



# FORAGE FACTS

*Publication Series*

## BRASSICAS AND CHICORY FOR FORAGE

### INTRODUCTION

Brassica forages are high quality, high yielding, fast growing crops that are suitable for livestock grazing. Brassicas have been used sparingly in Kansas, therefore, most of the information about brassicas is based on work done in other parts of the United States. Both tops (stems plus leaves) and roots (bulbs) can be grazed and are very nutritious. Members of the brassica family include kale, forage rape, turnips and swedes. Brassicas are very high in crude protein and energy, but extremely low in fiber. Weight gains by feeder lambs have been 0.2 to 0.4 pounds per day and 1.5 to 2.0 pounds per day for stocker cattle. Brassicas may best fit an early to late fall grazing program in Kansas. Chicory is a perennial cool-season herb in the sunflower family. In New Zealand, it produces in excess of 10 tons of forage with 18 to 22 percent protein and 62 to 77 percent in vitro dry matter digestibility.

### TYPES OF BRASSICAS

Kale has the greatest cold tolerance of the brassicas and can survive temperatures down to 10°F. Varieties vary greatly in the rate of establishment, stem development, days to maturity and winter hardiness. Stemless (marrow stem) varieties reach crop heights of 25 inches and mature in 90 days. Varieties with stems can grow to 60 inches in height with 2-inch stems and require 150 to 180 days to attain maximum production.

Forage rape, which should not be confused with oil seed rape, is a short-season leafy brassica whose stems and leaves are ready to graze 60 days after establishment. It is a prime forage for fattening lambs or flushing ewes. Forage rape is usually categorized as a giant or dwarf. Giant varieties are mainly utilized for cattle or sheep grazing, whereas the dwarf varieties are best suited for finishing lambs. Generally, a 60-day growth period is required prior to the first grazing or harvest and a 30-day regeneration period is required prior to the second harvest, however, harvest management can vary with variety.

Turnips, an excellent late-fall forage, are short-season, fast growing brassicas that reach maximum production in 80 to 90 days after establishment. The tops have 15 to 22 percent protein while roots contain

8 to 10 percent protein. Turnip varieties can range from 90 percent top/10 percent root to 15 percent top/85 percent root.

Turnip hybrids are a cross between Chinese cabbage, rape, turnip and swede. Some hybrids have a fibrous root only and do not work well in a grazing situation.

Swede is a long-season plant with a large edible root. It requires 150 to 180 days to reach maximum production. Swede is recommended for late-fall grazing and is higher yielding than turnips.

### CROP ESTABLISHMENT AND HARVEST MANAGEMENT

Brassicas require good soil drainage with a soil pH between 5.3 and 6.8. Seeds should be planted ½ inch deep in a firm, moist, seedbed with 6- to 8-inch rows. Fertility requirements are similar to wheat for pasture and should be based on soil test results.

To provide grazing in November and December, rape, turnips, and turnip hybrids should be planted in July or early August and swede and kale (with stems) should be planted in May or early June. Rape, turnips and stemless kale should be planted in May or June for August and September grazing.

Strip grazing and rotational grazing provide the most efficient utilization of these crops. Approximately 6 to 8 inches of stubble should remain following the grazing period to allow adequate regrowth during a four-week rest period. Consumption and damage to the root of turnips and swede during grazing can prevent regrowth and limit additional grazing.

Brassica yields in Pennsylvania have averaged 3.1 tons per acre of dry matter at 90 days after planting. Longer maturing swede and kale have averaged over 4 tons per acre at 120 days after planting. The average carrying capacity of a good brassica stand in Pennsylvania is approximately 1,550 ewe or 160 cow grazing days per acre. This is moisture driven and would be much lower in Kansas because of the dry falls. Dry matter digestibility is between 85 to 95 percent and generally does not decrease markedly with increasing plant maturity. The low fiber content of brassicas can cause health disorders in grazing animals if they exceed 75 percent of the diet. Introducing animals to brassicas slowly and avoiding abrupt changes from dry pasture to lush brassica can reduce the problems.

#### CHICORY

Puna chicory, a member of the sunflower family, is a perennial cool-season herb which originated in Central Europe but was developed for forage production in New Zealand. Puna chicory has larger and denser leaves, much like dandelion in winter, than the native wild chicory of North America. Pure stands in New Zealand pastures yielded up to 22,300 pounds of dry matter per acre with crude protein content between

18 and 22 percent. In Pennsylvania, from April through October, chicory produced 50 pounds of forage per acre per day. At peak growth periods, chicory produced 73 pounds of forage per acre per day.

Chicory is suited to well or moderately drained soils with a soil pH of 5.5 or greater, and moderate to optimum soil phosphorus and potassium levels. Drilling 3 to 4 pounds of seed per acre  $\frac{1}{4}$  to  $\frac{1}{2}$  inch deep should produce optimum stands. Frost seeding is also an option for establishment of chicory. If chicory is grown without a legume partner, 100 to 150 pounds nitrogen (N) per acre should be applied in split applications: one-third at green up in early spring, one-third in early summer and one-third in early fall. Since N will enhance stem growth, the forage yield increase must be weighed against the ability to keep chicory grazed so that stems do not bolt.

Maximum life of chicory stands with good quality will be about five to seven years. Chicory will disappear from pure and mixed-grass pastures when grazed full season, whereas rotational grazing allows chicory to persist in the stand. Chicory should be grazed heavily, leaving a stubble height of  $1\frac{1}{2}$  to 2 inches, for short periods of time. This intense grazing should prevent plants from bolting, which will extend the vegetative state and forage productivity. A rest period of at least 25 to 30 days between grazings will allow chicory stand persistence and optimum performance. Research at USDA-ARS in El Reno, Oklahoma, indicated that chicory has the potential as a high-quality and highly productive cool-season forage crop.

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Contact: Curtis Thompson  
Extension Specialist  
Crops and Soils, Southwest  
Telephone: 316-275-9164  
FAX: 316-275-0627  
E-mail: cthompson@oznet.ksu.edu

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Contact: Stu Duncan  
Extension Specialist  
Crops and Soils, South Central  
Telephone: 316-663-5491  
FAX: 316-662-9197  
E-mail: sduncan@oznet.ksu.edu

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