Association of Mycoplasmalike Bodies with Little Peach and X-Disease

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ABSTRACT

Mycoplasmalike bodies (MLB) were found in leaves of peach trees exhibiting little peach symptoms taken from 5 of 6 orchards, and in leaves from peach, sour cherry, and chokecherry with X-disease symptoms. The MLB were found more consistently in little peach leaf samples and in pedicel and leaf samples from X-disease-infected sour cherry than in X-disease-infected peach leaves. The MLB in sour cherry, peach, and chokecherry were morphologically similar to those reported for peach Western X-disease and were more elongate than those in little-peach-infected tissues.

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Little peach, a disease of peach in Michigan, was considered to be a virus disease without direct evidence for a viral etiology. Infected trees have numerous short lateral shoots; abnormally green, or slightly yellow, and smooth leaves; and small, late-maturing fruits.

X-disease of peach and cherry is of presumptive mycoplasma etiology (1, 4, 5). Infected peach trees develop leaves with yellow to red blotches, defoliate prematurely, and rarely produce fruit. Infected sour cherry trees propagated on mahaleb rootstock, wilt and die suddenly in late summer, whereas trees on mazzard rootstock survive for several years and produce characteristic small green cherries.

Although different in symptomatology, the two diseases are similar in that both are transmitted by leaf hoppers and infected plants may be cured by immersion in water at 50 C for 6-10 min (3). Since several other hot-water-labile diseases spread by leafhoppers are of the yellows group and have mycoplasmalike bodies (MLB) associated with them (2), it was likely little peach would have a similar etiological agent. This paper presents the results of our electron microscopic examination of ultrathin sections of peach infected with these diseases and the results of our examination of sour cherry, a host of X-disease not previously examined.

Little peach specimens were collected primarily in August. X-disease specimens were collected periodically from late June to early September. Segments of lateral leaf veins were cut from fully expanded, but not senescent, peach (*Prunus persica* Batsch) foliage with symptoms of little peach or X-disease and immediately immersed in 5% glutaraldehyde in phosphate buffer in the field. The next day, tissues were postfixed in 1% cacodylate or phosphate buffered osmium tetroxide solution and dehydrated through an ehtanol series. Segments were embedded in Spurr's epoxy resin (6), sectioned with a diamond knife, and stained in alcoholic uranyl acetate followed by aqueous lead citrate. Sour cherry (*P. cerasus* L. 'Montmorency' on mazzard rootstock) leaves and fruit pedicels, and chokecherry (*P. virginiana* L.) leaves were sampled similarly for comparison with peach tissues. If the first sections examined were negative, other segments were sectioned. Sections were examined with a Philips 300 transmission electron microscope.

Mature phloem sieve tubes of leaves from trees with symptoms of little peach contained MLB. In cross section, the bodies appeared pleomorphic with spherical, ovate, and filamentous forms present (Fig. 1). Portions of filaments were also evident in longitudinal sections (Fig. 2) but they were not predominantly elongate as was noted previously for X-disease (1, 4). No MLB were found in samples from trees lacking little peach symptoms.

Peach leaves with X-disease symptoms contained MLB in phloem cells similar to those described for peach Western X-disease (4, 5) and for X-disease-infected chokecherry, mazzard, and sweet cherry (1). Several of the bodies were more elongate than those associated with little peach, although spherical and ovate bodies predominated in some sections.

The incidence of MLB in leaves with little peach symptoms was greater than in leaves with X-disease. In trees exhibiting little peach symptoms, MLB were found in samples from five of six orchards. Although MLB were not found in each phloem cell of a given section, they were found in most sections. Periodic sampling over 3-4 mo in 10 peach orchards exhibiting X-disease symptoms yielded one sample out of 34 with MLB, but graft transmission studies yielded X-disease from nine of the orchards. Usually less than 10 MLB were present in a cell but occasionally areas were found which contained a cluster of bodies.

Leaf segments from seedling peach trees used for indexing suspect orchard trees yielded more sections with MLB in the phloem. Chances of finding MLB were best in sections from leaves with early symptoms of X-disease and they decreased rapidly with increased symptom severity. Locating MLB in severely infected leaves was difficult due to the presence of numerous collapsed and necrotic phloem cells.

Leaves of chokecherry and sour cherry, and fruit pedicels of sour cherry, yielded MLB more consistently than peach leaves with X-disease. Samples from six of seven sour cherry orchards revealed MLB. We later confirmed X-disease was absent in the one orchard lacking MLB. Concns of MLB in the lumen of fruit pedicels were high (Fig. 3). The concn and distribution of MLB in chokecherry leaves was similar to that reported previously (1).

