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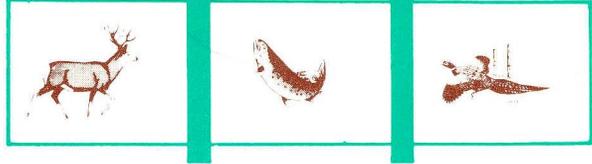
Outdoor Facts

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Game Information Leaflet

Number 113

ESTABLISHING SWITCHGRASS FOR WILDLIFE IN EASTERN COLORADO¹

Switchgrass (*Panicum virgatum*) has high cover value for wildlife (Myers and McPherron 1967, George et al. 1978). It has a tall, vigorous growth form that remains standing through the winter. This provides protective cover for loafing and night-roosting, escape from predators and blizzards, standing residual for early spring nesting, and helps concentrate wildlife to improve hunting opportunity (Fig. 1). Other perennial grasses, especially cool-season species, break down and mat under drifting winter snows and, thus, do not provide the cover values of switchgrass. In Iowa, ring-necked pheasant (*Phasianus colchicus*) nest densities in switchgrass averaged 68.4/100 ha, exceeding densities of 39.8/100 ha in alfalfa/orchardgrass (*Dactylis glomerata*) (George et al. 1978). Northern bobwhite (*Colinus*



Fig. 1. Switchgrass often grows in tall vigorous clumps which remain standing over winter.

virginianus), mourning doves (*Zenaida macroura*), and several species of passerine birds also nested in the Iowa plantings. Other wildlife known to readily use switchgrass for nesting and/or concealment include prairie grouse (*Tympanuchus* spp.), several species of ducks (*Anatinae*), and deer (*Odocoileus* spp.).

Some grass species -- side oats grama (*Bouteloua curtipendula*), smooth brome (*Bromus inermis*), and crested wheatgrass (*Agropyron cristatum*) recommended for use in eastern Colorado -- possess growth forms and height-density characteristics less valuable for wildlife. They do not provide sufficient concealment for nesting pheasants and grouse. Taller species, if planted sparsely, usually provide the best wildlife cover. However, tall warm-season grasses (switchgrass, bluestems [*Andropogon* spp.], yellow Indiangrass [*Sorghastrum nutans*], etc.) are usually more difficult to establish than cool-season grasses (wheatgrasses [*Agropyron* spp.], smooth brome, etc.).

Switchgrass is a tall, warm-season rhizomatous grass adapted to moist, deep, fertile soils (Duebbert et al. 1981). In Colorado, switchgrass is best adapted to subirrigated wet meadow sites or irrigated fields where it is relatively tolerant of high alkalinity. It grows better in sandy soils, but also grows well in the loam soils of northeastern Colorado where annual precipitation averages ≥ 40 cm (15 in.). Switchgrass use is questionable under more arid, poor-soil conditions.

FIELD TESTS

The herbicide, atrazine, applied pre-emergent to planting (Wilson 1970), was used in switchgrass field

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trials in 1980 by the Division of Wildlife in northeastern Colorado. It controlled weeds and greatly improved establishment and growth of switchgrass seedlings. Tall, vigorous stands were attained within 2 growing seasons. Where atrazine was not used, poorer success occurred and growth and establishment were much slower. Since 1985, numerous switchgrass stands have been successfully established on Division of Wildlife properties in northeastern Colorado (Fig. 2).



Fig. 2. Switchgrass provides cover for wildlife under adverse weather conditions.

Evaluations of the cover quality of switchgrass compared to alfalfa, tame grass, native grass, wheat stubble, and green wheat were conducted in 1986-87. Comparisons were conducted on randomly-selected tracts distributed primarily in loam soil types in northeastern Colorado. Most stands of switchgrass were 5-15 years old. Some contained lesser amounts of other warm-season native grasses. Height-density indices (HDI) of visual obstruction (Robel et al. 1970) were used to compare cover quality. The HDI values for residual stands of switchgrass surpassed other cover types in early spring exemplifying its importance as potential nesting cover (Fig. 3).

