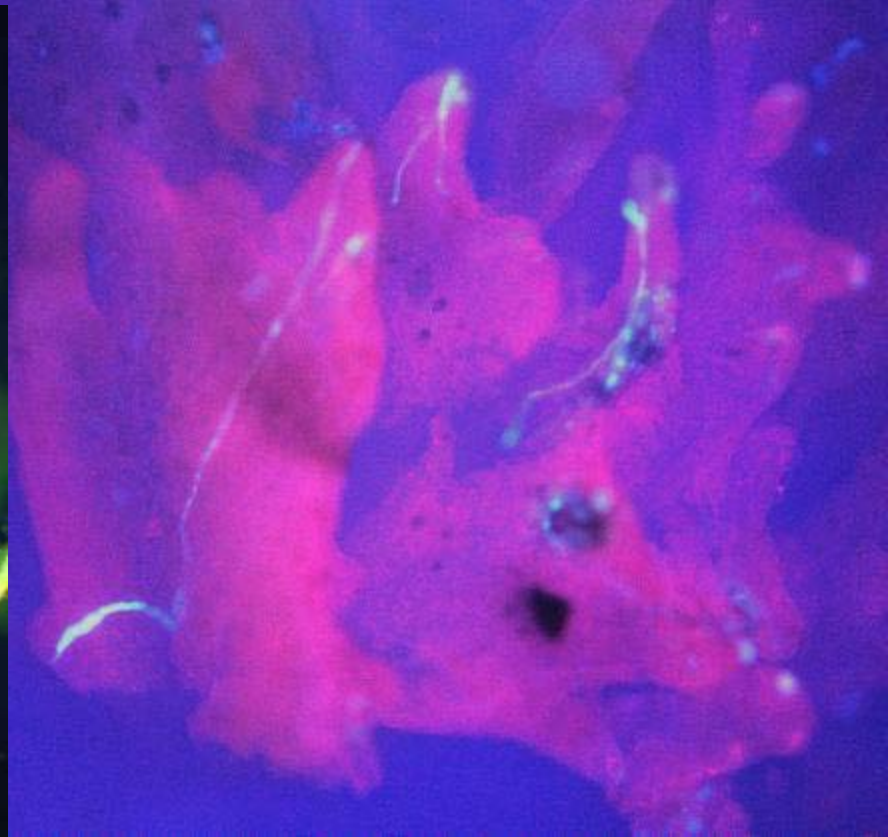


Pecan Pollination



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Biology of Pollination

- Pecan has evolved to be cross pollinated, you need two parents to produce a seed.



Why? Because inbreeding leads to severe loss of vigor in pecan trees.



Normal 4 year old seedling.

Inbred 4 year old seedling.

Step 1

Pecan has separate
male and female
flowers.

Female Flowers
(pistillate)

Male Flowers
(catkins)



Step 2

Male and female flowers on the same tree mature at different times, reducing self-pollination.



Female Flower



Female Flower Maturation



Immature

Receptive

Past Maturity

Stigma color ranges from green to burgundy.

Stigma color does not indicate receptivity.

Stigma size does not indicate receptivity.



