

**Morphology of Mycoplasmalike Bodies
Associated with Peach X-Disease
in *Prunus persica***

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We report herein the results of an electron-microscopic study of leaves of peach trees affected with peach X-disease. A mycoplasmalike agent is now thought to incite this disease (2, 4). Our observations through the use of ultrathin serial sections provide new information on the morphology of this organism and its relationship to the host. An abstract of this report appeared earlier (2).

Leaves of peach were collected in October 1969 from infected and healthy trees growing in an orchard in San Joaquin County, Calif. Samples about 1.5 mm long were taken from the distal end of the midrib region of the leaf, fixed in Karnovsky's solution for 3 to 5 hr, rinsed overnight in 0.1 M cacodylate buffer, pH 7.3, and postfixed in OsO_4 for 2 hr. After dehydration in an acetone series, the material was embedded in Spurr's low-viscosity epoxy resin medium (5). Cross and longitudinal serial sections (about 100 nm thick) of vascular bundles were cut with a diamond knife and mounted on grids coated with Formvar. The sections were stained with uranyl

acetate and lead citrate and examined with an electron microscope.

Mycoplasmalike bodies (MLB) were seen in mature sieve tubes of the leaves that had symptoms of X-disease, but not in sieve tubes of leaves from healthy trees. In longitudinal sections, the bodies were predominantly straight or undulating cylindrical tubules as long as 5,400 nm, and 120 to 360 nm in diam. In cross section they appeared to be spherical, ovate, or elongate discrete bodies similar to those illustrated for other MLB associated with several diseases in plants (1).

Cross and longitudinal serial sections of sieve tubes containing MLB were obtained in several instances. These sections revealed clearly the elongate, tubular nature of the bodies. Portions of specific MLB can be identified in five serial cross sections (Fig. 1-A, B, C, D, E) and in two longitudinal serial sections (Fig. 1-G, H). Four longitudinal serial sections were obtained, two of which are shown. One elongate body could be identified in three longitudinal serial sections, but in most cases the same body could be seen only in two adjacent sections.

In our micrographs, the individual MLB appear relatively uniform in diameter throughout their entire length, but different individuals vary in diameter. For example, MLB 1 is about 120 nm in diam, whereas MLB 2 is about 360 nm (Fig. 1-A).

The long axes of the MLB were usually oriented parallel to the long axes of the sieve elements, although some bodies, or portions of them, were oriented at various angles to the long axes. In some sections, a few bodies were observed to extend from one sieve element to an adjacent one through the

