

## DISCUSSION NUMBER THREE

Kriebel: In regard to English elm, I might mention an observation that we have made in Ohio in only one location, a plantation in the Secrest Arboretum. About 10 years ago, we noticed that the trees were not very healthy. They were infected with a root fungus. I don't recall the species, but apparently this was an aftermath of a couple years of severe drought. I think that the species is not ideally suited to the rather warm, dry summer climate of this part of the country. It grew reasonably well for about 3540 years, then succumbed after a period of severe summer weather.

McDaniel: Dr. Wright, were any of the seedlings grown from your English oak trees hybrids?

Wright: No, the three trees apparently pollinated each other. Hybrids would have been identified easily. Hybrids between English and white oaks are known, and back in 1939 or 1940 Schreiner and Duffield produced about 500.

McDaniel: We do have some obviously hybrid trees in Urbana, Illinois, some of them quite old, big trees. The English oak has been cultivated there for perhaps 80 or 90 years. Some of those trees are giving a high proportion of hybrids from the open-pollinated seed, crossing particularly with bur oak which is native there and with chinkapin oak, another native.

Wright: We would like to try some of it.

McDaniel: I have collected some of the hybrid seed. There are two in the Mt. Hope cemetery, side by side; one is a bur oak cross, the other with chinkapin. Both had good crops this year. Of course, you have to get up early to beat the squirrels. We did collect some and I am testing them both at the University and with cooperating nurserymen.

Mokry: What about surviving American chestnut? Are they immune or lucky trees? And has any work been done on *Castanea ozarkensis*?

Jaynes: As you are well aware, there are surviving American chestnut trees, a few within the native range and many outside the native range or on outlying fringe areas of the range. I think we have to consider them as escapes until there is evidence that they have been infected and withstood it.

*Castanea ozarkensis*, which is one of several chinkapin species, has been used in crosses. We have a number of Pi hybrids between *C. ozarkensis* and the Chinese chestnut from which we are collecting open-pollinated seed. These F1's are in a planting situation where they can intercross. Our reason for interest in these hybrids is primarily for wildlife food production.

In the paper I emphasized the problems we are confronted with and some of the stone walls we are

batting up against—sometimes not making much progress. Presently, one of the things we are doing to obtain better selections is to collect seed from what we consider promising trees in isolated plantings that have desirable genetic characters. For instance, Dick Johnson, forester here on the Crab Orchard Refuge, was able to collect a large number of seed this fall from the Clapper chestnut. This desirable tree gets cross-pollinated by other good trees in the same planting, so we are able to obtain several hundred nuts of promising parentage. If we were to attempt controlled crosses between similar select trees we would be expending much more effort for fewer nuts—nuts which very well might not be better than those collected from selected trees that are open pollinated. We are doing the same sort of seed collection from other isolated plantings where we feel there are several superior trees that are intercrossing.

Nienstaedt: I want to relate an experience I had a few years ago out in North Dakota, and then ask a question of the audience in general. About 10 years ago, the then Lake States Station was suddenly bombarded with requests from North Dakota to go out and look at the dying boxelders. We went out and looked at them, all of us, and we soon came to the conclusion that it was 2,4-D damage. Of course, the farmers wouldn't accept that, and it took from 6 to 8 years to prove that it was 2,4-D damage. Now, my question is: "Do we overlook a source of pollution if we do not consider similar agricultural pollution in the future? Should we be developing new varieties with some resistance to herbicides?"

Wollerman: I would like to add to Dr. Nienstaedt's comments about 2,4-D damage in regard to weed killer and undesirable effects. At the Delaware, Ohio Laboratory, home owners bring in damaged leaf samples of pin oak and when we ask them if they used weed killer on the lawn beneath the trees, the answer is usually yes. It was not an insect or disease as they suspected, but soil contamination by weed killers. And the other situation I had a chance to observe was the 'effect of ammate on a small red oak sapling. The effect of the weed killer was to curl the leaves. This effect lasted 2 years and it wasn't until after the third growing season that they returned to normal.

Jaynes: I have a question here for Don Lester or John Wright concerning these elm tree selections that appear to have resistance to Dutch elm disease. When you find these native trees, do you have any evidence that resistance is in fact not resistance to the disease *per se* but resistance to insect damage? And, therefore, the trees are not getting infected with the disease.

Lester: All of our work to date is based on resistance to

artificial inoculation although there are good opportunities for natural inoculation in our elm arboretum. We have American elm seedlings which have resisted artificial inoculations, but we will have to test each tree with a series of inoculations to rule out variation in seasonal susceptibility as a cause of apparent resistance.

Santamour: I have a question for Don Lester. In the *Ulmus japonica x pumila* putative hybrids, have you looked at meiosis to see how the chromosomes pair? If they are true hybrids, it is likely that there will be some meiotic irregularities.

Lester: No, we are just starting, and we have been able to get the crosses indicated in the table. That's all we have done. However, in these wind-pollinated progenies we get such a range of segregating types that we feel quite

confident that this is in fact a *U. japonica x pumila* hybrid.

Santamour: One other question. Have you found anything that we consider an interspecific hybrid with American elm?

Lester: No. Through use of irradiated pollen, pollen mixes, and wide crosses, I have produced material that, based on experience with other species, ought to have given me interspecific hybrids, but chromosome counts have all been tetraploid.

Santamour: We have recently found a triploid that may be an *U. americana x pumila* hybrid. Meiosis is beautiful: 14 univalents and 14 bivalents. We hope to publish on this soon.