A Graft-Transmissible Agent Associated with Bark- and Wood-Grooving Disease of Peach and Nectarine

D. A. Rosenberger and A. L. Jones

Graduate Research Assistant and Associate Professor, respectively, Department of Botany and Plant Pathology Michigan State University, East Lansing 48824.

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ABSTRACT

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Longitudinal grooves along the trunks and branches of peach and nectarine trees were observed in two orchards in southwestern Michigan. Symptoms were not present on leaves, fruit, or roots of affected trees. Halford peach seedlings inoculated by using buds, wood chips, and root chips from infected nectarine trees developed the same bark- and wood-grooving symptoms two years after inoculation. Preliminary attempts to transmit the causal agent(s) to herbaceous hosts have failed.

Additional key words: *Prunus persica,* virus disease.

A disease of unknown etiology was observed in 1972 on nectarine (*Prunus persica* var. *nectarina* 'Red Gold') trees in an orchard in southwestern Michigan. The grower observed the disease in some of the planting stock when the orchard was established in 1967. In 1973, 17 of 256 trees in the block showed symptoms. The disease was observed in another orchard in 1975 on 4-year-old peaches (*Prunus persica* 'Red Haven'). Cresthaven and Redskin peach trees interplanted with Red Haven showed no symptoms. The inoculum source for the Red Havens was traced to diseased propagation materials: several older Red Haven trees from which budwood had been taken showed grooving symptoms in 1975. The inoculum source for these older trees was not determined.

Symptoms on diseased trees are found on trunks, scaffold limbs, and branches two or more years old. Affected areas have longitudinal grooves in the bark which extend into the wood. Severely affected branches show some flattening (Fig. 1). Grooving may be severe on one or two branches, but light or absent on others. Grooves are deeper in trunks and older branches, which suggests that the woody tissue develops around the indented area. No symptoms are found on the current season's terminal growth or on belowground portions of the tree. Fruit and leaves develop normally. Infected trees show some decrease in vigor when trunk and scaffold limbs become severely distorted.

Bark chips from stems and roots of naturally infected nectarine trees were handled as buds and T-budded onto Halford peach seedlings in a nursery row. Chips of stem tissue were taken from 2-year-old wood that showed grooving symptoms, whereas root chips were taken at random from roots of infected trees. Inoculations were also made with buds from the current season's terminal growth taken from branches showing symptoms. All inoculations were made by budding three sites per seedling between mid-June and mid-August.

All tissues used in budding readily transmitted the disease agent to peach seedlings. Following inoculation in 1972, three of three, two of two, and four of five Halford seedlings inoculated with buds, stems, and roots, respectively, showed symptoms during summer, 1974. Eight of 11 trees inoculated with buds in 1973 showed symptoms by August, 1975. Although symptoms usually were not evident until the second year following inoculation, one of two trees inoculated with buds on 28 June 1974 showed slight symptoms in June, 1975. Symptoms were most evident on growth which developed the year following inoculation, although some pitting was evident on growth which developed during the year of inoculation. Symptoms on inoculated seedlings were identical to those in the orchard. Four seedlings inoculated with buds from apparently healthy trees showed no symptoms.

Blossom petals collected from diseased nectarine trees in 1973 and kept frozen were ground in a phosphate-nicotine buffer (2) and used for mechanical inoculation of small seedlings of tobacco (*Nicotiana tabacum*), cowpea (*Vigna sinensis*), cucumber (*Cucumis sativus* 'National Pickling'), and *Chenopodium quinoa*. Triturated buds, stem chips, and root chips taken from diseased peach trees in 1975 were used for mechanical inoculation of the same herbaceous species. Control plants of each species were inoculated with ground tissue from healthy plants. None of the inoculated plants developed disease symptoms. Further attempts to transmit the causal agent(s) to herbaceous plants have been inconclusive.

