

NATIVE GRASS AND WILDFLOWER SEED: AN LCMR GRANT

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Abstract. In 1991, the Legislative Commission on Minnesota Resources (LCMR) funded research to better manage and utilize a Minnesota natural resource: native plants. In a cooperative effort, the Minnesota Department of Agriculture (MDA) and the University of Minnesota's Department of Horticultural Science undertook a two year project to increase commercial production and improve quality of Minnesota native grass and wildflower seed. The grant supported market research by the MDA to assess supply and demand. The MDA also began to establish seed testing standards and regulations, bringing the native seed industry up to par with other seed industries. The University of Minnesota's Department of Horticultural Science studied the maintenance of genetic integrity in managed systems of native plants. In addition, production techniques and seed yield were evaluated and documented.

INTRODUCTION

A significant portion of the original vegetation of Minnesota was once tallgrass prairie. Tallgrass prairie in Minnesota extended in a roughly diagonal band from the northwest corner of the state to the southeast. Patches of prairie extended east to the Mississippi River (Marschner 1978). Now less than one percent of that original prairie remains in fragmented pieces (Coffin and Pfannmuller 1988). Rich soils which once supported prairie are now being farmed or have been developed as highways, or for urban and industrial use.

Interest in preserving native prairie and restoring degraded prairie habitat has sharply increased over the last two decades. Because of their value as wildlife habitat, low maintenance requirements, and potential for erosion control, the use of native plants has been encouraged for farm retirement programs such as the Conservation Reserve Program and roadside plantings. The Minnesota Department of Transportation (MnDOT) has emphasized the use of native plants as a management tool and a tourist attraction along highways (Bolin et al. 1990). For the same reasons, native species are widely used to restore habitat in Department of Natural Resources (DNR) wildlife refuges and scientific and natural areas. The low maintenance image and aesthetic appeal of native plants have made them attractive to homeowners and for commercial landscaping. Establishment of native plants creates a market for locally derived resources and provides a means of expressing Minnesota's unique regional character. With increased understanding of and appreciation for their

assets and the subsequent increased use of native plants, demand has surpassed supply of seed for some Minnesota-origin grasses and wildflowers.

The Legislative Commission on Minnesota's Resources (LCMR) funded the Native Grass and Wildflower Seed research project. The LCMR grant supported basic research leading to better management and utilization of native plants, an increasingly popular Minnesota natural resource. The goal of the research was to enable the industry to meet future demand and to create a more affordable supply of Minnesota-origin prairie plant seed. The results of the research project will hopefully encourage expansion of the commercial production of Minnesota-origin native grass and wildflower seed through the provision of technical information, development of regulatory standards, and analysis of market trends.

DISCUSSION

The LCMR research project is unique because of the multi-agency cooperation it has generated. The grant was guided by a steering committee which met quarterly to discuss progress and provide technical guidance. Scientists, policy-makers, market specialists, conservationists, and native plant producers were brought together in a process which encouraged interaction and understanding of different viewpoints.

The Minnesota Department of Agriculture (MDA) had administrative responsibility for the grant under the coordination of Charles Dale, Agronomy Services Division. Within the Department of Agriculture, the State Seed Testing Laboratory and the Marketing Division played active roles in carrying out research objectives. At the University of Minnesota, the Center for Alternative Plant and Animal Products (CAPAP) was the nexus of the project. CAPAP was created to aid in the development of new and alternative crops and facilitated completion of work for the grant by contracting with researchers. CAPAP has assisted in realizing new objectives, such as seeking additional funding for the publication of resource materials developed from the research. The Department of Horticultural Science of the University of Minnesota (UM-H) was a major research contributor in the areas of genetics and production. The research cooperators

each had a specific area of responsibility which they carried out on their own initiative.

In addition to the active researchers in the MDA and the UM-H, the steering committee was composed of representatives from agencies such as CAPAP, MnDOT, and the DNR. Jack Johnson represented the Agricultural Utilization Research Institute (AURI) which operates within Minnesota to support and facilitate the implementation of new technology into the mainstream agricultural community. The organization of a native plant producers association was facilitated by Jack Johnson of AURI and Dr. Anne Hanchek of the UM-H. To date, the Minnesota Native Wildflower/Grass Producers Association, which formed in 1991, has 9 members. This organization was also represented on the steering committee. Regional interests of the National Wildflower Research Center were represented on the steering committee by Bonnie Harper-Lore.

The research project's five major objectives for 1991 and 1992 were as follows:

1. Development of market information to enable potential investors, producers, and consumers to make sound decisions.
2. Development and standardization of seed purity and seed viability testing methods.
3. Establishment of certification standards to aid in the maintenance of genetic diversity when native species are raised for seed in field plots.
4. Determination of genetic diversity within and between natural populations through morphological characteristics and isozyme analysis.
5. Evaluation and summarization of commercial production practices to provide guidelines to new and existing producers of native wildflowers and grasses.

The MDA Seed Testing Laboratory, under the direction of Michael Muggli, started to develop seed testing procedures for purity and viability for seven species of wildflowers and grasses. For most native species, a standard test has not been established to date. Once established, these standards will enable the producer to have seed tested and labeled in the same manner as that required for traditional crops. This will lead to improved labeling of marketed seed. Tests have been completed on Junegrass (*Koeleria pyramidata* (Lam.) P. Beauv.), prairie cordgrass (*Spartina pectinata* Link.), and purple prairie clover (*Dalea purpurea* Vent.) (taxonomy follows Gleason and Cronquist 1991). These tests must be replicated by additional laboratories before approval of a standard test method and acceptance for publication in the Association of Official Seed Analysts rules.

