

First insights into segregation for aggressiveness among sexual progeny isolates of *Puccinia striiformis*

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It was recently discovered that common barberry (*Berberis* spp.) may serve as alternate host for sexual reproduction of *Puccinia striiformis*, a fungus causing yellow (stripe) rust on several cereals and grasses. It is currently considered one of the most devastating diseases on wheat worldwide. Infection on cereals and grasses are primarily caused by asexual urediniospores and during the end of the disease cycle teliospores start to develop. Teliospores may germinate and produce basidiospores which can then infect barberry. On barberry, pycnia containing pycniospores develop on the adaxial side of the leaf and upon successful fertilization aecial cups containing aeciospores develop on the abaxial side of the leaf. Aeciospores may infect the cereal and grass hosts and produce asexual urediniospores, thus completing the life cycle. An experimental system for infection of barberry was established at the Global Rust Reference Centre, which has provided first insights into the genetics of *P. striiformis*. A selfing of an isolate of the Warrior race, which has been prevalent in Europe since 2011, resulted in 17 progeny isolates which showed segregation for SSR markers, virulence, and aggressiveness. The segregation for SSR markers and virulence has already been reported (Rodriguez-Algaba *et al.*, 2014). Here we present preliminary data about segregation for aggressiveness. An experimental system was developed for the assessment of components of aggressiveness, e.g., latent period and lesion growth. The progeny isolates were tested in three independent experiments at different times of the year in a controlled greenhouse environment. Four progeny isolates had a significantly longer latent period and higher lesion growth rate than the rest whereas two isolates had a short latent period combined with a significantly lower lesion growth rate. This behaviour was different from the parental isolate which was intermediate for both latent period and lesion growth rate. These results suggest the existence of a trade-off between latent period and lesion growth rate, which is consistent with a common hypothesis in the theory of pathogen evolution that fitness parameters may be negatively correlated. The progeny isolates constitute a unique material to gain further insight into the molecular basis of pathogen aggressiveness (Chen *et al.*, 2015).

References

- Chen Y-J, Vogt JK, Sørensen CK, Rodriguez-Algaba J, Sicheritz-Ponten T, Hovmøller MS & Justesen AF. 2015. Identifying transcripts associated with aggressiveness in wheat yellow rust by transcriptome sequencing. Abstract in Conference proceedings, 14th International Cereal Rusts and Powdery Mildews Conference 2015, 5-8 July Helsingør, Denmark.
- Rodriguez-Algaba J, Walter S, Sørensen CK, Hovmøller MS & Justesen AF. 2014. Sexual structures and recombination of the wheat rust fungus *Puccinia striiformis* on *Berberis vulgaris*. Fungal genetics and biology, 70, 77-85.