

This article was presented on  
June 22, 2000 at the Purdue Forage Day.

## **WHY ANNUAL FORAGE CROPS SHOULD BE CONSIDERED**

Craig Williams  
Cass County Extension Educator  
Ag & Natural Resources

Annual forage crops are often thought of as supplemental or emergency crops by many livestock producers. Although a high quality perennial forage should be the base forage for livestock producers, annual forages can play an important niche role in a forage system by providing forages in the form of hay, silage, or grazing. When supplemental forages are needed, winter injury impairs forage crop stands, drought decreases forage crop yields, or producers are interested in extending the growing/ grazing season, annual forage crops should be considered.

Other considerations for utilizing annual forages might include:

1. When transitioning from endophyte-infected tall fescue to an improved forage in the pasture.
2. As an intervening forage between a previous alfalfa crop and a new seeding to eliminate concern of autotoxicity.
3. As a follow up forage crop to wheat or a winter killed or poor hay stand after the first cutting of hay is removed.
4. In a feedlot that is not utilized during the summer.
5. In winter hay-feeding areas damaged by daily high concentrations of livestock.
6. Following silage fields as a winter cover crop for erosion control and possibly extend grazing seasons.

The selection and management of annual forage crops require special considerations, as they can be expensive to produce, require additional management, and have the potential for prussic acid and/or nitrate poisoning. Summer-annual grasses provide excellent forage during the summer. Small grains can be mechanically harvested as silage or hay and can ease fall or spring shortages when grazing is possible. Brassica crops such as rape, kale, and turnips make good late-summer and fall pasture, but require advanced planning in order to have a sufficient growing season. Winter rye or wheat are the most commonly used cover crops in Indiana.

The following information has been extracted from Purdue publication AY-263 "Producing Emergency and Supplemental Forage For Livestock". Contact your local Extension Office for a copy, which describes the various types of annual forages and their establishment, fertilization, harvesting, potential animal health hazards, animal utilization and performance, and other considerations.

Summer-annual grasses to consider include the following:

Sudangrass is a rapid growing warm-season grass which can produce a good quality forage if managed properly. It usually contains lower levels of prussic acid than sorghum-sudangrass hybrids, but is also lower yielding.

Sorghum-sudangrass hybrids resembles sudangrass in growth, but the hybrids are taller, have larger stems and leaves, and generally produce higher yields. They are more likely to contain toxic levels of prussic acid than are other summer-annual grasses. This grass can become coarse and unpalatable if not utilized properly.

\*\*\*\*\*Brown Midrib Sorghum-Sudangrass Hybrids have recently become available. Research at Purdue University by Keith Johnson, Purdue Forage Specialist, reveals potential for increased animal performance when utilizing a brown midrib sorghum-sudangrass hybrid when compared to normal sorghum-sudangrass hybrids.

Pearl millet is another annual grass that could be grown for supplemental forage. It tends to have smaller stems and is more leafy than the other grasses previously mentioned; it does not produce prussic acid. Slow growth and poor re-growth has caused the limited use of this grass in Indiana. It is more adapted to the warmer, more humid climates of the southeastern United States.

Soft red winter wheat is an excellent fall and spring pasture which is high in digestibility. Because of its excellent winter-hardiness, wheat can be sown later in the fall and withstands wetter soils than barley can tolerate. Wheat can produce more tonnage than barley and is of higher quality than rye. After proper fall or early-spring grazing, it can be harvested for grain, silage, or hay.

Winter rye is the most winter-hardy of the small grains. Quick growth in both fall and spring make it the most productive of the small grains for pasture. Rye is of poorer quality than the other small grains and can become unpalatable if allowed to mature past the boot stage.

Winter triticale can be used for late fall and early-spring pasture, silage, or hay. It is managed similarly to wheat and has a higher forage yield but lower quality as compared to wheat. It is not commonly harvested for grain as no cash markets currently exist.

Spring oats is commonly used as a companion crop for seeding legumes; it may be used as hay, silage, or pasture in spring and early summer when sown in the early spring. Spring oats may be sown in August for fall pasture, but it will be killed by frost and will not produce spring growth. It is better adapted to northern than to southern Indiana.

Brassica crops (turnips, kale, and rape) can be described as high-yielding, high-quality, and fast-growing biennial crops. The crop is utilized the seeding year only. The most common usage is for late-summer or fall grazing.

\*\*\*Mixtures such as "Field peas, soybeans, forage sorghum" are available.

Establishment Information for Emergency and Supplemental Forages. (From Purdue publication AY-263 "Producing Emergency or Supplemental Forages for Livestock")

Crop	Comments	Planting date	Seeding rate (lb pure live seed/acre)	Emergence time (days)	1st grazing (weeks)	Hay Yield (ton/acre)
Sudangrass	Rapid growth; medium prussic acid potential; used for pasture, silage, green chop, hay	May 1- July 15	25	10	4	3-4
Sorghum x sudangrass hybrids	Rapid growth; high yield; high prussic acid potential; best for pasture, silage, green chop	May 1- July 15	20	10	4	4-5
Pearl millet	Slower growth and regrowth; no prussic acid; use as pasture, silage,	May 1- 15 -July 15	20	7	4-5	3

	greenchop					
Winter wheat	High yield, best as hay, pasture, silage, greenchop	*Aug 15-Sept. 1; Sept. 15-Oct. 31	120	7	4	2-4
Winter rye	High yield; lower quality than wheat; use as hay, pasture silage, greenchop	*Aug 15-Sept. 1; Sept. 15-Oct. 31	112	7	4	4
Winter barley	Lower yield; medium quality; southern 1/3 of Indiana only; best for hay, pasture silage, greenchop	*Aug 15-Sept. 1; Sept. 15-Oct. 31	96	7	4	2-3
Winter triticale	High yield; lower quality than wheat; No market for grain; best as hay, pasture, silage, greenchop	*Aug 15-Sept. 1; Sept. 15-Oct. 31	100	7	4	3-4
Spring oats	Lower yield; spring or fall grazing; use as hay, pasture, silage, or greenchop	Mar. 1-Apr. 15 or *Aug.1 - Sept. 1	96	10	4	2-3
Brassica Crops	High quality; used for late-summer or fall grazing	May 1-July 1	1 1/2, turnips & swedes; 3 1/2 kale & rape	10	10	4-6

