

Developing Fragrant Camellias

WHAT IS A CAMELLIA?

Family--Theaceae

Genus--Camellia

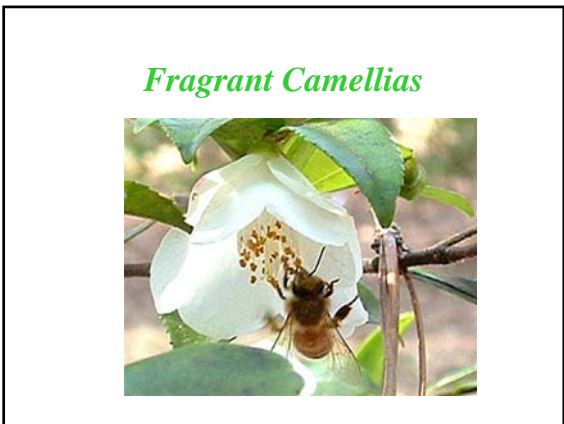
Species

- C. japonica (winter blooming camellias)
- C. sasanqua (fall blooming camellias)
- C. reticulata (camellias with larger fancier blooms)
- C. sinensis (tea camellia)
- C. (around 50 to 200 other species)

C. japonica

- The different named Japonicas are called cultivars.
- New Japonica cultivars are produced from seeds of existing Japonica cultivars or from mutations (sports) of existing Japonica cultivars.
- Japonica cultivars do not come true from seeds.
- Desirable cultivars are reproduced by cloning (rooting, grafting, air layering, or tissue culture.
- It may take thousands of seedlings to produce one improved Japonica cultivar.

Existing camellia species may not have all of the desirable characteristics that breeders want.
Desirable characteristics from different species may be combined through hybridization of species that possess these characteristics.
Some examples:
Beautiful flowers, petal coloration (e.g. yellow)
Cold hardiness
Fragrance
Disease resistance
Timing and frequency of blooming



- Fragrant Species*
- C. dubia
 - C. euphlebia
 - C. forrestii
 - C. fraterna
 - C. furfuracea
 - C. gracilipes
 - C. grijsii
 - C. handelii
 - C. henryana
 - C. kissi
 - C. lutchuensis
 - C. melliana
 - C. miyagii
 - C. nemotodea
 - C. nitidissima var. nitidissima
 - C. oleifra
 - C. salcifolia
 - C. synaptica
 - C. tsaii
 - C. yuhsiensis
 - C. yunnanensis

C. forrestii



C. fraterna



C. furfuracea



C. grishii



C. grijsii



C. kisii



C. lutchuensis



C. olifera



C. salicifolia



C. synaptica



C. Tsaii



C. yuhsiensis

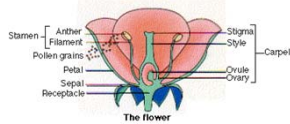


Plant Reproduction

- Sexual--Produces a plant that has a differ assortment of genes from both the male and female parents (Allows a species to maintain a high level of genetic diversity).
- Vegetative--Produces plants that are like the original plant (Clones produced by grafting and rooting)

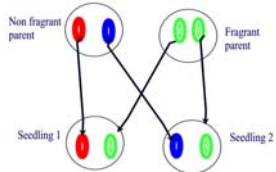
Sexual Reproduction

- Camellias are perfect flowers
- Squash vines have separate male and female flowers
- Holly trees have male and female flowers on separate trees
- Self pollination limits genetic diversity and most plants have ways to reduce or limit self pollination. For this reason clones often have limited ability to pollinate themselves ,e.g.,blueberry clones.



Sexual Reproduction

- Sexual reproduction produces plants that usually have half of their chromosomes from the seed parent and half of their chromosomes from the pollen parent.



The Function of Flower Characteristics

- Flowers have characteristics that facilitate pollination.
 - Color
 - Size and Form
 - Fragrance

Plant Pollinators

- Wind (Plants that use this do not usually have showy flowers, e.g., ragweed)
- Insects (Plants pollinated by insects have flowers that attract bees, flies, moths, beetles etc.)
- Birds (Requires larger flowers that will not be destroyed by the bird, e.g., C. japonica.)

Wind vs. Insect Pollination

Ragweed



Goldenrod



Insect Pollination

Dutchman's Pipe Night-blooming Cereus Moon Vine
Fly Pollinated Moth Pollinated Moth Pollinated



Insect Pollination

- Stapelia Gigantea
- Fly Pollinated



Bird Pollination

Wild C. japonica Japanese White-eye



Breeding Fragrant Camellias

- Selective breeding of existing species and cultivars
- Creating new varieties by creating cross-species hybrids

Selective Breeding of Existing Cultivars of Japonicas

- C. japonicas have desirable color, size, and flower form, but most lack fragrance.
- The japonicas with some fragrance could be selectively bred to increase fragrance
- This is a very slow process and might require many generations.

Carter's Sunburst



Amy Maryott



Temple Incense



Herme



Grand Slam



Kramer's Beauty



Scentsation



Blood of China



Black Dragon



Buddy



Lookaway



Kramer's Supreme



Mrs. Bertha A. Harms



***Selective Breeding of Existing
Fragrant Species***

- A number of camellia species have a desirable fragrance, but lack desirable size, color and flower form.
- Breeding requires a population of plants with variations in size, color and flower form.
- Diverse wild populations of fragrant species are not readily available. Most available fragrant species have been cloned from a small sample of wild plants.

***Creating Hybrids With
Fragrance and Other Desirable
Flower Characteristics***

- Introduce fragrance into cultivars that lack fragrance, but have other desirable characteristics by crossing a fragrant species with the cultivar.

CF44



High Fragrance



Scentuous



Sweet Emily Kate



Koto-no-kaori



Spring Mist



Fragrant Pink



Scented Gem



Cinnamon Scentsation



Problems in Creating Fragrant Hybrids

1. Hybrids with an uneven number of chromosomes are sterile. Ackerman overcame this in "Fragrant Pink" by treating tissue with colchicine to double the number of chromosomes thereby creating "Fragrant Pink Improved" which was not sterile.
2. Characteristics produced by recessive genes from fragrant parents may not show up until there is backcrossing or the breeding of F2 generation plants.
3. Most F1 hybrids do not have the most desirable flower size and form.

Other Camellia Hybrids

- C. japonica C. reticulata hybrids to produce hardy plants with the flower characteristics of C. reticulata.
- C. japonica C. oleifera hybrids (a very cold hardy camellia to extend the range of camellias as far as zone 6.
- C. japonica and yellow blooming camellia species to produce yellow blooms.

Other Camellia Hybrids

- C. japonica C. azalea hybrids to produce ever blooming camellias.
- Various other camellia species are used to produce hybrids with desirable characteristics.

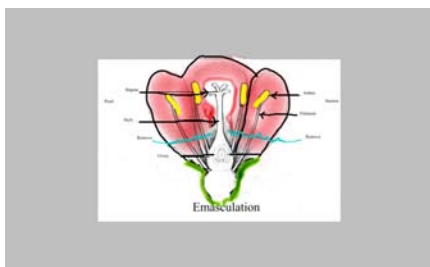
Pollinated Mrs. Bertha A. Harms Blooms



Steps in Pollinating Blooms

- 1. Select a camellia that is a good seed setter.
- 2 Remove petals and stamens just before bloom is ready to open.
- 3. Rub stamens or use a brush to place pollen from pollen parent on stigma of seed parent bloom.
- 4. Cover with bag.
- 5. Repollinate a day or so later and recover.

Emasculation



Mrs. Bertha A Harms Seed Pod