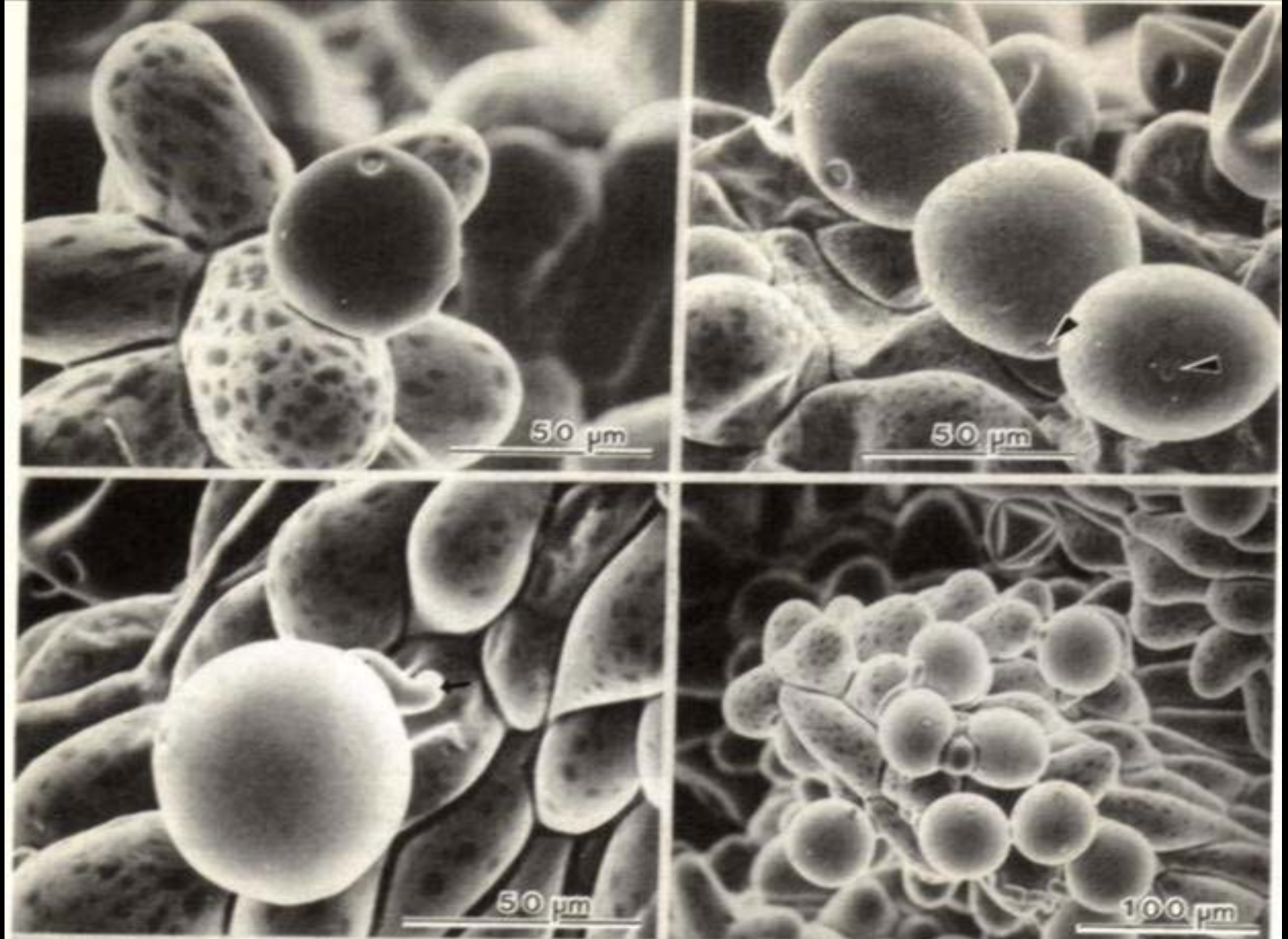
Green



Pink

