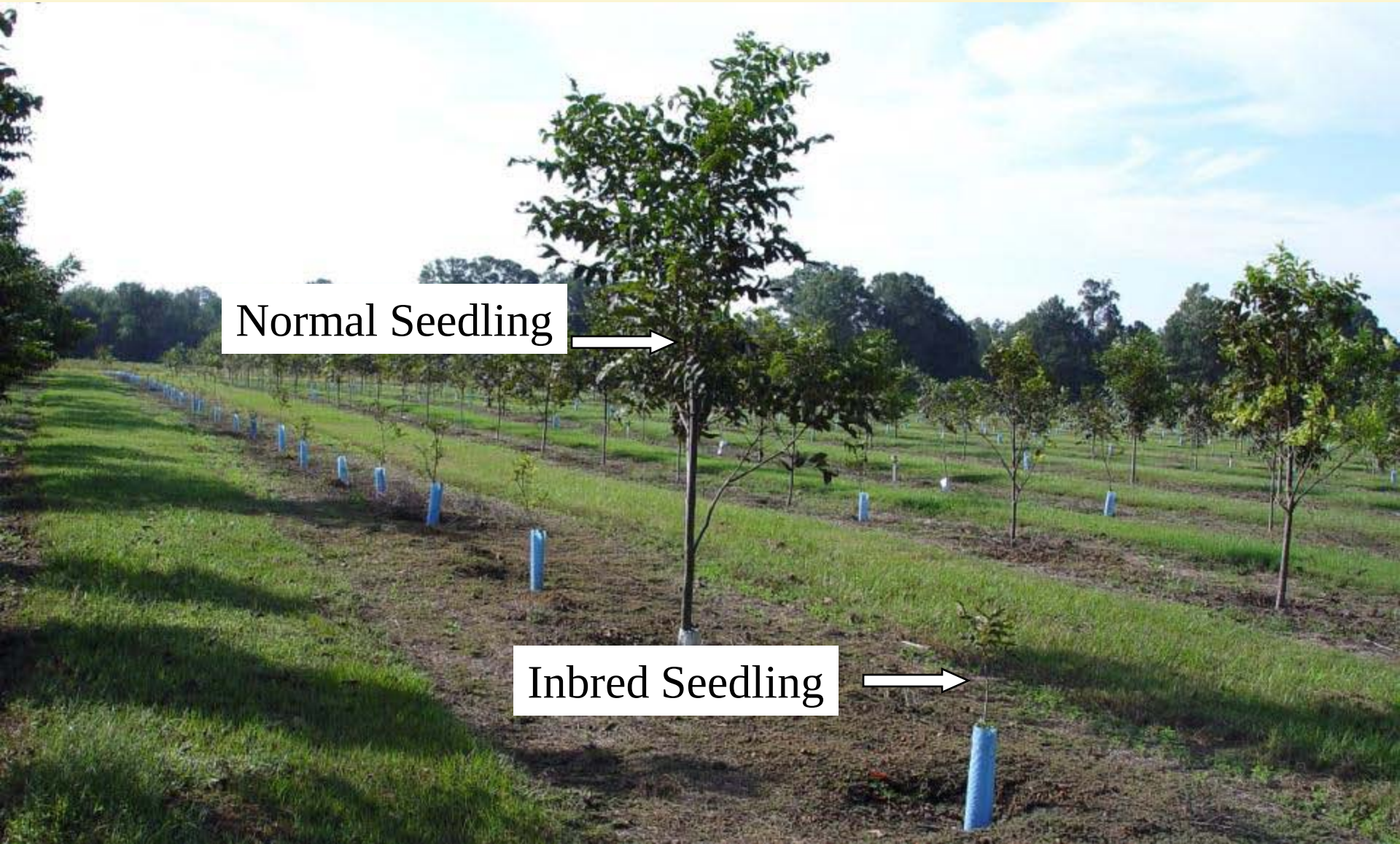
Biology of Pollination

- Pecan is cross pollinated, you generally need two parents to produce a seed.

