

Plant Talk

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by Michael Yanny

Where Do Baby Plants Come From?

A frank discussion about plant sex with Dr. Mike

I have been doing this Plant Talk thing for about three years now and have skirted around an important issue for all of this time. That is plant sex. I know most of you in the landscape industry are familiar with human sex at least from summer to winter. Spring--not so much! So, I think it is about time we have this discussion. After all, it is close to Valentine's day.

Like I do with many of the most difficult and sensitive subjects I encounter in my life, I consult with my lovely wife, Lori. Sex is one of her favorite subjects. You see, Lori has a M.S. degree in plant breeding from UW-Madison and has told me all kinds of interesting things about it. She was the first to show me how to cross pollinate crabapples back in the 80's. She showed me how to alter flowers so that pollination was truly controlled and not messed up by the bees. She explained to me how the little crabapple seeds developed from the ovaries at the base of the pistils of the crabapple flowers that we had cross pollinated. She showed me the pistils getting fat, in a pregnant sort of way, developing into fruits with little baby crabapple embryos inside the seeds. It is really quite amazing when you think about it! Lori opened my eyes to sex in a very natural way.

If people realized how much sex is going on outside each day in the summer, our flower gardens would have to be rated like movies are. Most landscapes would be PG-13 if not rated R. The Sugar Maple woods in spring would have to be rated X, with all those spring wildflowers going at it in haste before the trees leaf out. Parents would have to ban their kids from the woods but would likely have a hard time keeping teenagers out.

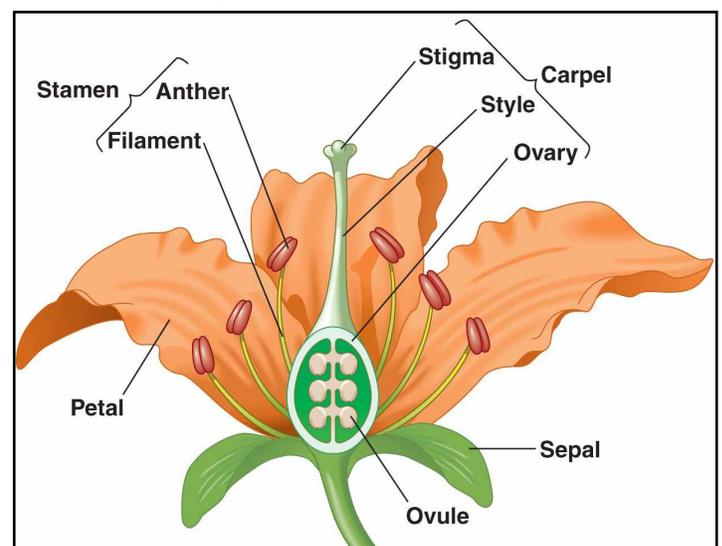
I don't know why I didn't write about this subject sooner. This is fun!



Lori and Mike Yanny in full flower before they went to seed!

Let's get started with the sex organs of the plants. You need to know these terms in order to discuss the subject.

So, when we are talking about the male parts of a flower we are referring to the stamens (*see pic below*). These have anthers on top of them from which the pollen or plant sperm is shed to fertilize the female. The female part of the flower is the pistil which is a tube with a stigma or sticky surface at its tip which is receptive to the pollen. It is the place on which the pollen lands. At the base of the pistil are the ovaries. This is where the



The anatomy of a complete flower.

Plant Sex cont.

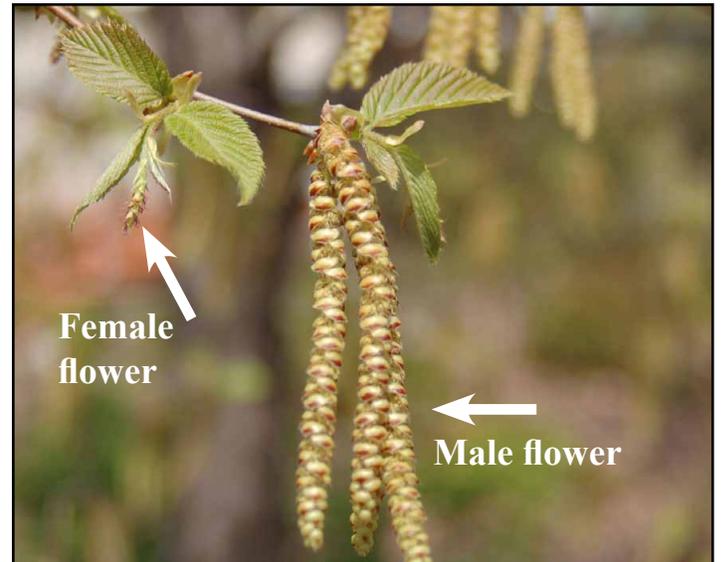
actual fertilization takes place after the pollen grows down the tube (the style). The sex cells in the ovaries combine with the sex cells from the pollen to form the eggs that develop into seeds or new little plant babies.