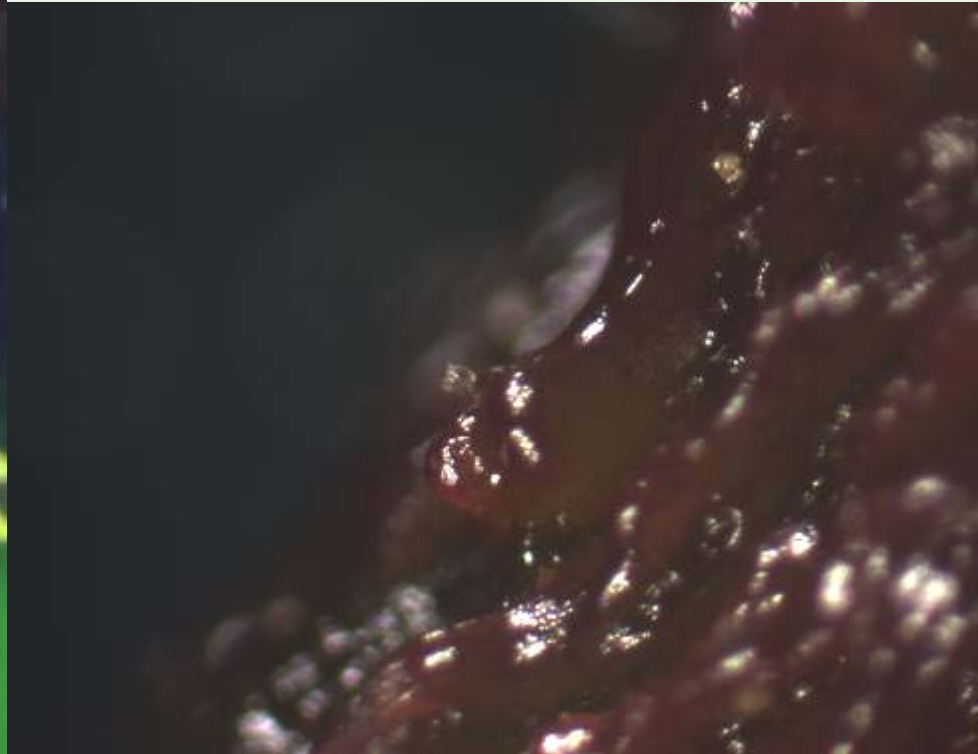
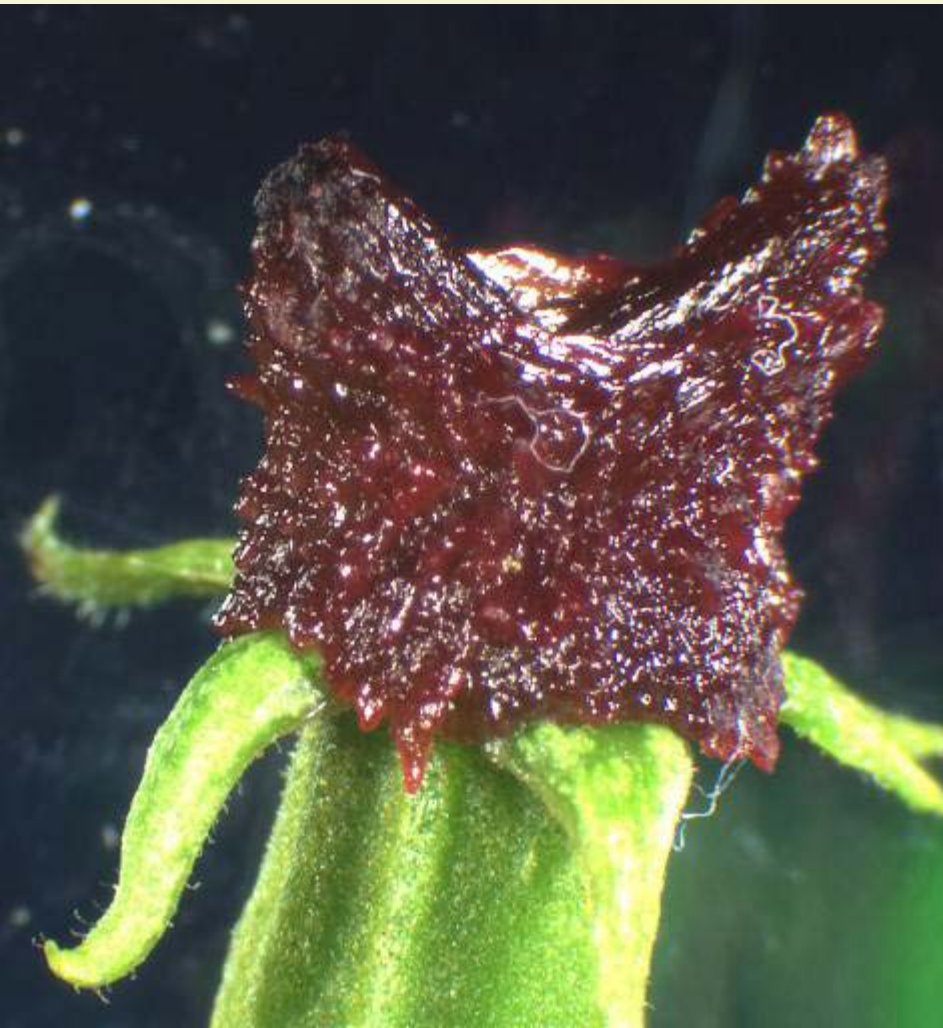


