Rootstock Evaluation and Development

Effects of Saturated Soils in Spring on Walnut Trees

Evaluation of trees damaged in 1974 from flooding and seepage in Colusa and Yolo counties was continued in 1975. All trees in one plot in Colusa county were removed. In other plots, practically all severely damaged trees have been removed. In general, trees slightly damaged in 1974 either improved or remained nearly unchanged. Few moderately damaged trees improved whereas most were unchanged or became worse. No consistent effect of either light or severe topping was observed. Trees which remain in each plot will be rated during 1976.

Sensitivity of Walnut Species and Hybrids to Waterlogging
P. B. Catlin

Measurement of differential sensitivity to waterlogging of walnut seedlings was continued in 1975. Several different genotypes each of J. regia, J. hindsii and Paradox were tested as was one J. nigra seed source. These taxa continue to be in the following order of increasing sensitivity: Paradox, J. hindsii, J. regia. J. nigra may be more sensitive than J. hindsii. Over 200 plants have been selected as possessing increased tolerance though only about 50% of these are expected to ultimately survive. One such plant has been maintained from 1973 as have 8 from 1974.

Attempts to measure sensitivity during the latter stages of dormancy were only partially successful. Damage occurred with J. hindsii seedlings treated at 23°C but not at 12°C. Differences with time of treatment in relation to resumption of growth were not obtained.

Investigation of mechanisms responsible for sensitivity to anaerobic conditions were begun in 1975. Both ethanol and acetaldehyde production is induced rapidly after imposing waterlogged or anaerobic conditions. No correlation has yet been made between production or accumulation of these substances and differential sensitivity.

Greenhouse treatments have suggested that tissues of the base of the stem-upper taproot might be especially sensitive to saturation. Observations also revealed considerable morphological differences between root systems of J. regia and J. hindsii.
seedlings with Paradox more like the latter. Morphological and anatomical characterization has been conducted by Dr. Bijan Shaybany. Emphasis has also been on describing histological changes occurring with waterlogged plants.

With the probable exception of anatomical work all phases of this project will continue in 1976.

Sensitivity of Walnut Species and Hybrids to Salinity
P. B. Catlin, M. Viveros, and R. M. Carlson

Work preliminary to testing potential walnut rootstock materials for sensitivity to salts was initiated in late 1975. The main deterrent to growing walnut seedlings in mist of one-half strength Hoagland's solution or water seems to be electrical and mechanical failures. A chamber has been constructed where fog produced by an impeller surrounds the roots. If suitable for growing plants it is hoped that this chamber will avoid system corrosion and plugging during salt treatments.

Effects of the Ring Nematode, Criconemoides xenoplax, on Juglans hindsii
B. F. Lownsbery

Criconemoides xenoplax is common in walnut orchards, and Juglans hindsii is known to be a host for this nematode. Treatment of soil in which C. xenoplax was the predominant plant parasitic species with ethylene dibromide markedly improved subsequent growth of J. hindsii. Addition of C. xenoplax to J. hindsii seedlings at the time of spring planting resulted in trees significantly smaller than untreated controls after one year's growth. At the time of harvest root lesions were present on the roots of ring nematode infected trees, but not on uninfected controls. These lesions tended to be smaller than those caused by the root lesion nematode, Pratylenchus vulnus, but they coalesced with time to form larger lesions indistinguishable from those caused by P. vulnus.

After finding evidence that the ring nematode, Criconemoides xenoplax, is a walnut pathogen, it would seem advisable to compare the reactions of Juglans hindsii and J. regia to this nematode under controlled conditions. Support needed for this work would be $500 OE&E to the Department of Nematology.