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Potato Virus Y: A Pathogen Associated With an Emerging Disease of Poha in Hawai'i

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There has been renewed interest in Hawai'i in the cultivation of poha or cape gooseberry (*Physalis peruviana* L.), which is known for its sweet fruit encased in a papery husk. Poha belongs to the plant family Solanaceae, along with other familiar plants such as eggplant, pepper, potato, and tomato. The ripe poha fruit is juicy, with a distinctive flavor, and is eaten fresh or used for making jam, ice cream, salsa, and dressings. The plants are usually propagated by seed but may also be started from cuttings.

Common pests include certain birds, broad mites, spider mites, three-lined potato beetles, solanaceous tree hoppers, aphids, and diseases such as rootknot nematodes, black mildew, and *Cercospora* leaf spot.

An emerging disease affecting poha grown in many areas of the Island of Hawai'i is caused by *Potato virus Y* (PVY). Although PVY commonly infects other plants such as tomato, potato, and peppers, it was once uncommon to see poha affected by PVY disease in Hawai'i. However, now PVY disease in poha has become widespread on Hawai'i Island, and growers need to be able to identify and understand the nature of the disease in order to make sound management decisions.

How is the disease spread?

In crops such as potatoes, the virus is spread from an infected plant to a healthy plant by several species of aphid vectors including the green peach aphid (*Myzus persicae*) and the potato aphid (*Macrosiphum euphorbiae*). The aphids feed on plant sap and can acquire the virus from an infected host on their mouthparts rapidly and can transmit the virus to an uninfected plant just as quickly. The virus can also be spread mechanically, as when infected plants are handled and the sap is transferred to an uninfected plant. Additionally, the virus can also be spread via cuttings made from infected plants and by grafting. It is unlikely that the disease is spread through poha seeds.

How can you identify this disease?

As the disease progresses, infected plants will develop symptoms including deformed and discolored husks, puckered and bumpy leaves, and mosaic (dark and light) patterns on the leaves (see Figure 1).

What happens when plants become infected?

Infected plants continue to bear fruit; however, these fruits tend to be markedly smaller compared to those produced on healthy plants. Affected fruits may also not ripen as fully as those from healthy plants. The fruit yield and quality may be so severely affected that the grower often finds it infeasible to produce a crop for commercial purposes. Infected plants may also serve as a reservoir for the virus, and subsequent nearby plantings may become quickly infected when aphid vectors are present. Other susceptible solanaceous crops may be at risk of infection when planted near virus-infected poha plants.

What can I do to manage this disease in poha?

There is no practical way to cure a plant once it has become infected with PVY. In addition, growers have not

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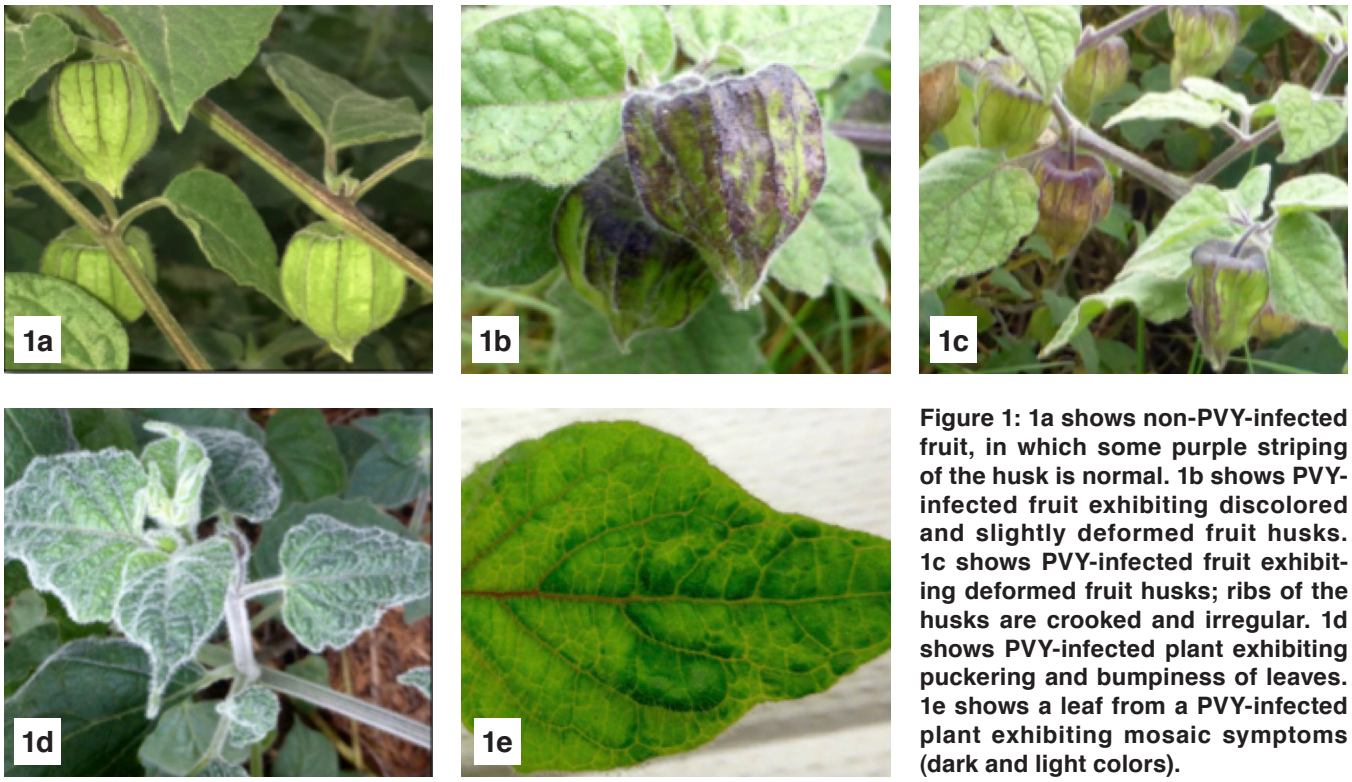

