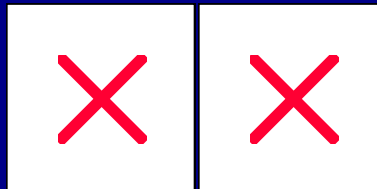


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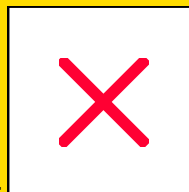
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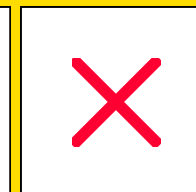
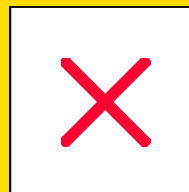
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What are trichomes? Trichome 101

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Contributed by: **Snaps_provolone**

Submitted June 18, 2003

What are Trichomes?



capitate stalked trichome photo by: Eirik

Although cannabis resin glands called trichomes are structurally diverse, they come in three basic varieties:

- **Bulbous:**

The *bulbous* type is the smallest (15-30 micron). From one to four cells make up the "foot" and "stalk," and one to four cells make up the "head" of the gland. Head cells secrete a resin - presumably cannabinoids, and related compounds which accumulate between the head cells and the cuticle. When the gland matures, a nipple-like protrusion may form on the membrane from the pressure of the accumulating resin. The bulbous glands are found scattered about the surfaces of the above-ground plant parts.

- **Capitate-Sessile:**

The second type of gland is much larger & is more numerous than the bulbous glands. They are called capitata, which means having a globular-shaped head. On immature plants, the heads lie flush, appearing not to have a stalk and are called *capitate sessile*. They actually have a stalk that is one cell high, although it may not be visible beneath the globular head. The head is composed of usually eight, but up to 16 cells, that form a convex rosette. These cells secrete cannabinoids, and related compounds which accumulate between the rosette and its outer membrane. This gives it a spherical shape. The gland measures from 25 to 100 micron across.

- **Capitate-Stalked:**

Cannabinoids are most abundant in the capitata stalked gland which consists of a tier of secretory disc

cells subtending a large non-cellular secretory cavity. During flowering the capitate glands that appear on the newly formed plant parts take on a third form. Some of the glands are raised to a height of 150 to 500 micron when their stalks elongate. These capitate-stalked glands appear during flowering and form their densest cover on the female flower bracts. They are also highly concentrated on the small leaves that accompany the flowers. The male flowers have stalked glands on the sepals, but they are smaller and less concentrated than on the female bracts. Male flowers form a row of very large capitate glands along the opposite sides of anthers.



photo by: Proof_of_the_pudding



photo by: Proof_of_the_pudding

The figures above denote capitate-stalked trichomes with green arrows, the bulbous trichomes with yellow arrows & the red arrows mark the capitate-sessile trichomes. Cyan arrows denote cystolith hairs.

