

Prairie Plant Production at the Mason State Nursery, Topeka, IL

David J. Horvath

Natural Resource Site Manager, Illinois Department of Natural Resources, Mason State Nursery, Topeka, IL

Abstract

The Mason State Nursery has been producing native Illinois prairie forbs and grasses since the late 1970s. Increased demand for plant materials for restoration and governmental programs in the 1980s led the Illinois Department of Natural Resources to institute a capital expansion of the nursery program. This expansion included construction of a greenhouse facility to grow prairie plants and clean the seed from these forbs and grasses. Custom growing agreements with other agencies led to additional expansion of the greenhouse facilities to meet additional production demands. Over time, experimentation with different growing regimens and containers has resulted in current container production methods now in use at the Mason State Nursery. This paper was presented at a joint meeting of the Northeast Forest and Conservation Nursery Association and Southern Forest Nursery Association (Williamsburg, VA, July 21–24, 2014).

Introduction

During the late 1970s, the Illinois Department of Natural Resources (IDNR) began to expand its activities to include personnel and programs designed to protect and manage the prairie and other natural communities of the State. One of the more important components of this new direction was developing programs to establish prairie restorations on IDNR-owned properties. Although more than two-thirds of Illinois originally had been prairie, by the 1960s, less than 1 percent of these areas remained in native vegetation. The increasing demand for agricultural lands, coupled with the growing population of the State, resulted in the loss of more than 99 percent of the State's prairies.

In 1977, the Division of Forest Resources was approached by land managers for assistance in establishing prairie grass seed collection areas. The IDNR Nursery Program was considered for this role for several reasons: (1) land for the establishment of seed collection areas was available at the nursery, (2) an experienced workforce was located at the nursery, and (3) equipment for collection and processing was either available on site or could be located in the surrounding farm community.

While the fledgling prairie program was developing, the demand for plant materials from the two State nurseries was increasing, partly because of the Federal Conservation Reserve Program (CRP) and the Illinois Forestry Development Act (FDA). As a result of the 1985 and 1990 Farm Bills, CRP participation has resulted in 36,000 ac (14,570 ha) being designated for tree planting since 1985. The demands for planting stock generated by CRP and FDA and a shift from conifer production to hardwood production created a situation that left existing nursery facilities unable to meet production demands.

To meet this increasing demand, IDNR instituted a capital program to expand and rehabilitate the nursery facilities. In 1988, this program provided \$5.8 million for nursery expansion and rehabilitation.

Nursery Expansion

Most of the expansion activity was focused at the Mason State Nursery located in Topeka and occurred from 1988 through 1998. Nursery acreage was increased from 80 to 240 ac (32 to 97 ha). Irrigated seedbed area was increased from 40 to 120 ac (8 to 23 ha). A new 46 by 80 ft (14 by 24 m) building was also constructed specifically for drying and cleaning prairie forb and grass seed. A Crippen fanning mill, brush debarer, and indent seed separator were purchased and installed in this building to increase the ability to clean and process seed.

One important capital item during this time period was the construction of a 3,000 ft² (279 m²) greenhouse (figure 1). This structure was built specifically for producing prairie forb and grass plants. In developing the prairie program, it was found that many species would not produce individual plants when grown in seedbeds. A lack of individual plants created considerable problems during lifting and grading. Mold development during overwinter storage of fall-harvested bareroot prairie forbs was also a problem. The greenhouse enabled production of these prairie species as individual plants and reduced the incidence of molding when in storage.

In the early 1990s, the Illinois Department of Transportation (IDOT) entered into an intergovernmental agreement with IDNR to produce prairie plants for IDOT's use along road



Figure 1. Greenhouse built in 1991 at the Mason State Nursery. (Photo by David J. Horvath, 2014)

right-of-ways and rest areas. The agreement allowed IDOT to reimburse IDNR for prairie plants and seed that were produced. Later in the 1990s, IDNR entered into another agreement with the U.S. Department of Agriculture (USDA), Forest Service Midwin National Tallgrass Prairie (Wilmington, IL) to grow prairie plants from seed collected by USDA Forest Service staff.

To increase efficiency and meet the production demands required by the growing agreements, prairie plant production was moved from outdoor, bareroot seedbed production to all container production in the greenhouse. Because of this transition, it became apparent that one greenhouse was not enough to meet production demands and dedicated space was needed to fill and seed containers.

To meet the increased demand, workers constructed two 80 by 30 ft (24 by 9 m) polyhouses and a 40 by 25 ft (12 by 8 m) building to fill containers and store materials. A bulk soil mixer was also purchased. The original 3,000 ft² (279 m²) greenhouse was capable of producing approximately 40,000 plugs using a 45-cell plastic multipot (IPL Rigipot with 7 in³ [110 ml] volume) supplied by Stuewe and Sons, Inc. (Tangent, OR) (figure 2). With the two additional polyhouses, production was increased to more than 100,000 plugs, and the dedicated potting building increased efficiency and production flow.

Current Production System

Developing a production system and a final product that would meet customer demands proved challenging. IDOT decided on 1.0 gal (3.8 L) containers for prairie material and 2.0 and 5.0 gal (7.6 and 18.9 L) containers for trees and shrubs to allow for greater flexibility and a longer planting



Figure 2. Rigipots used for production of New England aster (*Symphotrichum novae-angliae* [L.] G L Nesom.) at the Mason State Nursery. (Photo by David J. Horvath, 2014)

window compared with bareroot or plug material. Midwin National Tallgrass Prairie and IDNR field staff still prefer plant material grown in the 45-cell multipot.

