



Alternative Annual Forages

Beef cattle producers may look to short-term or annual forages to stretch forage productivity, or to extend the grazing season. Nearly all of the short-term choices are fast-growing annual crops. Traditionally, warm-season annuals such as sorghums and millets are planted for summer forage and can typically be grazed when cool-season pasture species are dormant. Increasingly, cereal grains and forage brassicas are being planted for more fall, winter, or spring forage, allowing pasture acres to recover before the winter or increase in spring growth prior to grass turnout. All of these annual species vary greatly in height; regrowth potential; yield; feeding value; growing season; suitability for hay, grazing, and silage; and toxic or anti-quality components. Producers should carefully consider the cow herd needs as they compare alternative forage

Cool-season annual grasses, cereals, and brassicas

The following are considered to be cool-season crops. Many of these species are commonly planted in the fall behind harvested cash crops as cover crop forages to aid in reducing soil erosion, retaining nutrients, and improving water quality. However, these species can also

be planted in the spring for grazing or hay production and can generally be usable in 45-60 days, depending on weather conditions.

Spring-planted oats, spring wheat, and spring barley can be cut or grazed at the late-vegetative (boot) through early-milk stage for the best feeding value. As seedheads mature, stems greatly decrease in feeding value. If these spring cereals are planted in mid- to late-summer, they will remain mostly leafy and can be grazed in the fall before winter-killing late in the year. Some wheat and barley varieties have beards (awns) that, when mature, become fibrous and detract from feeding value.

Cereal or grain rye, winter wheat, and winter triticale can be planted in the late summer or early fall for fall grazing. They will also overwinter and allow for spring grazing or harvesting. These species require a cold period to induce seedhead production. Each species has desirable characteristics for forage use. Cereal rye is the most hardy and cold tolerant of these species and often greens up earlier in the spring than other cereal grains. Winter wheat is less cold tolerant than cereal rye, but matures later in the spring, making it a desirable feed source due to its later harvest date. Winter triticale is a cross between wheat and cereal rye, so it has a combination of characteristics from each species. It is generally hardier than wheat and higher in feed value than cereal rye, due to its later maturity.

IBC 0136 May 2019



Cereal rye at early boot stage. Photo by Meaghan Anderson.

Brassicas such as forage rape, turnips, and radishes are annual, cool-season crops that are high in protein and highly digestible. With nutrient values comparable to concentrate diets and extremely high moisture content, it may be helpful to offer supplemental fiber and dry matter when utilizing these forage species. When intended for grazing, it is recommended that brassicas are seeded with some type of small grain to provide a more optimal consumed diet. Likewise, brassicas can accumulate sulfur and nitrates. Therefore, producers should avoid feeding other high sulfur feeds or water sources to minimize the risk of sulfur toxicity. While brassicas can be planted in early spring, they are most commonly used in late summer seedings behind shorter season crops like corn silage or small grains. Varieties within a species may vary significantly in their root and leaf production, so if grazing is intended, variety selection for leaf production will yield greater forage production. Seeding rates will vary among species. Forage rape seeds and forage turnip seeds are small compared to those of radishes, allowing for lesser seeding rates compared to radishes. Brassica species should be usable in approximately 45 days. While brassicas will winterkill, they have a high degree of frost tolerance and will often remain in good condition for grazing into November.

Warm-season annual grasses - sorghums, millets, and teff grasses

These are usually planted from mid- to late-May through early July or when the average 4-in. soil temperature is 65°F and increasing. They are typically used for 2-3 months during summer and autumn. Most are ready for first harvest or grazing about 50 days from emergence,

and if managed properly, often result in more than one forage crop per year.

Foxtail millet, a fine-stemmed species, is an alternative hay crop that will produce only one crop. Sudangrass and Japanese millet have larger, coarser stems, which make them more difficult to harvest as dry hay. They are, however, better suited for multiple silage harvests.

Forage sorghum is a tall, one-cut, warm-season annual best used for fresh-cut forage or stored as silage. Grain sorghum can be planted from late spring through early summer for a silage crop. These sorghums are harvestable in about 60 days and require good fertilization for production.

Hybrid sorghum x sudangrass and hybrid pearl millet are multiple-cut, warm-season annuals. They are used for fresh-cut forage, pasture (rotational grazing is recommended), or silage. Hybrid pearl millet grows somewhat slower than sorghum x sudangrass hybrids and may grow poorly in cool summer seasons. Varieties vary greatly in height, leafiness, and grain yield, depending on the parent lines that make up the hybrid. First growth is usable in about 50 days; regrowth is from tillers. For sudangrass and sorghum x sudangrass, leave at least a 6-8 in. stubble height to maximize regrowth. Cutting or grazing shorter greatly reduces regrowth potential.

