

DISCUSSION NUMBER TWO

Hunt: I would like to ask Carlyle a couple of questions.

You said you came out with aberrant types from selfing your plus tree selection project. Did you have any idea that they would come out this way when you selected them? Also, if you graft cuttings from the witches'-broom, does the propagule remain dwarfed on the normal rootstock? Lastly, is the non-branching slash pine a genetic segregate—did the mother tree demonstrate this trait to some extent?

Franklin: In answer to the first question, the virescents are homozygous recessive with single gene control, so the parent was heterozygous. Of course, we didn't know that it was heterozygous until after we had bred it. Rootstock seems to have little or no effect on the dwarf habit. The slash pine family with the columnar tree is just being evaluated and this non-branching phenotype is the first one to show up. Here, again, this represents one extreme of a wide range.

Johnson: Aren't there also virescent Austrian pines?

Santamour: There are two virescent hard pines that have been in the trade for a long time, *Pinus densiflora* var. *oculus-draconis* and *P. thunbergii* var. *oculus-draconis*, the so-called "dragon-eye" cultivars. The yellow bands on the needles disappear after the first growing season. Outcrosses of these trees to normal types gave all normal progeny. Only 6 seedlings were raised from selfing of the *thunbergii* dragon-eye parent, and all were virescent. The dragon-eye character is apparently recessive and may be controlled by a single gene.

McDaniel: I have grown this year what appears to be a virescent seedling of *Magnolia virginiana australis*, from wild seeds collected in Alabama. It came out with green cotyledons but the earlier leaves were completely yellow. Later in the summer the cotyledons kept it alive and some of the later leaves are greening up and the latest comes almost to normal color. I hope to keep it alive and see if we can't propagate a virescent magnolia. There have been variegated selections made in *M. acuminata* and *M. grandiflora*, but like many variegations in other broad-leafed plants, it is difficult to keep the trees uniformly variegated. The green branches tend to take over.

Teich: Dr. Franklin had a segregation ratio of 1:1. This indicates that there was no natural self-pollination.

Franklin: The witches'-broom seed were wind pollinated. This broom has never produced pollen, only female flowers, so there could be no selfing within the broom.

Nienstaedt: I wonder if Frank would consider the possible contribution that provenance research could make to horticulture. In other words, a lot of the past introductions, if I am not misinformed, have included a very limited amount of material, not at all like our provenance testing of exotics; I wonder if we can't make a contribution there.

Santamour: Yes, I think so, Hans. It is true, as you well know, that Arboretum introductions of certain species, are based on one seed collection; sometimes on only one parent tree. The provenance work that the forest geneticists have been doing should play a larger part in the species used as seed-propagated ornamentals. But one of the difficulties is getting this information to the arboretum or nursery that could be involved in mass producing such seedlings or introducing germ plasm from the same source. I am sure arboreta and nurseries don't have the space to maintain 4 or 5 parent trees for a seed source of this type. Probably when your provenance trees get large enough to produce seed perhaps you could get them into the trade this way. We will look for the provenance research to put more diversity into the ornamental program.

Kriebel: Along that line, in the case of sugar maple, I think there are some possibilities for direct utilization of selections from provenance tests. I am thinking of one example. It just so happens that in our tests in Ohio, the provenance right around this area of southern Illinois is an intermediate form apparently *Acer saccharum* subspecies *floridanum*. It is a very bushy tree; it is not very good for timber but as a small ornamental maple it has possibilities in northern areas where *floridanum* might not be expected to be hardy, because it is in this northern extreme of the *floridanum* gene complex. It is very compact and extremely drought resistant, as well as winter hardy. We have a number of selections from our geographic testing of sugar maple which have possibilities of direct utilization, and I think we can use ordinary open-pollinated seed in this case.

Santamour: I think you are right, Howard. With native species that have been adequately tested, we can go back to seed source. I think Hans was more concerned with foreign exotic types that have been brought in. I would like to see more of this done, but you know what's likely to happen. Some nurseryman is going to get hold of one clone of this and call it the "George Brown" and there we go. One clone of this Carbondale source will be propagated *ad infinitum*.