

Section VII
Vectors of Plant Pathogens

DOES THE TOBACCO APHID HAVE POTENTIAL TO CAUSE DAMAGE TO IDAHO
POTATOES?

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As a result of work by Roger Blackman, it is now accepted that the entity which has been known as the green peach aphid is really at least three species. It was not known if either of the newly designated species occurred in Idaho, or whether they had the potential to cause damage to potatoes, Idaho's most important crop. We obtained permission from the State Department of Agriculture to work with *Myzus nicotianae* Blackman, the tobacco aphid, to attempt to answer this question.

Green peach aphids pose a threat to the potato crop primarily because they transmit potato leafroll virus (PLRV). Because PLRV is a persistently transmitted luteovirus, the vector must colonize the crop to be an efficient vector. Additionally, Idaho winters are severe enough that a species capable of holocyclic overwintering would do better in Idaho than one which is not. The objectives of our research were to determine whether the tobacco aphid occurred naturally in Idaho, whether it could transmit PLRV, whether it could colonize potato and whether it was holocyclic.

Methods:

Trap Nurseries

Trap nurseries, including host plants of all the *Myzus (Nectarosiphon)* spp. reported in North America, were planted at Moscow, Parma, Aberdeen and Teton. These were observed throughout the season, and all *Myzus* found were collected alive, allowed to form colonies, harvested and identified. The trap nursery at Parma was maintained for a second season.

Host Acceptance

One clone of green peach aphids and two clones of tobacco aphids were given access to potato, tobacco and mustard plants in a randomized complete block design with 6 replications. Adults were allowed to deposit nymphs on the plants for 24 hours, after which the adults were removed and numbers of nymphs were adjusted to five per plant. After 15 days, the aphids were harvested by Berlese extraction and aphids were counted.

PLRV Transmission

The same three clones were given a two day access to *Physalis floridana* leaves infected with PLRV. They were then transferred to *P. floridana* indicator plants for 3 days. The indicator plants were held in the greenhouse and observed for symptoms. The experiment was replicated four times, using 20 aphids per replicate. Sets of 20 plants infested with green peach aphids directly from the culture and 20 uninfested test plants were included as checks in each replicate.

Holocycle Experiment

Cultures of the same three clones were kept in a growth chamber maintained at 8 hour days and 15°C for 3 months. These were observed periodically for sexuales and eggs.

Results:

Trap Nurseries

No *Myzus* spp. other than *M. persicae* were found in trap nurseries. Tobacco was not colonized. Based on this, we think that *M. nicotianae* does not occur naturally in Idaho.

Host Acceptance

Tobacco aphids were able to colonize potato as well as green peach aphids.

PLRV Transmission

Tobacco aphids transmitted PLRV. Neither clone transmitted the virus as well as the green peach aphids, but the clone of green peach aphids we used was selected for its high PLRV transmission efficiency. Transmission rates of the tobacco aphids fell within the range of other green peach aphids we have tested (Halbert, Castle and Mowry, unpublished data).

Holocycle Experiment

The green peach aphid clone produced males, oviparae and eggs and eventually disappeared except for the eggs. This is typical of a holocyclic species. Though one male was found in one of the tobacco aphid colonies, there were no oviparae and no eggs. The apterous viviparae continued to multiply throughout the experiment.

Conclusions:

Tobacco aphids probably do not occur naturally in Idaho. They can colonize potato and transmit PLRV as well as the common green peach aphid; however, unless a holocyclic clone exists and is introduced, they probably cannot become a permanent threat to the Idaho potato crop.