I fe inside a capitate-stalked trichome

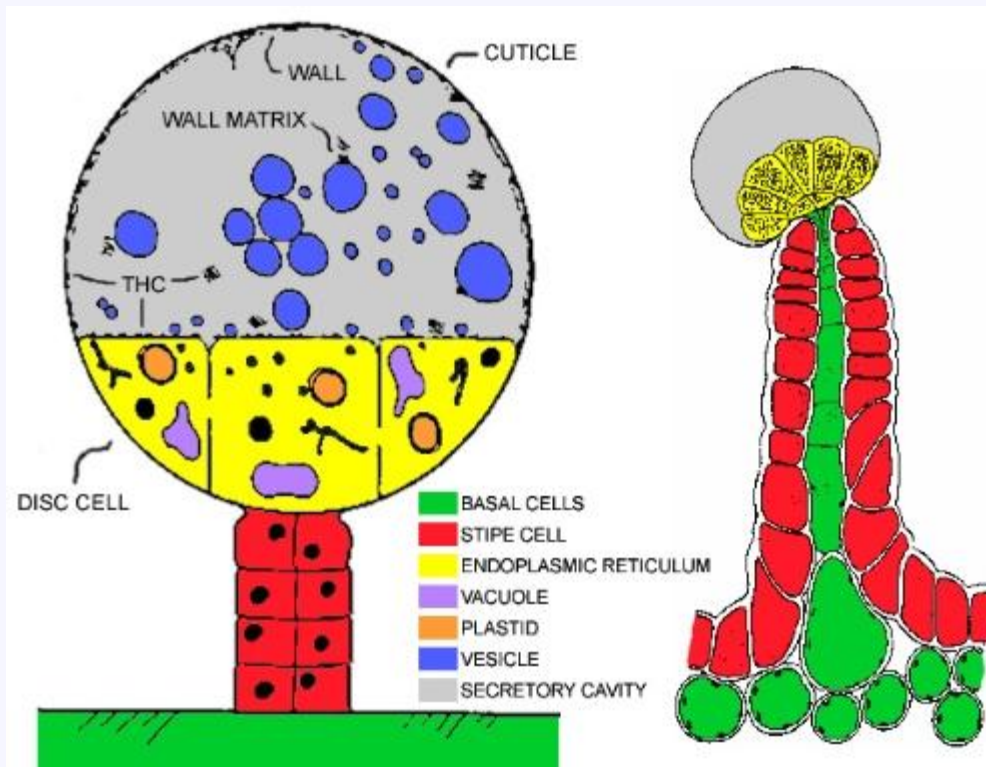


image by: Snaps_Provolone

Disc cells, attached to leaf or bract by stipe cells (**RED**) & basal cells (**GREEN**), release fibrillar wall matrix into secretory cavity where it contributes to thickening of subcuticular wall during enlargement of secretory cavity. Plastids (**ORANGE**) in disc cells produce secretions called lipoplasts which synthesize quantities of lipophilic substances that accumulate outside the plasma membrane, migrating into the endoplasmic reticular cytoplasm and through the plasma membrane and cell wall into the secretory cavity where they form vesicles (**BLUE**) in the secretory cavity. Vesicles in contact with the subcuticular wall release contents that contribute to the growth of the cuticle during the enlargement of the secretory cavity. THC occurs in the walls, fibrillar matrix & other contents surrounding the vesicles, but not in the vesicles. Trace amounts of THC is present in the disc cells.

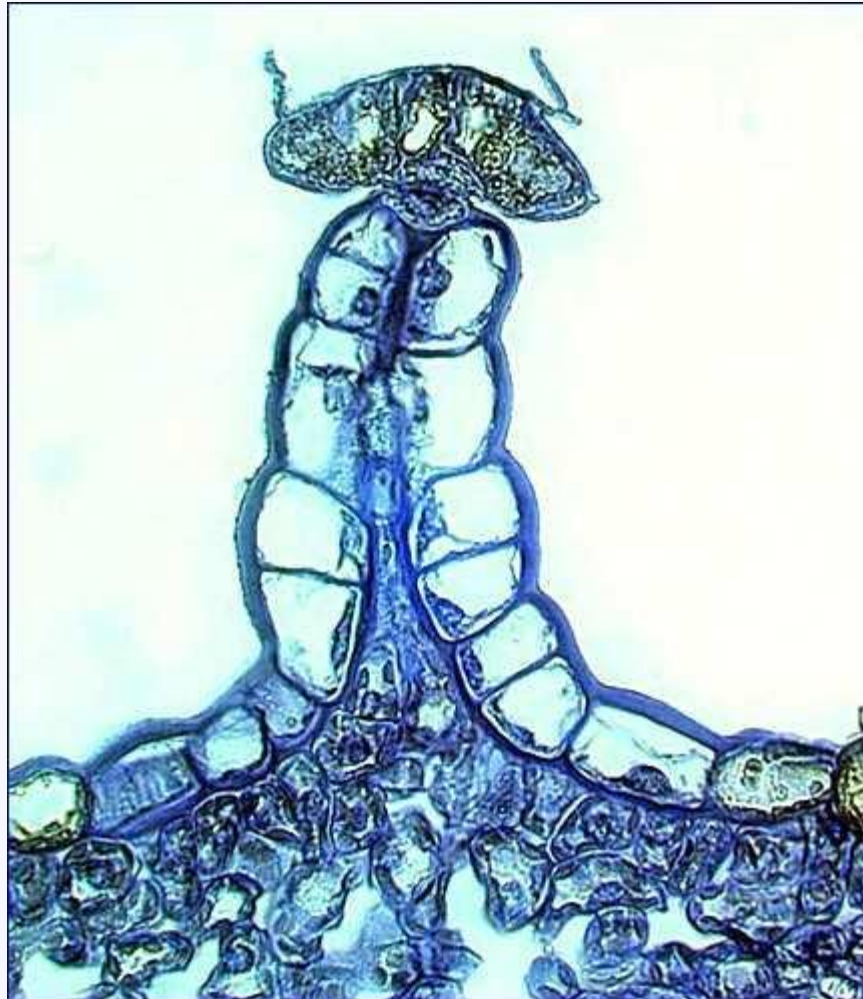


photo by: Eirik

When to harvest your trichomes

There are several schools of thought as to when it is the time to harvest. I shall attempt to explain how you can determine the harvesting time that will produce the most favorable psychoactive effect for your individual preferences.

