



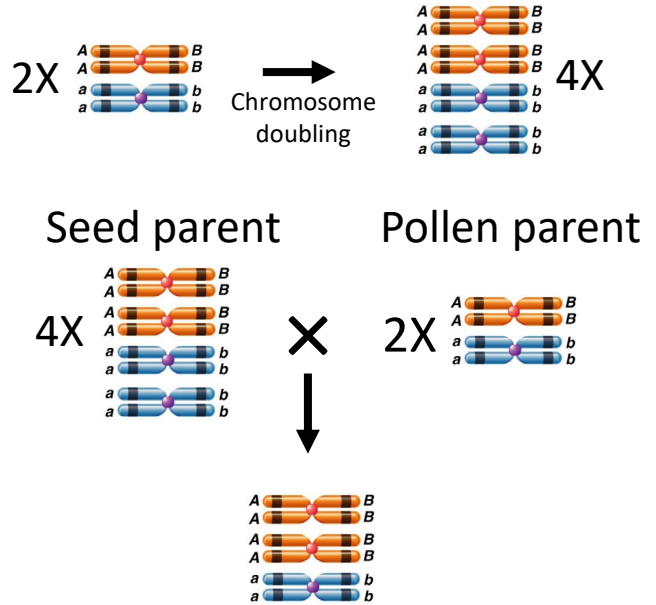
## Triploid Pollen-challenge Trials

George Stack, Maylin Murdock, Alex Wares, Stephen Snyder, Jacob Toth, Jamie Crawford, McKenzie Schessl, Nicholas Genna, Glenn Philippe, Zachary Stansell, Jocelyn Rose, Ginny Moore, and Larry Smart

Cannabinoids are produced in greatest concentrations in unpollinated female inflorescences. Pollination decreases the value of material for both market classes of cannabinoid hemp, diluting the concentration of cannabinoids in floral biomass used for extraction, and resulting in unmarketable seeded material for smokable flower products.

In other plant species, such as watermelon and banana, triploid cultivars are sterile and do not produce any seeds. **Development of triploid hemp cultivars, which do not produce seed even in the presence of hemp pollen, could lead to greater and more reliable yields for growers** and less conflict between producers of cannabinoid hemp and grain/fiber hemp. As seen in Fig. 1, triploids can be produced by first doubling the genome of the diploid seed parent – using a chemical treatment to recover a tetraploid individual. That tetraploid (4X) seed parent is crossed with the diploid (2X) pollen donor to produce seedless triploid (3X) F<sub>1</sub> hybrid cultivars. Oregon CBD has accomplished this by doubling their CBD and CBG seed parents and crossing them with their autoflower pollen donor to produce triploid F<sub>1</sub> hybrids.

In 2021 and 2022, we evaluated the performance of diploid and triploid cultivars at sites with and without pollen pressure (Table 1).



### Seedless triploid hybrid (3X)

**Fig. 1** Schematic of a method for hybrid triploid cultivar development

**Table 1.** Diploid and triploid cultivars from Oregon CBD trialed in 2021 and 2022

Cultivar	Ploidy	2021	2022
Lifter	Diploid	X	X
Lifter Seedless	Triploid	X	X
Sour Lifter Seedless	Triploid	X	
Suver Haze	Diploid	X	X
Suver Haze Seedless	Triploid	X	X
Sour Suver Haze Seedless	Triploid	X	
White CBG	Diploid	X	X
White CBG Seedless	Triploid	X	X
Pine Walker Seedless	Triploid	X	
Sour RNA Seedless	Triploid	X	



## Key Results:

- At pollen-free sites, triploids had similar concentrations of cannabinoids to their diploid counterparts. At pollen-challenge sites, triploids had greater concentrations of cannabinoids than diploids.
- Triploid cultivars produced similar concentrations of cannabinoids at pollen-free and pollen-challenge sites.
- Triploid cultivars produced significantly less seed than diploids at the pollen-challenge site, though they did produce some viable seed.

**Table 2.** Cannabinoid and seed production data. Total cannabinoids were quantified in regulatory-style inflorescence samples at 3 and 5 weeks post flowering, as well as in stripped floral biomass. Seed production was quantified by weight and number of seeds relative to the amount of stripped floral biomass produced by each plant.

	Cannabinoid Sampling Timepoint			Seed Production	
	3w Reg	5w Reg	Biomass	% of Biomass	Seeds/g
<b>Lifter (2X)</b>					
Pollen-challenge	5.77%	6.04%	6.17%	39.25%	28.90
Pollen-free	10.66%	18.99%	11.68%	0%	0
<b>Lifter Seedless (3X)</b>					
Pollen-challenge	9.82%	13.06%	12.83%	5.13%	5.12
Pollen-free	17.24%	22.31%	12.24%	0%	0
<b>Sour Lifter Seedless (3X)</b>					
Pollen-challenge	13.14%	16.16%	12.27%	5.34%	4.81
Pollen-free	13.81%	16.93%	11.22%	0%	0
<b>Sour RNA Seedless (3X)</b>					
Pollen-challenge	9.97%	12.13%	10.11%	1.32%	1.43
<b>Sour Suver Haze Seedless (3X)</b>					
Pollen-challenge	11.56%	14.39%	12.85%	6.42%	8.07
Pollen-free	11.03%	15.35%	10.84%	0%	0
<b>Suver Haze (2X)</b>					
Pollen-challenge	6.33%	5.48%	5.54%	43.61%	36.38
Pollen-free	13.14%	19.95%	11.34%	0%	0
<b>Suver Haze Seedless (3X)</b>					
Pollen-challenge	14.09%	15.27%	12.91%	5.58%	4.34
Pollen-free	12.67%	20.01%	11.49%	0%	0
<b>White CBG (2X)</b>					
Pollen-challenge	4.37%	4.27%	3.83%	44.58%	36.04
Pollen-free	8.64%	13.27%	8.64%	0%	0
<b>White CBG Seedless (3X)</b>					
Pollen-challenge	5.26%	8.11%	6.44%	8.84%	7.37
Pollen-free	7.37%	8.80%	6.39%	0%	0

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