

Adventures in Hemp Breeding



<http://digital.vpr.net/post/vermonts-third-year-industrial-hemp-growth-and-growing-pains#stream/0>

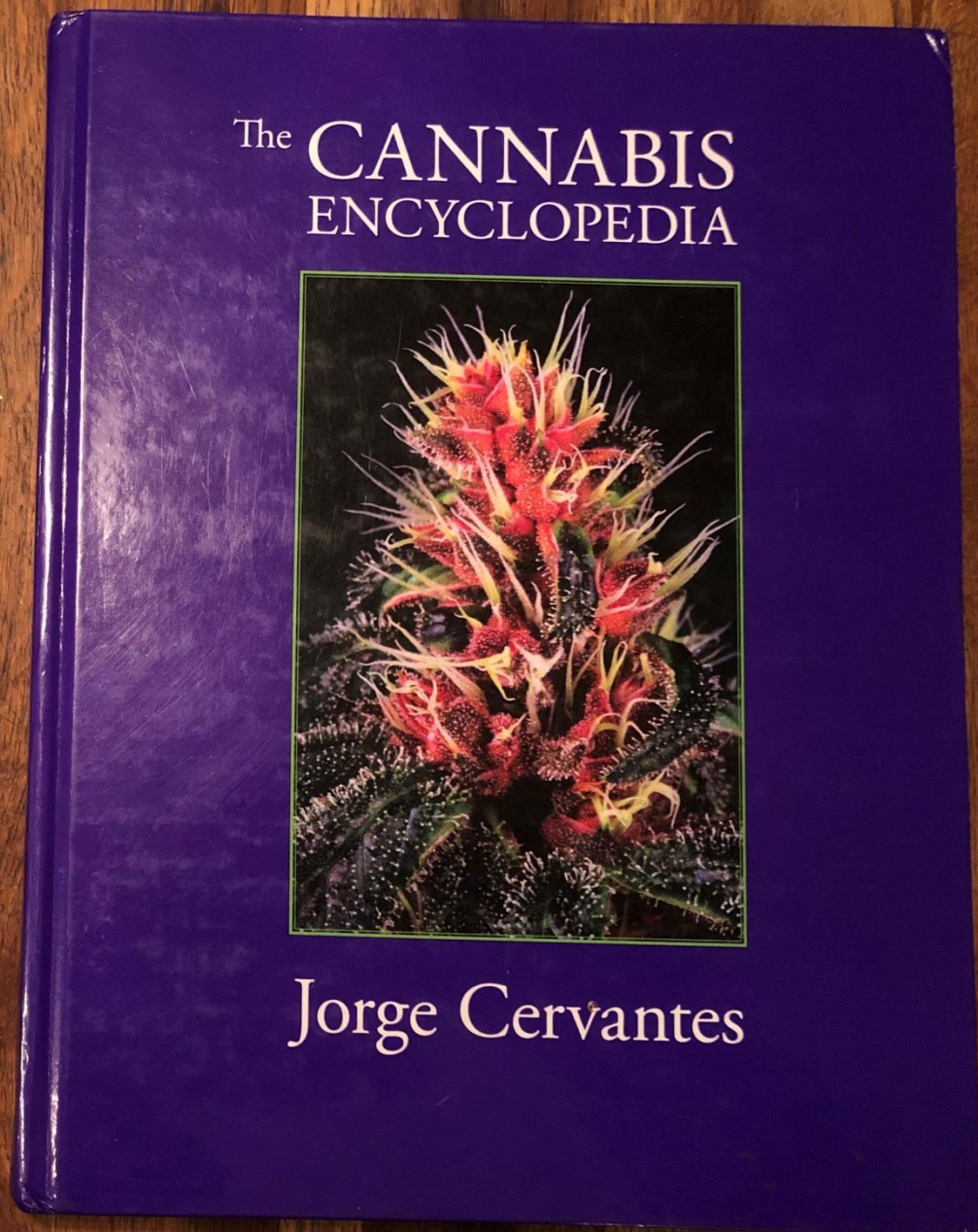
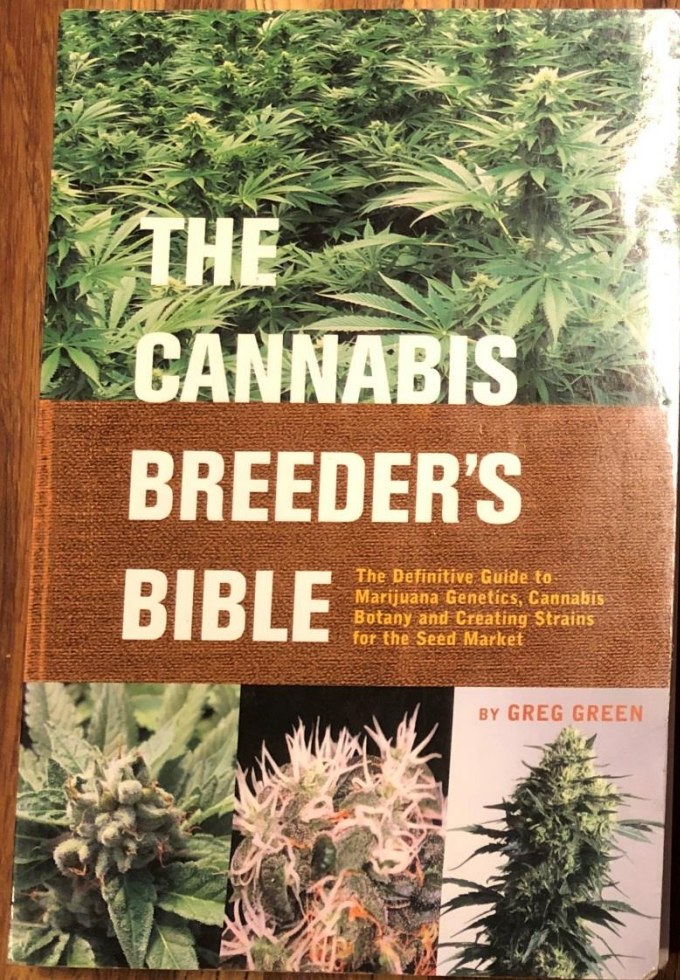
2019 Industrial Hemp Conference at UVM

