



Assignment 3.1:

Morphological Differences Between the Male and Female Cannabis Plant

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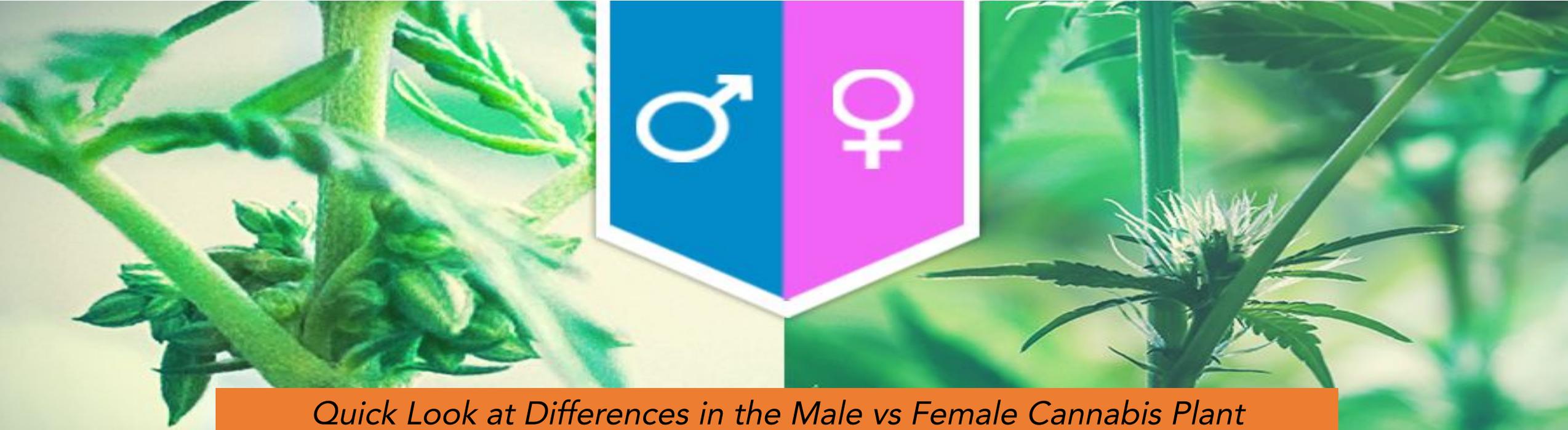
MCST 608 - Cannabis Genomics & Pharmacognosy

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Cannabis Morphology Overview

- Cannabis is considered a "dioecious" plant, meaning that it is distinctly unique compared to most plants regarding its sexual organs.²
 - *Cannabis can be a male plant (with only male sexual organs) or it can be strictly female (with only female features).*²
- While there are times when breeding or growing conditions can result in abnormalities, such as one cannabis plant having both sexes (called a hermaphrodite plant), for the most part cannabis is specifically bred to be one sex or the other.²
- The female cannabis plant is the best for growing the flowers (buds) and produce higher percentage of cannabinoids.² The male plant is important for growing future crops and altering the genetics and producing hybrids.²
 - However, to obtain the often desired *sinsemilla* ("large cannabinoid-rich buds...without seeds") the males need to be removed from the crop as soon as they are identified.³





