

Botanical Word of the Month – July 2022

Trichomes and Plant Hairiness, by MG Patricia Stooke

When we look closely at many types of plants, fine hairs are often noticeable on their stems, leaves, flowers, or all over. When we touch or brush against them, they may feel velvety, fuzzy, sticky (think deadheading spent pentunia flowers) or produce an odor, such as sweet basil (*Ocimum basilicum*) or tomato (*Solanum lycopersicum*).

Hairs on plants are botanically named **trichomes** (pronounced TRY-combs). Trichomes are elongated epidermal cells that come in hundreds of sizes and shapes (e.g., linear, branched, star-shaped, hooked, peltate). A given plant species may have one or more types of trichomes on the same plant.

What do trichomes do? In the words of Garfield the cat, what's the big fat hairy deal?

Trichomes provide physical protection.

The presence of trichomes can make it difficult for an insect to land on, walk on, or chew into a leaf. They can form a barrier that prevents spores or other microbes from reaching the leaf surface, or they prevent films of water forming on leaves, so pathogens cannot germinate or multiply.

Trichomes can act as sunscreen, shading underlying tissues by blocking some incoming sunlight when too intense in summer, or in high alpine environments. Trichomes also help prevent desiccation in dry environments by creating a layer of immobile air next to a leaf surface, so the water molecules that diffuse out of leaf stomata may bounce back in rather than be swept away by air currents.

Trichomes produce and secrete chemicals.

Trichomes that are glandular may secrete antiherbivore substances as a chemical defense against pests, such as the biochemicals produced in alfalfa (*Medicago sativa*) glandular trichomes, or the poisonous, irritating compounds found in stinging nettle (*Urtica dioica*).

The essential oils of peppermint (*Mentha x piperita*) and spearmint (*Mentha spicata*) are also produced in glandular trichomes. Glandular trichomes in carnivorous plants secrete digesting enzymes onto trapped insects, as in the case of sundews (*Drosera* sp.).



Above Left: Trichomes on the developing floral bud of sunflower (*Helianthus annuus*) help prevent insects from finding a home. Image Credit: P. Stooke.

Above Right: African violets' (*Saintpaulia* sp.) trichomes contain chemicals that protect their leaves by absorbing UV light. Image Credit: P. Stooke.

Below Left: Glandular trichomes on snapdragon (*Antirrhinum majus*) flower buds. Image Credit: P. Stooke.

Below Right: Glandular trichomes on stinging nettle (*Urtica dioica*) stem. Image Credit: Wikipedia.



Sometimes we encounter terminology that describes the overall appearance of masses of trichomes on a plant's surface. Botanists call these surface features a plant's **vestiture**. Some common terms that describe a plant's vestiture are: **canescent**, **hirsute**, **hispid**, **pilose**, **pubescent**, **scabrous**, **sericeous**, **strigose**, **tomentose**, or **woolly**.^{*} In contrast, if a plant has no trichomes, its vestiture is **glabrous**, meaning 'smooth'.

What is the difference between these types of hairy surfaces?

canescent: has very short, dense hairs; producing a whitish appearance

Example: *Lithospermum ruderales* (woolly gromwell)

hirsute: covered with coarse, stiff hairs (stiff enough to break the skin)

Examples: Staghorn sumac (*Rhus typhina*); *Verbena stricta* (hoary vervain)

hispid: rough with firm, stiff hairs (not stiff enough to break the skin)

Example: *Castilleja hispida* (harsh Indian-paintbrush)

pilose: long, soft, straight hairs

Example: *Pilosella aurantiaca* syn. *Hieracium aurantiacum* (orange hawkweed)

pubescent: covered with short, soft hairs; (may also be used in a more general sense to refer to a plant bearing any type of hair)

Example: *Rubus pubescens* (dwarf red raspberry)

scabrous: stiff, sharp hairs that are very short and straight

Example: *Agrostis scabra* (rough bentgrass)

sericeous: hairs are soft, long and flexible, and lie flat

Example: hairs on young stems of red-osier dogwood (*Cornus sericea*)

strigose: stiff, sharp hairs that lie flat

Example: hairs on bottom surface of leaves of daisy fleabane (*Erigeron strigosus*)

tomentose: hairs short, dense, curly or wavy, and matted

Example: snow-in-summer (*Cerastium tomentosum*)

woolly (also called **lanate**): hairs long, dense, curly or wavy, and interwoven or entangled

Examples: *Jacobaea maritima* syn. *Senecio cineraria* (dusty miller)

^{*} For a comprehensive list of terms, sketches of vestiture, and a botanical key, a very useful reference is:

Plant Identification Terminology: An Illustrated Glossary, second edition. ©2001 by James G. Harris and Melinda Woolf Harris. Spring Lake Publishing, Payson, UT, USA. See pages 164-172.



Above: Fine, long, entangled hairs on the woolly surface of dusty miller (*Jacobaea maritima*) leaf.
Image Credit: P. Stooke



Below: Short, matted hairs on the tomentose buds of snow-in summer (*Cerastium tomentosum*).
Image Credit: Wikipedia.