Regional native seed cooperatives: working toward available, affordable, and appropriate native seed

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ABSTRACT

Regional native seed cooperatives are emerging as a tool to vastly improve the availability of genetically appropriate native seed. Within a cooperative, practical and ecological requirements for native seed are balanced by bringing users and producers together to jointly develop genetic protocols. Regional native seed cooperatives promote a novel agricultural niche that requires the development of new farms, infrastructure, and techniques. The South Sound Prairies partnership has a successful cooperative that is used here as a case study to explore this model of seed production.

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The restoration community faces a growing unmet need for genetically appropriate native seed. Native seed currently available on the commercial market can be of unknown provenance or, when known, may be considered by many users as not sufficiently local. Genetic requirements for native seed differ among users, making speculative production for the restoration market difficult to impossible for the seed industry. Custom seed grow-outs are common for restoration projects, but these are expensive, limited in scope, and require years of pre-planning and advance funding.

Regional native seed networks are emerging as a solution to this problem. These cooperatives bring together geographically associated native seed users in order to pool resources and jointly contract for native seed production that meets their specifications. This arrangement requires cross-agency collaboration and compromise to standardize the genetic requirements for seed. To be successful, these cooperatives should establish a coordinating entity to lead the effort, unite and advise partners, and act as the financial vehicle for the cooperative.

The regional cooperative model of native seed production requires growers with the flexibility to innovate and deliver alternative production methods that maintain the genetic integrity of the species they grow. Standard agricultural practices select for uniformity, which runs counter to the common goal of genetic diversity in native seed (Kitzmiller 1990; Meyer and Monsen 1993; USDA 2006). Regional restoration, which requires a diverse set of species in relatively modest quantities, greatly benefits from mid-scale growers tooled for efficient "plot-sized" production.

This article outlines a method for native seed acquisition that can balance a project's practical and ecological goals, provides details on the requirements for the development of seed cooperatives, and finally presents the novel agricultural model that has arisen as a result of the South Sound Prairies seed cooperative's specialized needs.

NATIVE SEED ACQUISITION

Impacts to natural areas worldwide are extensive and losses of native habitat dramatic (Broadhurst and others 2016). In the Puget Sound region, prairie ecosystems have been reduced to 3% of their historic range (Crawford and Hall 1997). Restoration efforts in this prairie ecosystem now utilize several thousand pounds of native seed annually.

Access to native seed can be limited by practical constraints such as cost and availability. When working in native habitats, the source location and genetic diversity of seed must also be considered. Many authors have explored the potential ecological and genetic impacts of native plant material production and have proposed a variety of protocols for the native grower (Campbell and Sorensen 1984; Kitzmiller 1990; Huber and Brooks 1993; Meyer and Monsen 1993; Buis 2000; Rogers 2004; Rogers and Montalvo 2004; USDA 2006; Broadhurst and others 2008; Basey and others 2015). For the purposes of exploring native seed acquisition options, I will simply consider genetic diversity and local adaptation to be desirable traits alongside availability and affordability.

Land managers have several options when procuring native seed for restoration projects, each with trade-offs in desired attributes of the seed. Often the practical requirements for the project are seen to compete with genetic protocols. I propose that while the trade-offs are real, a regionally focused native seed increase program can provide the greatest balance. Figure 1 qualitatively weighs the desired traits of native seed across 5 common seed acquisition methods. These methods are explored below.

Site-Specific Wild Collection

Many project managers request or require that seed is sourced from within the geographical boundaries of the site, or from within a set distance from the restoration project. The likelihood is that collection of wild seed from around the site to be restored has the benefit of maximizing the potential for local adaptation; however, a much broader collection area may prove equally adaptive. One can even conceive of a scenario in which the closest population to the restoration site may not have the most adaptive traits for the project.

Generally, site-specific wild-collected seed is not likely to suffer from maladaptation, but plant populations on or around project sites can be very limited, which restricts the potential genetic diversity of source material. Low genetic diversity can lead to inbreeding and its potential to cause inbreeding depression.