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



Step 1

Pecan has separate male and female flowers.

- Monoecious (one household) male and female flowers on the same plant.

Step 2

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

Dichogamous (flowers mature at different times).

There must be pollen available throughout the pollination season.

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

Protandrous - Type I cultivars

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

Protogynous - Type II cultivars

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

Flower type is controlled by a single gene.

- Protogynous flower type is dominant – Aa
- Protandrous flower type is recessive – aa

Aa x aa

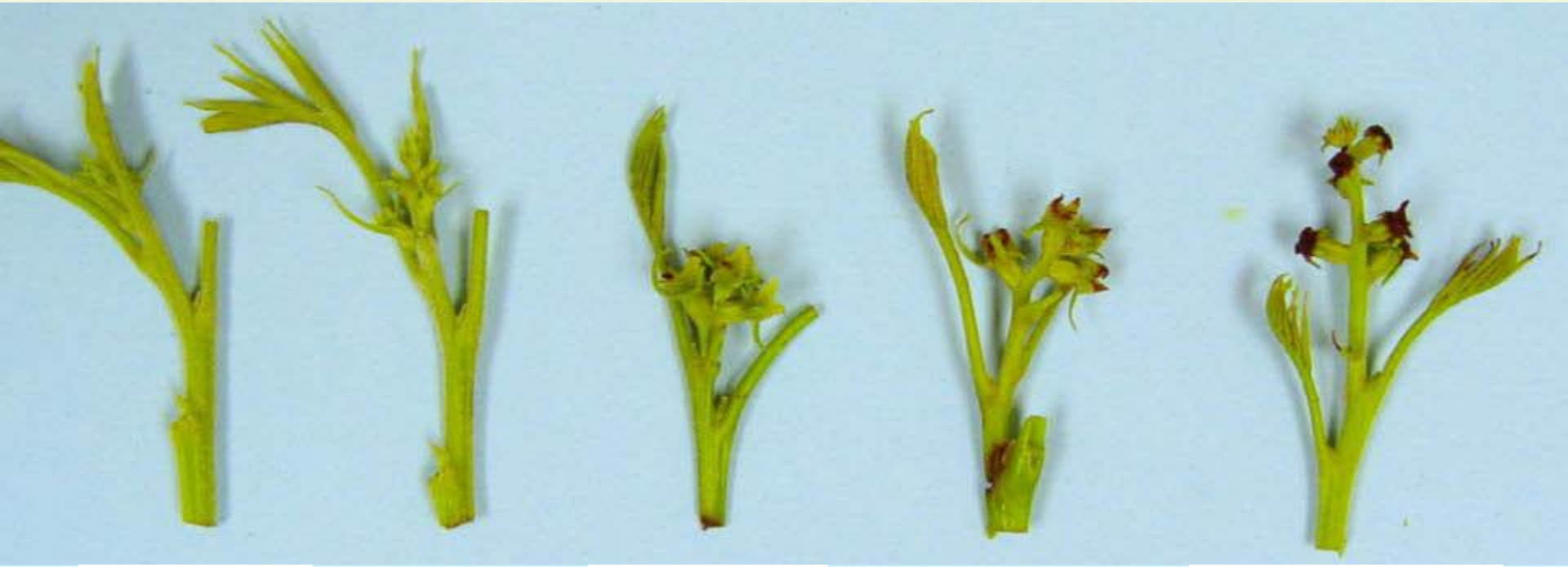
1/2 Aa

1/2 aa

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

Female Flower

Female Flower Maturation



Immature

Receptive

Past Maturity

Receptive stigmas have a rough appearance.

Stigmas turn brown 2-3 days after pollination.

Stigma color ranges from green to burgundy.

Color does not indicate receptivity.

Green

Pink

Burgundy

Catkin Maturation

Immature

Shedding

Past Maturity

Anthers with pollen grains.

Dry pollen is carried by wind to the stigma.

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

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.

