



U.S. DEPARTMENT OF AGRICULTURE

Rose Lake Plant Materials Center 2023 Annual Progress Report of Activities

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Effects of Seeding Rate, Date and Termination Timing on Biomass and other Attributes of Cool Season Legume and Grass Cover Crops for Production Agriculture

Background

The Michigan Plant Materials Center (MIPMC) is conducting a nationally coordinated cover crop study in cooperation with the Agricultural Research Service (ARS) to determine how seeding rate and planting dates affect several varieties of cover crops. An important study goal is to determine whether there are opportunities to reduce seeding rates, thus reducing costs to the farmer and consequently increase the likelihood of cover crop adoption.

The data and information gathered will help populate field office conservation tools and provide data to update conservation practice code 340 (Cover Crop). Additionally, PMC staff will use a new method to collect non-destructive biomass samples through a Plant Map 3D tool on a field tablet. In addition to plant biomass, the MIPMC will be collecting data on fall and spring canopy cover, and height.

The first two years of the project will focus on collecting data on the variety 'Aroostook' cereal rye (*Secale cereale* L.). 'Aroostook' is an early-maturing variety developed by the NYPMC that is quick to regrow in spring and can be terminated with a roller-crimper in no-till systems. The project was successfully installed on three planting dates: October 18th; November 6th; and November 29th (Figs. 1 and 2).



Figure 1. Installation of cereal rye using a Wintersteiger precision plot planter in well-prepared seedbed.



Figure 2. View of completed cereal rye planting in December 2023.

Establishment Study for Prairie Grass and Wildflower Conservation Planting

Background

MIPMC staff planted a prairie grass and wildflower demonstration planting in late fall/early winter at the Rose Lake PMC in 2021. The upland seed mix planted in a sandy loam soil consisted of 26 MI ecotype species in a forb dominant mixture. The rationale of the project was to develop a seed mix where native grasses would not dominate later in the life of the planting. Four species of native grasses were planted at 10.4 seeds/sq. ft. The 22 remaining forb species were planted at 17.6 seeds/sq. ft.

Two years after establishment MIPMC staff and Earth Team volunteers took the first evaluations in late summer 2023 (Aug 23rd; Fig. 3). Staff used both a quadrat and Canopeo app to determine plant counts and percent cover respectively. Canopeo is an app that helps determine whether the seeding rate was adequate to



Figure 3. PMC staff and Earth Team volunteer conducting a vegetative evaluation.



Figure 4. Meter squared quadrat used for sampling.

protect the soil surface. Plant counts were used to determine success rate of individual species (frequency), and to help understand seedling distribution in a well-mixed broadcast planting. The most abundant grass species established were purple lovegrass (*Eragrostis specabilis*) and sideoats grama (*Bouteloua curtipendula*). The most abundant forbs established were spotted beebalm (*Monarda punctata*), brown-eyed susan (*Rudbeckia triloba*), blackeyed susan (*Rudbeckia hirta*), and false sunflower (*Heliopsis helianthoides*). Evaluations will be conducted each year to document changes in species composition due to plant physiology, distribution, and inter-species competition (Fig.4).

One of the goals of the project is to select a grass and wildflower mix suitable for recommendation in the area that increases plant biodiversity while remaining forb dominant over time.

Vegetative Barriers for Erosion Control or Snow Capture

The MIPMC installed a vegetative barrier study with Southlow Germplasm switchgrass in September 2020 to determine whether this selection of switchgrass (*Panicum virgatum*) had potential as a vegetative barrier (Code 601). This material was selected based on general appearance of vigor, grass blade persistence, and the ability for stems to remain upright over winter (Fig. 5). In the southeastern US, switchgrass has been shown to be a suitable plant for use as a vegetative barrier because of its stem size and density.

PMC staff conducted evaluations on stem counts and stem diameter in spring and fall 2023. Plants were considered top performers if the stem counts were greater than 11 per planting unit, and if their stem diameter was equal or greater than .10 inches. This selection criteria are suitable to meet the specification needs in the vegetative barrier conservation practice standard if planted at 45-50 PLS/sq ft. In the coming year we will compare stem attributes of commercially available switchgrass cultivars to Southlow Germplasm.



Figure 5. Switchgrass vegetative barrier installation.

