Trichomes Encyclopedia Article

Trichomes

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Trichomes

Trichomes are single or multicellular outgrowths of the plant epidermis and collectively constitute the pubescence (hairiness) of the plant surface. These epidermal hairs in many plant species are specialized for defense against attack by insects and mites. The mode of defense used by trichomes is determined by whether they are nonsecretory or glandular, as well as their density, length, shape, and degree of erectness. When present on the plant surface at high densities, **nonsecretory** trichomes create a physical barrier to insect feeding on the underlying surface or internal tissues. Barrier defense is an important element of resistance to leafhoppers in cultivated crop plants such as alfalfa (*Medicago*), cotton (*Gossypium*), and soybean (*Glycine*). Although not defensive, similar but downward-pointing trichomes in the upright tube of the carnivorous pitcher plant (*Sarracenia*) create a "lobster pot" effect preventing the escape of prey. Beans (*Phaseolus*) have evolved fish-hook-shaped trichomes that help to anchor their climbing vines but the hooked feature is also defensive because leafhopper and aphid pests are impaled and captured by these hairs. The most elegant specializations of plant hairs for defense are glandular trichomes, which secrete adhesive materials that physically entrap and immobilize insects and mites or which contain toxic or deterrent substances. Trichomes of this type are common in the nightshade family (Solanaceae) and plant breeders have created new varieties of potatoes (*Solanum*) and tomatoes (*Lycopersicon*) that resist insect pests because of glandular hairs on their leaves and stems. Other crop plants in which glandular trichomes are being used to breed for pest resistance include alfalfa, strawberry (*Fragaria*), sunflower (*Helianthus*), and tobacco (*Nicotiana*).

A praying mantis perched atop a pitcher plant. Trichomes in the upright tube of the carnivorous pitcher plant (*Sarracenia*) create a "lobster pot" effect, preventing prey from escaping.

See Also

Carnivorous Plants; Defenses, Chemical; Defenses, Physical; Halophytes; Leaves.

Bibliography

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