We are most concerned with the capitate-stalked trichomes, as these contain the overwhelming majority of the psychoactive cannabinoids (*THC*, *THCV*, *CBN*). Different cannabinoids affect the high in a multifaceted manner.

- **THC:**

delta-9-tetrahydrocannabinol & delta-8-tetrahydrocannabinol - THC mimics the action of anandamide, a neurotransmitter produced naturally in the body, which binds with the cannabinoid receptors in the brain to produce the 'high' associated with marijuana. THC possesses high UV-B (280-315 nm) absorption properties.

- **THCV:**

tetrahydrocannabivarin - prevalent in certain South African and Southeast Asian strains of cannabis. It is said to produce a 'clearer high' & seems to possess many of the therapeutic properties of THC.

- **CBD:**

cannabidiol - previously believed to be psychoactive, or to contribute to the high by interacting with other cannabinoids, conversely the most recent research indicates that CBD has negligible effect on the high, it is however a strong anti-inflammatory, and may take the edge off some THC effects, such as anxiety. CBD as a non-psychoactive cannabinoid appears to be helpful for many medical conditions. CBD biosynthesizes into cannabinol (CBN) & tetrahydrocannabinol (THC).

- **CBN:**

cannabinol - a degradation product of THC, produces a depressant effect, 'fuzzy' forehead.

- **CBC:**

cannabichromene - non-psychoactive, a precursor to THC.

- **CBG:**

cannabigerol - non-psychoactive, hemp strains often possess elevated levels of CBG while possessing only trace amounts of THC.

Heavy trichome production is not necessarily an indication of a potent plant. Some hemp strains have moderate layers of trichomes yet pack only a strong headache. In a drug strain, a thick layer of trichomes is a symbol that it may well possess an elevated potency level, but it is certainly not a guarantee.

What defines a cannabis drug strain is the plant's ability to produce THC & THCV.

A small 25x or stronger pocket microscope, which can be picked up inexpensively at an electronics store like Radio Shack, works well for getting a closer peek at your trichome development. We are examining are the capitate stalked glandular trichomes, the coloration of these gland heads can vary between strains and maturity. Most strains start with clear or slightly amber heads which gradually become cloudy or opaque when THC levels have peaked and are beginning to degrade. Regardless of the initial color of the secretory cavity, with careful observation you should be able to see a *change in coloration* as maturity levels off.

Some cultivators wait for about half of the secretory cavities to go opaque before harvesting, to ensure maximum THC levels in the finished product. Of course nothing tells the truth more than your own perception, so try samples at various stages to see what is best for you & the *phenotype* your are growing. While you may be increasing the total THC level in the bud by allowing half of the glands to go opaque, the bud will also have a larger percentage of THC breakdown products such as CBN, which is why some people choose to harvest earlier while most of the secretory cavities are still clear.

Indica varieties will usually have a 10-15 day harvest window to work with. Sativas and Indica/Sativa hybrids often have an extended period to work with.



photo by Fish



photo by: Proof_of_the_pudding

The figures above denotes clear trichomes with green arrows, the cloudy trichomes with yellow arrows & the red arrows mark the amber trichomes.

Why did trichomes evolve in nature?

Cannabis has evolved trichomes for a multitude of uses in nature, some of these require THC & other cannabinoids to be effective, and others that do not.

- **Insect Protection:**

Many insects find the thick coating of trichomes unpleasant, this offers a level of protection for the

developing seeds.

- **Animals:**

The layer of trichomes and cystolith hairs makes cannabis less palatable to many herbivores & omnivores.

- **Desiccation:**

The layer of trichomes helps to 'insulate' the pistillate (female) flower from low humidity levels and high wind.

- **UV-B Light:**

UV-B light is harmful to living things, THC has very high UV-B adsorption properties, thus cannabis evolution may have favored the evolution of genotypes that produced these THC laden capitate-stalked trichomes as a built in 'sun-screen' for protection against UV-B light rays.

- **Fungal Protection:**

Some of the compounds present in the trichomes actually inhibit the growths of some types of fungus.

Quite possibly, the most important reason for the evolution of the THC laden capitate-stalked trichomes is the intercession of man in the natural selection process, favoring genotypes that produce copious amounts of THC laden trichomes.

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