This disease of nectarine and peach trees has not been described, although a similar disease, Prunus stem pitting, has been studied (1, 3, 4). However, the two diseases differ in several ways. Prunus stem pitting causes secondary thickening of the cortex and pitting of the

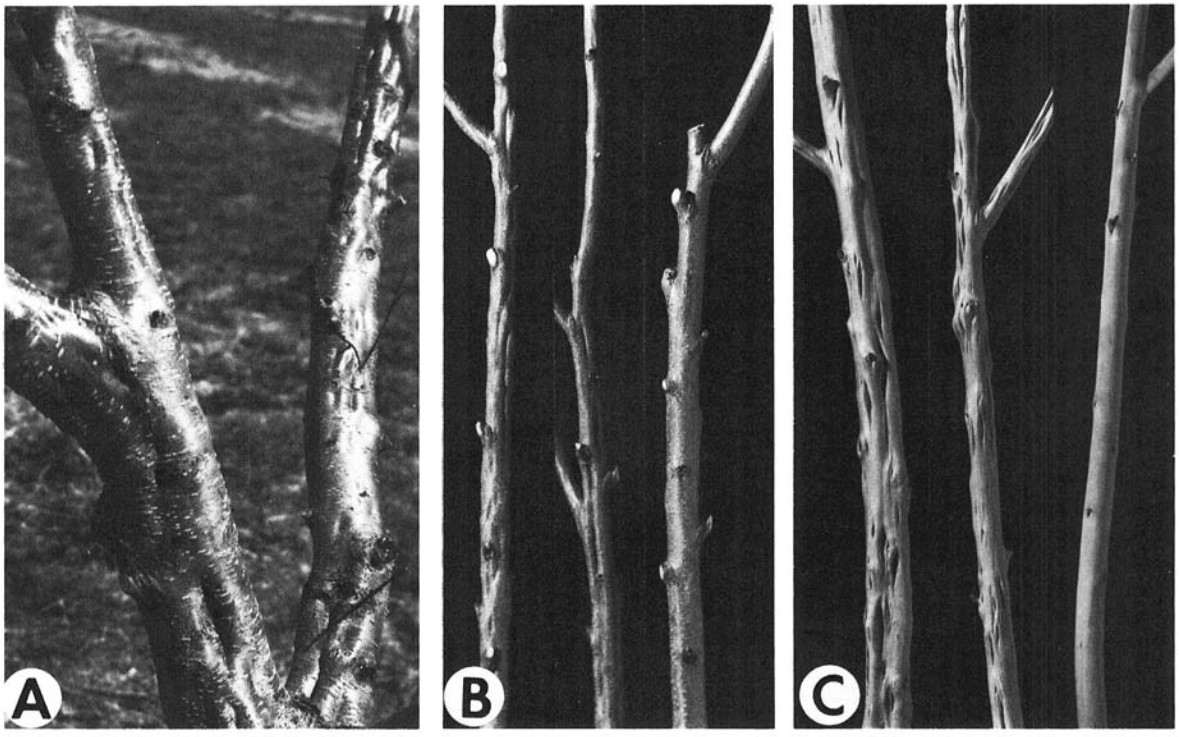

Fig. 1-(A to C). **A)** Symptoms of bark- and wood-grooving disease on the scaffold limbs of a 7-year-old nectarine tree. (B and C) Symptoms of bark- and wood-grooving disease **B)** in bark, and **C)** with bark removed, on branches from two peach seedlings inoculated with diseased nectarine buds (left) compared to control seedling (right).

wood only on the tree parts below ground, whereas the bark- and wood-grooving disease causes symptoms only on trunks and branches. The stem pitting virus is more readily transmitted from the roots than from other parts of diseased trees (4) whereas the infectious agent(s) of the bark- and wood-grooving disease is transmitted readily by root chips, wood chips, or buds.

The leaf scorch disease of almond also produces pitting on infected branches, but leaf scorch causes distinctive leaf and bark symptoms that are absent in the disease described here (5). Unlike leaf scorch or Prunus stem pitting, the bark- and wood-grooving disease has not been observed to spread from tree to tree in the orchard. The mode of transmission appears to be primarily through infected budwood, and our observations suggest that careful selection of budwood sources should eliminate this disease in commercial plantings.

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