

ML 2018 Project Abstract

For the Period Ending June 30, 2023

PROJECT TITLE: Biology and biocontrol potential of a rust fungus infecting *Phalaris arundinacea* and *Frangula alnus*

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION:

ML 2018, Ch. 214, Art 4, Sec 2, Subd 6a

APPROPRIATION AMOUNT: \$247,507

AMOUNT SPENT: \$247,507

AMOUNT REMAINING: \$0

Sound bite of Project Outcomes and Results

The presence and distribution of *Puccinia coronata* var. *coronata* (Pcc) was confirmed, generating a detailed disease description and morphological and phylogenetic data. The host specificity was also studied. Under controlled conditions, Pcc significantly reduced reed canarygrass biomass production and glossy buckthorn seedlings.

Overall Project Outcome and Results

Results of this research indicated that Pcc is distributed across the range of glossy buckthorn in the United States from eastern North Dakota east to New England. In Minnesota, Pcc is widespread not common outside the range of glossy buckthorn despite the presence of susceptible grass hosts. Morphological and phylogenetic data collection and detailed analysis were produced including a detailed disease description and compelling image panels that show all five spore stages of Pcc. As previous results indicated, morphological and phylogenetic data show our samples are consistent with *Puccinia coronata* var. *coronata*.

Through greenhouse trials, the team tested many species for susceptibility to Pcc. Main cereal crops, including oat, barley, rye, triticale, durum wheat, and bread wheat, are all resistant to Pcc. Species that can be harmed by Pcc include grass species, native buckthorn species, reed canarygrass, and glossy buckthorn. However, further research is needed to understand the impact of Pcc on reed canarygrass and glossy buckthorn in natural settings

Results indicate that reed canarygrass biomass production is significantly reduced with Pcc infection. Glossy buckthorn seedlings are also significantly affected by rust infection. Results offer promise for control of reed canarygrass and perhaps glossy buckthorn. Also studied and tested, *P. digitaticoronata*, a recently described crown rust pathogen of Kentucky Bluegrass, has been found in Minnesota. Most *Poa* species are affected by *P. digitaticoronata* while cereal crops are not.

Project Results Use and Dissemination

Results have been presented at local, regional, and national level conferences and workshops.

A [fact sheet](#) for the disease was produced and disseminated to natural resources professionals and citizens interested in glossy buckthorn and reed canarygrass.

Four manuscripts presenting results from this research have been submitted/accepted to peer-reviewed scientific journals:

- "*Puccinia coronata* var. *coronata*, a crown rust pathogen of two highly invasive species, is detected across the Midwest and Northeastern United States" was published in Plant Disease in 2022 .
- "Aecial and telial host specificity of *Puccinia coronata* var. *coronata*, a Eurasian crown rust fungus of two highly invasive wetland species in North America" and "Aecial and telial host specificity of *Puccinia digitaticoronata*, a recently observed fungus causing crown rust on Kentucky bluegrass in North America" published in Plant Disease in 2023.
- A fourth manuscript with results of the assessment of *Pcc* potential for biological control of *P. arundinacea* and *F. alnus* is in preparation.