Burgundy

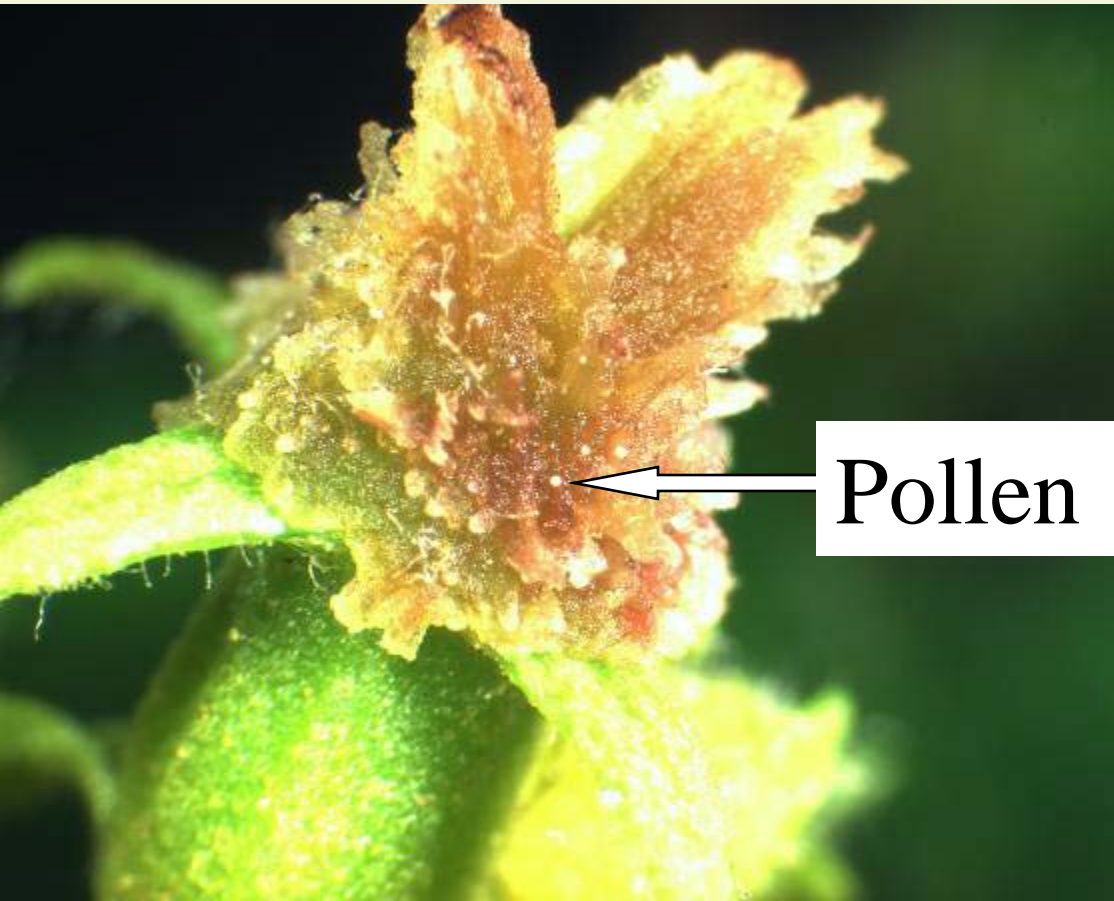


Wetzstein and Sparks, 1989.