Brown Midrib (BMR) types of hybrid sudangrass, sorghum x sudangrass hybrids, forage sorghum and hybrid pearl millet are becoming increasingly popular due to reduced lignin content in the stems, which increases digestibility of the forage.

Hydrocyanic acid poisoning (prussic acid) is a risk for sorghum, sudangrass, and hybrid sorghum x sudangrass. Prussic acid risk is greatest during early growth stages and following severe, widespread plant injury such as a frost or hail event. Sorghum and sorghum x sudangrass hybrids should not be grazed until growth exceeds 24 to 30 in., while sudangrass and hybrid sudangrass should not be grazed until growth exceeds 18 to 24 in. Additionally, these species should not be grazed immediately following any weather or management event that damages or injures plants. The millets have no hydrocyanic acid (prussic acid) poisoning risk. Likewise, sorghums and millets can accumulate nitrates when growing during extended drought.

Table 1. Forage planting date, harvest date, yield, and quality of annual forages.¹

Crop	Planting Date	Seeding Rate/Acre	Maturity Date	Yield (DM tons/acre) at Maturity	% Crude Protein	RFV ²
Winter rye	September	1-2 bushels	mid-May	3.0-3.5	12-13	85-90
Winter wheat	September	1-2 bushels	late-May	3.0-3.5	11-12	85-90
Winter triticale	September	1-2 bushels	early June	3.0-3.5	11-12	85-90
Barley, Sp triticale, Sp wheat, oats	mid-April	2-3 bushels, 2-3 bushels oats	mid-June	2.5-3.0	12-13	100-110
Barley, Sp triticale & peas, oats ³	mid-April	2-3 bushels, 2-3 bushels oats	late June	2.5-3.0	15-16	115-120
Wheat (spring)	mid-April	1-2 bushels	early July	2.5-3.0	11-12	100-110
Teff grass	mid-May to July	8-10 pounds		3-5		
Forage sorghum	June 1	15-20 pounds	mid-Sept	6-9	10-11	90-100
Forage sorghum	July 1	15-20 pounds	mid-Sept	2-4	10-11	90-100
Sudangrass & Japanese millet	June 1	20-25 pounds	mid-July	3-5	11-13	90-100
Sudangrass & foxtail millet	July 1	20-25 pounds	mid-August	2-3	11-13	90-100
Sorghum x sugan hybrid & hybrid pearl	June 1	20-30 pounds	mid-July	4-6	12-14	90-100
Sorghum x sugan hybrid & hybrid pearl	July 1	20-30 pounds	mid-August	3-5	12-14	90-100
Grain sorghum & soybeans ⁴	June 1		Sept	6-7	11-12	95-110
Forage rape and turnip - tops	mid-June	3-6 pounds	Fall	2-3	20-25	150-250
Forage rape and turnip - tops and roots	July to late August	3-6 pounds	October	0.5	16-20	---
Oats, barley, Sp triticale	August	1-2 bushels, 2-3 bushelsoats	October	1-2	10-11	140-150
Wheat (winter)	August	1-2 bushels	October	0.5-1.0	12-13	150-160
Mixed winter wheat & oats	August	3/4 bushels & 1-2 bushels	October & May	3-5	10-13	100-120

¹ Data compiled by Steve Barnhart from various sources in 2007

² RFV = Relative Feed Value, 100 equals approximately the digestibility and feed energy value of full bloom alfalfa

³ Add about 50 pounds/acre of field peas to cereal grain

⁴ Add 0.75-1.25 bushels soybeans/acre to 10-15 pounds/acre sorghum

Teff, or summer lovegrass, is becoming a relatively popular choice for a summer grass hay crop. Teff is a warm-season, annual grass that has grown reasonably well in Midwest locations. It establishes relatively quickly and is harvestable in 45-50 days, with multiple harvests possible. To maximize regrowth, leave at least 4 to 5 in. stubble height at harvest. However, seed sources are limited and the small seed requires a well-prepared seedbed for successful establishment.

Table 1 outlines estimated yield and feeding value of various annual forages harvested at full maturity. Keep in mind that as plants mature, nutritional value declines. Therefore, grazing or harvesting forages in the late vegetative stages through early dough stage is ideal for

optimizing forage yield without compromising forage quality. As with any forage, there is likely a wide range in value based on several factors including planting and harvest dates, weather patterns, species varieties, and more.

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Cover photo by Erika Lundy.