Joe Veldon
Seven Leaf Genetics



Selective breeding can enhance physical traits, like root ball, branching structure, leaf size, leaf volume and flower structure, of the Cannabis plant.

Introducing new genes into the Cannabis genome can be linked to enhanced drought tolerance, CBD content and disease resistance.



Thick, dense and deep roots produce the best plants.



A dense main stalk, concave branches, and branch symmetry all affect yield.



https://upload.wikimedia.org/wikipedia/commons/5/55/Cannabis_Stalk.JPG

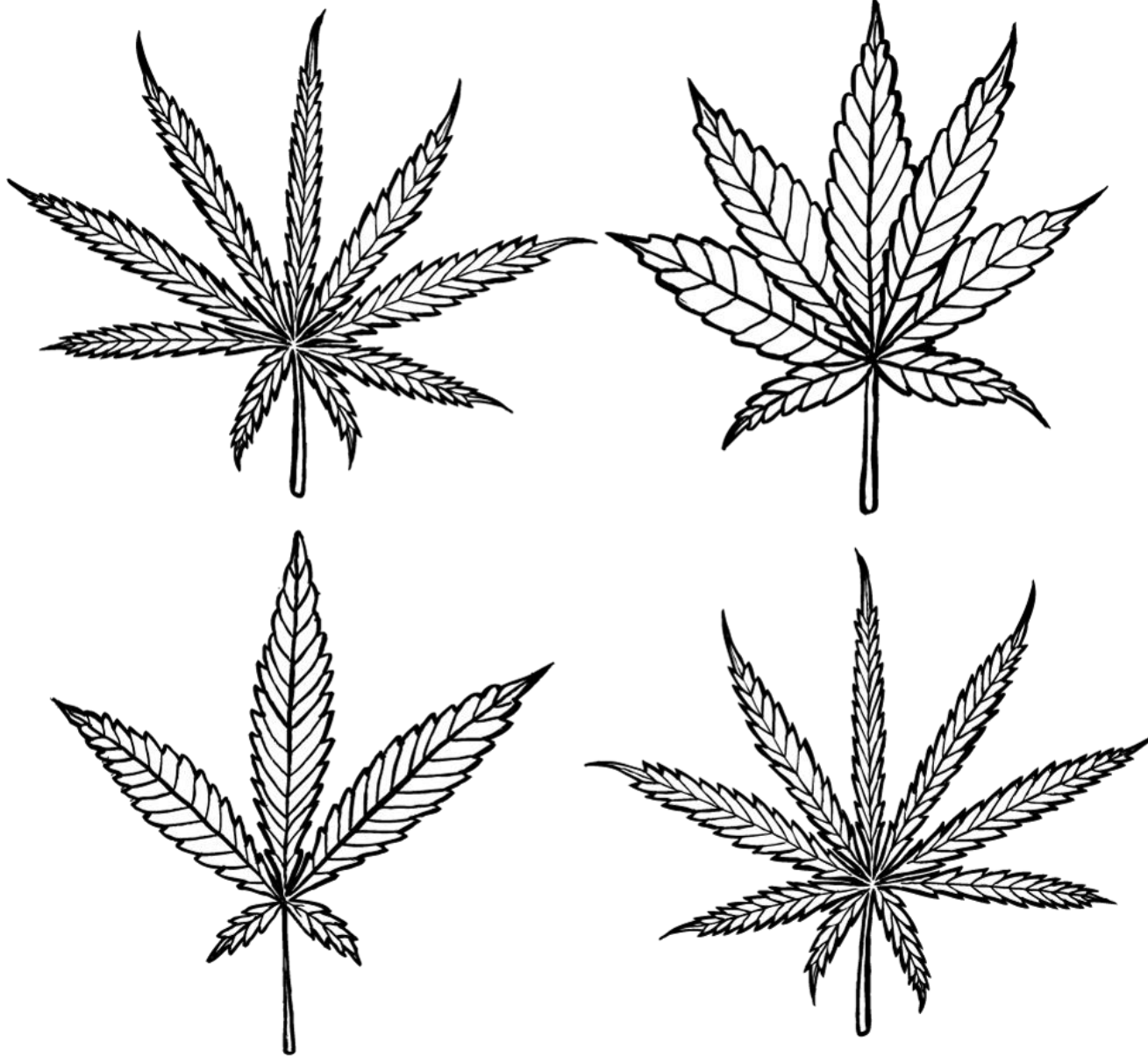
The “bumps” and vertical concave grooves make plants structurally superior.