Clover Cover Crop Installation to Assist State-Wide Core Cover Crop Field Office Training for 2024

Rose Lake PMC collaborated with the Michigan NRCS State Agronomist to identify core cover crop training needs for field office staff. PMC staff identified potential cover crop installation demonstrations that can be used in an upcoming 2024 training at the Center. In preparation for this training PMC staff installed 4 x ~ quarter-acre plots in September 2021 with white ladino clover (*Trifolium repens*) and alsike clover (*Trifolium hybridum*) according to planting specifications for cover crop (Code 340) in the Michigan Field Office Technical Guide (Fig. 6). Cereal rye (VNS) was drilled into the clover approximately one month later at 60 pure live seed lb/acre. These rye + clover interseeded



Figure 6. Clover cover crop interseeded with cereal rye.

demonstrations will be compared to clover plots planted alone at high and low seeding rates.

Culturally Significant Plants Training and Outreach

The PMC continues its collection and development of culturally significant plants in support of our tribal outreach efforts and our cultural resources training program (Fig. 7). Our observation boxes currently hold 17 species of selected plants historically known and used for their ethnobotanical properties. During a Basic Conservation Assistance training for field office staff held in June 2023, Elisa Lauritzen, PMC agronomist delivered a presentation on the traits and uses of many of these culturally significant plants. These plants are also recommended in the conservation cover practice standard (Code 327).

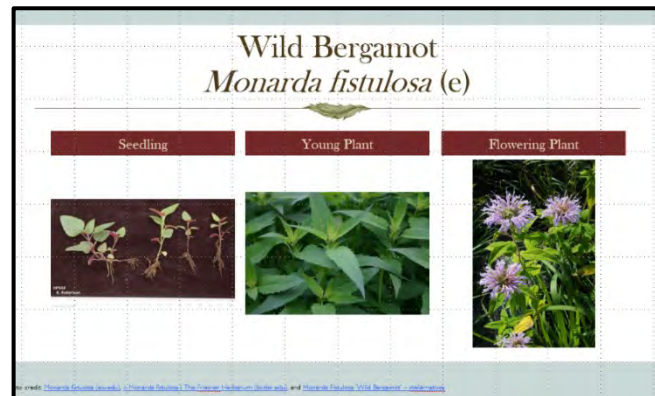


Figure 7. A slide from a PowerPoint training session on culturally significant plants conducted onsite for field office staff.

Additional Training and Outreach

The Rose Lake PMC helped conduct several trainings this year including Basic Conservation Assistance for New Employees, Controlled Burning, Tree and Shrub Establishment, as well as hosting MI staff for Wetland Compliance training, Geophysical training, and Basic Engineering Surveys for Conservation Practices (Fig. 8).



Figure 8. Controlled burn training conducted on a short-grass prairie planting.

Publications

PMC Advisory Committee

The Michigan Plant Materials Advisory Committee consists of seventeen members who meet on a biannual basis to discuss ways in which the PMC can help meet the needs of

field offices. It is chaired by Christina Nickola, State Grazing Land Specialist. To help achieve outreach goals, the committee drafts monthly newsletter articles for distribution to all MI field offices and State Resource Conservationists in the surrounding states of the MIPMC service area. This year, Elisa Lauritzen, MIPMC Agronomist, produced 10 newsletters, totaling 25 pages of content filled with interesting facts and helpful links on topics such as: seed cleaning methods; Plant Materials Program history and updates; current challenges in the native seed supply chain; pros and cons of common weeds; warm season grasses; climate warming and flooding effects on plant communities; USDA Northern Forest Climate Hubs; and updates to the USDA Plant Hardiness Zone maps.

Plant Guide for tulip poplar (*Liriodendron tulipifera*)

Elisa Lauritzen, MIPMC Agronomist produced a five-page plant guide on tulip poplar (*Liriodendron tulipifera*) for publication on the USDA-NRCS PLANTS database (in review). <https://plants.usda.gov/home>. The tulip poplar is a fast-growing and long-lived, native tree in the magnolia family that is ranked with a high coefficient of conservatism. The tree can be used for lumber and cabinetry, urban forestry, carbon sequestration, and wildlife and pollinator habitat (Fig. 9).



Figure 9. Tulip poplar at the Rose Lake PMC in fall 2023.

The Rose Lake Plant Materials Center (MIPMC) in East Lansing, Michigan provides plant solutions for the Great Lakes Region. The Rose Lake program serves Indiana, Michigan, Ohio, Wisconsin, and portions of Illinois, New York, and Pennsylvania. The MIPMC has developed technology to improve water quality and soil health.



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