



# Phyllanthus Rust

## *Phakopsora phyllanthi* Dietel

### Background

On August 18, 2015 Tahitian gooseberry seedlings (*Phyllanthus acidus* (L.) Skeels) (Phyllanthaceae) from Haleiwa, Oahu infected with a rust fungus, were intercepted at the USDA-APHIS-PPQ Plant Inspection Station (PIS) in Honolulu. The interception occurred during a routine pre-departure agricultural inspection for commodities going to the United States mainland. The rust was identified by the USDA-APHIS-PPQ National Identification Services (NIS) as *Phakopsora phyllanthi* Dietel (Phakopsoraceae). This is the first record for this species in Hawaii and in the U.S. Subsequent surveys conducted by HDOA Plant Pest Control (PPC) staff in September confirmed the presence of this rust at two different sites in Waimanalo.

While some *Phyllanthus* species are considered to be weeds, many others are widely cultivated species in Africa, Asia, the Pacific, and South America for food and ethnomedicinal and pharmaceutical uses. In Hawaii, *P. emblica* (Indian gooseberry) and *P. acidus* (Tahitian gooseberry, or Otaheite gooseberry, star gooseberry, etc.) are grown in backyards, especially those of families from Asia or Pacific Regions. Both seedlings and fruit (Fig. 6) are available for purchase at some nurseries and farmers markets around Hawaii.

Because of increasing interest in the commercial cultivation of the ethno-*Phyllanthus* species (e.g., Indian and Tahitian gooseberries), it is important to determine the distribution of the rust disease and its associated damage to host plants, including the endemic Hawaiian species *P. distichus*. Such information will help design regulatory or other measures to contain, control, or eradicate the disease.

### Symptoms

Rust infected Tahitian gooseberry may have some or all of the following:

1. Tree: Unthrifty appearance with thinning canopy, and barren branches or twigs (Fig. 1).
2. Leaves: Discolored chlorotic or necrotic spots on the upper (Fig. 2, L) and lower (Fig. 2, R) leaf surfaces. Uredinial pustules on the lower leaf surfaces appearing as white-brownish raised spots (Fig. 3 & Insert) with abundant powdery urediniospores spreading from the center of the pustules. These affected leaves will eventually drop to the ground.
3. Fruit: Rust pustules and lesions forming on the surface (Fig. 5).

Urediniospores (Fig. 4) spread by wind or splashing rain to other susceptible plants. However, since no teliospores (the next life stage of a rust) have been observed, the exact life cycle, and whether or not it needs an alternate host, is unknown. In general, rust diseases are most damaging under cool conditions with long periods of wetness.



Figure 1. Barren branches on rust-infected tree.



Figure 2. Chlorotic and necrotic spots on the upper (L) and lower (R) surface of leaves.



Figure 3. Close up view of rust pustules on the lower leaf surface. Insert: higher magnification of pustules.



### Host Range and Distribution

Phyllanthus rust occurs on the leaves, and sometimes fruits, of *Phyllanthus* species (*P. acidus*, *P. benguetensis*, *P. emblica*, *P. niruri*, and *P. phyllanthi*) and *Cicca acida* in Asia (China, India, Malaysia, Philippines, Thailand) and South America (Brazil, Ecuador, French Guyana, Venezuela). However, the susceptibility of the endemic Hawaiian *P. distichus* (pamakani mahu) to the rust is unknown. A survey on the major Hawaiian Islands for presence of this rust is currently underway. So far, positive identifications have been limited to *P. acidus* on Oahu. A recent survey by HDOA PPC staff in Waimanalo found that *P. emblica* (Indian gooseberry) was not infected by the rust.

### Management

At present, there is no approved specific fungicide to control the disease. Some licensed broad-spectrum fungicides can be used, however, consult your local county Extension Agent for the proper ones and always read the label before buying and using pesticides. HDOA recommends good sanitation practices, such as removing and bagging or destroying infected leaves, fruits, or other plant parts as soon as symptoms appear. Sanitizing tools before and after use and keeping the foliage dry when irrigating will help lower the disease incidence and severity. Since occurrence of the rust on other islands is unknown, do not move gooseberry plants or fruits from Oahu.

**If you think you have seen *Phyllanthus* rust, please report it to the Hawaii Department Of Agriculture's Plant Pathology Laboratory at [808-973-9525](tel:808-973-9525).**

### For More Information

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Figure 4. Urediniospores deriving from the pustules.



Figure 5. A rust infected fruit with lesions.



Figure 6. Healthy Tahitian gooseberry tree. [http://www.fruitipedia.com/otaheite\\_gooseberry.htm](http://www.fruitipedia.com/otaheite_gooseberry.htm)

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