Photo credit: V. Veldon

Leaf structure, volume, and size can be controlled to affect yield.



Shape of flower structures mimic the plant yet have no effect on yield.

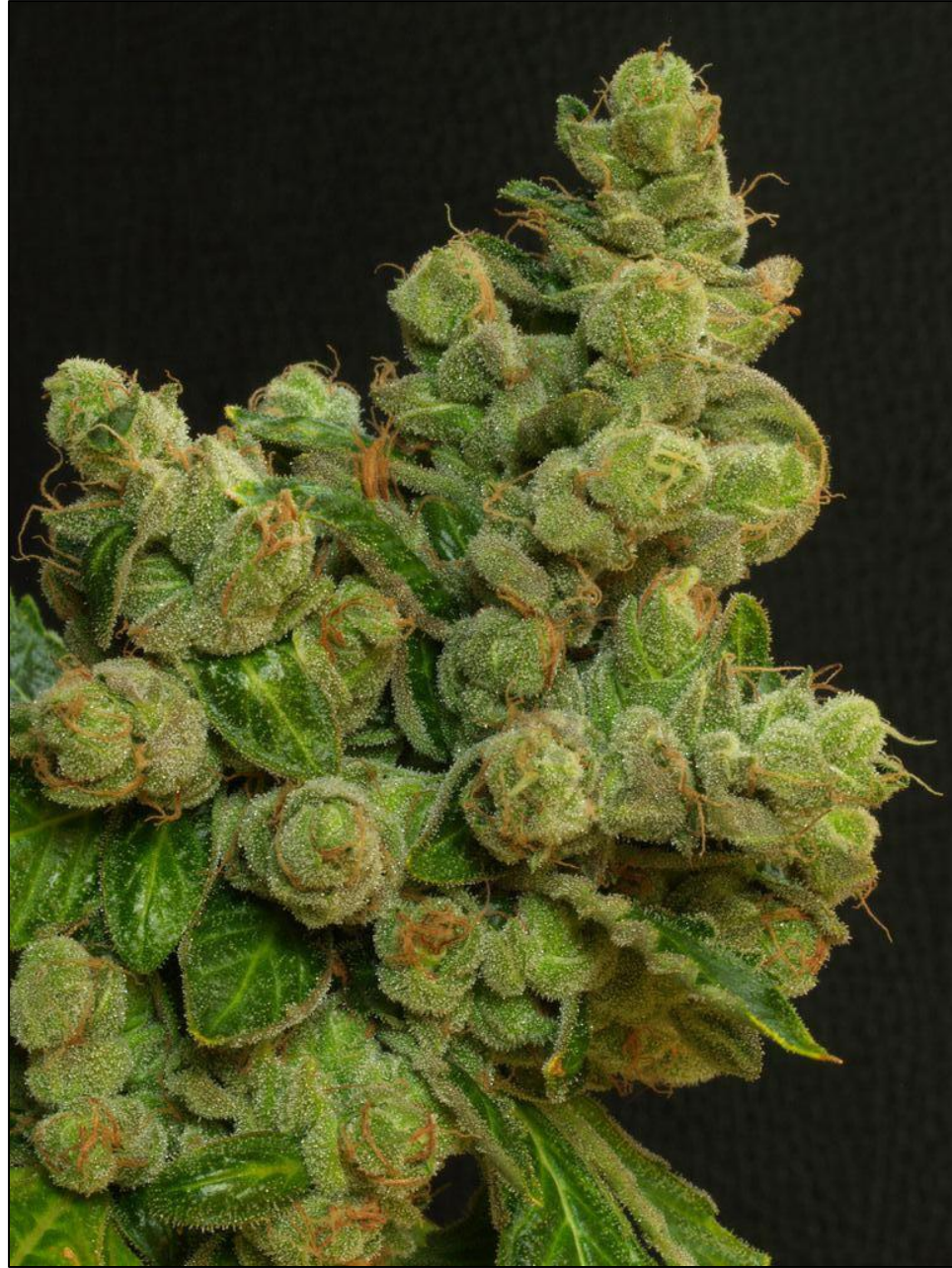


<https://cheapbudcanada.com/marijuana-products/bulk-cannabis/girl-scout-cookies-hybrid-flower-cannabis-bulk/>



<https://www.thedistrict8.com/products/flower/>

Pistillate calyx chains, also known as dieseling out, is a typical plant mutation.



Large Cola, Green Top Farm



An ideal plant for Vermont is short, plump, cold tolerant, disease resistant and high yielding.