Well, ladies and gentlemen, now you know the basics of plant sexual reproduction. Let's talk about some of the variations on the theme because heck, wouldn't life be boring if all the organisms did it the same way all the time!

You know that expression, "teaching him about the birds and the bees", well that is what we are doing here. And it is not just the birds and bees but the wind as well, that is involved with much of the sex that takes place in our not so innocent outdoors.

Oak trees, Birches, Musclewood, Ironwood, Hazelnuts, Pines and Spruce all rely on the wind to transport their pollen. You see, all of the plants that I've just mentioned have two different kinds of flowers on each plant (*see pic upper right*). The male flowers and female flowers of individual plants may or may not flower and be receptive to each other at exactly the same time. Often times they are not. This is a preventative measure instituted by plants to encourage cross-pollination over self-pollination. It is the plant's way of preventing inbreeding and staying genetically diverse. For practical purposes, if you want to maximize the amount of fruit produced on the plant species I have mentioned here, it is best to plant seedling material or various different clones in close proximity to assure proper pollination and good fruit set.

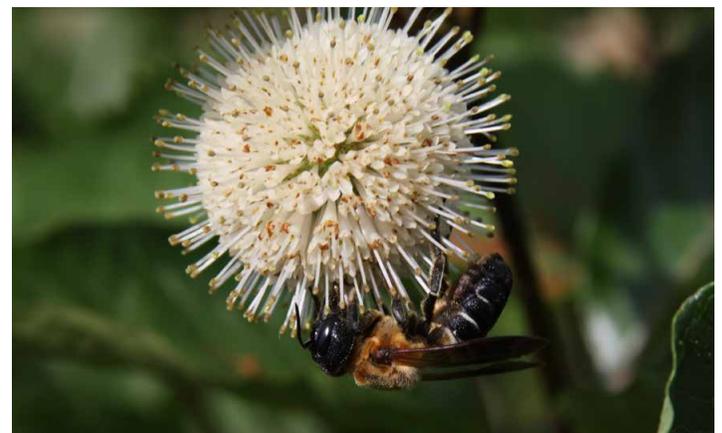
I may be a little weird, as I'm sure you have discovered already, but I like to see if I can find the tiny flowers on wind pollinated plant species (*see pic middle right*). The flowers are typically not very showy because they don't have to be, not like insect or animal pollinated plants. You see, insect or animal pollinated plants have showy flowers to attract the pollinators when the time is right (*see pic bottom right*). The colorful flowers are part of what you would think of in human terms as a courtship ritual. They are the attractant. They lure in the pollinator with their beauty to perform the act and then fade away and develop their seed. Often times they will never be



Ironwood (Ostrya virginiana) in flower.



Musclewood (Carpinus caroliniana) flowers.



Buttonbush (Cephalanthus occidentalis) is a bee magnet!

as beautiful again. It's kind of like our youth when we are typically the best looking we will ever be. Then we grow old, and go downhill from there. It is a sad fact of life for many organisms.

Plant Sex cont.

Some plants have two different types of flowers (male & female) but on separate plants. These species are said to be dioecious. In other words, you have plants that have only female flowers and other plants that have only male flowers. You truly have boy plants and girl plants. Some examples of species in this category are: American Bittersweet, Kentucky Coffeetree, Honeylocust, Ginkgo, Ash, Fringetree, and Winterberry Hollies. So in order for these plants to have sex and develop seed you, typically, must have a boy and girl plant in close enough proximity to each other.

Because of the fact that we have these dioecious plants it allows us horticulturists to be discriminating in our selective practices of plant use. In other words, we exhibit a sexist brand of discrimination that has been allowed to be socially acceptable. For example, cultivars of male forms of Kentucky Coffeetree, Honeylocust, and Ginkgo have been selected and introduced because they typically don't bear any fruit and therefore require less clean-up maintenance. So, in most cases, we use just boy plants (*see pic upper right*).