Immature stigmas have a smooth shiny surface.



Receptive stigmas have a rough appearance.



Maximum nut set with pollination within 1 day of initial receptivity.

No fruit set after 4 days.



Stigmas turn
brown 2-3 days
after
pollination.

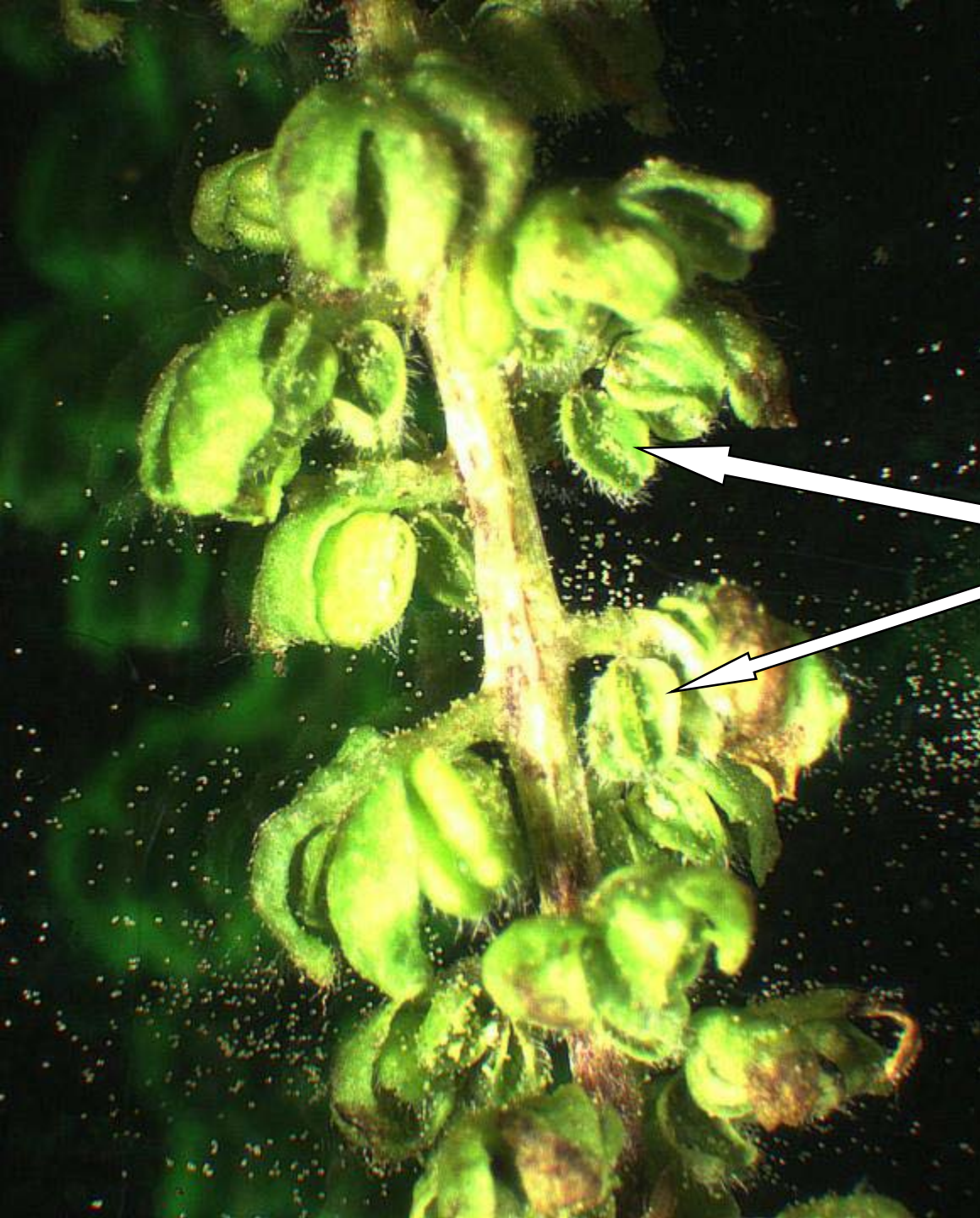
Catkin Maturation



Immature

Shedding

Past Maturity



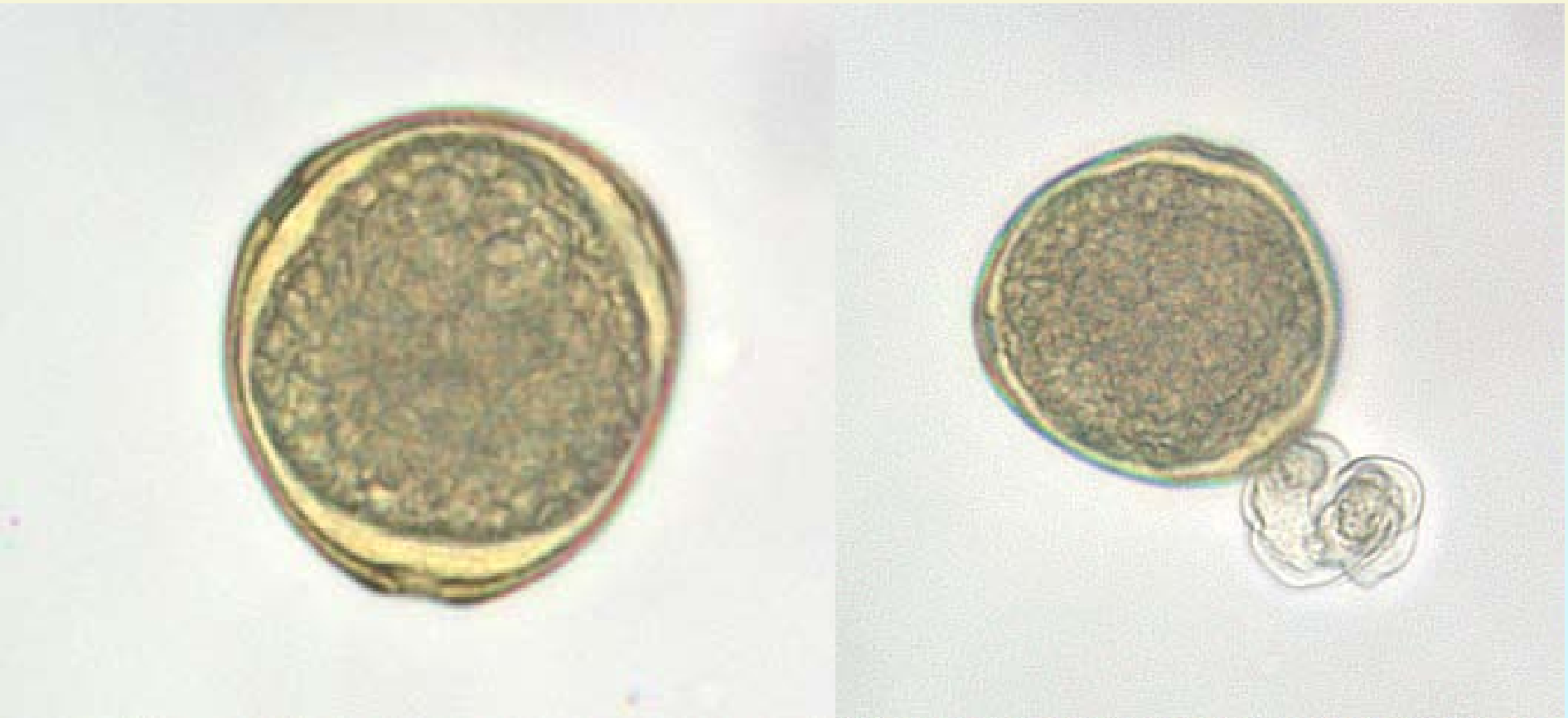
Anthers with
pollen grains.





