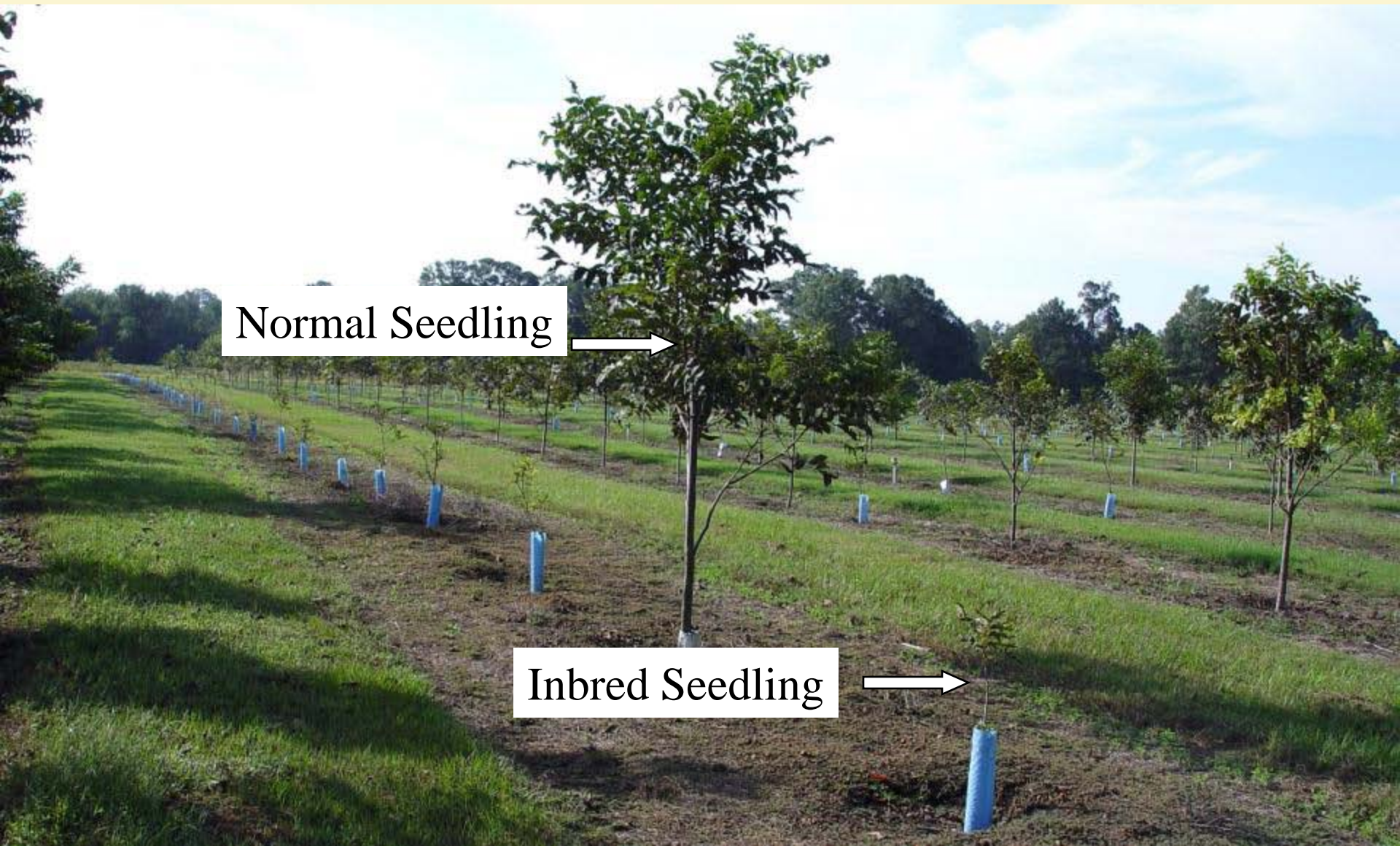


Biology of Pollination

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



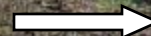
Why? Because inbreeding leads to severe loss of vigor in pecan trees.



