES 1.5–6.0 cm long, short-petiolate, the root-like blade with numerous branches mostly near the base, with dense dark multicellular hairs. SPOROCARPS in chain-like clusters of 6–35 along “branches” of the submerged leaf blade, the proximal 1 or 2 slightly longer-stalked and megasporangiate, the remainder microsporangiate, 1.2–2.2 mm long, ovoid, narrowed to a short beak-like tip, pubescent with hairs similar to those of the submerged leaf. SPORANGIA empty or the spores abortive and collapsed. $2n = 45$. —Backwaters of the Colorado River and canals, floating aquatic in still or slow-moving water, occasionally stranded on mud: La Paz and Yuma cos. (Fig. 1); 20–100 m (60–300 ft); native of s Brazil, naturalized in regions with warm climates nearly worldwide.

Giant *Salvinia* is considered one of the worst weeds in the world. Although this taxon is a sterile pentaploid of putative hybrid origin (Loyal and Grewal, 1966; Schneller, 1981), plants propagate vegetatively extremely rapidly and can cover the water’s surface so densely as to exclude light and preclude gas exchange. In other parts of the world, *S. molesta* has not only wreaked havoc with the ecology of aquatic habitats, but has also had an economic impact by causing declines in fisheries, impeding traffic of small watercraft, and clogging the intakes of hydroelectric plants (see Room [1990] and Moran [1992] for reviews of the ecology and conservation biology). In the United States, infestations have been reported along the Gulf Coastal Plain from eastern Texas to Florida, and the U.S. Department of Agriculture has declared the species a federal noxious weed, prohibited from commerce and interstate transport. Despite this, Giant *Salvinia* continues to be one of several *Salvinia* species sold as an ornamental for aquaria and water gardens.

In Arizona, the species was first reported by Tellman (1999), based on plants observed by state and federal agency biologists in the Colorado River south of Parker. These apparently originated from plants introduced into an agricultural drainage ditch in eastern Imperial County, California, which then reproduced and were transported into the main river drainage. Concern exists about its potential spread into adjacent wildlife refuges and possible impacts on sport fishing, hydroelectric plants, and riverine ecology, but thus far eradication attempts have not been successful.

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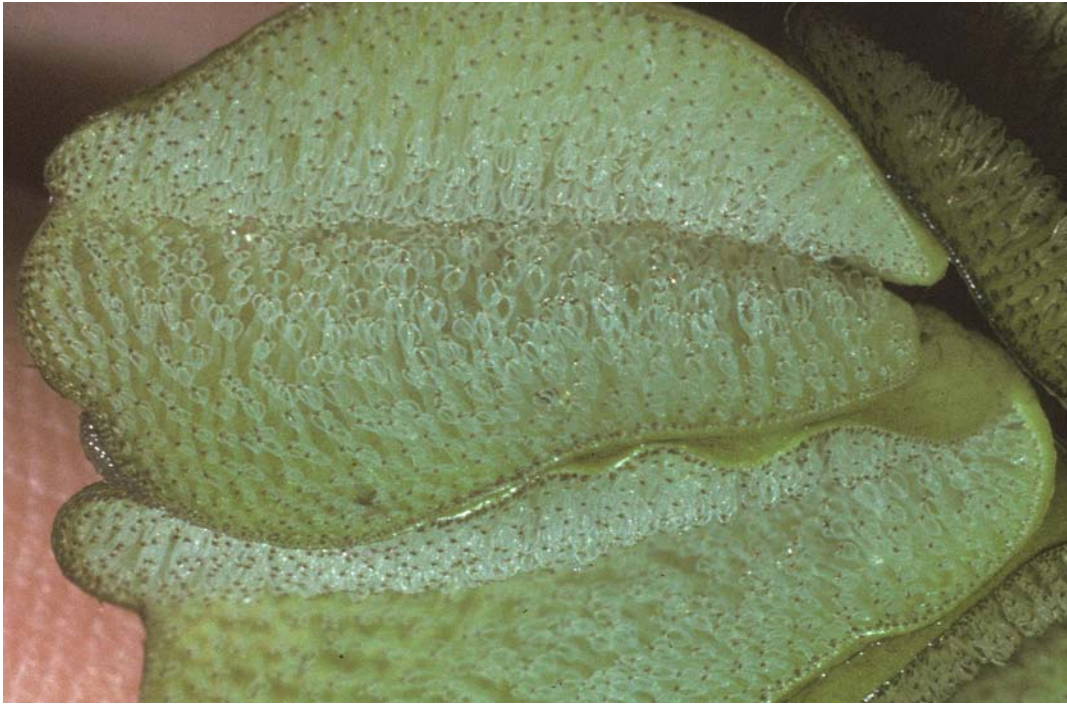
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Salviniaceae Figure 1. Distribution of: *Salvinia molesta*.



Salviniaceae Figure 2. Leaves of *Salvinia molesta*, showing adaxial trichomes.



Salviniaceae Figure 3. *Salvinia molesta* plants with sporocarps.