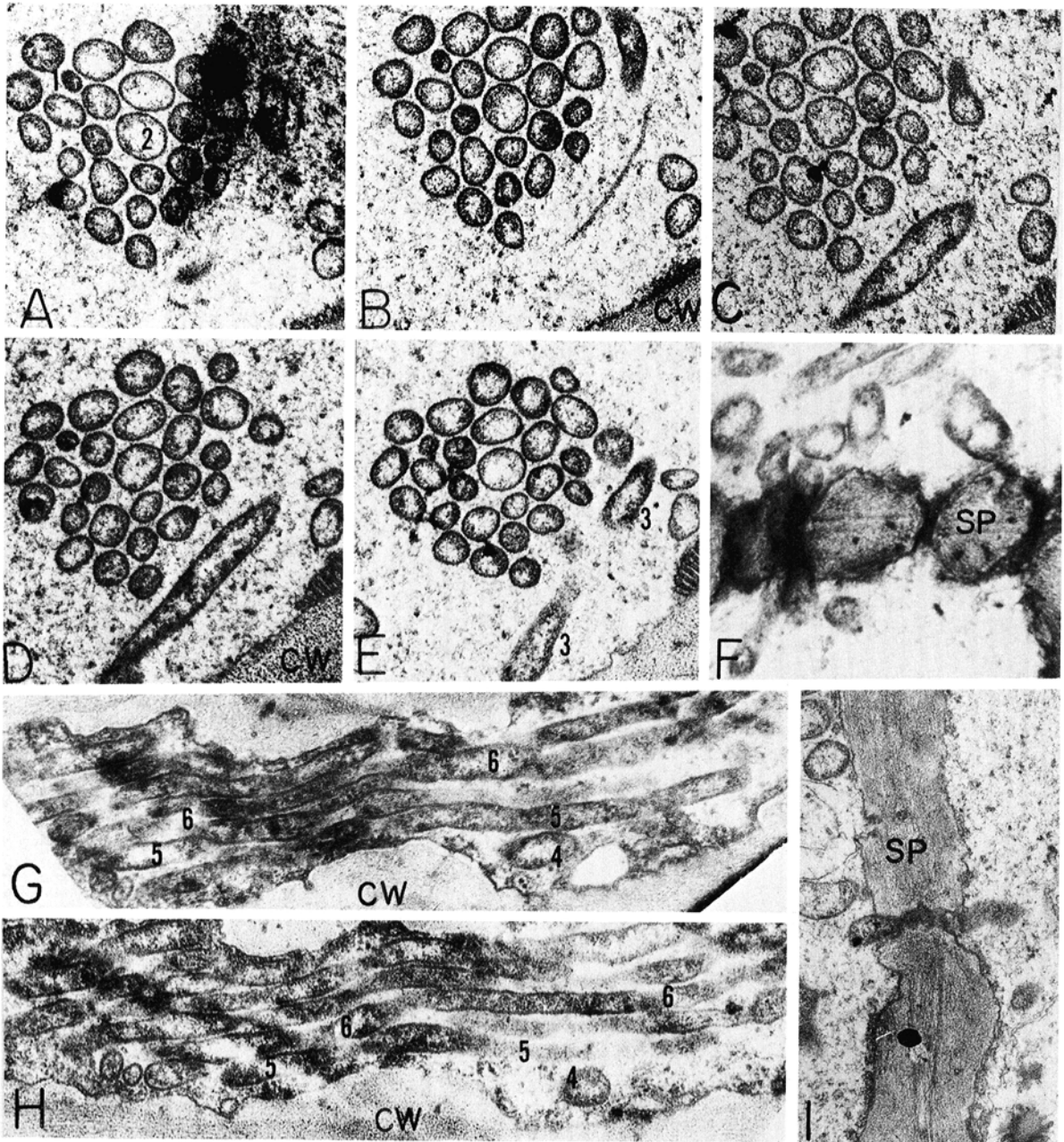


Fig. 1. Selected cross and longitudinal serial sections of midrib of peach leaves affected with X-disease (\times ca. 17,000). A, B, C, D, E) Serial cross sections of a group of mycoplasma-like bodies (MLB) in a sieve element, most of which can be identified in each section. Number 3 in Fig. E illustrates how portions of the same undulating MLB might appear as two separate bodies in a given section. Cell wall (CW). F, I) MLB extending from sieve elements to adjacent ones through pores of the sieve plates (SP). G, H) Longitudinal serial sections of a different sieve tube than shown in A, B, C, D, E containing elongate MLB. Some of the same bodies (4, 5, 6) are identified in adjacent sections. Cell wall (CW).

pores in the sieve plates (Fig. 1-F, I). In one instance, a branched body was observed. Maramorosch et al. (3) showed earlier the apparent passage of MLB through the pores of the sieve plate. Movement in the sap stream seems likely, at least early in the season,

since the infectious agent of peach X-disease usually disappears from the tops of infected peach trees during the winter, only to return, presumably, from the roots each spring (6).

In our studies, the cross and longitudinal serial

sections of infected leaf tissue of peach indicate that the MLB associated with peach X-disease in late summer are elongate undulating tubules, some of which are over 5.0μ in length. In single cross sections, these appear similar to those associated with some other diseases in plants.

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