

Common rust

CAUSAL ORGANISM

Fungus: *Puccinia sorghi*

COMMON NAMES

Common rust of maize; rust of maize; common maize rust

HOST RANGE

Primary hosts:

Zea mays (maize) and *Zea mays* subsp. *mays* (sweet corn).

Wild hosts:

Oxalis corniculata (creeping sorrel).

IMPORTANCE

Common rust, as the name suggests, is the most frequently occurring rust in South Africa and all maize growing areas of the world. It reduces grain yield, primarily resulting from a reduction in kernel size. Estimates of losses vary, but are associated with the percentage of the leaf area infected at different growth stages. Estimates of reductions in grain weight range from about 3-8% for each 10% of the total leaf area infected. *P. sorghi* rarely causes significant yield reductions, however yield losses as high as 25% have been measured. Yields on some extremely susceptible hybrids may be reduced by as much as 75%.

DISEASE INFORMATION

Spores are wind blown with new infections occurring every 7 to 14 days. Moderate temperatures (16-25°C) and high relative humidity (>95%), associated with mist or dew for prolonged periods, favour rust development and spread. About 6 hours of moisture is required for infection, hence, leaves can often be infected even under relatively dry conditions, because tissue in the whorl is moist for the minimum period required for infection. Younger leaf tissue is more susceptible to infection than mature, adult leaves.

SIMILARITIES TO OTHER DISEASES

Common rust can sometimes be confused with Polysora rust caused by *Puccinia polysora*. Common rust pustules form on both upper and lower sides of an individual leaf, unlike Polysora rust, which predominately sporulates on the upper leaf surface. Pustules of Polysora rust are circular and light, cinnamon-brown in appearance and scattered over the whole leaf surface compared to common rust's darker, elongated pustules forming in a localised band pattern (refer to Polysora Rust fact sheet).



SYMPTOMS

Common rust is normally one of the first leaf diseases to be observed on maize in South Africa. Early lesions on leaves are small, pale, circular flecks occurring in clusters (Fig. 1). As lesions mature, it may be recognised by small, powdery pustules over both surfaces of the leaves. Brownish-red oblong pustules (Fig. 2) are the characteristic symptom on leaves in early stages of infection; later the fungus erupts (Fig. 3.) through the leaf surface (epidermis) exposing masses of powdery urediniospores. Spores produced within the pustules are easily dislodged and can be seen on a white shirt when walking through an infected field. Severe infections may form a rust band closer to the base of the leaf as a result of infection that took place when the leaf tissue was in the whorl. Band development causes death of the entire leaf blade (Fig. 4). As the season progresses these pustules darken as black overwintering teliospores are produced within the lesions (Fig. 5). Plants of the alternate host, the yellow flowering creeping sorrel (*Oxalis corniculata*) (Fig. 6), are subsequently infected producing light orange-coloured pustules called aecia (Fig. 7). This is simply another spore stage of the same fungus, a sexual stage responsible for the development of new races, which render current sources of resistance ineffective. Numerous physiological races of *P. sorghi* can be identified from reactions on maize lines with specific genes for resistance.

The red garden sorrel (*Oxalis latifolia*), with pinkish flowers, also gets infected by a rust towards the end of the maize season, showing an abundance of orange-coloured rust spores (Fig. 8). This rust is not to be confused with common rust and holds no threat to maize.



PANNAR

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Figure 1. Initial pin-point symptoms.



Figure 2. Brownish-red pustules.



Figure 3. Erumpent pustules.



Figure 4. Rust banding.



Figure 5. Black teliospores.



Figure 6. Creeping sorrel.



Figure 7. Aecia on *Oxalis corniculata*.



Figure 8. Rust on *Oxalis latiflora*.

CONTROL

Cultural control:

- Common rust is controlled effectively by planting resistant/tolerant hybrids (refer to the PANNAR Catalogue for information on resistance of PAN hybrids)
- Susceptible hybrids produce a magnitude of spores and can serve as a source of inoculum to neighbouring fields.
- Other than the alternate sorrel host, *P. sorghi* is very specific to maize and the spores cannot infect other crops e.g. beans, soybeans or sunflowers, therefore crop rotation will not really reduce risk of this disease.
- The disease is not seed- or soilborne and tillage practices will have minimal effect on disease control.

Chemical control:

- Timely applications of fungicides - initial application when inoculum levels are low (a few pustules per leaf).
- In a suitable spray programme the first spray with one of the strobilurin/triazole combinations will act as a curative measure of the rust pathogen and also as a preventative to other leaf disease infections.
- The disease is not seedborne and seed treatments will not prevent common rust.