Initial screening was begun on hoary vervain (*Verbena stricta* Vent.), thick spike blazing star (*Liatris pycnostachya* Michx.), prairie dropseed (*Sporobolus heterlepis* A. Gray.), and golden alexander (*Zizia aurea* (L.) Koch.).

Sue Ye, Agricultural Marketing Specialist for the MDA, spearheaded the market analysis research. Ye developed detailed producer and consumer surveys to enable the collection of primary data on the native wildflower and grass seed industry. The surveys were designed to determine current production and consumption levels, as well as to point out trends for future supply and demand for wildflower and grass seed. Information concerning the geographic distribution of seed source and seed destination was requested.

The survey identified current producers and consumers, and potential consumers. It was distributed to nearly thirty producers within Minnesota. Six hundred current and potential consumers were identified and received surveys. Consumer surveys were targeted at nursery and landscape firms, city and state agencies, and special interest groups that might use native species. A database has been developed and will be maintained to manage industry data. This information will be summarized in the final report which will be available by writing the project manager (Dale 1993).

Dr. Harley Otto of the Minnesota Crop Improvement Association has been instrumental in the development of cultural and isolation standards which will ensure that native grass and wildflower germplasm does not significantly change under cultivation for seed production. Certification standards have been written for seed production from native plants.

A primary concern in the cultivation and sale of native plants and seed is the maintenance of genetic diversity. Dr. Mark Strefeler and Kerstin Concibido of the UM-H have conducted research using six model species to evaluate genetic diversity within populations and between regions within Minnesota. Big bluestem (*Andropogon gerardii* Vitman.), little bluestem (*Schizachyrium scoparium* (Michx.) Nash), wild bergamot (*Monarda fistulosa* L.), thick spike blazing star, northern plains blazing star (*Liatris ligulistylis* (A. Nels.) K. Schum.), lacerate blazing star (*L. aspera* Michx.), few headed blazing star (*L. cylindracea* Michx.), and dotted blazing star (*L. punctata* Hook.) were used as the model species. For each of the eight species, several populations were established under cultivation to document morphological differences. Starch-gel electrophoresis was utilized to detect genetic variability based upon separation of enzymes into distinct banding patterns. This information can help to develop guidelines for sound management practices to preserve the genetic diversity of natural and cultivated populations of native plants, and has provided the background information for Otto's cultural and isolation standards.

Dr. Anne Hanchek and Julia Bohnen, also from the UM-H, carried on research involving the evaluation and development of production guidelines. A survey, developed to elicit information regarding facilities, production methods, products being marketed, and the nature of the market was sent to the members of the Minnesota Native Wildflower/Grass Producers Association. A request for a list of problems encountered in harvest and production was included on the survey.

The survey, a literature review, and preliminary research guided the selection of species for further study. Seed was collected from remnant prairies in cooperation with The Nature Conservancy and the Department of Natural Resources. Members of the Minnesota Native Wildflower/Grass Producers Association also cooperated by providing seed. The research of Hanchek and Bohnen addressed two questions developed from responses to the producer survey: how can the rate and uniformity of germination be increased? can seed yield for a species be increased in a cultivated setting versus a native stand?

Twenty-five species were studied in greenhouse germination trials conducted under controlled conditions simulating those of the producers, and/or through a literature review. Prairie cordgrass, wood lily (*Lilium philadelphicum* L.), and prairie phlox (*Phlox pilosa* L.) have been examined in more detail to characterize uniformity and rate of germination in response to stratification and gibberellic acid treatments. Variation in germination response between populations of a species was evaluated. In response to producers' concerns about low seed yield and viability when seed is collected from prairie remnants, field trials were established in May 1992 at the Minnesota Landscape Arboretum to compare seed yield for spiderwort (*Tradescantia* cf. *ohiensis* Raf.), purple prairie clover, and prairie cordgrass in an intensively managed setting versus in the prairie.

CONCLUSION

The LCMR Native Grass and Wildflower Seed project was unique in establishing open lines of communication and cooperation in the development of a new body of knowledge. Industry operators, researchers, and regulatory agencies shared a common goal of making high quality native plant materials more accessible to consumers for many applications. Different perspectives on issues like maintenance of the genetic integrity of Minnesota native plants were aired and, hopefully, will be resolved on the basis of future biological research. New partnerships have been formed and new questions, both basic and applied, have been framed. This exchange of knowledge between organizations and the increased availability of market, seed testing, and production

information encourages strong growth of the local-origin native seed industry. Funding for further work has been investigated.

A complete species list, certification standards, germination and yield trial data are available in the final report. An extensive bibliography of prairie plant production literature has also been compiled. Producer guidelines and pictorial seed and seedling identification resources to aid producers unfamiliar with these new crops are being developed. Decisions as to the form of dissemination of this information have yet to be made. CAPAP is assisting in securing funding for publication of the resource materials. Further information about these resources and the final report can be obtained through Charles Dale, project manager, at the Minnesota Department of Agriculture, 90 West Plato Blvd., St. Paul, MN 55107. The final project report will be available after the close of fiscal year 1993.

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