After experimenting with different plug containers, Jiffy pellets (Jiffy J7 Forestry Peat Pellet, 36 pellets per tray; Jiffy Products of America, Inc., Lorain, OH) were chosen to germinate and grow our prairie species for transplanting into pots and for direct outplanting to the field. The Jiffy forestry pellets work well for these situations and provide the added benefit of not having to retrieve and clean the plug trays (figure 3).

The growing regimen for prairie species at Mason State Nursery starts in March or April with sowing seed into Jiffy Forestry plug and 45-cell multipot containers. Sowing is done by hand because it is the most efficient method because of



Figure 3. Jiffy pellets used for production of rough blazing star (*Liatris aspera* Michx.) at the Mason State Nursery. (Photo by David J. Horvath, 2014)

the number of species and the variation in seed size among species. Recalibrating a mechanical seeder for each species was found to be overly time-consuming.

Prairie forb and grass seed is germinated and grown until about June, at which time most species are ready to be transplanted to 1.0-gal (3.8-L) containers and moved outside for continued growth. The Jiffy Forestry pellets are used for repotting into larger containers or transplanting into the field. Usually three plugs are transplanted into each pot so, under optimum conditions, our greenhouse can grow enough plugs for 13,000 pots; actual production averages around 8,000 to 10,000 pots. Total 1.0-gal (3.8-L) container production from all houses is generally 20,000 to 30,000 pots, depending on the year and conditions. Plants produced in the 45-cell multipots can be planted at any time during the summer but are usually held and grown in the cell trays throughout the summer, allowed to go dormant, unplugged, counted, and held in cold storage for spring use. All 1.0 gal (3.8 L) and larger size containers are grown throughout the summer and then stored in cold storage (1.0 gal [3.8 L]) or cold frames (2.0 and 5.0 gal [7.6 and 18.9 L]) until spring distribution. Container and greenhouse plug production numbers for the spring of 2014 are listed in table 1. Species grown for container production at the Mason State Nursery are presented in table 2.

Address correspondence to—

David J. Horvath, Natural Resource Site Manager, Illinois Department of Natural Resources, Mason State Nursery, 17855 N. County Road 2400E, Topeka, IL 61567; e-mail: dave.horvath@illinois.gov; phone: 309-535-2185.

Table 1. Container material for distribution from Illinois' Mason State Nursery in the spring of 2014.

Plant material	Stocktype	Number distributed
Forbs and grasses	1.0 gal (3.8 L) containers	20,000
Trees and shrubs	2.0 and 5.0 gal (7.6 and 18.9 L) containers	3,000
Forbs and grasses	Plugs from 45-cell multipot	40,000

Table 2. Species grown in containers at Illinois' Mason State Nursery.

Species	Scientific name
Grasses	
Northern dropseed	<i>Sporobolus heterolepis</i>
Big bluestem	<i>Andropogon gerardii</i>
Little bluestem	<i>Schizachryium scoparium</i>
Sand love grass	<i>Eragrostis trichodes</i>
Side oats	<i>Boutilou acurtipendula</i>
Indian grass	<i>Sorghastrum nutans</i>
Forbs	
Black-eyed Susan	<i>Rudbeckia hirta</i>
Partridge pea	<i>Chamaecrista fasciculata</i>
Spike blazing star	<i>Liatris spicata</i>
Butterfly weed	<i>Asclepias tuberosa</i>
Lance leaf coreopsis	<i>Coreopsis lanceolata</i>
Lead plant	<i>Amorpha canescens</i>
Obedient plant	<i>Physostegia virginiana</i>
Smooth aster	<i>Aster laevis</i>
Purple prairie clover	<i>Dalea purpurea</i>
White prairie clover	<i>Dalea candida</i>
Purple coneflower	<i>Echinacea purpurea</i>
Stiff tickseed	<i>Coreopsis palmata</i>
Tall gayfeather	<i>Liatris pycnostachya</i>
Gray headed coneflower	<i>Ratibida pinnata</i>
Rough blazing star	<i>Liatris aspera</i>
Pale purple coneflower	<i>Echinacea pullida</i>
New England aster	<i>Aster novae-angliae</i>
Spiderwort	<i>Tradescantia ohioensis</i>
Oxeye sunflower	<i>Heliopsis helianthoides</i>
Royal catchfly	<i>Silene regia</i>
Western sunflower	<i>Helianthus occidentalis</i>
Compass plant	<i>Silphium laciniatum</i>
Rosin weed	<i>Silphium integrifolium</i>
Alum root	<i>Heuchera richardsonii</i>
Prairie dock	<i>Silphium terebinthinaceum</i>
Round headed lespedeza	<i>Lespedeza capitata</i>
Illinois mimosa	<i>Desmanthus illinoensis</i>
Indigo bush	<i>Amorpha fruticosa</i>
New Jersey tea	<i>Ceanothus americanus</i>
Wild blue iris	<i>Iris shrevei</i>
Trees	
Hackberry	<i>Celtis occidentalis</i>
Bur oak	<i>Quercus macrocarpa</i>
Shumard oak	<i>Quercus shumardii</i>
Pin oak	<i>Quercus palustris</i>
Shingle oak	<i>Quercus imbricaria</i>
Bald cypress	<i>Taxodium distichum</i>
Northern white cedar	<i>Thuja occidentalis</i>
White pine	<i>Pinus strobus</i>
Cherrybark oak	<i>Quercus falcata</i>
Norway spruce	<i>Picea abies</i>
Chinkapin oak	<i>Quercus muehlenbergii</i>
Pecan	<i>Carya illinoensis</i>