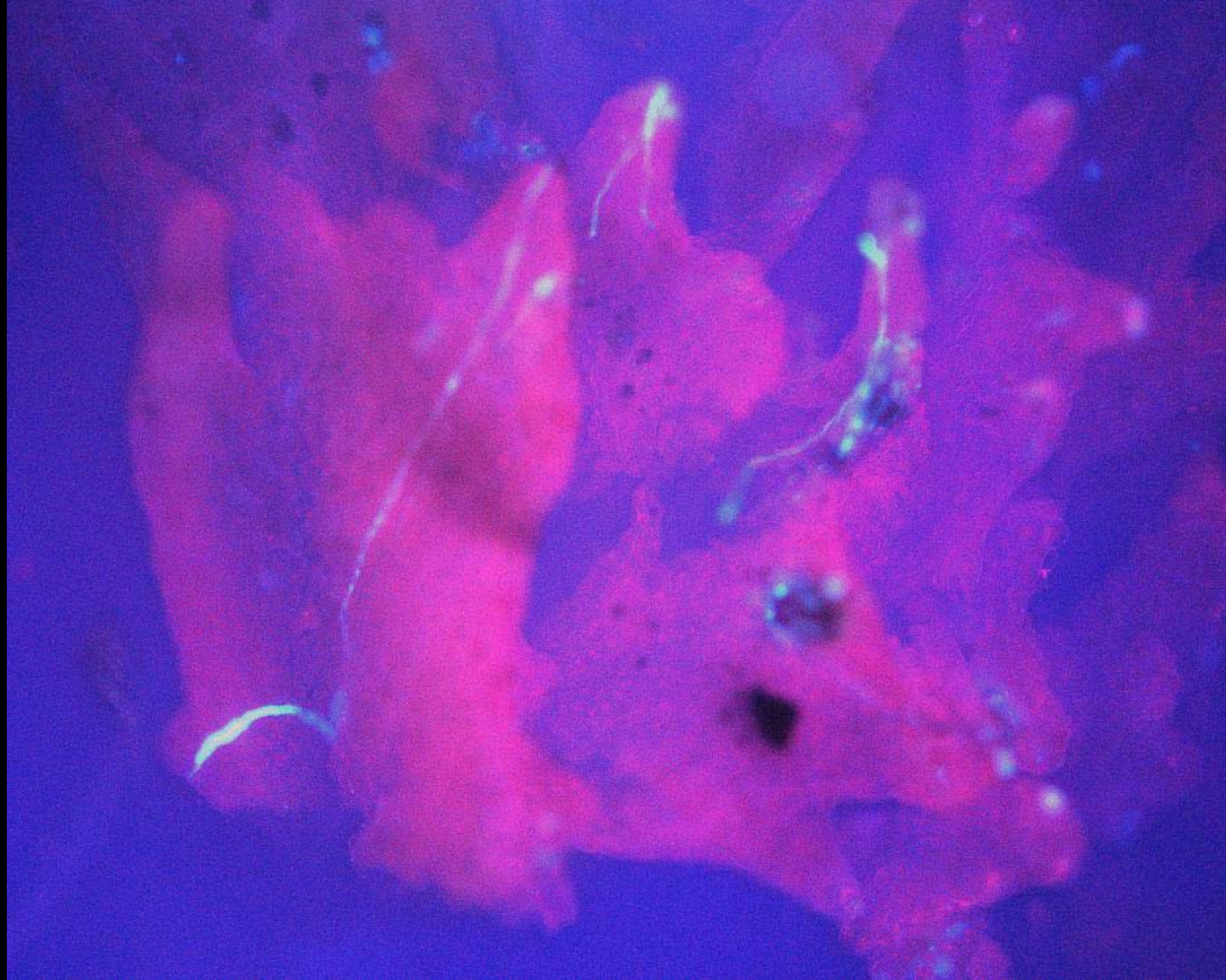
Dry pollen is
carried by
wind to the
stigma.

Pollen rehydrates on stigma.



Once on the stigma pollen germinates quickly and grows towards the ovary.





Male and female flowers on the same tree mature at different times, reducing self-pollination.

There must be pollen available throughout the pollination season.

Type I cultivars

- First – Pollen matures and is shed.
- Then – Stigmas become receptive.

Type II cultivars

- First – Stigmas become receptive and flowers are pollinated.
- Then – Catkins shed their pollen

There are equal numbers of Type I and Type II trees in native groves, ensuring good pollination.



Other factors influencing flowering time.

1. **Bud break** – Earlier bud break leads to earlier flowering.
2. **Tree age** – Young trees often bloom differently than mature trees.
3. **Flower position** – Flowers in the interior and lower positions mature sooner.
4. **Weather** – Unusual spring temperatures alter flowering patterns.

Significant self-pollination can occur in isolated orchards. This results in...

1. Lower fruit set.
 2. Increased abortion of fruit.
 3. Decreased kernel percentage and nut size.
- * 'Western' is more likely to self-pollinate



Effect of self-pollination – Marquard, 1988

	Self Pollination Western x Western	Cross Pollination Western x Wichita
Weight	5.4 g	6.5 g **
Volume	7.4 ml	8.3 ml **
% Pops	11.7 %	3.6 % NS

Self pollination results in:

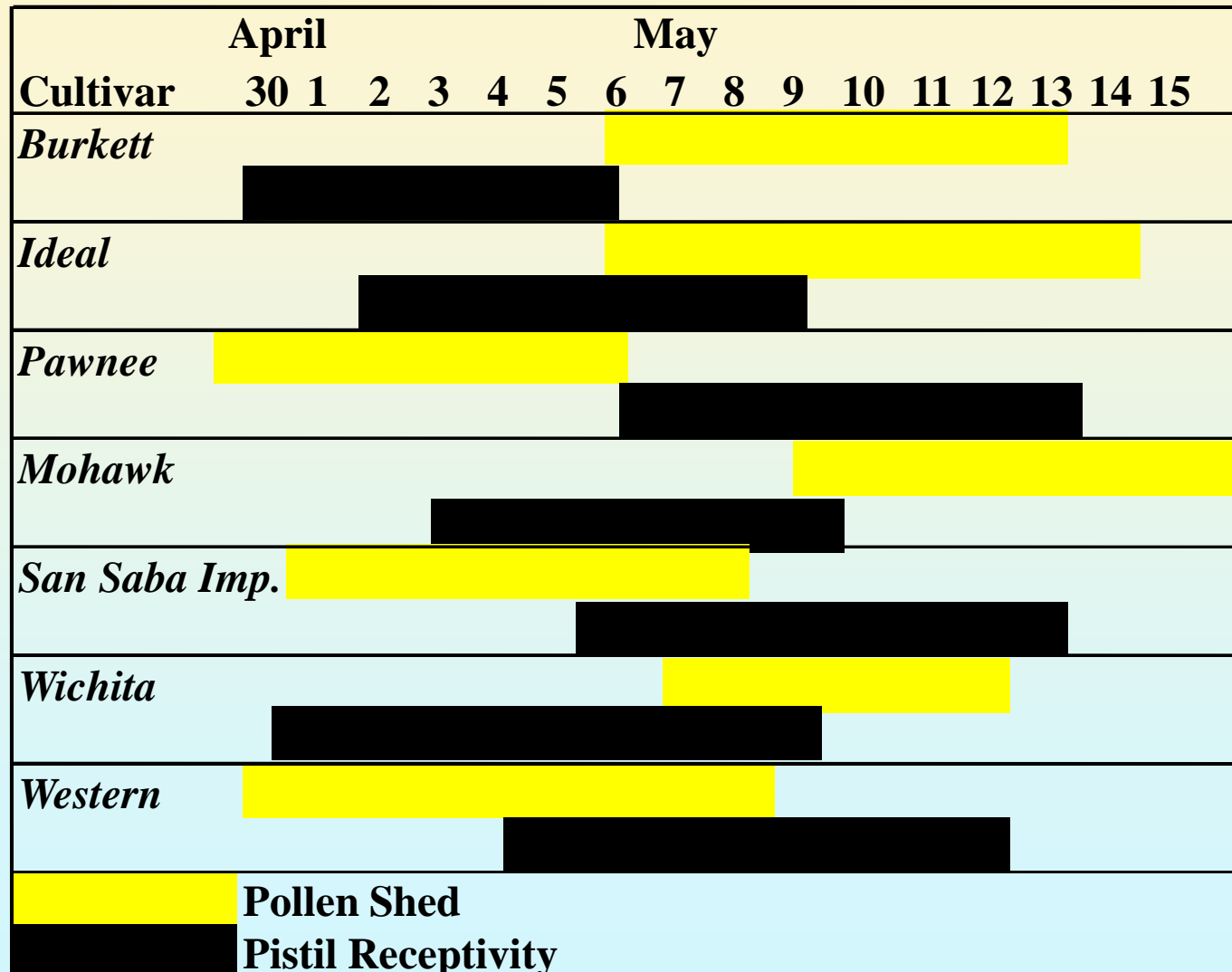
17 % less nut weight

11 % smaller volume

Choice of pollinators.

- Pollination times vary by year, location, and tree age, making predictions difficult.
- In my opinion, pollination chart data is a rough estimate only.
- In the 'OFF' year for a cultivar, no pollen is produced.
- It is best to have at least two pollinators.

Pollination Charts



From: Esteban Herrera, Pecan varieties for New Mexico

Where to put the pollinators?

Data from Wood 1997 'Desirable' orchard with 'Stuart' pollinator.

- Maximum fruit set when next to a pollinator.
- 30% loss of fruit when further than 2 rows from a pollinator in light crop years.
- Amount of canopy between trees is more important than actual distance.
- Need to pollinate flower within 1 day of receptivity – risky to depend upon 1 pollinator.

• Wild trees are not sufficient for good production!

How many pollinators do you need?