Wild collection of seed, especially from small populations, is time consuming and expensive and therefore cannot be

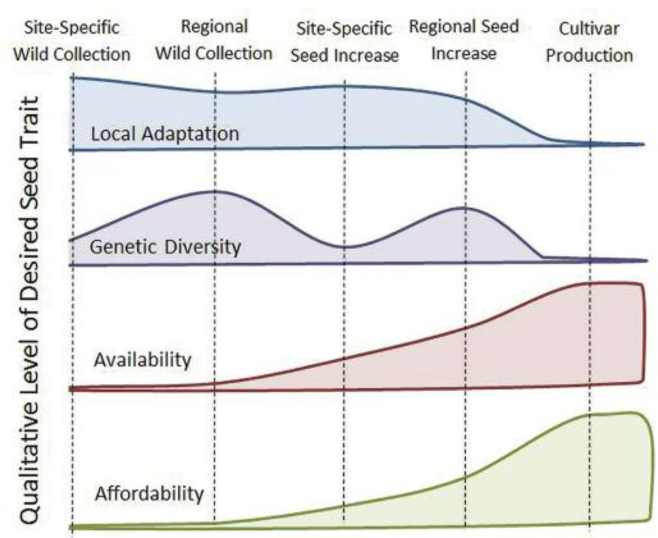

Figure 1. Trade-offs of seed acquisition methods.

expected to produce seed in quantities sufficient for larger restoration projects.

Regional Wild Collection

The genetic diversity issue resulting from site-specific wild collection can be ameliorated by increasing the collection range to an ecologically defined region. Although this satisfies the ecological goals of the project, the practical issues of wild collection remain. Seed is generally very limited in quantity and expensive to procure.

Site-Specific Seed Increase

An available option for native seed acquisition is a custom seed increase specific to the restoration site at hand. This method provides wild-collected seed from around the restoration site to a commercial grower for one to several generations of seed production. This approach capitalizes on the power of agriculture to greatly increase the quantity of seed available. Local adaptation can be maintained with appropriate protocols, but genetic diversity is still subject to the limited size of source populations around the restoration site. There may also be some further narrowing of genetics associated with agricultural production.

Custom seed increase requires multiple years of lead time to allow for wild collection, establishment of plant material, and maturation of seed fields. In the case of some slow-growing perennials, custom seed increase requires half a decade or longer. Because the customer base for custom-grown seed is limited, the price is often higher and (or) the customer must assume more risk than is associated with mass-produced seed.

Regional Seed Increase

A regional native seed program coordinates the needs of several geographically associated land managers with one or several seed producers. As with regional wild collection, using an ecologically defined area of collection for farm stock greatly increases the genetic representation within the seed while maintaining local adaptation.

The regional seed-increase option also harnesses the practical benefits of agricultural production and offers several advantages over the custom seed-increase option. The larger and sustained need of the region allows growers to confidently produce in advance of specific project needs, making seed available to land managers essentially on demand. Additionally, with a regional approach, seed is produced in larger volumes and often can be purchased at a lower price than with seed produced through a custom grow-out. This seed acquisition method is explored in detail in the next section.

Cultivar Production

For native seed to approach the cost of other agronomic seed it needs to be produced by large-scale growers utilizing standard methods of seed production. This requires that seed perform well in the agricultural production system and be broadly applicable to maximize the potential customer base. Selection for agronomic performance greatly narrows the genetic diversity of seed. Agricultural systems favor rapid growth and relatively short life cycles, meaning traits that support long-term, self-sustaining wild populations, a key goal of restoration projects, may be diminished in the selection process.

Nevertheless, production of selected strains (cultivars) of native plants can make native seed highly affordable and available in the quantities needed for landscape-level seeding efforts. Use of native cultivars is highly practical but may not meet the ecological goals of all land managers.

