



## 26 DO YOU KNOW YOUR RUSTS?

There are two well-known rust diseases of sugarcane – orange rust caused by *Puccinia kuehnii* and brown rust caused by *Puccinia melanocephala*. During the 1970s brown rust spread to many sugar industries throughout the world and, consequently, was known as ‘common’ rust. It appeared in Australia in 1978. Orange rust, although present in Australia since the 1890s, was considered a minor disease and confined to the Asia-Pacific region.

Of course, things changed in 2000 when an orange rust epidemic swept through the industry – the ‘rare’ rust became ‘common’ in Australia. To avoid confusion ‘common rust’ was given the more descriptive name of brown rust. The two rusts can be distinguished by symptoms, environmental requirements and spore characteristics. Both diseases show elongated lesions on the leaf. In a fresh infection, the underside of the leaf shows masses of spores erupting from the lesion, known as a pustule.

Orange rust occurs in all cane-growing districts in Queensland and

New South Wales and the disease is prevalent in humid summer conditions. Orange rust pustules are orange when fresh, shorter than those of brown rust and tend to form in clumps, more towards the leaf base (Figure 1).

Brown rust occurs during dry weather with cool nights and dews. Brown rust is most often seen in the spring in northern districts, and in late spring and into the summer in the south. Brown rust pustules are brown and are more elongated. The pustules are spread evenly, located more towards the leaf tip (Figure 2).

Orange rust spores are larger than brown rust and golden-orange in colour (Figure 3). By looking at the spores under the microscope, you can easily see that the spores have a thick wall at the apex and have large spines.

Brown rust spores are smaller than orange rust, and are red-brown in colour (Figure 4). When observed under the microscope, brown rust spores can be distinguished from orange rust spores because the entire wall of the spore is of uniform

thickness, the spines are very small but more numerous and several pores will be prominent. The pustules also contain some very distinctive structures known as paraphyses (see Figure 4).

During an epidemic in Mackay, losses due to orange rust in the susceptible variety Q124 were up to 45%. Since that time, with lower infection pressures, the losses are more likely 15–20% in susceptible varieties. Losses in other districts are likely to be similar to this latter figure, and will vary with the weather experienced each year. The best conditions for orange rust are a long and extended wet season. It is difficult to clearly quantify the potential yield losses by district as there are very few susceptible varieties grown.

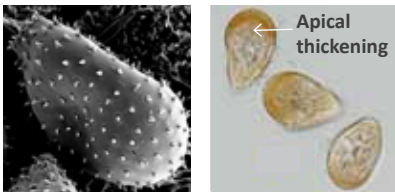
Brown rust yield loss research was carried out soon after the disease entered Australia, in the late 1970s to the early 1980s. Trials were undertaken with fungicides and in the most susceptible varieties losses were around 25%. As with orange rust, losses will vary with season and weather conditions.



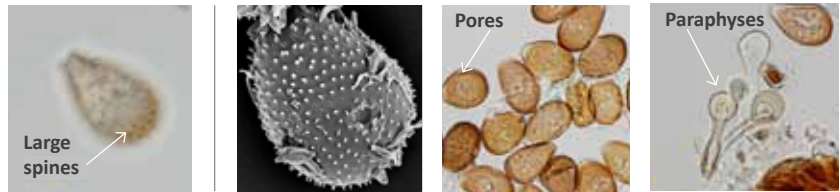
**FIGURE 1** | Orange rust pustules in clumps.



**FIGURE 2** | Brown rust in Q190<sup>®</sup>. Pustules are more towards the tip.



**FIGURE 3** | Orange rust spores. Optimum temperature for orange rust spore germination is 17–23°C.



**FIGURE 4** | Brown rust spores. Optimum temperature for brown rust spore germination is 11–27°C.

## WEED PROFILE

Under the National Weeds Strategy, 20 introduced plants were identified as Weeds of National Significance (WoNS). These weeds are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts. *Hymenachne* (*Hymenachne amplexicaulis*) is one of the declared weed species in Australia.

*Hymenachne*, also known as olive hymenachne, has emerged as an important weed in Queensland. It is included in the WoNS list because of its potential impact on sugarcane production, natural wetlands, waterways, fisheries and irrigation storages.

*Hymenachne* is a robust semi-aquatic stoloniferous, perennial grass up to 2.5 m high introduced from South America to provide ponded pasture for cattle. *Hymenachne* stems are erect and pithy, leaf blades are 10-45 cm long and up to 3 cm wide. The flower heads are spike-like, cylindrical, 20-40 cm long, with flowering occurring from April to June. Seeds set from late autumn

to early spring, and are spread by water movement, and migratory aquatic birds. Because it produces creeping runners it has easily invaded natural wetlands and land used to grow sugarcane and in some cases, has grown across creeks. Continued proliferation is expected to cause substantial losses to the sugarcane industry and conservation areas.

With its ability to spread vegetatively, produce up to 4,000 seeds on a seed head and have high seed survival over a minimum of 8 years, *Hymenachne* is rapidly invading rivers, creeks and wetlands in northern Australia.

*Hymenachne* forms dense stands that reduce plant diversity and habitat for native organisms. Once established, *Hymenachne* is difficult and costly to manage and therefore requires early detection and immediate control.

For further information on *Hymenachne* contact your local BSES Limited extension officer.

