

WALNUT ROOTSTOCK EVALUATION FOR RESISTANCE TO ARMILLARIA ROOT ROT

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Abstract

A trial started in 1986 comparing rootstock resistance to Armillaria mellea shows considerable differences in tree death to this fungus. Rootstocks that appear to be showing resistance are Northern California Black, Royal, Arizona Black and one English walnut source (Amigo). Some variation in source trees may exist and possibly will be shown in future evaluations.

Procedures

A trial was planted in 1986 to evaluate the resistance of various walnut rootstocks to Armillaria mellea commonly called "oak root fungus". The planting site was on Yolo loam in an existing walnut orchard where many trees previously had died from Armillaria Root Rot. The orchard was mapped as to tree replants and missing areas. From the preliminary evaluation circular patterns were observed showing areas infested with the fungus. Root samples and observed roots from removed trees from the area confirmed the disease presence.

The trial was planted in the Armillaria areas where previous trees had been diagnosed with the disease. A randomized complete block of 5 replicates of 4 trees per replicate was designed. Only ten trees were available for three rootstocks listed. These were planted with two trees of each rootstock per replicate. The Paradox and Juglans californica were from several source trees and were maintained as separate replicates but are reported as a single composite.

Trees are evaluated when they die by digging and then careful examination for characteristic plaques and mycelia. Trees reported killed are those killed by Armillaria.

Results

Data collected so far indicate that some rootstocks seem to be very susceptible to Armillaria. These rootstocks include Juglans microcarpa - Texas black walnut, J. ailantifolia - Japanese black walnut, and J. californica - Southern California black walnut. Other rootstocks such as J. nigra - Eastern black and J. regia (India and Manregian sources) are also being killed but at a slower rate.

Preliminary data that was previously reported from these trials showed only 4% Paradox being killed. Approximately one-half the Paradox trees had been grafted to Hartley instead of Chico whereas all others were grafted to Chico variety. If the data from only the Paradox trees grafted to Chico are reported, 11% of the trees have died whereas none of the 120 grafted to Hartley have died even though trees in both populations are from the same source trees. One may consider that Hartley might impact resistance to the rootstock although there are

instances in the literature of any scion imparting disease resistance to the rootstock. I would suggest that the Chico variety is causing more stress on the rootstock due to the heavy crops produced the past three years whereas the Hartley has not produced much crop. This stress is then causing the rootstock to be more susceptible to change and death from the pathogen.

Several rootstocks for walnut appear to be reasonably resistant to Armillaria mellea after 6 years. These rootstocks include Northern California Black, Royal and Arizona Black walnut. J. regia variety Amigo seed also appear to be resistance. This trial will continue to be evaluated but it appears that there may also be differences within species and possibly from source trees. The Amigo English walnut indicates perhaps that this rootstock may be resistant

1992 Evaluation of a 1986 Planted Walnut Rootstock Trial in an Orchard Infested with ARmillaria. Trees are grafted to Chico variety.

<u>Rootstock Name</u>		<u>Trees in Trial</u>		
<u>Scientific</u>	<u>Common</u>	<u>No.</u>	<u>#Killed¹</u>	<u>%</u>
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J.h. x J.r.	Paradox	100	11	11
J.h. x J.n.	Royal	8	0	0
J. hindsii	N. CA. Black	60	3	5
J. regia	Amigo	20	0	0
J. regia	Manregian	40	6	15
J. regia	India	10	2	20
J. major ²	Az. Black	20	0	0
J. Microcarpa	Tx. Black	40	22	55
J. californica	S. CA. Black	60	22	37
J. nigra	Eastern Black	20	5	25
J. ailantifolia ²	Japanese Black	10	6	60

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1. Trees killed by Armillaria
 2. Planted in 1987 as grafted trees.