Using Brassicas as a Supplemental Pasture Crop

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Plan ahead to beat the traditional Midwest summer slump and late fall decline in pastures by planting and utilizing forage brassicas. Forage brassicas include kale, rape and turnip and can be grown and used successfully in the Midwest to supplement pastures during times of shortage.

Forage brassicas can provide a high-quality forage source when grazed in a timely manner from summer through mid-winter. Livestock eat the stems, leaves and roots of turnips, but just the stems and leaves of rape. The above-ground parts of brassicas normally contain 20-25% crude protein, 65-80% *in vitro* digestible dry matter (IVDDM), about 30% neutral detergent fiber (NDF) and about 23% acid detergent fiber (ADF). The roots contain 10-14% crude protein and 80-85% IVDDM.

Paja turnips seeded at 8 lbs/acre with 20 lbs/acre ryegrass in May 2003, West Branch, MI. Dry weight was 2.5 tons/acre on July 14, 2003. The planting was grazed two more times in 2003. Photo by Joe Rook.

Turnips and other brassicas can provide grazing at any time during the summer and late fall, depending on the seeding date. The best use is for late fall grazing, however, many producers are planting brassicas in the spring along with oats or triticale to provide good grazing during the normal summer slump in pastures. The crops maintain their forage quality well into the fall, even after freezing temperatures. Experience in Michigan has shown that for the best results grazing of summer-planted turnips should be complete by early November. However, some sheep producers in southern and central Michigan have grazed turnips as late as early March. Brassicas can be grazed more than once if about 5 inches of stubble is left for regrowth. Grazing in the late fall or early winter is the last time the crop will be grazed as very few plants survive the winter.

Duane Terrill utilizes turnips for his ewe flock by planting after winter wheat and grazing from November to March. Average yields range from 3-6 tons DM/acre depending on rainfall. Photo by Rich Leep.

Growing Requirements

Forage brassicas are a cool-season crop. The crop can be planted any time from May until late July or 70 days before the first killing fall frost. In South Dakota, the best planting time is around the first week in August for late fall pasture; if planting is delayed until mid-August a drastic reduction in forage yield will be noticed (both the tops and bulbs). The crop grows best at 40° - 60°F. Typical dry matter yields obtained in numerous university and farm trials are 1-5 tons DM/acre.

Brassicas grow best on fertile, loam, slightly acidic soils that are well-aerated. They do not grow well on poorly drained soils with high clay content. Rape and turnip seeds are small. The same care that is taken to plant alfalfa should be used with brassica seed. No-till seeding offers some benefits in that the sod maintains a better footing for grazing livestock if wet conditions exist. Sods should be killed with a herbicide prior to seeding. Care must be taken to adjust the drill so seed is placed in contact with the soil and pressed in with a press wheel. Advantages of seeding into sod are fewer crop losses due to flea beetles and less erosion on sloping sites.

Turnip seed should be planted at 1.5 lbs/acre and the larger rape seed at 3-4 lbs/acre. A final population of 5-6 plants per square foot is ideal. Good soil fertility is essential for forage brassica growth. Brassicas are heavy nitrogen feeders. If no legume or manure is plowed down or used, then 100 lbs of nitrogen/acre should be applied. Phosphorus and potassium requirements are similar to small grains.

There are limited varieties to choose from (Table 1). Seed of common dwarf essex rape and purple top turnip are the least costly; however, some of the more expensive hybrids maintain leaf quality for a much longer period, especially under less than ideal conditions. Forage Star turnip has looked particularly good in several Michigan trials. Weed control should be done prior to planting the crop since there are no herbicides available once the crop is planted. Therefore, control grass with Roundup or emerged annual weeds with a burn-down herbicide such as Graxomone.

The crop is ready for grazing about 75 days after planting. It is best to start grazing at this time as delayed maturity can result in leaf loss due to fungal infections. Since the crop contains a high amount of water (88-90%), it should be pastured with supplemental hay. Supplemental hay should comprise about 30% of the animals' daily dry matter intake providing enough fiber in the diet. Animals should be gradually introduced to the crop to allow for development of the rumen microbial population that is adequate to digest the high levels of protein in the crop. Normally, there are few problems using brassicas for dairy production and the rule of thumb is to limit intake to about 1/3 of the total diet. In 2003, many cows in New Zealand were milking off 100% summer turnip due to drought and a lack of grass. The brassicas kept the cows producing without any tainting issues. Practical animal performance data are given in Table 2.

In summary, forage brassicas can provide a good source of forage for grazing during the times when cool-season grass growth is declining in the summer months and the late fall. Growing brassicas can be a good economic alternative to feeding supplemental hay as it will only cost about $20/dry ton and provide crude protein levels of nearly 18% in tops and 12% in roots, making this one of the cheapest crops to grow.

Table 1. *Seed sources for forage brassicas.*

Seed Company	Brassica Type
Ampac Seed Company	Kate-Kestrel, Swede-Winton, Turnip-Appin, Major Plus, Pasja
Barenbrug USA	Rape-Barnapoli, Rangoria, Turnip-Barkant
Kester's Wild Game Food Nurseries, Inc.	Rape
Seed Solutions	Turnips-Dynamo 717 and Samson, Rape-Interval, Kale Pinfold
Peaceful Valley Farm Supply	Rape
Rupp Seeds, Inc.	Turnip
Southern Michigan Seed, Inc.	Rape
Sweeny Seed Company	Rape, Turnip

Table 2. *Brassica (purple-top turnip) vs. grass paddocks for fall grazing yearling heifers at MSU Lake City Farm, Lake City, MI. (1994)*

Item	Forage Treatment	
	Grass	Brassica
Number of Heifers	15	30
Number of Acres	6.5	6.5
Initial Stocking Rate (Head/Acre)	2.3	4.6
Number of Days	28	28
Initial Weight (lb)	1156	1144
Final Weight (lb)	1208	1188
Gain/Head (lb)	52	44
Average Daily Gain (lb)	1.86	1.57
Number of Acres Actually Grazed	3.25	3.25
Actual Stocking Rate (Head/Acre)	4.6	9.2
Gain/Acre (lb)	**240**	**406**
Hay DM Disappearance/Head (lb)	334	239
Hay DM Disappearance/Head/Day (lb)	11.9	8.5