REGIONAL NATIVE SEED COOPERATIVES

Of the 5 native seed acquisition strategies presented above, regional native seed cooperatives have the greatest potential to meet the increasing need for affordable, genetically appropriate native seed. The concept of agricultural cooperatives is not new and is actually quite common in other sectors. Traditional agricultural cooperatives are largely producer based and serve to empower small farmers in response to market failures, such as excessive cost of supplies or inadequate compensation for product (Sexton and Iskow 1988; Nilsson 1998; Ortmann and King 2007). By contrast, applications to the native seed industry are largely a response to unmet needs of buyers in terms of species selection and genetic representation (Toth 2008; Ward and others 2008; Broadhurst and others 2016).

Toth (2008) laid out a very convincing case for the development of regional native seed networks that bring native seed users together to pool resources and expertise, ultimately resulting in lower prices, increased availability, and more appropriate genetic decision making. While increased availability and lower prices are common results of pooled buying power, Toth's claims about improved genetic decision making are related to localized policies.

Generalized native seed protocols do not consider species-specific information, such as breeding biology, ploidy levels, population dynamics, or a myriad of other factors that would be necessary to understand and protect genetic diversity. Management decisions aimed at maintaining genetic integrity of plant populations are best made by considering the specifics of the target species and the local habitat (Rogers and Montalvo 2004). Individual restoration managers may not have the resources to explore this information for all species of interest in order to make decisions about seed collection or production. A regional network of native seed users, however, would bring together the local experts and allow the assemblage of this information (Toth 2008). Regional cooperatives can identify information gaps and focus research on the most pressing local species to support appropriate genetic management in the nursery setting.

Toth's proposal is well-considered from the seed users' standpoint; however, I suggest including seed producers as integral members of the cooperative. Land managers are in the best position to identify species, propose genetic requirements, and identify the timing and quantity of seed needed, whereas seed producers are vital to the development of new production methods and the quantification of costs of proposed protocols. By sharing information among and between land managers and seed producers, these networks break down the barriers that have kept valuable ecological and practical knowledge from being fully utilized and applied. Because this approach intimately connects growers and users—and capitalizes on the strengths of both—it has the potential to greatly increase the availability and affordability of genetically appropriate native seed where implemented.

Several regional native seed cooperatives are now emerging in the US, with a variety of focuses and structures (Getty 2013; Kilkenny and others 2015; Pawelek 2015; Smith and Elliott 2015). The Center for Natural Lands Management (CNLM), a land conservation nonprofit organization, coordinates the South Sound Prairies native seed cooperative in Washington State. Interest in expansion of this seed cooperative to other regions in the Pacific Northwest has led to this documentation of the native seed cooperative model and its specific application in the South Sound.

A regional focus for a native seed cooperative narrows the potential membership. A more nimble group simplifies the decision-making process and increases the likelihood of consensus. Participation is improved when meetings are held locally and individuals consider themselves relevant to the larger group.

Regionality

Using an ecologically defined region narrows the scope of potential habitats and plants, thus improving focus and streamlining decision making. By defining regional boundaries to coincide with agreed-upon seed transfer zones, a single, shared seed supply can be developed (Miller and others 2011). This approach removes the need for genetic isolation within the cooperative and greatly decreases the cooperative's farm infrastructure needs.

The Environmental Protection Agency (EPA) developed a comprehensive ecoregion classification system that considers geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. EPA ecoregions have been mapped in Washington State at 2 useful scales for native seed purposes (Pater and others 1998). The level III ecoregion provides a coarse-scale classification of similar habitat types. The South Sound Prairies seed cooperative has adopted the Puget Lowlands level III ecoregion as the area within which some gene flow would be naturally expected and will be allowed in agricultural production. The higher resolution Southern Puget Prairies level IV ecoregion adopted by the South Sound Cooperative represents the regional seed transfer zone. Within this area, environmental variables are considered to be consistent enough that finer-scale local adaptation is unlikely. Only a single ecotype will be produced for each species within the level IV ecoregion. This approach to genetic management follows protocols developed for the Willamette Valley in Oregon (Ward and others 2008).