Figure 1: 1a shows non-PVY-infected fruit, in which some purple striping of the husk is normal. 1b shows PVY-infected fruit exhibiting discolored and slightly deformed fruit husks. 1c shows PVY-infected fruit exhibiting deformed fruit husks; ribs of the husks are crooked and irregular. 1d shows PVY-infected plant exhibiting puckering and bumpiness of leaves. 1e shows a leaf from a PVY-infected plant exhibiting mosaic symptoms (dark and light colors).

yet been able to find poha varieties that are resistant to PVY. Therefore, preventing infection is critical in managing this disease of poha. Start with healthy plants—only use plants that you started from seed or transplants from a reputable source. Manage solanaceous weeds on farm; black nightshade (*Solanum americanum*) has been cited as a potential reservoir of the virus and a host for aphid vectors. In Hawai'i, poha itself may be present as a weed on mountain slopes at elevations between 1,500 and 4,000 feet above sea level. It's also possible that established tomato, pepper, and potato crops may harbor the virus. Avoid planting poha crops close to any of these infected plants. Control aphids using chemical and/or cultural measures. Minimize plant handling to reduce risk of mechanical spread of the virus. Conduct work in fields with younger plants before working in fields with older plants that may be infected. Scout fields regularly for diseased plants and carefully remove them to avoid dispersal of aphids and the mechanical spread of the virus.

Testing plants for PVY

If you suspect that your poha plants may be infected, they may be submitted to the Agricultural Diagnostic Service Center through your Cooperative Extension Service Office for a fee. Collect several recently matured symptomatic leaves (or husks) and place them into a clean plastic bag. Place the samples in an ice chest or refrigerator to avoid heating the samples during transport or short-term storage. Growers may also conduct their own testing using commercially available potato virus Y (PVY) or potyvirus (Poty) ImmunoStrips, available from Agdia, Inc (see Figure 2).

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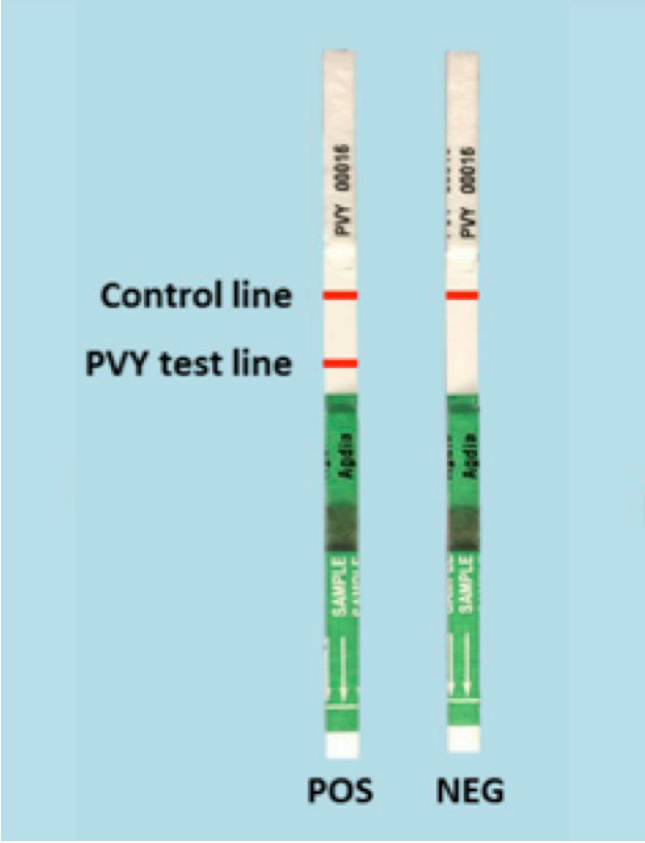

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Figure 2. Agdia ImmunoStrips for Potato Virus Y (PVY). Positive result showing 2 lines (left), negative result showing 1 line (right).