

Two types of trichomes developed in the epidermis of *Salvinia* leaves

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As an unique water fern having rootless small body, *Salvinia* develops two very different types of trichomes throughout the plant. Leaves are formed in whorls of three, with a pair of unwettable floating leaves and a finely dissected, rootlike submerged leaf at each node. The orbicular floating leaves are covered with close parallel rows of obvious, whitish, multicellular trichomes in the upper epidermis. The trichomes are divided into four branches at the early stage. The tips of branches are not joined, but free. Such immature, quadrified trichomes, ca. 250-380 μm , have 6-10 obliquely oriented cells within each branch, whereas mature trichomes divided into 8-10 branches and extend about 1 mm in length.

The second type is found in the lower surface of the floating leaves and submerged leaves. The trichomes are simple, septate, 300-450 μm , and the tips are acicular. The trichome bears semi-spheric protuberance of ca. 20-25 μm diameter at the base. The protuberance appears to be attached to the base, but the two are not connected. This structure is believed to make the plant buoyant. Trichomes occurring along the surface of the highly dissected submerged leaf are densely tomentose. They are similar to the second type, but the length often extends more than 2-3 mm.

The cells of both trichomes have much dense cytoplasm with well-developed organelles when young, while enormously large vacuoles occupy cells of the matures trichomes. By trapping air among the tip area in the branched forms of the first type and/or among hugh vacuoles of the second, the trichomes in *Salvinia* leaf surface probably cause the plants to stay upright in the water in addition to the aerenchyma tissue formed within the leaves.

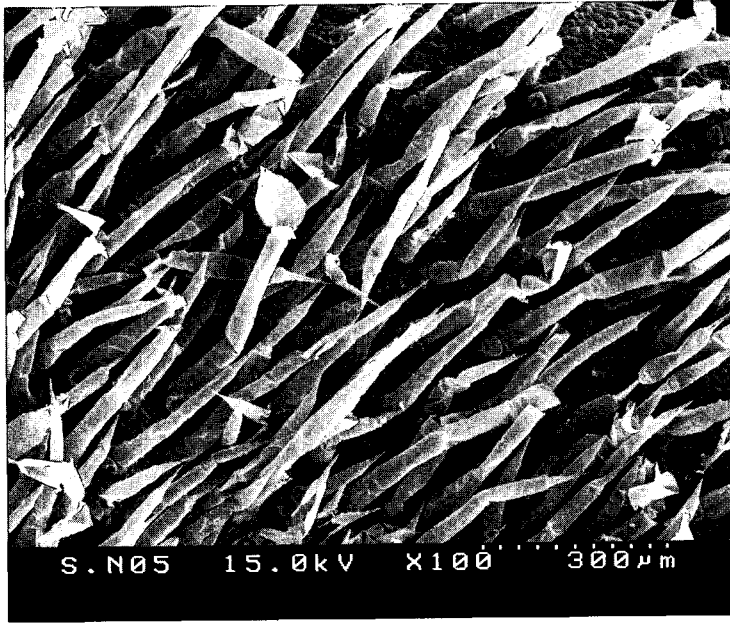


Fig 1. Simple, elongated trichomes in the lower epidermis of the floating leaf.

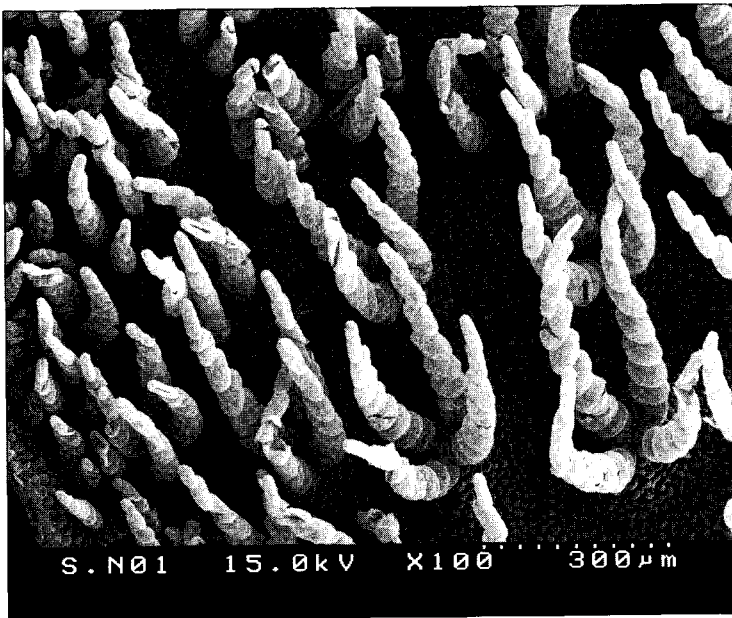


Fig 2. Four-branched trichomes in the upper epidermis of the floating leaf.