

Pistachio breeding: A lifetime may not be long enough

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At the turn of the last century, Henry Ford was purported to have said that a new Model T could be ordered in any color that you wanted just so long as it was black. Like the Model T, it appears in California that you can plant any pistachio variety that you desire, as long as it is Kerman.

Over 90 percent of the pistachio acreage in California is planted to the Kerman female and this percentage is increasing with time. This variety was selected decades ago and no new varieties have appeared to challenge its preeminent position. Not only have no new varieties been successful in displacing Kerman, but also no new varieties have arisen since that mature earlier or later so as to extend the harvest season.

A significant reason for the lack of choice is the length of time required to develop a new variety of pistachio.

A breeder would begin to develop a new variety by making appropriate crosses from selected male and female trees (pistachio is dioecious, meaning that male flowers appear only on male trees and female flowers only on female trees). The seeds recovered from these crosses would be harvested the following year and planted in pots for eventual transplantation into a test plot. As the seedlings sprouted and grew they would be evaluated for various characteristics, but there would be little to measure until the seedlings began to flower and, if female trees, began to produce nuts in five to seven years.

Further evaluation

After flowering, the seedling trees would probably be evaluated for another three years or more so as to determine the stability and repeatability of desired nut characteristics and growth parameters in response to increasing maturity and in response to stress such as that produced by weather, insects and diseases.

After a suitable period of evaluation, superior seedlings would be selected and grafted onto rootstocks.

For resistance to diseases and to encourage earlier flowering, pistachios are grafted onto rootstocks. The performance of a variety may change as a scion on a rootstock. Superior seedlings will need to spend at least four to five more years on a rootstock before flowering occurs at which point yield and nut characteristics can begin to be evaluated.

Before a new variety is released, data would have to be collected for at least another five years, again, to help ensure, although not guarantee, that this variety was superior to Kerman and contained no fatal flaws. If everything goes well, a new variety would be out in 20 years or so.

Of course, very seldom does everything go right. A 40-year old pistachio breeder could reasonably expect to get his or her first new variety out at about the time for his or her retirement party.

What characteristics would we want to see in a replacement variety for Kerman? Growers would be tempted to replace Kerman, if the replacement variety was shown to be superior to Kerman in at least one characteristic and be equal to Kerman in all other desired characteristics.

Some single characteristics possessed by a new replacement, that fit the above scenario and that might topple Kerman include the following:

1. Greater edible split nut percentage.
2. Larger nut size.
3. Whiter, cleaner (prettier) looking nut.
4. Greater resistance to fungal diseases.
5. Larger yields.
6. Nut bearing at an earlier age.
7. Reduced alternate bearing.

A new variety to be successful does not necessarily need to replace Kerman. New varieties that mature earlier or later in the season that could be planted in conjunction with Kerman and thus extend the harvest period would be of value to the pistachio industry as well.

So what is being done to develop new pistachio varieties?

The University of California, as funded by the California Pistachio Commission, and with the help of several California pistachio growers, is currently in the 15th year of a breeding program. The oldest selections are entering their sixth year on rootstock with many more entering their second year on rootstock.

Currently, several advanced selections appear to have performance characteristics that exceed those of Kerman. However, early results can be deceiving. Only more patience and time will tell. Since this project began, at least one retirement party has come and gone, but the work continues. Remember that, eventually, you truly could buy a Ford automobile that was painted red, white, blue, green silver or just about any other color a person could want.