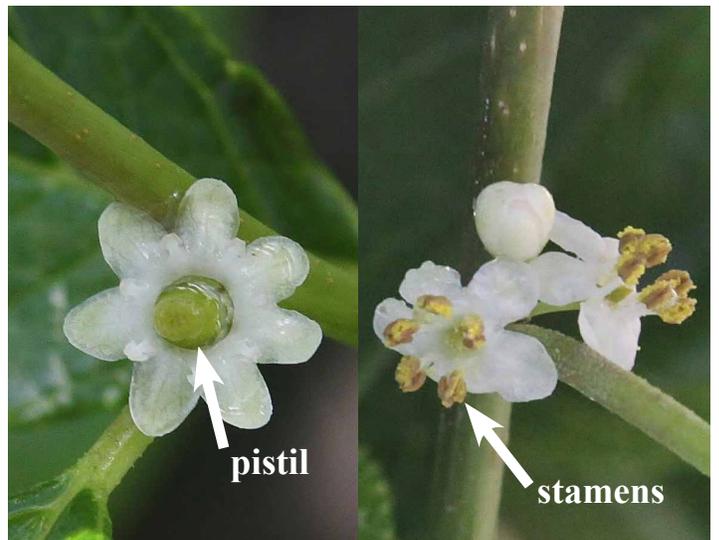
With some other dioecious plants we have reverse sexism and for the most part want the beautiful fruiting displays of the girls and just a few boys. Winterberries (*Ilex verticillata*) (*see pic middle right*) and other Holly species are like this, as are American Bittersweet (*Celastrus scandens*). With these species, effective berry production is best accomplished by planting masses of females in close proximity with a few male plants interspersed between. Because the timing of flowering must coincide, cultivars of Holly (*Ilex* species) have been selected in male-female pairs for proper pollination. For instance, 'Jim Dandy' is the male clone selected to pollinate the female 'Winter Red'. I guess these are the pre-arranged marriages of the horticultural plant world. When utilizing seedling material it is useful to have the nursery 'sex' the plants (sort the crop into identified boys and girls) (*see pic bottom right*) so that you can customize the amount of males and females you have in your planting. Johnson's Nursery often does this both with our larger sizes of native Winterberries (*Ilex verticillata*) as well as our American Bittersweet (*Celastrus scandens*). A recent



Female Ginkgos produce undesirable, smelly fruits.



Winterberry (Ilex verticillata) females produce gorgeous fruit when pollinated properly.



Female (no stamens)

Winterberry Flowers

Male (no pistil)

Plant Sex cont.

development in the world of Bittersweet is a cultivar selection that has male and female flowers on the same plant. It is called ‘Autumn Revolution’. Because of its atypical characteristic of having both male and female flowers on the same plant, there is no requirement to mix the sexes when planting these in the landscape.

Many plants have complete flowers, prototypical of what we learned about in grade school science class (*refer back to pic on page 1*). They have the pistils, stamens, anthers and ovaries all in one flower. These plants are usually pollinated by insects and often times have no problem setting fruit by themselves. There are exceptions though. *Viburnum* species are notorious for being self-infertile even though each plant has complete flowers with all the necessary sexual parts. They have some mechanism that is a mystery to me, which will not allow the plant to self-pollinate. It is for this reason that one must have two or more clones that flower at the same time in order to get good fruit set. For instance, if you want good berry production on your Red Feather™ Arrowwood *Viburnum* you need to have a different cultivar or seedling plants in close proximity to provide pollen to allow fruit set to occur (*see pic upper right*).

The same is true for many fruit tree cultivars. They can be self-infertile. Pears are especially notorious for not being self-fruitful. Most varieties need a pollinator plant. Many apples, cherries and plums also require a pairing of cultivars to get fruit set. Following is a link to a publication from Purdue University which goes into detail about which varieties are best paired with each other for best pollination. <https://hort.purdue.edu/ext/HO-174.pdf>. A good solution to pollinator problems on fruit trees in a small yard is to get plants that have numerous cultivars grafted together on the same plant. These are typically called 5 in 1 trees or 3 in 1 trees depending on how many cultivars are grafted onto a single individual.

Apomixis is a very interesting phenomenon that takes place with some species of woody plants in the Rose family. This is a process by which plants produce seed without sex. The result is genetically identical plant seedlings. All progeny are the same as their mother—



Arrowwood Viburnum produces fruit only with proper pollination.



Black Chokeberry grown from seed. This is an apomictic crop.

clones. Over the years, I have noticed this in populations of seedling *Amelanchier*, *Aronia*, *Cotoneaster*, *Crataegus*, some *Malus* species, and *Sorbus* (*see picture bottom right*). There are rarely if any variations or differences between individuals in a seedling population. These “cookie cutter” plants are apomictic seedlings. Plants can be really weird sometimes.

I hope this has been an enlightening read for you and has answered a lot of the questions you had always wanted to ask but were too embarrassed to do so. If you have any more plant sex questions that I failed to address just call Dr. Mike at 262-252-4980. I’ll get ahold of my wife, Lori, and get you the answers.

Plant Talk Available Online

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