Pacific Pests, Pathogens & Weeds - Fact Sheets

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Maize common rust (225)

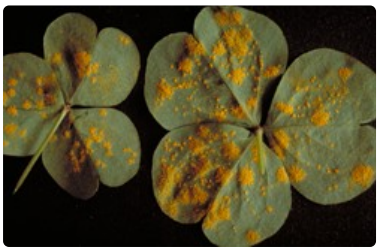

Photo 1. Some stages of the life cycle of common rust, *Puccinia sorghi*, occur on *Oxalis*.

Photo 2. Pustules of rust, *Puccinia sorghi*, on the upper surface of a maize leaf.

Common Name

Common rust (*Puccinia sorghi*); American rust (*Puccinia polysora*) (**see Fact Sheet no. 042**).

Scientific Name

Puccinia sorghi (also known as *Puccinia maydis*). Another rust affects maize in the region, southern rust, *Puccinia polysora* (**see Fact Sheet no. 42**).

Distribution

Both rusts occur worldwide.

Puccinia sorghi - Asia, Africa, North, South and Central America, the Caribbean, Europe, Oceania. It is recorded from Australia, Cook Islands, Fiji, New Caledonia, New Zealand, Papua New Guinea, and Vanuatu..

Puccinia polysora - Asia, Africa, North, South and Central America, the Caribbean, Oceania. It is more common in the tropics than *Puccinia sorghi*, especially at lower altitudes. It is recorded from American Samoa, Australia, Fiji, New Caledonia, Papua New Guinea, Samoa, Solomon Island, Tonga, and Vanuatu.

Hosts

Puccinia polysora - maize and some grasses. Note, there is no alternate host for this rust and it lacks those stages that occur on *Oxalis*.

Puccinia sorghi - maize and *Oxalis* species (wood sorrel). This rust has two unrelated hosts, and different spore-producing stages occur on each. The sexual stages occur on *Oxalis* (Photo1).

Note, *Puccinia sorghi* does not infect sorghum!

Symptoms & Life Cycle

Puccinia sorghi - circular pustules, powdery, brown becoming brown-black as the plant matures (Photo 2). The pustules occur on all above-ground parts, but are most common on the leaves where they are scattered on both surfaces. In severe cases, the leaves and leaf sheaths turn yellow and die early.

Puccinia polysora - small circular to elliptical, reddish brown pustules (0.2-2 mm) occur well distributed over the upper surface of leaves. Severely affected leaves die early. Pustules produced on the midribs and leaf sheaths are larger than those on the leaves and are irregular in shape. The rust is most severe on the lower leaves.

Spread of these rust fungi is by spores blown in the wind. Rust spores have thick dark walls and can survive a long time in the atmosphere, travelling thousands of kilometres. The hardiness of the spores increases the chance of infection of new maize crops. Spores often collect in the v-shaped whorl of leaves where humidity is high and conditions favour infection. In the tropics, new maize crops often overlap old ones, so that survival of rust occurs easily. Survival is also possible on "volunteer" maize and sweet corn.

Warm wet weather favours the diseases caused by these rusts. Temperatures in the range of 16-23°C are best for *Puccinia sorghi*, and 20-30°C for *Puccinia polysora.*

Impact

Puccinia sorghi has caused severe damage to susceptible maize varieties in the past, limiting production in tropical countries, but the threat has largely been overcome by resistant varieties. *Puccinia sorghi* is not now considered a problem on maize, but it is on sweet corn, especially in temperate countries where plantings throughout spring and summer overlap, and late season plantings are severely affected. In the tropics, *Puccinia sorghi* occurs more commonly above 1000 metres.

Puccinia polysora has also caused severe epidemics in Africa as well as the US and the Philippines. It occurs in the sub-tropics and tropics, and is favoured by higher temperatures than *Puccinia sorghi.*

Detection & inspection

Both rusts produce similar symptoms and they are difficult to tell apart. To make it even more difficult, they can occur together on the same plant. When alone on a plant, pustules of *Puccinia sorghi* form in about equal numbers on both sides of the leaf, while those of *Puccinia polysora* form primarily on the top surface. The pustules of *Puccinia sorghi* are darker and more round than those of *Puccinia polysora*, which are more oval to irregular in shape. Also, Puccinia polysora is more ommon on maize in the tropics, especially at lower altitudes.

Microscopic examination is required to see the size of the urediniospores and the thickening of the walls of the teliospores. A molecular test has been developed to identify each of these rust species.

Management

CULTURAL CONTROL

Maize rusts are generally controlled by the use of resistant maize hybrids, and by foliar applications of fungicides on sweet corn. Cultural practices may be effective in areas where rust spores can overwinter on debris or where infected *Oxalis* species are a source of spores. Therefore, collect the remains of the crop and destroy by burning or burying, and weed around maize plots if *Oxalis* is common.

RESISTANT VARIETIES

The use of resistant varieties is the best way of managing rust diseases. Two types of resistance exist: partial resistant and qualitative resistance. Partial resistance (or tolerance) results in fewer pustules, reduced sporulation, and lower germination rates. Disease spread and the development of epidemics are slower. Qualitative resistance is based on single genes providing total resistance. The trouble with this kind of resistance is that it may encourage the selection of new strains of the rust that can overcome varietal resistance.

CHEMICAL CONTROL

Fungicides have been used against both common and southern rust, but they are usually not needed in maize because of the resistance bred into commercial varieties. However, foliar fungicides may have a use on sweet corn. A number of protectant fungicide have been recommended: e.g., chlorothalonil or mancozeb. Plants are monitored and sprays commence when there are on average six pustules per leaf.

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Information from CABI (2015) *Puccinia sorghi* (common rust of maize), and CABI (2013) *Puccinia polysora* (American corn rust) Crop Protection Compendium. (http://www.cabi.org.cpc/). Photos 1&2 Kohler F, Pellegrin F, Jackson G, McKenzie E (1997) *Diseases of cultivated crops in Pacific Island countries.* South Pacific Commission. Pirie Printers Pty Limited, Canberra, Australia.

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