Limiting a seed cooperative to a single seed transfer zone simplifies decision making and production logistics; however, coordinating cooperatives on a state or federal level has distinct advantages. Infrastructure development is expensive and need not be fully duplicated for each seed transfer zone. Species-specific protocols developed by one region may be relevant to habitats served by other seed cooperatives. Expertise in native seed production can be shared across regions and can greatly advance overall efforts. CNLM coordinates a well-established seed cooperative for the Southern Puget Prairies ecoregion and is applying that experience to establish cooperatives that serve the Olympic Rain Shadow and San Juan Islands ecoregions. Constituents differ for each of these cooperatives but the infrastructure and expertise is largely shared.

Constituents

The players may vary across regions, but key roles within a seed cooperative can be consistently identified. The South Sound Prairies cooperative was initially made up of government agencies with a mandate to restore native habitat. As the cooperative matured and seed prices fell, other user groups have emerged including municipalities, private landowners, and land trusts. Increasing the breadth of interest and demand for native seed not only increases the conservation impact of the cooperative but can also help the cooperative weather inevitable funding fluctuations.

Native seed producers play a key role in the cooperative. Producers fall into 3 service categories: the raised bed nursery, the seed plot grower or research farm, and the commercial-scale seed grower. Small nursery-scale seed production is often initiated on a project-by-project basis and can well serve a greenhouse operation interested in producing transplants from native seed. This small scale is not suited to supply the direct seeding of multiple-acre restoration projects, however. The South Sound Prairies seed nursery is reserved for bulb production, initial seed increase when source seed is very limited, and seed production of those species for which only a very small need exists.

At the other end of the spectrum are the commercial seed producers who measure individual crops by the hectare and who are by far the most efficient means to acquire native seed. However, most species are not required in quantities to justify this scale of production, and for many other native species, production protocols have not been developed to allow commercial production. In the South Sound, a single grass species is contracted to commercial producers and accounts for 75% of the seed weight produced for the entire cooperative.

This leaves the lion's share of diversity to be filled by the grower tooled for producing seed on the "plot" scale of 50–1000 m^2 (510 to 10,200 ft^2). In today's agricultural market, the plot-scale seed grower is unusual because of the cost of the wide range of equipment needed for efficient seed production. Primarily, plot-scale production is performed at agricultural research entities such as those run by the US Forest Service and the USDA Natural Resources Conservation Service (NRCS). A plot-scaled grower is critical for the success of a regional native seed cooperative and if not available, as was the case in the South Sound Prairies region, an appropriately scaled and tooled native seed operation may need to be developed specifically to serve the cooperative. CNLM built a series of plot-scaled native seed farms in the South Sound that produce 725 kg (1600 lb) of seed from more than 100 native ecotypes annually. I explore the desired attributes of a regional native seed grower later in the article.

Coordination

Project coordinators fill a critical role in any successful seed cooperative. A coordinator can be a member of the user group, a producer, or a third party. They are responsible for involving the correct entities in decision making, achieving buy-in and participation from all interested parties, and developing a financial structure that allows persistence and expansion of the cooperative. In the South Sound Prairies region, CNLM acts as the coordinator, holding meetings, generating reports, securing funding, contracting growers, and allocating seed.

A coordinator who understands both restoration ecology and agricultural production systems can be pivotal in recruiting appropriate participants to the cooperative. The coordinator must find sufficient growers of appropriate sizes and expertise to meet the production demands and must identify a broad enough customer base to financially sustain the cooperative over time. Insufficient membership is a serious and often fatal problem for new agricultural cooperatives (Sexton and Iskow 1988).

Each member of the cooperative likely has their own genetic seed guidelines and requirements, but an important goal of the coordinator is the development of a single set of production requirements for the region. The coordinator's role is to highlight the best available science while guiding the group toward the most universally acceptable decisions. Including both growers and users throughout this process helps to ensure that practical and ecological goals are balanced and that appropriate seed will ultimately be produced. And while it may be the goal to bring all interested parties into the cooperative, autonomy must be respected and some entities may decide that the cooperative's seed guidelines are incompatible with their own.

Successful buy-in from all users in a region to adopt similar standards for seed zones, genetic isolation, and production practices is difficult and takes time. Convincing growers to develop modified practices that can meet the group's specifications can be equally challenging. Because the collaboration requires all parties to abdicate some control over decision making, it is necessary to form trust and respect among the members of the group. Several factors have contributed to successful cooperation in the South Sound, including an effective coordinator, mutual respect among participants, common experiences, a shared vision, and a joint funding source.

