NORTH DAKOTA - Forage Brassicas' Potential as Supplemental Forage for Grazing

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Forage brassicas have been used around the world, especially in the northern part of Europe, Australia, New Zealand, and North America, for several centuries. These species have been used as supplemental forage due to their low temperature tolerance, fall and winter forage availability, high quality animal feed, and the possibility to extend the grazing season by reducing operational costs and improving profitability.

In the U.S., brassicas were used in the late 19th century and early 20th century, but were abandoned due to the high production cost. In the 70s and 80s the interest to produce brassicas (as forage and cover crops) was renewed. In North Dakota, some forage brassicas such as radishes and turnips are used as cover crops after cereal crops, but usually in mixture with other cover crops. In 2010, forage brassica acreage was estimated at 120,000 acres.

North Dakota growers extend the grazing season with brassica forage and cover crops by reducing costs and improving profitability with high quality feed for late-season use. Growers without cattle can benefit by using forage brassica cover crops to improve soil health by reducing soil erosion, increasing water infiltration, reducing soil compaction, and suppressing weed seeds germination and some potential pests. In addition, growers will have alternative crops to introduce into their cropping system, reducing the negative effects of short rotations.

Objectives: 1) evaluate cultivars of brassicas species as full-season forages and as cover crops in different environments; and 2) determine adaptability, yield potential, and nutritional quality.

The experiment had six brassica species and several cultivars of each (Table 1). The experimental design was a randomized complete block with three replicates. The plots had 8 rows spaced at 6" and 20' in length. Seeding date was April 25 and 26 at Fargo and Carrington, respectively. Kale and swedes were harvested with a flail forage harvester once, while forage rape, winter canola, and Ethiopian cabbage were harvested twice.

Table 1. Forage brassica dry matter biomass yield at Fargo and Carrington, ND in 2012.

Species (Cultivar)	Carrington	Fargo	Combined
	(tons/acre)		
Kale (Siberian)	1.5	3.6	2.6
Kale (Maris Kestrel)	4.8	5.1	5.0
Kale (Dwarf Blue Vates)	2.7	3.9	3.3
Swede (Major Plus)	3.3	5.0	4.2
Swede (American Purple Top)	2.6	4.4	3.5
Hybrid (Winfred)	2.9	5.7	4.3
Hybrid (Pacer)	2.7	5.2	4.0
Forage Rape (Rangi)	2.5	5.6	4.0
Forage Rape (Barsica)	2.6	6.2	4.4
Forage Rape (Dwarf Essex)	2.2	4.7	3.5
Forage Rape (Bonar)	2.3	5.8	4.1
Winter Canola (Riley)	2.6	4.6	3.6
Winter Canola (Griffin)	2.3	4.8	3.5
Winter Canola (Athena)	2.3	4.4	3.3
Winter Canola (Summer)	2.1	4.4	3.3
Winter Camelina (Joelle)	0.7	1.2	1.0
Ethiopian Cabbage	2.8	2.4	2.6
LSD (0.05)	0.8	1.5	1.6
CV (%)	21	19.4	20

Preliminary results for 2012 indicate forage brassica hybrids and forage rape had the highest biomass yield in spite of the drought at Fargo (Table 1). Carrington's lighter soil texture had less water retention under drought conditions than Fargo's clay soils. This might explain the lower biomass yield of all brassicas except for one kale cultivar. The 'Maris Kestrel' kale had the greatest biomass yield - 4.8 and 5.1 tons/acre at Carrington and Fargo, respectively. The 'Brassica' forage rape had a biomass yield of 6.2 tons/acre at Fargo. It was surprising that some forage brassica yields were higher than those for seasonal alfalfa yields in adjacent plots. These are preliminary results, but are a first indication of the potential of forage brassicas in North Dakota.