

WASHINGTON TURFGRASS SEED COMMISSION
PROGRESS REPORT FORMAT FOR 2021 PROJECTS

Project No.: WSU ACCOUNT #13C-3019-6780 and #17A-3019-9832

Title: Characterization of vernalization genes and flowering in Kentucky Bluegrass

Personnel: Michael M. Neff Ph.D. (PI) and Xin Xin (Graduate Student)

Reporting Period: 7/16/21 – present

Accomplishments: Vernalization requirement experiments- Two years ago, with the construction of the WSU Grass Breeding and Ecology Farm located in Pullman, Washington, we developed a novel, on-farm, cultivar screening method for identifying KBG accessions with a low-vernalization requirement. The genetic material harvested from this screen was retested this past year in both field and greenhouse conditions to characterize and determine the heritability of this low-vernalization requirement. **VRN gene experiments-** We have been working with our collaborator, Dr. Shaun Bushman, on bioinformatic analysis of KBG VRN genes and are starting to write a manuscript to initially describe their identification and characterization. **PGR experiments-** A multi-year spray study was initiated in the spring of 2020 to evaluate the effects of a gibberellin acid (GA₃, RyzUp SmartGrass[®]) plant growth regulator (PGR) on seed yield and biomass of KBG. The first-year spray was conducted at the WSU Grass Breeding and Ecology Farm, with both fall and spring spray experiments. Spraying before winter was suggested by one of our cooperative local KBG farmers, Jason Miller. The fall and spring spray experiments were initiated on first-year irrigated KBG (cultivar ‘Midnight’) at the WSU Grass Breeding and Ecology Farm. The GA₃ fall spray was applied to one group on October 2nd and another group on October 15th at 0, 0.5, 1 and 2 oz/acre, with one group sprayed on both dates (double spray). The spring spray was conducted on separate plots of the same genetic material on March 17th and April 9th. Plant height, row spreading, visual color, biomass visual estimate and winter damage data were recorded before heading in April 2021. Dried above-ground biomass and seed yield was measured after harvesting and seed cleaning.

Results: Vernalization requirement experiments- Two KBG accessions were identified as having a low-vernalization requirement which was demonstrated to be heritable in both greenhouse and field experiments. We are now using this material to develop a high-throughput greenhouse screening protocol in order to identify additional low-vernalization KBG accessions. In addition to having a low-vernalization requirement, these accessions showed potential for good turf quality and will be included in turf trials as well as in our KBG breeding pipeline. **PGR experiments-** Similar to our preliminary spring spray results last year, the spring spray treatments did not have an impact on seed yield or plant biomass. In contrast, certain fall spray treatments did significantly increase both seed yield and biomass. For example, the treatment of 0.5 oz/acre early spray increased the seed yield by 116% (more than double the yield). In addition, dried biomass was increased for 0.5 oz/acre early spray and 2 oz/acre late spray by 110.56% and 148.1%, respectively. This project will be repeated in 2021 fall and 2022 spring to confirm our results of 2020. In order to mimic multi-year KBG production practices, individual plots will be receiving the same PGR treatment in the second-year spray that they did in the first.

Publications: None at this time.