A coordinator who strives to maintain neutrality can build confidence that the cooperative is truly member driven. Mutual respect of fellow members' expertise can build trust in the group and increase the willingness to accept joint decisions. To create shared experiences and build understanding of each member's projects and goals, several tours are organized each year in the South Sound. Land managers are exposed to the practicalities and challenges of the seed farm, and seed producers are brought out to restoration sites to better understand the ecology of the plants they produce and to witness the successes and failures of restoration efforts.

A shared vision or restoration objective can help set priorities that transcend individual agency mandates. In Washington State, listed species recovery efforts serve well to bring many entities together under a shared goal. Finally, a joint funding source can contribute to bringing cooperators to the table and can maintain the collaboration through difficult decision-making processes. The joint development of objectives and sharing of responsibility for outcomes required by collective grant management can be a powerful binding force. The coordinator can serve as the vehicle for bringing this funding to the group and overseeing its implementation.

Infrastructure

To ensure success, the regional native seed cooperative requires significant infrastructural support related to seed collection, processing, storage, and germination. Any of these various seed production components may be available within the user or producer group, but it is unlikely that any individual party has access to everything needed by the cooperative. Pooling resources allows the coordination of existing infrastructure, the hiring of commercially available equipment, and the development of infrastructure specifically for the cooperative.

The most costly and specialized infrastructure needed outside of the seed farm is a seed-cleaning facility. Well-cleaned seed is important to minimize weed contamination, maximize storage life, accurately calculate seeding rates, and efficiently produce transplants. As with seed-farming equipment, seed-cleaning equipment needs to be appropriately scaled.

Laboratory-scale equipment is common at research facilities and is useful for wild-collected seed and for seedlots up to several kilograms. CNLM acquired the basic laboratory equipment including milling, brushing, screening, and aspirating machines for approximately US$ 50,000.

Most commercial seed growers will have cleaning facilities to process the seed they produce. They may also be willing to process seed grown by others; however, their equipment will be scaled to their production, which is often most efficient for lots of at least several hundred kilograms. If smaller lots can be cleaned on these processing lines, the expense to clean equipment between lots may make commercial cleaning impractical for a majority of the cooperative's seedlots.

Here again a mid-sized, native-focused seed-cleaning operation may be the most efficient for a native seed cooperative. I have found that equipment scaled to lot sizes of 5 to 100 kg (11–220 lb) is the most efficient for the South Sound Prairies' farm-produced seed. This size equipment may exist for hire at commercial seed growers or at government research facilities; otherwise, a shop may need to be developed specifically for the regional cooperative. Costs for mid-sized seed-cleaning machines are not trivial and can be as high as US$ 50,000 per machine. With perseverance, used and refurbished equipment can be obtained. CNLM's native seed-cleaning center has developed a 6-machine, mid-sized processing line for less than US$ 100,000, and it is cleaning 1000 kg (2200 lb) of native seed annually.

Another important infrastructure consideration for the cooperative is seed storage. Funding cycles, weather, and project timelines do not always allow the orderly and timely progression through wild collection, seed production, and restoration implementation. Climate-controlled seed storage allows for stockpiling and long-term preservation of precious wild seed with minimal decreases in viability. Toth (2008) suggested a nationwide network of regional seedbanks for just this purpose. Private industry or government agencies such as USDA NRCS may have rental space available in seed storage facilities. In the South Sound, CNLM has developed a temperature- and humidity-controlled seed storage facility to serve the cooperative. The storage unit is based on a design employed at the Corvallis Plant Materials Center (Bartow 2015) and employs a desiccant dehumidifier installed inside a stationary, refrigerated shipping container. Total installation cost was US$ 25,000 and the unit can maintain 4535 kg (10,000 lb) of seed at 40% relative humidity and 4.5 °C (40 °F).

