

## Mycoplasmas Associated with X-Disease in Various Prunus Species

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### ABSTRACT

Thin sections of chokecherry, sweet cherry, or mazzard cherry leaves from trees either naturally or experimentally infected with X-disease were examined with the electron microscope. In many sections, elongate mycoplasmas about 200 nm in diam and 720-3,060 nm in length were present in mature phloem sieve tube elements. These mycoplasmas were morphologically similar to those associated with peach Western X-disease. Mycoplasmas were absent in phloem sieve tubes in leaves from healthy controls. *Phytopathology* 61:1036-1037.

X-disease, a serious disease of peach and cherry in New York, has been presumed of virus etiology. The causal agent is transmissible by grafting, dodder (*Cuscuta* spp.), and various leafhoppers, but attempts to transmit it mechanically have not succeeded. Huang & Nyland (2) and Nasu et al. (3) reported that mycoplasmas were associated with peach Western X-disease in California. This report presents evidence that very similar mycoplasmas occur in chokecherry and sweet cherry trees infected with X-disease in New York.

Chokecherry, *Prunus virginiana* L., is a very susceptible and ubiquitous wild host of X-disease in New York. The disease is readily identified in infected chokecherry trees by the diagnostic reddening of the foliage in mid-July.

Leaves with symptoms were collected in August from diseased chokecherry trees in ten widely separated areas. One- to 2-mm sections of leaf vein were fixed in glutaraldehyde and osmium tetroxide, stained with uranyl acetate during dehydration, and embedded in Spurr's plastic (4). Sections 80-100 nm thick were cut with a diamond knife, stained with lead citrate, and examined at  $\times 10,000$  and  $\times 35,000$  magnifications with a Jeolco 100-B electron microscope.

Mycoplasmas were observed in mature phloem tissues in samples from six of the ten collection sites. Mycoplasma bodies were pleomorphic; elongate flexuous tubules about 200 nm in diam and 720-3060 nm long predominated (Fig. 1, 2). Numerous spherical or oval bodies were observed, possibly transverse sections of longer tubules. The internal contents of some

bodies appeared fibrillar (Fig. 2, 3), but in others were dense and amorphous (Fig. 2). The bounding unit membrane characteristic of mycoplasmas was present (Fig. 3). Bodies that appeared to consist of two or more separate tubules originating at a single point were occasionally observed (Fig. 2). Mycoplasmas were absent in similar phloem sections from healthy chokecherry leaves.

Mycoplasmas were observed only in mature phloem elements. Individual sections through a single sieve tube cell often contained 10-50 mycoplasmas grouped in one or more clusters. Mycoplasmas were not necessarily present in each phloem cell of a given section, and in several instances numerous sections were examined before mycoplasmas were found. This random and discontinuous distribution of mycoplasmas may account for the failure to find them in four of the samples, even though many sections were examined. The frequent difficulty in transmitting the causal agent of X-disease by grafting with buds from infected trees is evidence of its discontinuous distribution (1).

Similar mycoplasmas occurred in phloem tissues of leaves collected from a Windsor sweet cherry tree (*P. avium* L.) with symptoms of little cherry, a manifestation of X-disease (Fig. 4). They were also present in leaf phloem of several mazzard cherry seedlings (*P. avium*) inoculated 9 months previously with diseased chokecherry buds. These seedlings died from X-disease shortly afterward. Mycoplasmas were absent in non-inoculated controls.

Our observations corroborate the association of mycoplasmas with Western X-disease of peach (2). X-disease and Western X-disease are obviously closely related diseases (1). The mycoplasmas observed by Huang & Nyland (2) in California are remarkably like those found in our sections from diseased chokecherry, mazzard, and sweet cherry. Nasu et al. (3) published micrographs of mycoplasmas present in celery and in a leafhopper vector infected with Western X-disease. Although these mycoplasma bodies were larger and less elongate than those we observed, such variation may have been induced by the difference in hosts.

### LITERATURE CITED

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**Fig. 1-4.** 1) Mycoplasma (M) in phloem element of chokecherry leaf with X-disease. 2) Elongate mycoplasmas in infected chokecherry leaf phloem; in one of these (arrow), three tubules appear to originate at a common point. 3) Bounding unit membranes (arrows) of mycoplasmas in infected chokecherry leaf phloem. 4) Mycoplasma in phloem of naturally infected Windsor sweet cherry leaf. cd = Cellular debris; cw = cell wall; d = dense internal structure; f = fibrillar internal structure; M = mycoplasmas; pp = P-protein; sp = sieve plate; um = unit membrane.