-----  
-----

\* Seeding dates are for fall pasture usage. Other seeding dates are listed for spring forage and grain.

## Harvesting

Summer-annual grasses respond best to rotational-grazing systems. Millet, sudangrass, and sorghum-sudangrass hybrids may also be harvested and fed as green chop, silage, or hay. During a feed-shortage year, green chopping is an efficient way to stretch feed supply, but it is time consuming and somewhat weather dependent. When making hay, a mower-conditioner should be used to increase the drying rate. Even when a mower-conditioner is used, haymaking can be difficult because of the high moisture content and large stems.

Grazing small grains is difficult in most of Indiana because of delayed planting dates and wet fields during the prime grazing season. Heavy-fall grazing increases the danger of winter kill, except when excessive fall growth exists. Heavy or late-spring grazing can greatly reduce grain yields. Remove livestock from small-grain pastures to be harvested for grain when "jointing" of the crop is first observed. Rye will begin to joint two weeks ahead of wheat and five weeks ahead of oats.

Small grains are more commonly harvested for forage as silage or hay. The stage of harvest is critical in determining feeding value. Purdue research data indicates dry matter yields increased from 2.3 to 5.0 tons per acre as small grain harvest was delayed from boot to soft-dough maturity stages. Associated with the increased yield was reduced forage quality. Crude protein content declined from 9.9 to 4.6%, and digestibility declined from 68.3 to 54.8% as the small grains matured. It is apparent the livestock species and the class of livestock (e.g., gestating or lactating) as well as the effect of planting date upon the succeeding crop's yield are critical factors in determining when the small grain should be harvested. Regardless of the growth stage at which the small grain is cut, a mower-conditioner should be used to increase the drying rate. Table 4 has specific harvest information.

Harvest Information for Summer-Annual Grasses, Brassica Crops, & Small Grains						
Desired Use						
Silage and Greenchop		Fall Pasture <sup>1,2</sup>		Summer Pasture (Spring for small grains) <sup>3</sup>		
Crop		When to graze	When to terminate grazing	When to graze (inches)	Height after grazing (inches)	Interval between grazings (weeks)

Sudangrass	Prior to boot stage or when 36 in. tall	18-30 in.	Frost (may resume 5 days after killing frost)	18-30	6-8	2-3
Sorghum X Sudangrass			-----			3-4
Pearl Millet			When utilized			

---

Brassica Crops	Not Recommended	18-30 in.	When roots & tops are utilized	10 wk. after spring seeding	5	3
Small Grains	Boot to early heading stage	6 in.		When growth begins until jointing if grain is desired	3	2-4 wk

- 
- <sup>1</sup>Do not graze when small grain is dormant or when ground is frozen.
- <sup>2</sup>Fall pasture only early-seeded small grains. Spring oats can be grazed until utilized.
- <sup>3</sup>If a grain crop is desired small grains can only be grazed one time during the spring.

### Potential Animal Health Hazards

The two most frequently reported animal health problems associated with summer-annual grasses are prussic acid poisoning and/or nitrate poisoning.

Prussic-acid poisoning occurs in sudangrass and sorghum-sudangrass hybrids. In general, ruminants are more susceptible to prussic-acid poisoning than swine or horses. Toxic levels of prussic acid occur most commonly after a killing frost or drought.

For more information on prussic acid poisoning, refer to Extension Publication AY-196 Minimizing the Prussic-Acid Poisoning Hazard in Forages.

Nitrate poisoning usually occurs when high rates of nitrogen fertilizer are used in one application and then a drought or sudden weather changes occur. High-nitrate levels are especially found in the lower stems. The nitrate in plants harvested for hay does not dissipate as it cures, so problems can occur when the hay is fed. There can also be problems in grazing the stubble in the fall and

winter after the leaves and upper parts of the plants are consumed and livestock begin eating the lower parts of the stalk. Nitrate poisoning can occur in pearl millet as well as in the sorghum-sudangrass hybrids and sudangrass.

Sorghum poisoning of horses occurs as an infection of the urinary tract, called cystitis, when horses graze on sorghum. The concern is reduced when the forage is harvested as hay.

Animal health concerns are not as prevalent with the small grains as they are in the summer-annual grasses. General rules include: 1) When turning lactating animals out on lush spring pasture, supplement with high magnesium mineral blocks or mineral-salt mixtures to reduce the incidence of grass tetany, 2) If seed is treated with a fungicide or other type of treatment, be sure to follow harvest restrictions on the label, 3) Remove dairy animals from small-grain pasture 2 hours before milking to reduce the problem of off-flavored milk, & 4) Split nitrogen applications to avoid nitrate poisoning.

### **Summary**

When emergency or supplemental forage crops are needed, **the economics** of production should be considered. Annual forage crops can aid in making the most of growing seasons and can enhance forage cropping systems for livestock producers.