

Morphological Differences in Zones of Pitcher Plants

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Abstract

The purpose of the study was to examine the North American *Sarracenia alata* pitcher plant and differentiate the zone morphology of the plant using scanning electron microscopy (SEM). Pitcher plants were collected at the Hickory Creek Savannah Unit in the Big Thicket National Preserve then observed in a laboratory at Eastfield College. This study resulted in finding morphological differences in zones of the *S. alata*.

Introduction

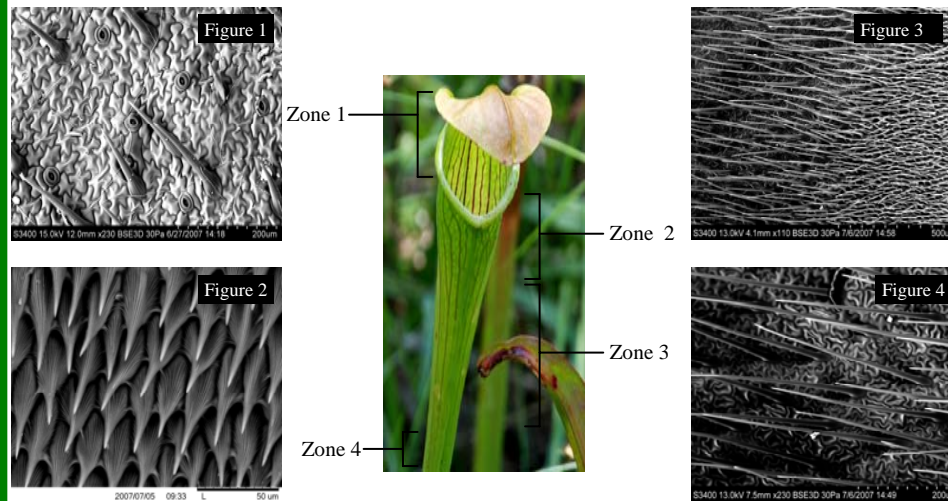
The carnivorous pitcher plant *Sarracenia alata* is found in nutrient deprived bogs in North America. This carnivorous plant is distinguished by its yellow-green coloration, purple venation, trumpet shape, and wing (ala) found at the anterior of the plant. The pitcher plant attracts insects of prey with a strong scent of nectar and bright coloration. It traps its prey with a slick surface and downward pointing hairs. The prey fall into the digestive liquid at the bottom where they are digested and nutrients are absorbed (McPherson 2007). This study examines the morphological differences of the zones found within the North American pitcher plant *S. alata* by using SEM.

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Results

Morphological studies of the *Sarracenia alata* using scanning electron microscopy show four distinct zones; attracting, imbricate, hairy, and digestive. The insect attracting zone, Zone 1 (operculum and peristome) had numerous nectar glands and hairs. Zone 2 had imbrications (sequential overlapping). Zone 3 was full of hairs that continued down to the bottom of the pitcher. Zone 4 was similar in structure to zone 3, in addition zone 4 contained digestive liquid and accumulated prey.



Numerous nectar glands and hairs of the operculum (hood) in zone 1 (Fig. 1). Smooth imbricate (sequential overlapping) surface of zone 2 (Fig. 2). Transition of imbricate surface (zone 2) to long downward pointing hairs (zone 3) (Fig. 3). Downward pointing hairs in zone 3 (Fig. 4).



Methods

Sarracenia alata were collected from the Hickory Creek Savannah Unit in the Big Thicket National Preserve. Additional samples of the pitcher plants examined in the laboratory were provided by Houston Herpetological Supply. At Eastfield College the specimens of *S. alata* were kept in a laboratory where they were placed in a soil mix of 70% sphagnum peat and 30% perlite. Distilled water was used to hydrate the plant, and specimens were kept under fluorescent lighting. Specimens of *S. alata* were observed using a Hitachi (S-3400N and TM-1000) SEM's.

Discussion

The data obtained from micrographs support the hypothesis and were consistent with the previous research (Adams, 1977) showing morphological differences in zones within the plant. Zone 1, contained numerous nectar glands to attract insects by secreting copious amounts of nectar, which supported morphological data of Adams (1977). The hairs found in zone 1 were much shorter than those found in zone 3. Zone 2 was slick to the touch and was expected to be a flat surface, but SEM studies revealed an imbricate surface. This finding concurred with Adams (1977). This surface does not provide a foot hold and causes prey to fall into the plant. The hairs in zone 3 were long and pointed downward. There were also nectar glands, but were not as abundant as in zone 1. This data was similar to findings by Adams (1977). These hairs prevent the prey from climbing back up to the opening of the plant.

Conclusion

In Conclusion, examination of each zone of the North American *S. alata* pitcher plant using scanning electron microscopy revealed the ultra structure of four distinctive zones; attractive, imbricate, hairy, and digestive. This data concurred with the findings of Adams (1977).

Literature Cited

Adams, R. and Smith, G. An S.E.M. Survey of the Five Carnivorous Pitcher Plant Genera. *American Journal of Botany*. 64 (1977): 265-272.
McPherson, S. 2007. *Pitcher Plants of the Americas*. McDonald & Woodward Publishing Company, Blacksburg, Virginia