Normal Seedling



Inbred Seedling



Step 1

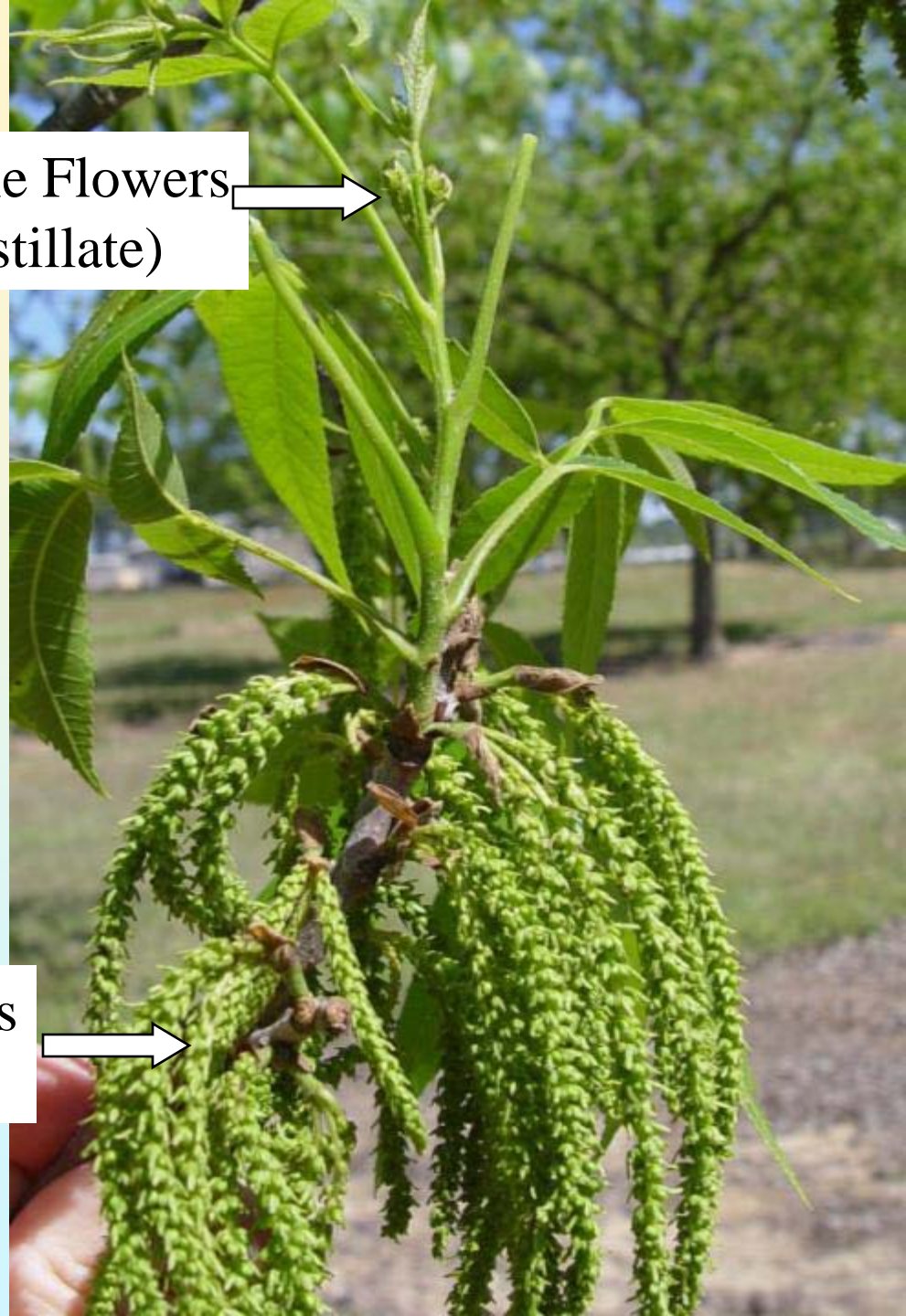
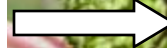
Pecan has separate male and female flowers.

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

Female Flowers
(pistillate)



Male Flowers
(catkins)



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



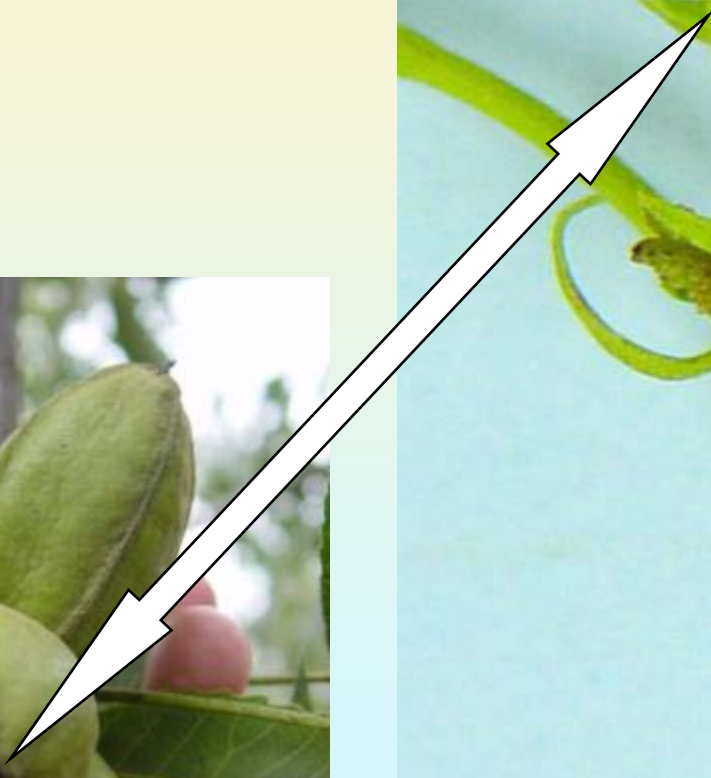
1/2 Aa

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.