Greenhouse facilities are also critical to the function of a seed cooperative in order to provide transplants for seed farms and restoration activities. In the South Sound, several nonprofit entities operate greenhouses that service the seed cooperative. The progressive Sustainability in Prisons Project has developed nursery facilities within correctional institutions specifically to support the cooperative. Coordination of production across these entities and facilities is an important responsibility of the cooperative.

Financial Sustainability

The creation of a full-service regional native seed cooperative requires substantial finances. Fortunately, a cooperative need not leap fully formed into existence; instead, the cooperative can develop and mature over time, building on recurrent investments.

Initially, the cooperative is likely to simply be a pooling of currently available resources for plant material acquisitions, which allows joint contracting or perhaps the initial development of some nursery infrastructure. For the cooperative to progress, however, a coordinator needs to be selected and a strategic plan developed. This process will help define initial potential members, restoration targets, and seed needs for the group. A modest grant request can often fund these initial coordination efforts.

Once the cooperative is ready to begin seed production, a sizable outlay of money is required. Compounding the funding challenge, at least 3 y of investment will be needed before seed is available to the group. Solid funding in the first few years will be critical to launch the effort; in traditional agricultural cooperatives, poor initial equity is a leading cause of failures (Sexton and Iskow 1988). Funding in the initial phases of the seed cooperative should focus on capacity building and infrastructure development. In the case of the South Sound Prairies cooperative, a well-funded, long-term, multi-species recovery effort funded the development of the nursery and initial seed farm. This was coupled with federal grants to establish the basic core infrastructure. Once native seed was reliably being produced, the local military base invested heavily in the cooperative to expand production capacity.

In the second phase of the cooperative, funding can be directly tied to production, which allows the cooperative to expand its support base and to reduce its dependency on grant funding. Currently, in the South Sound, support comes from a mix of federal grants, contracts for service, and direct sales. Approximately 20% of funding goes to protocol development and infrastructure expansion. Although diversified, the cooperative is still largely dependent on a few federal agencies.

In lieu of large multi-year grant funding, a parallel trajectory could be envisioned in which initial financing came through traditional business loans. Although the risk is higher, this avenue deserves consideration and may facilitate the development of native seed cooperatives when grant funding is not sufficient.

THE REGIONAL NATIVE SEED GROWER

The regional native seed cooperative makes unique demands of the seed industry and therefore requires a novel method of farming. Requested seed production may include dozens to more than 100 species, many of which may be entirely new to agricultural production or may not readily lend themselves to mechanized production methods. Requested seed quantities tend to fall in a middle range that is too large for nursery production but too small for commercial seed growers. If the desired quantity of seed for an individual species exceeds 100 kg (220 lb), the need is best met by commercial seed producers; however, the majority of species needed by the South Sound Prairies cooperative require a plot-scaled native seed grower. The regional native seed grower is unique in that they can efficiently grow 20 to 50 separate seed crops per hectare. The grower will have mechanized production at the plot scale but will also grow species that cannot be mechanized and will develop the tools and methods necessary to produce these crops efficiently.

The seed cooperative's genetic diversity protocols require deviations from standard agricultural practices, which may prove too cumbersome for well-established, high-efficiency seed farms. The specialty native seed grower is flexible enough to innovate and to employ alternative agricultural techniques aimed at maintaining the genetic breadth of the original foundation seed.

Alternative Agricultural Practices

Standard agriculture practices are excellent at maximizing harvests and minimizing labor inputs, predominantly by mechanizing as many actions as possible. For mechanization to function well, crops must be uniform. A genetically diverse stand of native plants is anything but uniform. Repeated application of standard agricultural practices to native crops tends to lead toward phenotypic uniformity in the crop over time (Meyer and Monsen 1993; Dyer and others 2016). The native seed grower, tasked with maximizing production while minimizing agricultural selection, can implement several nontraditional practices to this end. There are, however, direct costs associated with these practices that must be balanced with the ecological benefits of these practices. A discussion of the alternative agricultural techniques employed by the South Sound Prairies seed cooperative follows.

