THE USE OF PRAIRIE GRASSES AND FORBS IN IOWA ROADSIDE AND PARK LANDSCAPES

By

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An attractive roadside, blending into the mood of the surrounding landscape, ever changing in form, color and texture, is a desirable feature of an interstate highway system or a scenic road through a park. The tidy appearance of a lawn, appropriate at intersections and other heavy use areas, might give way in another place to the functional beauty of crownvetch and birdsfoot trefoil, unmowed and rank, holding onto a steep bank. In yet another place a uniform stand of smooth brome or the rugged mixture of original prairie grasses and forbs grows thick and colorful along a deep backslope. The prairie species, because of thousands of years of adaptation to the Iowa climate, are ideal subjects for use in lanscaping; however, their value has been recognized only in the past few years. What do we know about them? Can they be established and maintained easily, kept free of diseases and weeds, control erosion, be used for wildlife, and are they really attractive?

Our background with establishment of prairie species began in May 1965 when seeds of more than 65 species collected by hand from native prairies and railroad rights-of-way in Iowa were planted. Some plots were kept weed free, others were planted to a cover crop and others were left in weeds. Very different levels of early establishment occurred because of differences in germination and the effects of weeds; however, by the end of the first growing season several species had been established relatively independent of weeds and cover crops. By the end of the third growing season the annual weeds that had once dominated the plots were stunted or absent, and the prairie species were in full control of the site.

A large-scale planting of prairie grasses was made in late May 1967 at the Loveland Overlook on Interstate 80 in western Iowa as the start of a three year project funded by the Iowa State Highway Commission. Three mixtures based on heights of the component species were used (Table 1). Soil conditions were rather uniform for the 9 acres planted to these mixtures because of the deep loess deposition on the site. The short mixture was planted adjacent to the parking area near the crest of the overlook and was the only mixture which was mowed. K-31 fescue withstood severe trampling for two years; finally, it, buffalo grass and perennial ryegrass were restricted to more protected parts of the site. The medium and tall mixtures were planted in wide bands away from the crest where excellent establishment was obtained. Striking replacement of weedy species occurred during the second and third growing seasons. By July of the third year the medium and tall plantings looked like pure fields of waving grain, the wheatgrass dominating the medium mix and the Canada wildrye dominating the tall mix at the time. A striking example of weed control was noticed. In an area of about two acres where 65 musk thistles were growing in 1968, five could be found in 1969 and none in 1970. The natural competition of the prairie species alone had brought this species under control without mowing, spraying, or hand-chopping in this deep loess soil at the same time the pasture across the fence was heavily infested with the thistle.

Additional plantings were made in 1968 in rest areas in central Iowa along Interstate 35 to determine whether species could be used in areas of poor soil or subsoil exposures. Mixtures and single species were planted in 1/30 acre plots on coarse subsoil. One site was too severe, and regrading was necessary following a heavy downpour. The plots were lost but not before seedling counts could be made on the level portions and ridges between the small erosion gullies. Excellent establishment of sideoats grama, switchgrass, Indian grass and a few other species occurred with very little weediness. The topsoil and the weed seeds it contained had been scraped from this site in the process of grading. It was obvious that any new planting could not have prevented gully formation under these extreme conditions, but it was also obvious that a combination of prairie species would have established easily on the site under normal conditions.

We now have five years of observations on prairie species as roadside cover. Additional plantings are still being made. More than 130 acres were planted to prairie grasses in Iowa this year, 80 acres along primary and secondary roads, 10 at the national headquarters of the SCS, and 40 at a new industrial plant. During the first two growing seasons of a prairie planting, its appearance is weedy, untidy, and not conducive to good public relations in a region where mowing is the accepted practice. Most weedy species in Iowa are annuals, plants which live for one year only and must reproduce by seeds. Most prairie species, however, are perennials, which overwinter by persistent roots, bulbs or other underground parts as well as by seeds. The annuals have the advantage until the root systems of the perennials begin to occupy the entire soil and to crowd them out. By the third growing season, especially in the fall when colors appear in the prairie stems, one can see the dominance of the taller grasses and forbs controlling the weeds and adding a new dimension to the roadsides. This taller, rugged, patterned growth of the prairie species is especially fitting for Iowa, an original prairie state.

This interest in the prairie is not only for weed control and appearance; for the tall grasses offer a dependable source of nesting cover for pheasants and cover for other wildlife in a region where hayfields, oats and fence rows are disappearing as more corn and soybeans are planted. With prairie species in control it is probable that mowing of backslopes can be dispensed with entirely except where safe lines of vision are nejessary at intersections. This amounts to a large saving in maintenance costs where it has been the practice in the past to mow all the way to the fence. Other species which have been used very successfully in Iowa as standard plantings (e.g., crownvetch, smooth brome, K-31 fescue, and alfalfa combinations) receive one or no mowing at all without showing excessive weed invasion; however, it is likely that effective public information will be necessary to convince people that mowing can be reduced and that the taller prairie species are beautiful. Many people still regard an unmowed or an unknown plant as a weed, and a colorful prairie species may suffer because of a remotely similar looking pest of the fields and pastures. Another problem is the lack of seed sources for the colorful flowers of the prairie, a situation which could soon be remedied by the appearance of commercial seed companies interested in native plants. Many native grasses are available already.