Pollen !



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

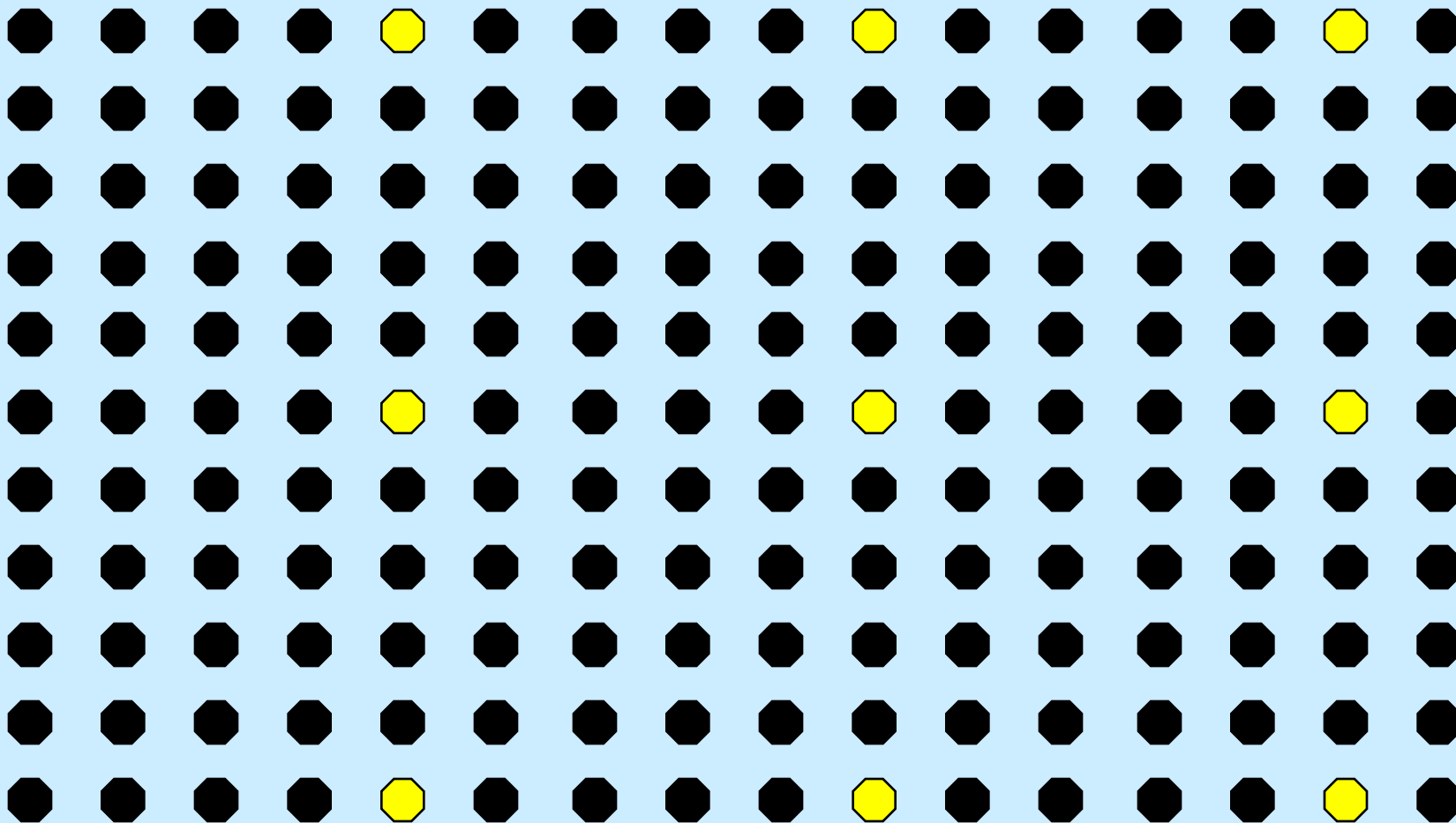
April 2	April 24	April 26	May 1	May 4	May 8
Caddo (I)	Pawnee (I)	Cheyenne (I)	Chickasaw (II)	Melrose (II)	Kiowa (II)
Osage (I)	Desirable (I)	Western (I)	Wichita (II)	Sioux (II)	Mahan (II)
Cherokee (I)	Cape Fear (I)	Success (I)	Shawnee (II)	Stuart (II)	Choctaw (II)
			Mohawk (II)	Tejas (II)	Comanche (II)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

Beginning Pistil Receptivity

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

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

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