Beginning Pollen Shed

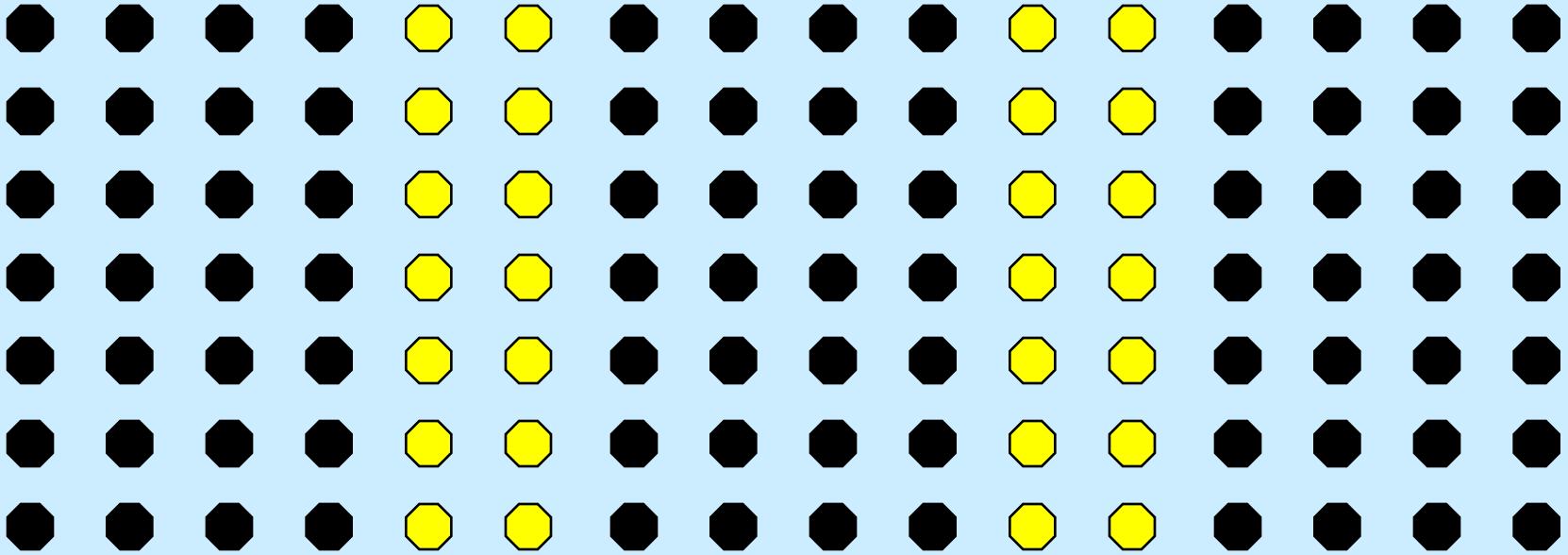
April 2	April 24	April 26	May 1	May 4	May 8
Caddo (I) Osage (I) Cherokee (I)	**Pawnee (I)** Desirable (I) Cape Fear (I)	Cheyenne (I) **Western (I)** Success (I)	Chickasaw (II) Wichita (II) Shawnee (II) Mohawk (II)	Melrose (II) Sioux (II) Stuart (II) Tejas (II) Apache (II) Maramec (II)	Kiowa (II) Mahan (II) Choctaw (II) Comanche (II) Podsednik (II) Burkett (II) Gratex (II)

Beginning Pistil Receptivity

April 22	April 24	April 26	May 1	May 4	May 8
	Shoshoni (II) Mohawk (II) **Wichita (II)** Chickasaw (II)	Tejas (II) Sioux (II) Shawnee (II) Mahan (II) Apache (II) Maramec (II) Choctaw (II) Burkett (II)		Caddo (I) Pawnee (I) Cape Fear (I) Cherokee (I) Success (I) Barton (I) Osage (I)	Desirable (I) Cheyenne (I) Western (I)