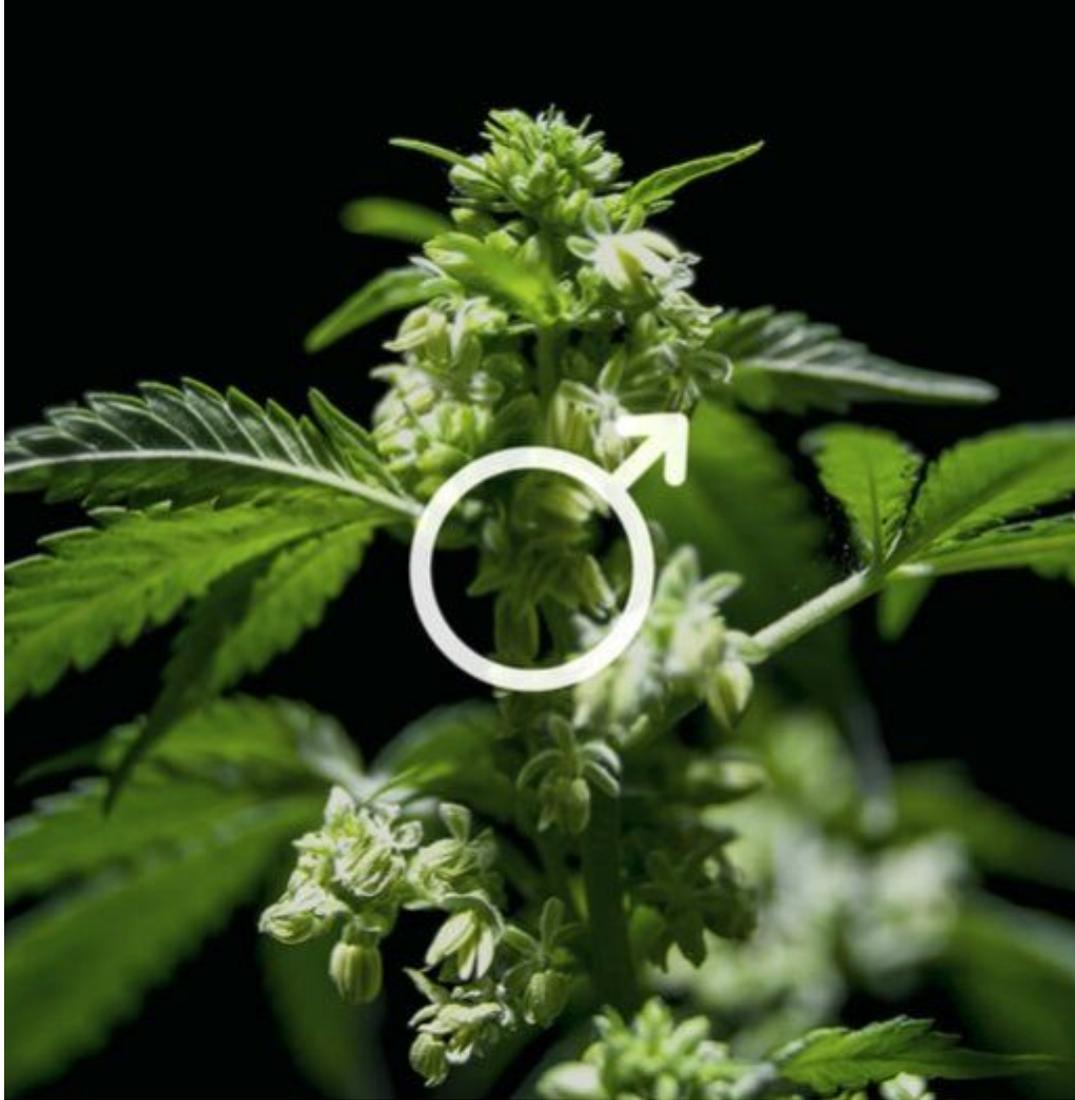
Quick Look at Differences in the Male vs Female Cannabis Plant

Male

- Thicker, sturdier stalks ⁵
- Will produce fewer fan leaves ⁴
- Shows sex of the plant earlier ⁵
- Will produce small, ball-like pre-flowers ⁴
- Joints on the stalk will show pollen sacs ⁵
- Considered more undesirable (*does not produce flowers*) ⁵

Female

- Shorter (*when comparing the same strain*) ⁵
- When fertilized will stop producing THC to grow seeds ⁵
- Joints on stalk will show bulbs with long translucent hairs ⁵
- Will produce thread-like pistils during pre-flowering ⁴
- Fuller leaves ⁵
- More bushy overall, especially at the top ⁵



