

ML 2015, CH. 76, Art. 2, Sec. 6a, MITPPC Sub-Project #17 Project Abstract

For the Period Ending June 30, 2020

PROJECT TITLE: MITPPC Sub-project #7: Tools to Distinguish Native from Exotic Reed Canary Grass

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SUB-PROJECT AMOUNT: \$248,848

AMOUNT SPENT: \$248,848

AMOUNT REMAINING: \$0

SOUND BITE: This project used genetic techniques to find that most reed canarygrass in Minnesota is native to the state and not from Europe. The implications of this surprising result for land management are still being discussed.

Overall Project Outcome and Results

The goal of this project was to use molecular markers to determine native vs. exotic reed canary grass status in various locations across Minnesota growing along rivers (Des Moines, Minnesota, Mississippi, Red, Roseau, St. Croix), in fields, as commercially-grown cultivars (forage, ornamental), and preserved historic specimens in herbaria (<1940, presumed native) and a corollary set of samples from rivers in the Czech Republic as exotic comparisons (Activity 1); along Minnesota transportation corridors (highways) existing during the 1920s-1930s (Dust Bowl era) and Minnesota lakes (Bush, Cedar, Como, Phalen, Mille Lacs, Minnetonka, Square, White Bear) and Central Park (Activity 2). Due to Covid-19 travel restrictions, we were unable to get permission to collect along additional lakes. The number of plants analyzed totaled 3,430 (Activities 1,2). Plant DNA was extracted from each sample to determine genomic markers of short DNA sequences (2,889 highly differentiated single nucleotide polymorphisms, SNPs, out of 16,902 total markers) to distinguish native vs. exotic status. Genetic analysis of reed canarygrass showed that river populations are native Minnesota or North American types. Herbarium samples as well those from a native, unplowed field (Roseau, MN) were genetically similar to wild collections from five Minnesota rivers; forage cultivars in commercial fields (Roseau, MN) and along the Roseau River formed a separate group. The exotic central European populations were distinctly different from all native MN groups. Most variation is within (98.8%), rather than among (1.2%), populations, suggesting little divergence and a high level of shared genetic markers. Across the state, Minnesota rivers had 2-32 genetic variants present, some of which were shared among rivers. Thus, the majority of Minnesota reed canarygrass, while invasive, is native in origin and not exotic (European). Thus, based on this study, all of MN reed canarygrass is native; Tribal and State managers may choose to preserve this species.

Project Results Use and Dissemination

Dissemination of native vs. exotic status of all *Phalaris* results has been reported on the [Department of Horticultural Science website](#), that of the [PI's](#), as well as in all [PIs/co-PIs Experts](#) at umn.edu links. As many as 11 abstracts were published in national and international meetings, along with corollary public posters sessions or seminar talks to varied audiences of academics, land managers, students, and/or the public-at-large. We have kept State and Tribal Land Managers informed on the native status of MN reed canarygrass and have initiated discussions on approaches to managing this native species yet invasive. The investment by the state on control

measures for this invasive grass warrant careful consideration of best management approaches to maintaining the native genetic diversity yet not encouraging the invasive spread of this grass into managed areas. Results were also communicated to the scientific community in peer-reviewed journal articles.