Successful establishment of prairie grasses and forbs has been achieved by scattering seed by hand on ground that has been rototilled or disked followed by packing or dragging. Best establishment has occurred with June plantings at seeding rates of about 20 pounds pure live seed (PLS) per acre (Table 3). With the Nisbet grass drill, this amount can easily be reduced by one half.

It would be difficult to find a better group of species for Iowa landscapes than the original prairie grasses and forbs. It was this combination of grasses, legumes composites and other prairie plants which built the rich Iowa topsoil and protected it until it was plowed. With the large number of different kinds of plants to select from there is little chance of a destructive disease spreading through a planting. It provides a variety of food and cover for wildlife. Fire, once a natural phenomenon on the prairie, could be introduced under prescribed conditiins to control woody species such as red cedar, mulberry, and elm.

The prairie species seem to respond with added vigor and reproduction during the year following such an event. Therefore, from the standpoint of weed control, natural beauty, wildlife conservation, and economy of maintenance, it appears that mixtures of prairie grasses and forbs can be added to the list of plant materials which should grace Iowa roadsides and park landscapes in greater abundance in the future. One landscape architecture firm in central Iowa believes in the opportunities of prairie landscaping so much that it has surrounded its building with several acres of prairie plantings. An excellent stand was obtained from seed and transplanted material from our experimental plots.

Table 1: Mixtures of Grass Species, Loveland Overlook. (See Table 2 for Natives).

A-Short	B-Medium	C-Tall
Blue grama	*Sideoats grama	*Big bluestem
*Buffalo grass	Little bluestem	Sand bluestem
Sand dropseed	*Intermediate wheatgrass	Sand lovegrass
Bluegrass	Tall wheatgrass	*Switchgrass
*K-31 fescue	*Slender wheatgrass	*Canada wildrye
*Perennial ryegrass	Crested wheatgrass	Russian wildrye
		*Indian grass
		*Alkali sacaton

*Successful establishment at end of second growing season.

Table 2: Selected List of Prairie Species in Iowa Plantings.

Grasses	Forbs
Little Bluestem (Blaze; native Nebr.) Andropogon scoparius	Showy sunflower Helianthus laetiflorus
Big Bluestem (Pawnee) Andropogon gerardi	Saw-tooth sunflower Helianthus grosseserratus
Switchgrass (Blackwell; Path finder) Panicum virgatum	Yellow coneflower Ratibida pinnata
Indiangrass (Holt; Nebr. 54) Sorghastrum nutans	Purple coneflower Echinacea pallida
Canada wildrye Elymus canadensis	Compass plant Silphium laciniatum
Side oats grama (Trailway) Bouteloua curtipendula	Bush clover Lespedeza capitata
Buffalo grass Buchloe dactyloides	Tick trefoil Desmodium canadense
Slender wheatgrass Agropyron trachycaulum	Purple prairie clover Petalostemon purpureum
	White prairie clover Petalostemon candidum
	Stiff goldenrod Solidago rigida
	Tall goldenrod Solidago altissima
	Rattlesnake master Eryngium yuccifolium
	White Heath aster Aster ericoides
	Fall aster Aster laevis
	Black-eyed Susan Rudbeckia hirta

Table 3: Native Grass Mixtures (Tentative for Iowa).

Basic Tall Mixture - for areas which will not be mowed, wet areas, deep soils and areas where plant height of 4-5 feet is desired.

	Pounds pure live seed per acre
Big bluestem	8
Indian grass	8
Switch grass	4
Reed canary grass	1
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Basic Medium Mixture - for areas which will not be mowed, on dry sites or shallow soils, and areas where plant height of 2-4 feet is desired.

	Pounds pure live seed per acre
Little bluestem	5
Side oats grama	6
Canada wild rye	8
Slender wheatgrass	4
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RANGELAND PRODUCTIVITY AND COMPOSITION DATA STORAGE, RETRIEVAL, AND USE

By

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ABSTRACT

The Soil Conservation Service started in 1967 to develop a nationwide Range Resource Data Storage and Retrieval System (RDS) consisting of several segments or subsystems.

To date, most effort has been expended on the subsystem relating to Rangeland Productivity and Botanical Composition. In this segment production and composition data from soil taxonomic units, along with related locator and environmental information, will be stored in a Data Bank. Data from prairie soils will make up a significant portion of the stored information.

These data will be retrieved and analyzed by standard and special computer programs to enable the SCS to render faster, more efficient, and more scientific service to those it assists. The arranging of soils into interpretative groupings, such as range sites, is a typical use anticipated for the system. Many other uses and studies can be made when sufficient data are stored in the bank.

The Productivity and Composition subsystem will include data from rangelands (natural grasslands and savannas), grazable woodlands (forest lands that produce an understory of herbaceous plants that can be grazed without harm to the timber resource), and native pastures (lands whose climax vegetation is forest but are being managed as disclimax grasslands).

The entire system is being closely correlated and coordinated with other data systems within the SCS. Many other uses are anticipated to improve the scientific accuracy of SCS work. Illustrations of data stored in the system include comparisons of productivity data between different soils in one year and between different seasons on the same site.