

VEGETATIVE REPRODUCTION IN FLYTRAPS

by Jan Hooft

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Vegetative reproduction by means of plantlets originating from modified floral parts in sundew (Drosera rotundifolia) has been reported from time to time and is discussed at length by Lloyd (1942) in Carnivorous Plants. In addition Lloyd discusses the formation of plantlets derived from adventitious buds formed on petioles and leafblades of sundews.

There are scattered reports of field observations concerning specimens of Venus' flytrap (Dionaea muscipula) with scapes bearing numerous plantlets. We have made several field collections of such plants, and have observed the phenomenon in cultivated flytraps in our greenhouses.

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In 1969-1972 we successfully induced formation of adventitious buds on the excised petioles of Venus' flytrap and sundew. We were able to cultivate the resulting plantlets, many of which developed into fine specimens.

Floral Modification. Green, cupshaped, modified sepals surround each "plantlet" which apparently consists of modified stamens, carpels, and perianth parts. Often, in other specimens only one flower on an elongated pedicel will show modification, while the other floral buds are aborted. From our observation, these plantlets in inflorescences do not originate from seed or from embryos developing in the ovulary; they are vegetative in nature. We have found such modified flowers in May when flytraps are just beginning to bloom.

Adventitious Buds. In the spring of 1969 several small plantlets resembling Venus' flytrap seedlings were found in trays of mature flytraps in our greenhouse. These plantlets measured less than 7 mm. in diameter. The mature plants, grown from field collected rhizomes ("bulbs") had not yet produced flowers, and thus could be ruled out as a seed source. Likewise, flytrap seed could not have been present in the horticultural peat moss used as a planting medium.

A source for such plantlets was discovered when we located a partly decayed leaf which showed three minute buds on the wing of the petiole. In time one of these buds developed into a plantlet resembling a young seedling. This phenomenon has since been observed numerous times in our greenhouse.

In 1971 and again in 1972 we were able to induce formation of adventitious buds on excised leaves placed in a moisture chamber. Several of these buds developed into plantlets, which eventually grew into healthy well developed specimens.

The moisture chamber consisted of a covered culture dish partly filled with wet vermiculite. Other inert sterile material may be substituted for the vermiculite. Mature leaves selected from healthy greenhouse-grown plants were cut as close to the bases of the petioles as possible, and the traps were removed. Thus, only the winged petioles were used. The petioles were thoroughly washed and surface-sterilized in diluted (1:1) S.T. 37 (hexylresorcinol), a common antiseptic. Prepared petioles placed on top of the wet vermiculite remained fresh for as long as two months.

We placed the chambers containing the petioles on a windowsill. The petioles were protected from direct sunlight with paper. Other chambers placed on a rack equipped with fluorescent lights proved to be equally productive. After about a month small buds formed close to the rib on several of the petioles. Complete leaves with minute traps formed after about two months. The plantlets did not produce roots until decomposition of the original petioles was well advanced.

The formation of adventitious buds was also observed on transplanted rhizomes. At the end of the 1971 growing season, all plants that had not grown to desirable size or shape were uprooted, and all leaves and roots cut off, leaving only the short bases of the petioles attached. These rhizomes were transplanted into fresh growing medium and placed in a cold frame. The following spring the flats containing these rhizomes were placed in a cool greenhouse. Within weeks numerous buds formed on the petiole bases surrounding the rhizomes. A total of 180 plantlets were collected and transplanted.

The factors involved in stimulating formation of adventitious buds in flytraps are not understood. However, certain stress factors seem to be involved, such as temperature extremes and separation from the apical meristem. Buds will readily develop into plants when conditions are such that the injured or separated leaves survive in a more or less fresh condition for a long enough period of time. In a wet sphagnum bog such conditions may be met.