Photo credit: V. Veldon

The male flower, the stamen, contains the sepals and a pendulous anther.



Photo credit: V. Veldon

The female reproductive parts the embryo, perianth, bracteoles and stigmata are collectively know as the pistillate calyx.



Wind blown pollen attaches to the stigma.



Photo credit: V. Veldon

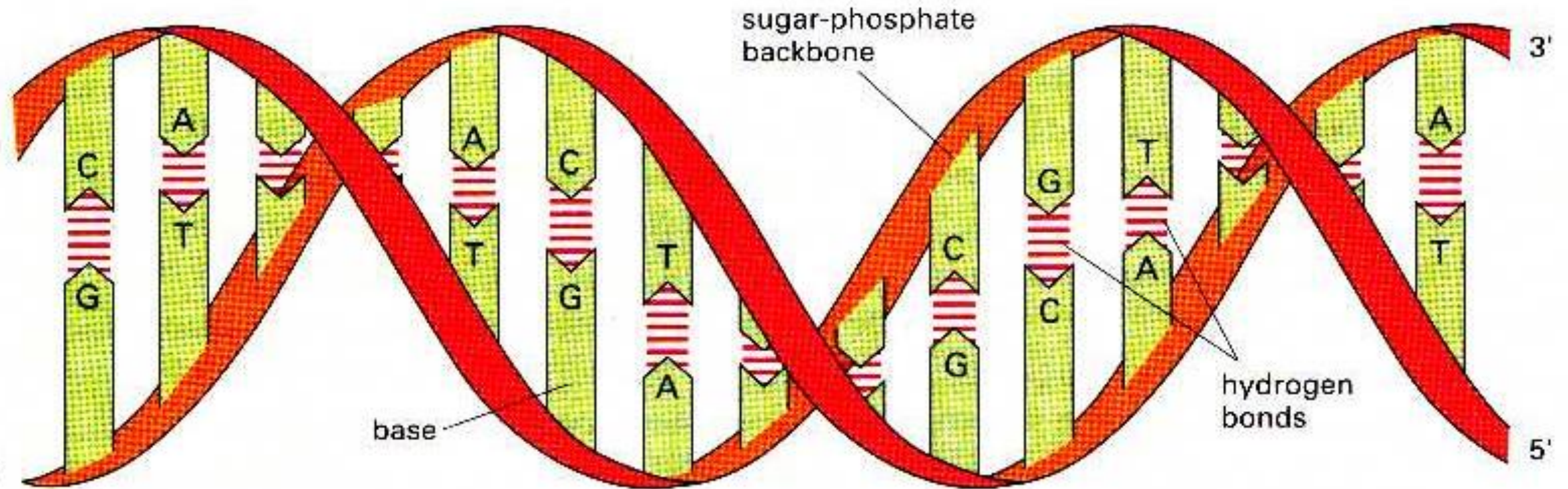


Photo credit: V. Veldon

The stigmata are whitish hair like structures, coated in a sugary substance that helps pollination.