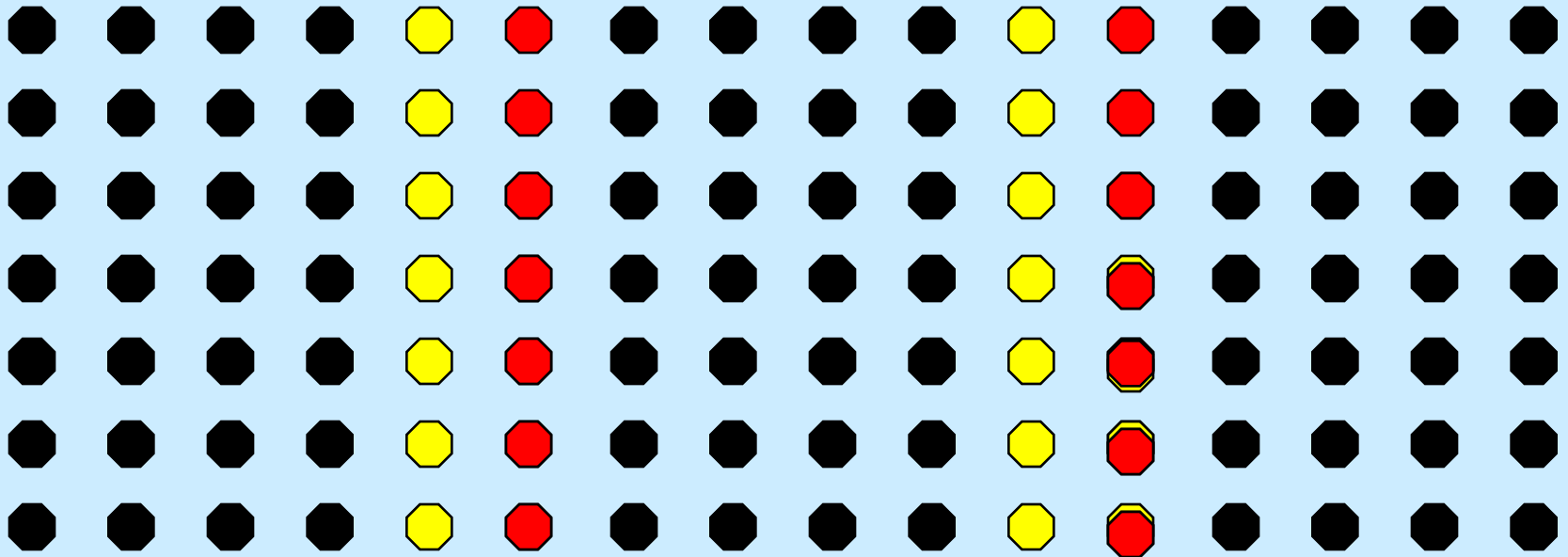
Data from Marquard 1987,

'Western' orchard pollinated by 'Wichita'.

- In most situations, predicted yield is maximized with a pollinator frequency of 25% – 33%.
- Lesser numbers of pollinators may be needed for varieties other than 'Western'.

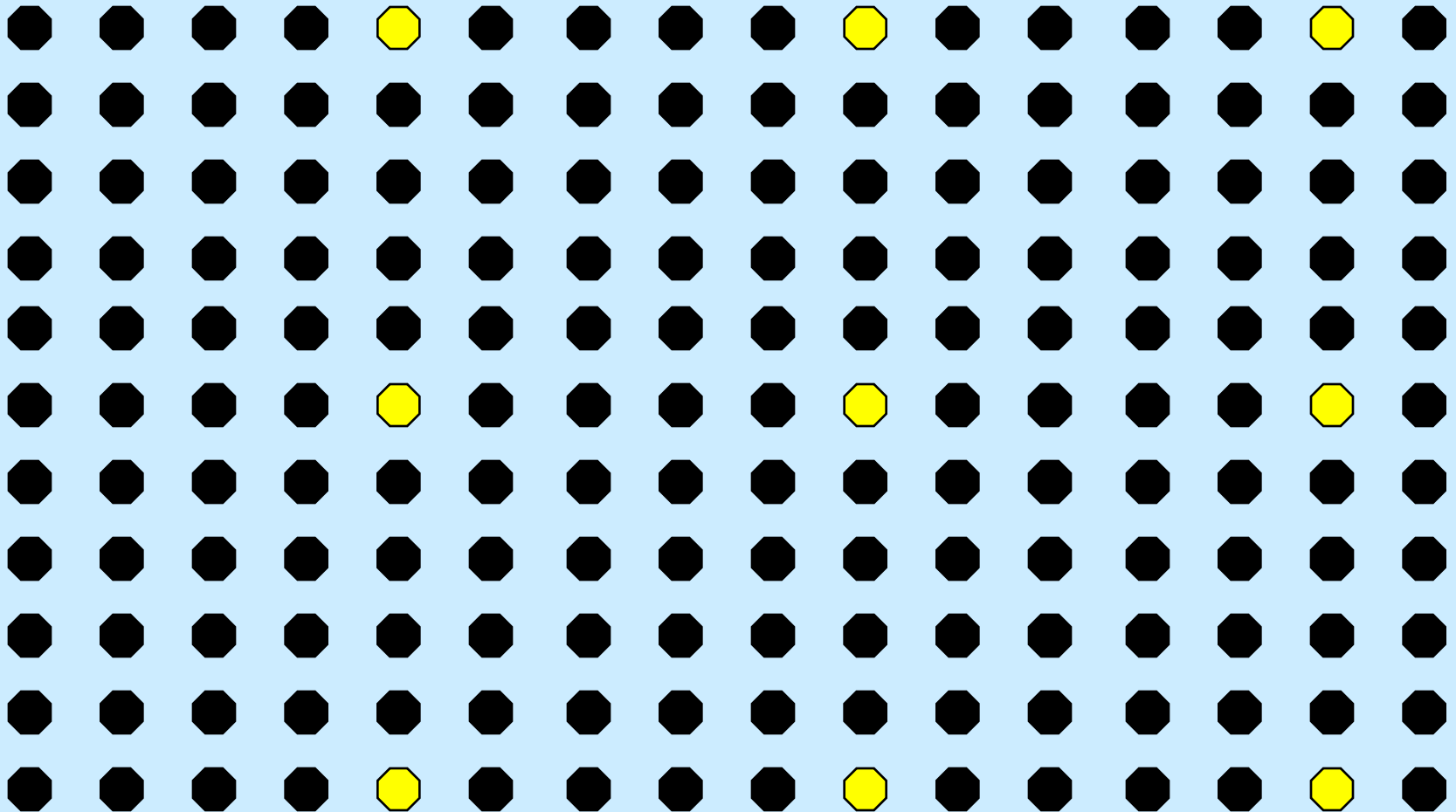
Option 1

Put main variety in blocks no greater than 4 rows with two rows of pollinators in between.



Option 2

Put pollinators at every 5th tree in within every 5th row.



Off Type Trees

- Be careful removing "OFF" type varieties. In orchards with few pollinators they can be very important sources of pollen.





Questions?