

# Rusts of Willows and Poplars

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Willows and poplars are an important component of the New Zealand landscape. Willows are planted for horticultural shelter, soil conservation, firewood, river control and amenity plantings and poplar for erosion control, shelter and timber production. New Zealand (*Populus* spp.) hosts the rust species *Melampsora larici-populina*, *Melampsora medusae* and an isolated single season observation of a unique interspecific hybrid *Melampsora medusae-populina*. Willows (*Salix* spp.) hosts four *Melampsora* species, *Melampsora coleosporioides*, *Melampsora epitea* var *epitea* and two unidentified species attacking *Salix viminalis* and *Salix daphnoides*/*Salix incana* x open pollinated hybrids respectively.

Rusts pose the greatest challenge to willows and poplar in New Zealand. We therefore undertook a study to investigate the ultrastructural nature of the urediniospores. We used light and electron microscopy to study urediniospores structure and verify if these rust races are different to already published data and if future research programmes are required. This poster shows in detail the different races of rust.

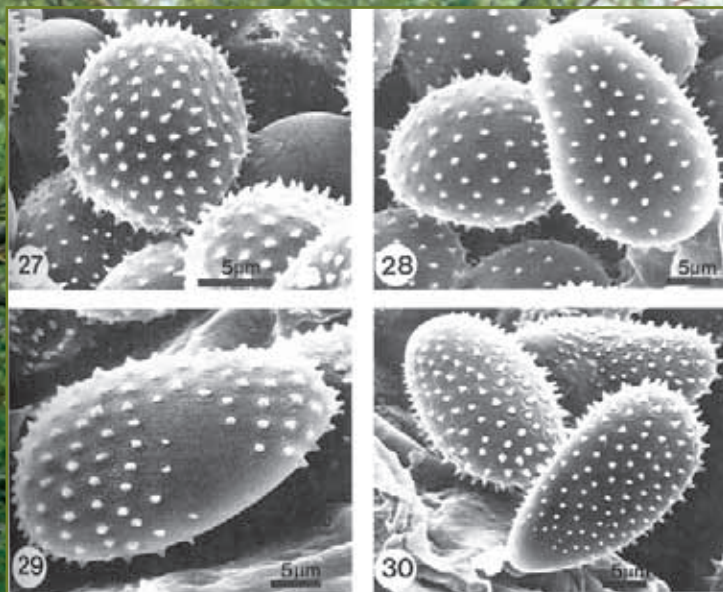


Figure 1. Uniformly echinulate urediniospores of *M. epitea* (27) and *M. coleosporioides* (28), echinulate urediniospores of *M. medusae* with smooth equatorial patch (29) and *M. larici-populina* with smooth apical patches (30), (Spiers and Hopcroft, 1985).



Figure 2. Urediniospores of *P. maximowiczii* x *nigra* x *P. nigra* hybrid, Palmerston North, x3,300.

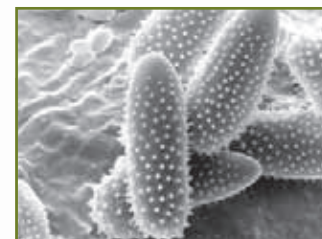


Figure 3. Urediniospores of *P. trichocarpa*, Palmerston North, x2,000, may be *M. larici-populina*.

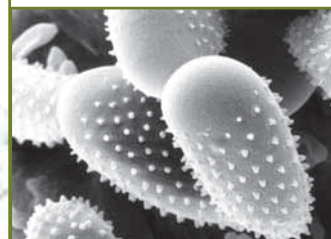


Figure 4. Urediniospores of *P. x euramericana* 'Crownsnest', Wairoa, x3,100.

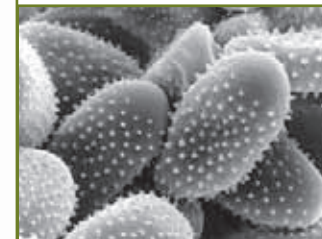


Figure 5. Urediniospores of *P. x euramericana* 'Fraser', Masterton, x2,500.

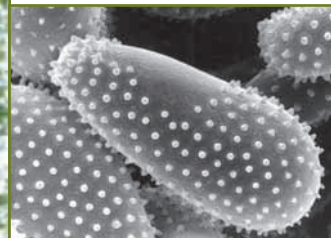


Figure 6. Urediniospores of *P. maximowiczii* x *nigra* x *P. nigra* hybrid, Palmerston North, x3,200, may be *M. medusae*.



Figure 7. Urediniospores of *P. x euramericana* 'Fraser' Masterton, x4,000.



Figure 8. Urediniospores of *P. deltooides* x *yunnanensis* 'Kawa', Hawkes Bay, x4000.



Figure 9. Urediniospores of *P. x euramericana* (clone unknown), x740, may be *M. larici-populina*.

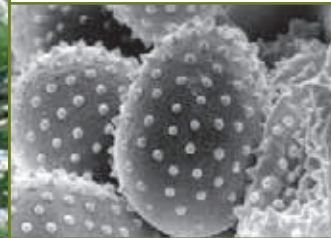


Figure 10. Urediniospores of *S. matsudana* x *pentandra*, Wairoa, x4,500, may be *M. epitea*.



Figure 11. Urediniospores of *S. matsudana* x *pentandra*, Palmerston North, x4000, may be *M. epitea*.

## Summary

Urediniospores isolated and shown in Figures 2, 4, 5, 7 and 8 clearly indicate the presence of different rust races based on the different location of the smooth patches on the echinulate spore surface. Further investigation is required to identify how widespread these different races are and whether susceptibility of the host *Populus* sp and *Salix* sp. has consequentially increased. *Salix* and *Populus* breeding programmes will need to expose future selections to these new rust races to fully evaluate resistance.

## Reference

Spiers, A. G., and D. H. Hopcroft. 1985. Ultrastructural studies of pathogenesis and uredinial development of *Melampsora larici-populina* and *M. medusae* on poplar and *M. coleosporioides* and *M. epitea* on willow. *New Zealand Journal of Botany*, 23:117-133.