Generation Control

Limiting the number of generations spent in the agricultural setting minimizes the opportunities for agricultural selection. By using only wild-collected seed to establish perennial seedbeds, all seed produced is only one generation removed from the wild. Because wild-collected seed is limited, it generally cannot be direct sown into production fields but must instead be started in a greenhouse and outplanted into seed fields. The required wild collection, nursery production, and outplant labor adds significant cost to seedbed establishment. For commercial seed producers, transplanting may be impractical, and seed that has already been agriculturally increased for at least one generation is needed to establish large fields.

Limiting generations in agriculture is much more difficult with annual species because seedbeds must be re-established every year. In the prairies of the South Puget Sound, native annuals are so rare that regular collections of large quantities of wild seed are impossible. Therefore, seed production of many annual species depends on seed that may have been under cultivation for several generations.

Vigor Bias

Whenever plants are handled manually, there is a tendency to select the largest and healthiest plants. This selection can occur during planting, thinning, or harvest. Consciously planting weak plants, thinning without regard to plant size or health, and harvesting equally from all plants is primarily a matter of training, but there are additional costs related to decreased productivity and increased labor.

Full-Spectrum Harvests

Agriculturally adapted seed crops have been selected to ripen uniformly, a characteristic which facilitates a single mechanized harvest. The majority of wild native plants are not so accommodating. While a single harvest near the midpoint of ripening would be the most economical approach, a narrowing of genetics would likely occur due to missing the early and late ripening individuals. Additionally, seedheads that are not at the appropriate height for mechanical harvest will not be represented in the final crop.

Several alterations to the standard mechanical harvest can be used to better capture the full spectrum of genetics in the seed field. Early hand-harvests before a single cut can capture early flowering plants. Hand-harvests immediately following a mechanical harvest will add seed from short-stature plants. Leaving some rows or portions of rows unharvested until late flowering plants have ripened can also expand the captured genetics. If different collections of the same species vary in phenology, keeping collections in separate rows, rather than intermixing, allows harvests to be more precisely timed (Ward and others 2008). These additional harvests can add significantly to the cost of a seed crop and should be used judiciously.

Another useful technique to secure the full harvest spectrum involves growing plants on weed block fabric that can collect seed as it falls over a period of time (Figure 2). Seed collected in this way has the full representation of ripening phenology; however, it is susceptible to predation and loss to wind and rain while it is lying in the field. Seed collection from the fabric surface is labor intensive and results in seed with a high level of contaminants, which requires additional processing labor.

Figure 2. Shortspur seablush (*Plectritis congesta* (Lindl.) DC. ssp. *congesta* [Valerianaceae]) planted on seed-collection fabric at the Violet Prairie native seed farm. Photo by Sierra Smith

Seed Cleaning for Diversity

Seed cleaning can be one of the most labor-intensive processes in producing native seed. Seed cleaning works by eliminating all material that differs in size, shape, density, and in some cases, color. Most plants have relatively uniform seeds, but this is not the case for all native species. To ensure the full genetic diversity of the seed harvest is represented, time can be spent with the discards of the seed-cleaning process to recapture the "unusual" seeds that may represent additional genetic diversity.

CONCLUSION

The need for genetically appropriate native seed in many regions of the country greatly exceeds the supply. The coming together of the native seed community at the local level to coordinate seed needs and production creates a consistent and significant market that can make regional native seed production financially viable. Involving producers in the development of locally standardized genetic guidelines helps to balance ecological and practical requirements for seed and increases industry buy-in. Multi-agency, cross-sector cooperation is challenging, but shared goals, pooled funding, and sustained coordination are extremely helpful in ensuring the cooperative's success. This level of coordination would be unworkable on the federal or even state level, but when focused on a single, ecologically defined region, the shared values of the local players make compromise and collaboration a possibility. If this infrastructure can be created, appropriate native seed can become affordable and locally abundant.

The need for diverse and genetically representative native seed is fostering the emergence of a specialized agricultural niche that employs small-scale mechanization and techniques that intentionally avoid agricultural selection. Farms, farmers, and equipment manufacturers are needed to support this emerging market. A growth in regional native seed cooperatives has the potential to stimulate a whole new agricultural field while supporting the expansion of successful habitat restoration.

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