

UNIVERSITY OF NEBRASKA-LINCOLN

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Figure 1. Steers grazing a mix of oats, turnips and radishes in mid-December. At this point in Experiment 4 there was still 1.5 ton dry matter per acre and calves grazed until mid-January when the weather ended grazing due to the forage being iced to the ground.

## Value of Oats and Brassicas for Fall Forage

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*This is one of several briefs on NU cover crop research (<http://cropwatch.unl.edu/2016/unl-cropwatch-december-9-2016>) featured in this week's CropWatch.*

### Background

There are unused growing degree days in the late summer and early fall following harvest of wheat and early corn silage. This provides an opportunity to produce a fall forage crop by planting winter-sensitive cool season species. Late summer planted oats don't lignify as much, have lower fiber and higher amounts of water-soluble sugars than do spring planted oats, thus they are much higher in energy. Brassicas have a low seed cost, are rapid growing and, with

their low fiber and high water-soluble sugar content, are more like a concentrate than forage. Thus planting oats alone or with brassicas can produce high quality forage in the fall.

## Study Description



Figure 2. Mix of oats, turnips and radishes (Experiment 3) in early November. This mix was 78% TDN and 23% CP at the time this picture was taken.

Five experiments have been conducted to evaluate the use of winter-sensitive, cool-season species planted in mid-August after wheat (two trials at Mead) or early September after corn silage harvest (three trials; two at Clay Center and one at Mead) for grazing of fall weaned calves during November and December.

In Experiment 1, after wheat a five-species mix of oats (15 lb/ac), purple top turnips (2 lb/ac), sorghum (1 lb/ac), crimson clover (1 lb/ac) and sunflower (2 lb/ac) was planted. However, the oats and purple top turnip dominated the forage produced. No N was added after wheat harvest.

In Experiment 2, after wheat a five-species mix of oats (15 lb/ac), purple top turnip (3 lb/ac), daikon radish (3 lb/ac), sorghum (5 lb/ac) and safflower (4 lb/ac) was planted. The forage produced was 47% radish, 23% turnip, 19% oat, and 11% sorghum with essentially no safflower. Liquid feedlot manure was applied prior to planting of the cover crop to provide 210 N for the subsequent corn crop.

In Experiments 3 and 4, oats (84 lb/ac), daikon radish (2 lb/ac), and turnip (1.5 lb/ac) were planted and N was applied via the pivot at 48 lb of N/ac. The forage produced was 60% oats, 13% radish, and 26% turnip. In Experiment 5, oats (90 lb/ac) were planted and 28% UAN was top-dressed to provide 40 lb of N/ac.

## Applied Questions

### What is the forage production potential?

When winter-sensitive cool-season species such as oats or brassicas are planted in mid-August through the first week in September, yields have ranged from 1.1 to 2.1 tons dry matter (DM) per acre with an average of 1.6 tons DM/ac. Fall grazing has ranged from 0.72 to 1.76 AUM/ac with an average of 1.34 AUM/ac. (AUM represents the amount of forage needed by an animal unit per month.) This is with allowing some biomass to remain on the ground to protect the soil.

Planting these winter-sensitive cool-season species in mid-September after high moisture corn harvest has resulted in very little fall growth (0.25 tons DM/ac or less) and is not recommended.

### What is the quality of the fall forage produced?

Both late summer-planted oats and brassicas are 70-80% IVDMD (TDN) in late October and appear to maintain quality well into the winter with loss of less than 5% units (due to loss of sugars) by early January. Brassicas are extremely good nitrogen scavengers and the tops of brassicas often have crude protein (CP) values of 20% to 25% with the roots typically being 10% units lower (10% to 15% CP). Late summer-planted oats often have CP content of 15% to 20% in early October. Like the energy content, the CP content appears to change little from late October to early January.

After the first few frosts both oats and brassicas will turn yellow-brown and often lay flat; however, forage color in winter is a poor indicator of quality. Calf gains when grazing from November to January (about 60 days) have ranged from 1.3 to 2.0 lb/day with an average of 1.7 lb/day. This resulted in gain of 86 to 141 lb/ac with an average of 119 lb/ac.

### What is the effect of using winter sensitive (oat-brassica based) cover crops on yield of subsequent cash crops?

Yield from soybeans planted in the spring following the winter sensitive mix (Experiment 1) was not affected by the cover crop or grazing of the cover crop. Similarly, soybean yields following the oat cover crop (Experiment 5) were not affected by the cover crop or grazing of the cover crop. Corn yields in Experiment 2, however, were decreased by planting of the winter sensitive cover crop (236 vs. 210 bu/ac for control vs. cover crop, respectively) but grazing of the cover crop resulted in a recovery of yields (226 bu/ac). In Experiment 2, liquid manure was applied in the summer (before planting the oat-brassica based mix) and was the main source of N for the corn. It is likely that the cover crop resulted in N being tied up in the biomass, making it unavailable to the corn plants early enough in the season, while grazing the cover crop made some of the tied up N more readily available earlier in the season.

## Table 1. Summary of forage production and calf performance when grazing oat and brassica-based mixes