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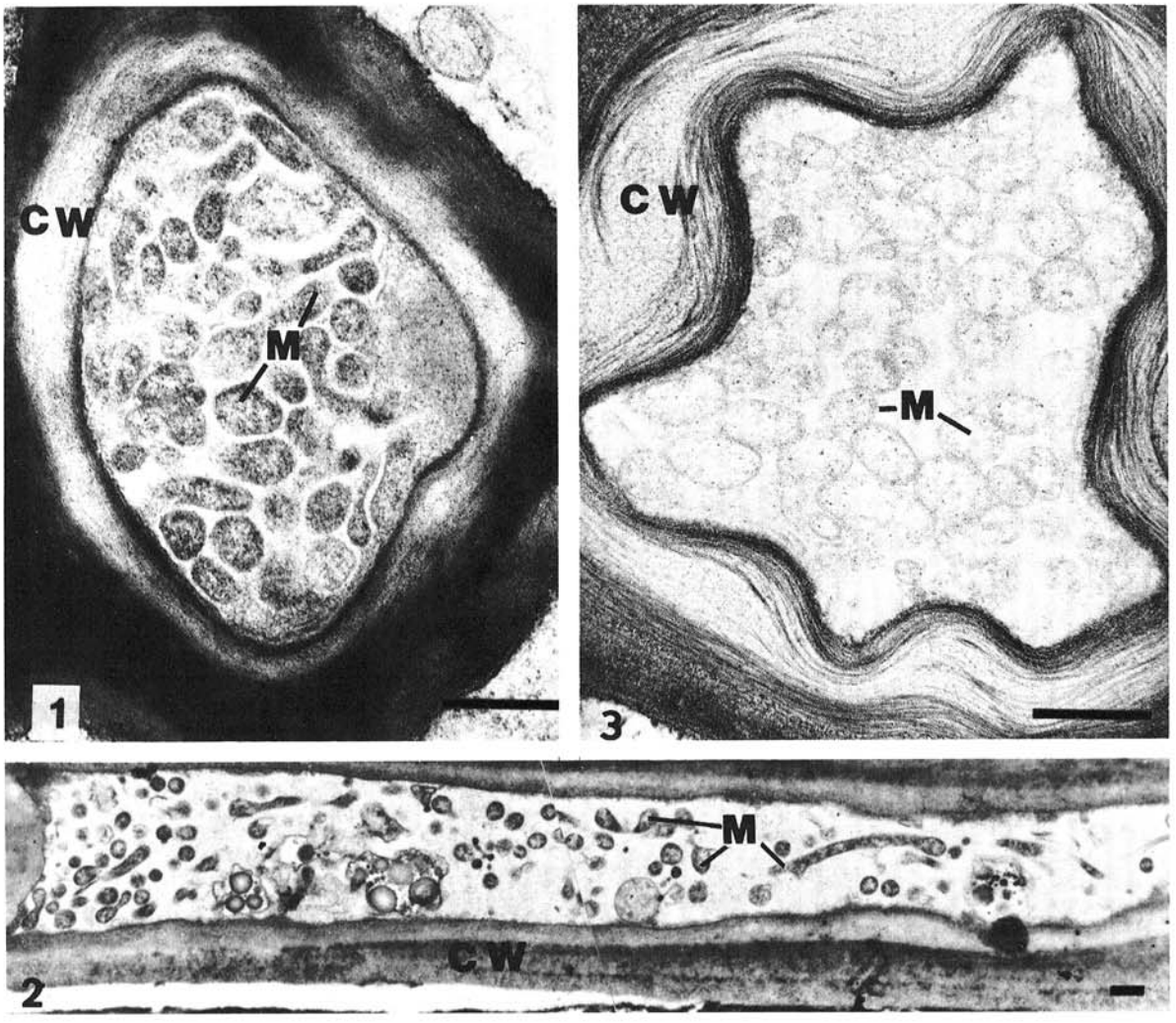

Fig. 1-3. Mycoplasmalike bodies (M) in sieve tube elements of a lateral leaf vein from a tree naturally infected with little peach disease **1)** in cross section and **2)** in longitudinal section. Phloem element **3)** in X-disease infected sour cherry fruit pedicel packed with mycoplasmalike bodies. CW = cell wall. Scale bar on each micrograph represents 500 nm.

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