

**Project No. 93-BJ2 - Occurrence, Distribution and Impact of MLOs on Almonds**

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- Objectives:**
1. Test field-collected almond samples from Northern California using established strain-specific MLO diagnostic assays.
  2. Graft inoculate two year old almond varieties grown on peach rootstocks with established MLO strains, as well as MLO-infected scions collected from BF symptomatic trees.
  3. Evaluate the impact of MLO infection on each variety over a five year period.

**Results:**

**Field Testing of Orchard Trees for MLOs:**

During 1993 we collected and extracted sample DNA from approximately 180 almond trees located in Butte, Sutter, Yolo and San Joaquin County. The samples were tested for the presence of plant pathogenic mycoplasma-like organisms (MLOs) using a test called the polymerase chain reaction or PCR. This test has the advantage of being able to detect a broadrange of MLOs. Although we have not yet tested all of the samples we collected, the following table summarizes the results we have obtained to date.

	<u>#Positive/#Tested</u>
<b>San Joaquin County</b>	
Roadside trees	20 / 24
Orchard trees	16 / 36
<b>Butte County</b>	
Orchard trees	4 / 36
<b>Sutter County</b>	
Roadside trees	8 / 20
<b>Yolo County</b>	
Roadside trees	6 / 16

All of the trees that tested positively in San Joaquin County were infected with the MLO that causes X-disease (X-MLO) of cherry and peach. Most of the other infected trees from other locations were also infected with the X-MLO, however 3 of the Sutter County trees were infected with a different type of MLO that causes peach yellow leafroll disease. It appears that MLOs can naturally infect almond trees in those locations where X-disease and peach yellow leafroll diseases have historically occurred.

Next year we plan to test orchard trees located in Yuba, Yolo, Sutter, Sacramento and Contra Costa counties.

**Graft Inoculation Studies:**

During 1993 we graft inoculated two year old trees of 10 almond varieties (Non Pariel, Carmel, Mission, Thompson, Butte, Price, NePlus, Padre, Sonora and Solano) with virus-free almond scions that were infected with the X-disease MLO and 1 of the 2 types of MLOs that cause peach yellow leafroll (PYLR). Two trees of each variety were inoculated and four trees will serve as healthy controls. The test trees were also budded with a peach indicator so we can easily determine if they become infected. The trunk diameter and average new shoot length was determined on all trees.

In 1994 we will graft inoculate the remaining 2 test trees of each variety with the second strain of the PYLR-MLO. All trees will be tested to insure that they were graft inoculated and trunk diameters and shoot length of all trees will measured. The objective of this study is to determine the impact of MLO infection on tree vigor and productivity over several years.

It is interesting to note that the older trees which we inoculated with X-disease MLO three years ago initially appeared to be symptomless; especially when these trees were compared with trees inoculated with the PYLR-MLO. However, during this past season we have noticed a pronounced decline in the X-MLO-inoculated trees. Many of the smaller shoots and limbs in the upper portions of the canopy started to die back and they did not set many terminal leaves. Although normal appearing nuts were produced on these trees the numbers were far less than healthy trees. These results suggest that the X-MLO could cause a significant slow decline in tree health and productivity.