Ten locations on the cannabis genome that control traits.



Three alleles for the trait of purple bud.



Ideally, we want a big, oily bud (or pale ale).



Chemotypes are a plant's propensity to produce specific oils.

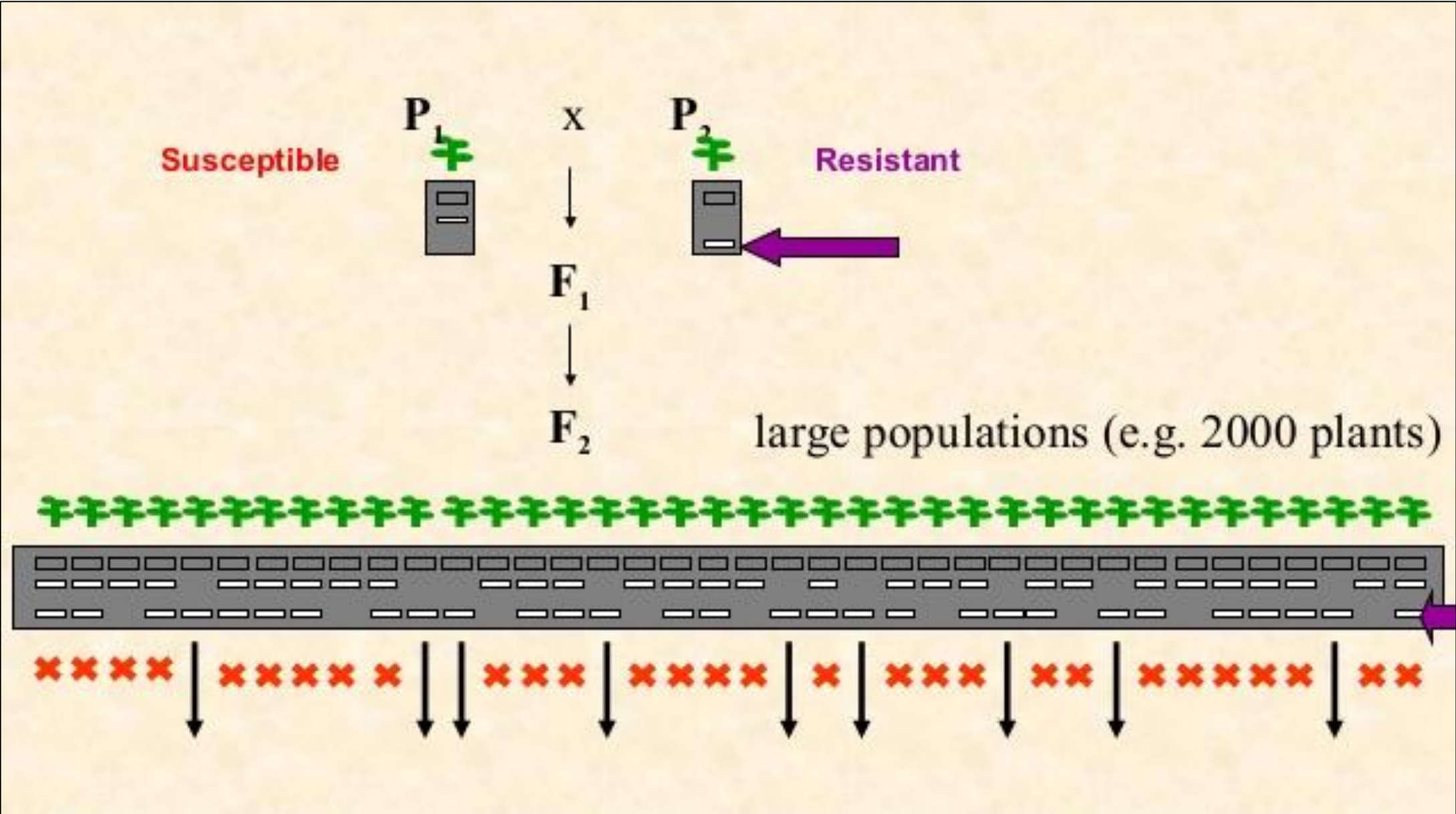
Type I: THC predominate (Td/Td)

Type II: Mixed THC/CBD (tD/Td)

Type III: CBD predominate (tD/tD)

Type IV: CBG predominate (td/td)

Marker assisted selection allows for specific planting.





Use selective breeding techniques to increase yield.