Switchgrass was seeded into several revegetation strips that had been disked, harrowed, and treated with atrazine in early spring 1985. These strips were within sandy loam soils on the Tamarack Prairie in eastern Logan County. Excellent stands were attained within 2 years. The height-density of standing residual measured in early spring 1989 demonstrated the superior cover quality of switchgrass compared to adjacent ungrazed and grazed native prairie grasses (Fig. 4).

Because of its cover values, switchgrass has been recommended for planting in Conservation Reserve

fields (CRP) in eastern Colorado by the Division of Wildlife which cost shared to promote its use. Switchgrass usually has been planted in mixtures, often as only a small proportion of the total, as required by U. S. Department of Agriculture, Soil Conservation Service standards and specifications (U. S. Dep. Agric. 1989). Preliminary results (1989) indicated switchgrass possessed better height-density quality than other grass species planted in CRP fields. All evaluated plantings have been ungrazed by livestock.

ESTABLISHMENT PROCEDURES

Site Preparation

A firm seedbed free of competitive vegetation is prerequisite to establishing switchgrass (or any grass species) in eastern Colorado. Cultivation is necessary to remove competing vegetation, preferably in early spring as soon as the ground has thawed and is tillable. Rainfall, if received, will settle and firm the seed bed prior to planting. A spike-tooth harrow will aid in soil firming and bring residual vegetation to the surface to reduce wind erosion.

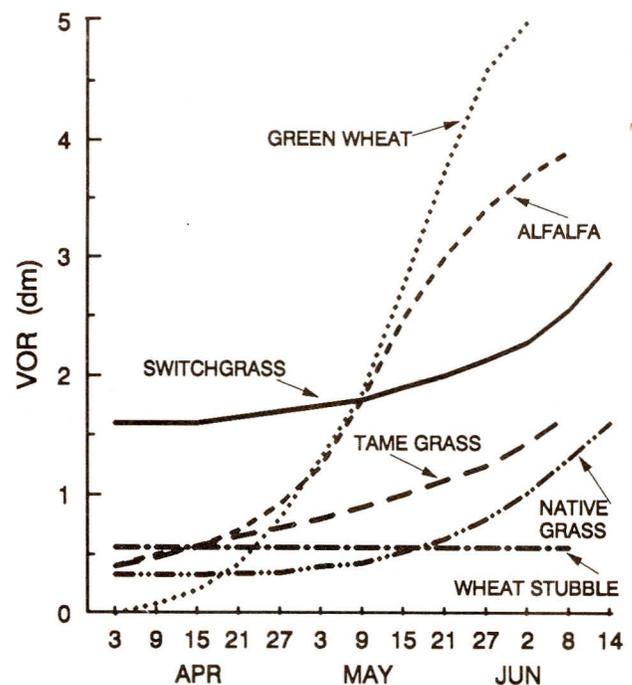


Fig. 3. Progression of height-density index among types of nesting cover (1986-87), northeastern Colorado.

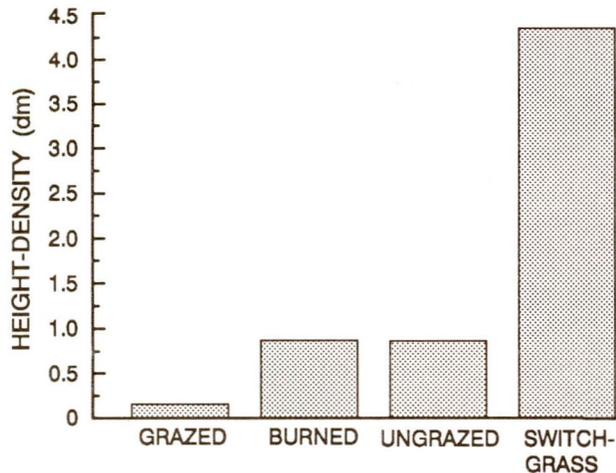


Fig. 4. Height-density index of residual grass-forb vegetation among grazed, ungrazed, and prescribed-burned native grasses and revegetated switchgrass, Tamarack Prairie, early spring 1989.