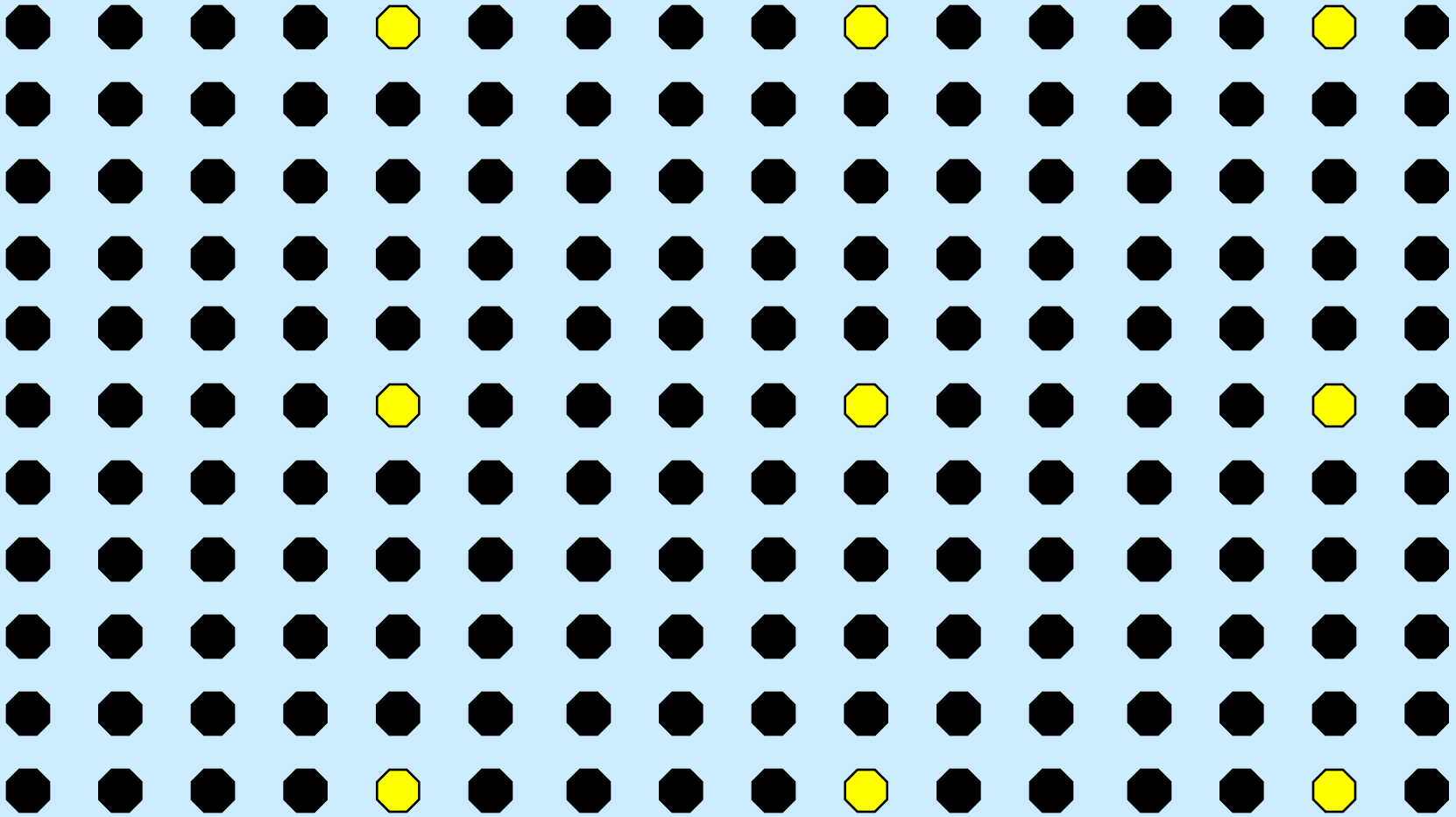
Option 1

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.



