Dr. Sandra L. Anagnostakis
Department of Plant Pathology and Ecology
The Connecticut Agricultural Experiment Station
123 Huntington Street, P. O. Box 1106
New Haven, CT 06504

Phone: (203) 974-8498
Fax: (203) 974-8502
Email: Sandra.Anagnostakis@ct.gov
Website: www.ct.gov/caes

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Butternut and Butternot Trees in Connecticut

Long a favorite of wood carvers and nut enthusiasts alike, butternut trees, or "white walnuts," are usually found near running water. Butternut trees have never been numerous in Connecticut, and populations are declining throughout the native range. Efforts to find trees resistant to the pathogens that kill them have been under way for some time. In 1994, The Connecticut Agricultural Experiment Station compiled a list of 855 reported butternut trees in the state, and by 2004 there were only 575 left. Since 2005, we have been sampling the trees to determine what pathogens are present.

We have found that many of our tagged trees are not pure butternut (*Juglans cinerea*), but hybrids with Japanese walnut (*J. ailantifolia*). The "National Champion Butternut Tree" was shown to me by Ed Richardson of Connecticut's Notable Trees Project. This is a remarkable tree (Figure 1). The trunk is 7 feet 4 inches in diameter and it towers over the other trees in the area. However, using a DNA test on twig samples, our cooperator Jeanne Romero-Severson (University of Notre Dame in Indiana) found that this is not a butternut tree, but that its mother was a Japanese walnut tree and its father was a butternut. Another tree in Chester (Figure 2) had a Japanese walnut mother and a tree that was probably a hybrid for a father. The trunk of that tree was almost 6 feet in diameter. This would be interesting, but not surprising, except that when we consider the potential age of these trees, something doesn't fit. That something is associated with when Japanese walnuts were imported into the U.S.

Figure 1. Jeri and Dale Bergdahl, butternut experts from Vermont, with the former National Champion Butternut in Chester, Connecticut.

Figure 2. A large hybrid *Juglans* in Chester, Connecticut.

How old is the former national champion butternut? There is no really good way to determine the age of a tree that big. Obviously, the size attained by a tree will depend on the conditions under which it is growing. A Japanese walnut tree in the botanical garden in Leiden, Holland, was planted in 1865 and is 3 feet in diameter. This means that it has increased in diameter an average of 0.3 inches per year for its 143 years. The Arnold Arboretum in Boston has a Japanese walnut planted in 1892 that is 12½ inches in diameter, making its average diameter increase only a little over 0.1 inch per year over its 116 years. I have been looking at cut trunks and branches of butternut hybrids in Connecticut, and counting and measuring growth rings trying to estimate how fast they can increase in trunk diameter. One hybrid had growth rings ¼ inch wide, and grew at that rate (almost ½ inch of diameter increase per year) for the first 32 years of its life and then grew much more slowly for another 43 years, for a final diameter of 2 feet 7 inches. In the Historic District of Old Wethersfield, Ed Richardson has found a tree with two "sprouts" that he thinks is a Japanese walnut. The two trunks of this tree are both over three feet in diameter. If these "sprouts" have grown at the rate of ½ inch diameter increase per year, they would be about 88 years old (planted in 1919). If they have grown at the rate of the tree in Holland they may be twice that old. If our (former) national champion grew at the remarkable rate of ½ inch diameter increase every year it would have been planted in 1832. Its mother, the Japanese walnut tree, was probably at least 10 years old before it flowered and crossed with a native butternut. This raises the question of when that Japanese walnut was brought to this country.

Plants from Japan have not always been available to plant fanciers in the U.S. Corsa's 1896 book on nut culture states that the oldest Japanese walnut tree growing in the U.S. was "grown from a seed planted about 1860 by a Mr. Towerhouse in Shasta County, California." Japanese walnuts soon became common in the nursery trade and by 1900 were available from many mail order houses. The Peabody Essex Museum of Salem, Massachusetts has published a wonderful catalog of their exhibit "Worlds Revealed: The Dawn of Japanese and American Exchange." In the first chapter, William Sargent writes that in 1639 an "exclusion policy closed Japan to the greater part of the outside world for almost 200 years. Only the Dutch and Chinese, who did not proselytize the Christian faith, were allowed to carry on trade…" Thus, in the early 1800's the Dutch ships that carried trade goods around the world were still able to conduct business in Japan but U.S. ships

were not. The first "official" U.S. importations of plants from Japan were after Admiral Perry sailed into Tokyo Bay and then to Nagasaki with four armed U.S. steamships in 1853. He demanded a trade agreement, and "opened" Japan to commerce. This lends additional glamour to the story reported by Peter Fetchko in the third chapter of the Peabody Essex Museum catalog that a ship from Salem, Massachusetts sailed into Nagasaki harbor flying a Dutch flag, and returned to Salem in the spring of 1800 with a cargo of objects from Japan. Starting in the middle 1700's, Chester, Connecticut was known for shipbuilding and sailing vessel repairs. The property next to the big tree in Old Wethersfield was owned by a sea captain, Richard Bunce, in the 1790's. Were some of our ship captains transporters of seed? Does Connecticut have Japanese walnut trees that are older than the first recorded U.S. plantings? This complicated history puzzle will not be easily solved. I will continue to search old records of trees planted, and rely on Ed Richardson to find old trees.

Of the 62 Connecticut trees examined so far, only one is a pure butternut. This new "state champion butternut" is in Glastonbury, and is three feet in diameter. Out of 107 trees sampled in Massachusetts, 34 were butternuts. The presence of so many hybrids that look like butternuts certainly complicates my work on butternut diseases. Melanconis canker disease was first described by Arthur Graves in 1919, and seems to affect butternuts, Japanese walnuts, and hybrids equally. This is a "slow killer" and trees survive for years in spite of infection. Sirococcus canker disease was first found in the U.S. in 1967 and can rapidly kill the trees it infects. The fact that I have only found this pathogen twice, so far, in Connecticut may be due to resistance in Japanese walnuts and hybrids, which make up the bulk of the trees growing here. If this is true, there is real hope for breeding butternut trees that are adapted to Connecticut and which have resistance to Sirococcus canker.

Our cooperators in other states include Dr. Dale Bergdahl in Vermont (tree pathology), Dr. Michael Ostry in Minnesota (tree pathology), Dr. Jeanne Romero-Severson in Indiana (DNA tests), and Dr. Scott Schlarbaum in Tennessee (forestry).

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