The Male Cannabis Plant

- Male cannabis plants have nodes that are found where leaves and branches extend from the stalk of the plant.¹
- During pre-flowering, males produce a tiny sac (like the female plant) but without any protruding stigmata.²
 - These sacs of pollen form a cluster that hangs down waiting until they are developed enough to open and drop the pollen.²
 - The pollen is what fertilizes the female plant.¹
- Males produce cannabinoids and terpenes are lower levels compared to female plants.⁴
 - The resin found around pollen sacs and leaves of a male plant can be used for edibles, extracts, and with the right tools kef can be collected in small amounts.⁴
 - THC-A (which turns to THC when exposed to heat) has anti-inflammatory properties and neuroprotective properties, making it still beneficial to use a male cannabis plant.⁴

The Female Cannabis Plant

- During pre-flowering, "Female plants develop a small pear-shaped bag from which protrude two hair-like stigmata, usually white in colour." ²
- The sex organ on a female cannabis plant is known as "pistils".¹
 - Pistils are very small white, red or orange colored hairs.⁴
 - "Pistils will start to emerge at internodes, sections where branches intersect with main stem....which will eventually grow and form together [two pistils] into what are commonly referred to as buds," which can grow to "large dimensions if given the right care."^{4, 2}
 - The pistils are considered the primary part of the reproductive system and consists of a "single ovule with two protruding stigmas".¹
- The female plant has a "cola" which is the main part of the flower and is "composed of many small floral clusters".¹
- Female plants also have "bracts" which are leaves that protect the reproductive cells of the female plant.¹



The Holy Grail of Cannabis: *The Female Plant*

- The flowers on the female plant are desired for their recreational and medicinal purposes.⁴
- Each flower is covered with a “thick layer of cannabinoid rich resin” that is produced by a mushroom-shaped glands called trichomes that can be found on the leaves, stems, and calyxes.^{4, 1}
- Trichomes protect the plant from the external environment and create the flavonoids, cannabinoids, and terpenes, which provide the plant's therapeutic properties.¹
- The resin on a female plant is what attracts the pollen produced by the male cannabis plant.⁴
- When the male plant is removed from the growing environment, the female plant will begin to produce more “valuable resin in a desperate attempt to capture pollen and become fertilized”, thus increases its medical and recreational potential.⁴

References

- ¹ Eddington, N. MCST 608. Introduction to the Morphology of the Cannabis Plant. Module 3 Video Lectures and Powerpoints. <https://mediasite.umaryland.edu/Mediasite/Play/6eff571247054dc68b0dc5cc1fcb8f4e1d?catalog=a802fc27b08747d3b83080ddec903912>
1. Published June 12, 2020. Accessed June 14, 2020.
- ² Civantos D. How to Tell Whether a Cannabis Plant is Male, Female or a Hermaphrodite. Dinafem Seeds. <https://www.dinafem.org/en/blog/differentiate-cannabis-plant-male-female/>. Published March 17, 2017. Accessed June 16, 2020.
- ³ Rahn B. Anatomy of marijuana plants: The different parts. Leafly. <https://www.leafly.com/news/cannabis-101/cannabis-anatomy-the-parts-of-the-plant>. Published April 23, 2017. Accessed June 16, 2020.
- ⁴ The difference between male and female cannabis plants. Cannaconnection.com. <https://www.cannaconnection.com/blog/1172-difference-male-female-plants>. Published August 21, 2019. Accessed June 16, 2020.
- ⁵ wikiHow. How to Identify Female and Male Marijuana Plants. wikiHow. <https://www.wikihow.com/Identify-Female-and-Male-Marijuana-Plants>.
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1. <https://cannabis.wiki/growing/how-to-tell-if-your-plant-is-a-male-or-female-before-the-flowering-stage>
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6. <https://cannabis.wiki/growing/how-to-tell-if-your-plant-is-a-male-or-female-before-the-flowering-stage>