M. J. Gardner, Division of Wildlife technician, tilled each strip twice with a tandem disk to remove most existing native grasses prior to planting switchgrass within the Tamarack Prairie. This treatment did not remove deep-rooted grasses, e. g., prairie sandreed (*Calamovilfa longifolia*), but eliminated shallow-rooted grasses. Plowing with a mold-board plow followed by disking would be needed to remove deep-rooted grasses. Disking, followed by harrowing, was conducted as soon as the ground was tillable in early spring. Strips (20-40 m wide) were disked perpendicular to the prevailing wind to reduce susceptibility to erosion.

Herbicides

Atrazine was applied at 0.84 kg/ha (0.75 lbs/ac) on sandy loam soils following tillage; higher rates [1.12 kg/ha (1.0 lbs/ac)] have been used on loam soils. Higher rates could be used in problem weed sites where moist, deep, loam or clay-loam soils with high organic matter occurred. Atrazine can be reapplied the 2nd year to continue weed suppression. The herbicide, chlorsulfuron (Glean®), (used extensively on CRP fields in eastern Colorado) can be substituted for atrazine, especially if switchgrass is planted in mixtures with warm-season grasses or wheatgrasses. Atrazine is more economical to apply, but switchgrass and bluestems are about the only tolerant perennials. These pre-emergent herbicides should be soil incorporated with a spike-tooth harrow when possible (rainfall will help soil incorporation). Label instructions should be closely followed when applying herbicides.

Use of herbicides permits no-till planting of switchgrass directly into sorghum, millet, or corn stubble. Glyphosate (Roundup®) herbicide can be applied to kill existing annual vegetation before planting. The high rates of application and timing required make use of Roundup® impractical where perennials are involved. The stubble of winter wheat and other small grains is allelopathic and must be removed prior to planting switchgrass and other warm-season species (U. S. Dep. Agric. 1989). Therefore no-till planting in wheat stubble is not practical.

When to Plant

April is the preferred month for planting switchgrass. Planting can be extended into mid May in north-eastern Colorado with no significant problems. In no-till situations, planting can be extended from November through winter, but minor seed deterioration is probable.

How to Plant

Switchgrass seed is small and should be seeded using an alfalfa seed attachment and double-disk furrow openers with depth bands. Seed placement should be about 1.27 cm (0.5 in.) in loam soils and slightly deeper in sandy areas. Rubber packer wheels behind the drill are recommended. A row spacing of 17.8-20.3 cm (7-8 in.) is best, but when a herbicide is used, a wider spacing of 30.5-40.67 cm (12-16 in.) may be better for wildlife plantings. A seeding rate of 4.5 kg/ha (4 lbs/ac) is usually recommended. However, with good soil moisture conditions, a firm seed bed, use of a pre-emergent herbicide, wider row spacing, and good planting equipment, this seeding rate can potentially be reduced to 2.2-3.4 kg/ha (2-3 lbs/ac). In recent years a few stands on Division of Wildlife properties were too dense. For wildlife plantings, moderately sparse stands that attain good height and vigor are preferable to dense, stunted stands.

CONSIDERATIONS IN WILDLIFE PLANTINGS

Large continuous monotypes of switchgrass, other grasses, or other vegetation are usually not optimum for wildlife. A 16.2-ha (40 ac) tract is probably maximum size, preferably in a rectangular design to increase edge. Relatively wide strips (50-100 m) of switchgrass can be interspersed with narrower strips of alfalfa, food-cover

strips (forage sorghum-grain sorghum mixes, etc.), and weed strips to provide excellent combinations of cover for pheasants. Narrow (4 m) fallow strips should border grass plots. Switchgrass can be mixed with other tall, warm-season grasses and alternated with narrow alfalfa-clover strips for prairie grouse.

MAINTENANCE TREATMENTS

Deep chiseling in early spring when soil is moist and mellow should be used to thin stands of any grass, including switchgrass. Fireguards can be disked around the tract and residual vegetation can be burned prior to chiseling. Shallow disking can also be used after chiseling to help thin the stand if necessary. Atrazine or chlorsulfuron may be used to reduce weed competition. Switchgrass and bluestems respond better than other grasses to fire management in eastern Colorado. These maintenance treatments are recommended in preference to grazing by livestock on wildlife plantings and need not be repeated more often than 5-10 years.

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Warren D. Snyder
Wildlife Researcher
June 1990

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