JULY 16 Pathogen of the month – July 2016

RS James & CA McMaster

Puccinia psidii

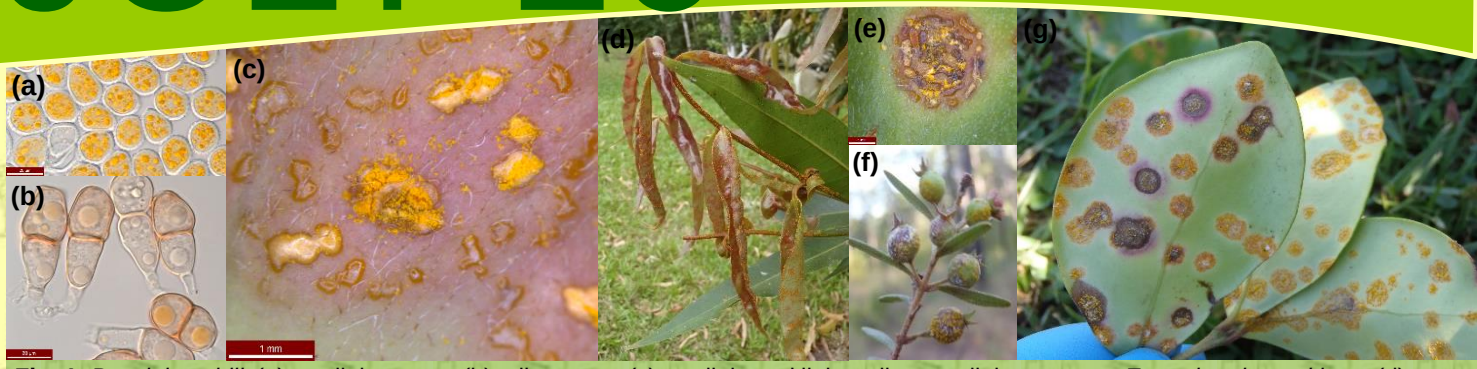

Fig. 1. *Puccinia psidii*: (a) urediniospores; (b) teliospores; (c) uredinia and light-yellow urediniospores on *Eugenia reinwardtiana;* (d) on new shoots of *Syzygium jambos* severely infected; (e) lesions on *Eugenia reinwardtiana;* (f) on *Lithomyrtus retusa*; (g) on *Eugenia reinwardtiana*. [image c and e by J.R. Liberato, NTDPIF©]

Common Name: Myrtle Rust, Guava Rust, Eucalyptus Rust
Disease: Rust in a wide range of Myrtaceous hosts
Classification: K: Fungi P: Basidiomycota C: Pucciniomycetes O: Pucciniales F: Pucciniaceae

Since *Puccinia psidii* was first detected in Australia in NSW in 2010[1], it has rapidly spread from the first site of infection and has been reported on over 300 native Australian species[2]. In Australia, the rust was first reported as *Uredo rangelii* but now is widely recognized as a member of the *Puccinia psidii* species complex. In Brazil, the rust is not known to cause severe damage except in guava plantations or on native Myrtaceous hosts[3]. Microsatellite analysis supports a single strain spreading across Australia and into Indonesia which is closely related to other rust species outside South America[4]. In February 2015, Myrtle rust was observed for the first time in Tasmania, followed by the first report from the NT in May 2015 and infecting a new host *Lithomyrtus retusa*. In June 2015, the rust was first reported from Sumatra, Indonesia[4].

Biology:

"Uredia are abundant on the leaves, buds and fruits. Urediniospores echinulate, sometimes with a basal tonsure, hyaline to light-yellow, globose 18–23 µm diam. to ovoid, 20–26×15–22 µm, wall 1.5–2.5 µm thick. Teliospores with a median septum, dark yellow to brown, ellipsoidal to ovoid, 27–43×16–24 µm, wall 0.7–1.0 µm, pedicel 9–13 µm long"[5]. Variable morphology has been seen of the pandemic strain found in Australia, including the presence/absence of tonsures on urediniospores.

Distribution:

In Australia, the rust has not yet been detected in South Australia or Western Australia. Endemic to parts of South and Central America. Widely distributed in South and Central America, Hawaii and New Caledonia. Limited distribution in North America (Florida), Japan, China, South Africa and Indonesia.

Host Range and Impact:

The pathogen is spread primarily by urediniospores which are produced in large numbers on host plants and dispersed over long distances by wind or transported by people including by clothing, cars and nursery stock, thus enabling it's rapid spread. The rust infects leaves, fruit, flowers and stems ranging from resistant to severe cases. In severe cases it causes dieback or reduced fecundity.

The full impacts of this rust within Australia are not known, owing to the recent introduction and the high numbers and wide distribution of native hosts[2,4] . Native hosts potentially include over 2250 species of native Myrtaceae[6] representing approximately 10% of Australia's flora; including some 140 threatened species. Gradual crown loss and ultimately tree mortality has been observed in natural stands of *Rhodamnia* rubescens and *Rhodomyrtus psidioides* since the rusts introduction[2].

Commercially the rust impacts timber, nursery, essential oil and cut flower industries. In commercial plantations, it is expected the greatest impacts will occur during seedling and young tree establishment. From the essential oil industry *Backhousia citriodora* (Lemon Myrtle) is a known susceptible host.

Management Options:

Numerous management plans targeting industry or environmental management have been formed. These support identifying assets at risk, limiting and monitoring the spread, conducting research on the biology of the rust, the use of resistant varieties and in some cases the rotational use of fungicides. Another important principle in the management of the rust includes limiting the introduction of new strains[4]. Introductions may allow the organism to increase its ecological impact by introducing variations in biology, virulence or host specificity of the rust.

References:

1. Carnegie *et al.* (2010) *Uredo rangelii*, a taxon in the guava rust complex, newly recorded on Myrtaceae in Australia. Australasian Plant Pathology 39(5):463-466
2. Carnegie *et al.* (2015) Impact of the invasive rust *Puccinia psidii* (myrtle rust) on native Myrtaceae in natural ecosystems in Australia. Biological Invasions. 18(1):127-144
3. McTaggart et al. (2015) Rust (*Puccinia psidii*) recorded in Indonesia poses a threat to forests and forestry in South-East Asia. Australasian Plant Pathology 45(1):83-89
4. Machado *et al.* (2015) Microsatellite analysis indicates that *Puccinia psidii* in Australia is mutating but not recombining. Australasian Plant Pathology 44(4):455-462
5. Machado PS, Glen M, Pereira OL, Silva AA, Alfenas AC (2015) Epitypification of *Puccinia psidii*, Causal Agent of Guava Rust. Tropical Plant Pathology 40:5–12
6. Makinson (2014) Myrtle Rust – what's happening? Australian Plant Conservation 23(1):13-15

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