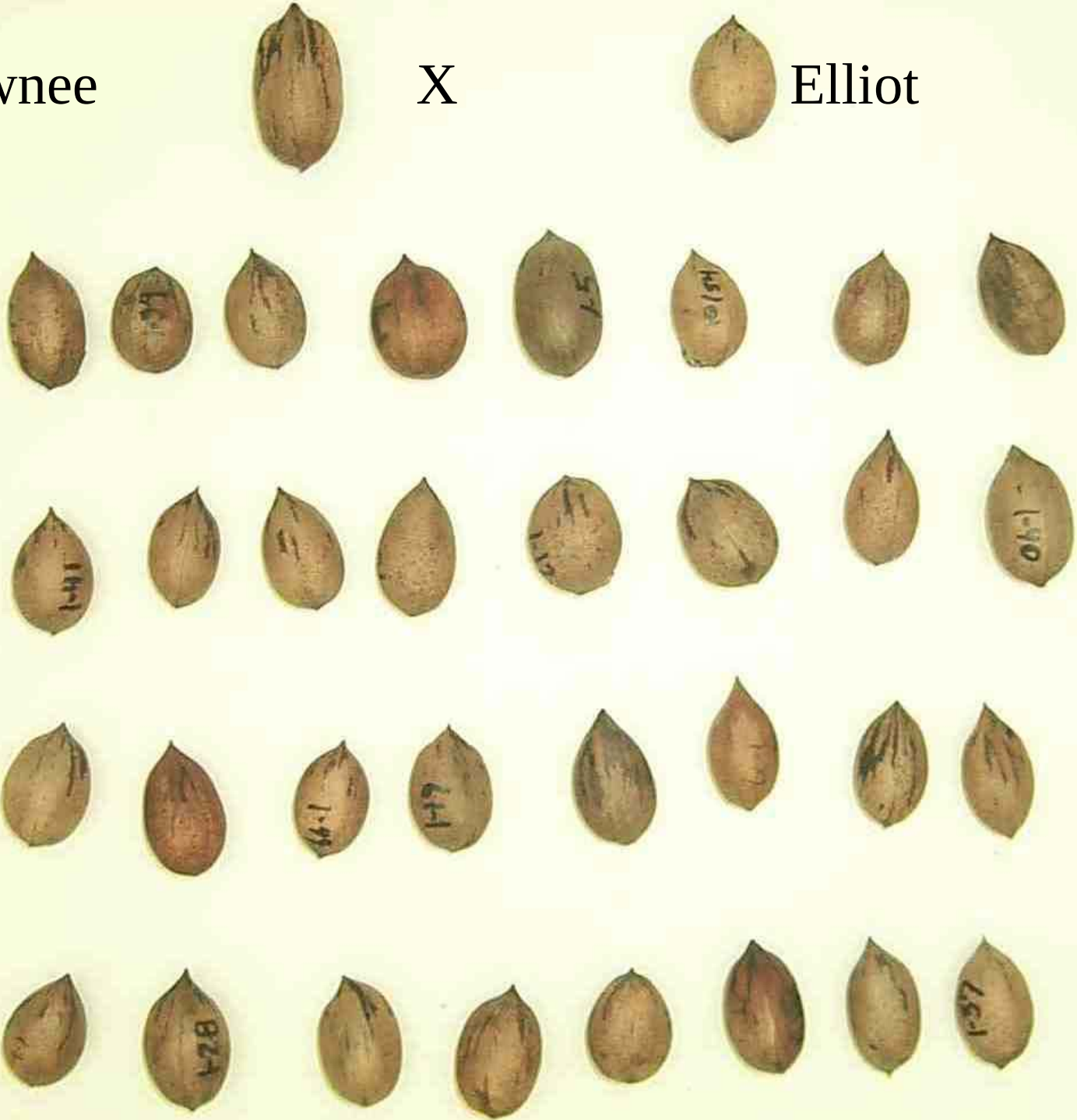
Pollination Technique

What is result of cross pollination?

- Heterozygosity – Each pecan tree is genetically unique.

- Seedling pecans will be similar to their parents, but different, just like children.

Pawnee X Elliot



Perfect flowered cultivars developed.

Male

Perfect

Female

'Cowart', first perfect flowered cultivar with good fruit quality released.