NORTH DAKOTA – Beef on Rye – A New Twist on a Reuben

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While you can't beat a good old Reuben sandwich, corned beef on rye bread; we think using rye to raise beef is even better. Rye is an extremely hardy winter cereal crop able to handle a wide range of environmental conditions. Rye is the earliest of the winter cereal grasses to initiate growth and produce forage/biomass in the spring. Rye tends to require fewer inputs to raise and can be sown quite late in the fall, providing a wide window of opportunity to plant. These traits are the impetus for the increasing popularity of rye as a major component in cover cropping, double cropping forages, or integrated crop-livestock systems in many regions including the Midwest.

Heifers grazing rye on 1st graze.

Steers grazing rye on 2nd time.

The NDSU Carrington Research Extension Center (CREC) has evaluated winter cereals as forage and cover crops for a number of years and has found rye to be a reliable winter crop in south central North Dakota. Data gathered from multiple years demonstrate an average dry matter forage yield of 2.5 tons/ac (www.ag.ndsu.edu/carringtonrec/documents/annual-reports/2012-annual-report; page 24).

The data demonstrating the early growth habit and forage production of rye made it apparent there is ample time to raise a second forage crop following a rye crop. These observations directed further research exploring options utilizing rye and sudangrass as the double crop after harvesting rye for forage. Results from this work showed early maturity combined with the short growing season in south central North Dakota gives rye an advantage over other winter cereals. Rye produced higher early yields and greater consistency in performance for the subsequent forage crop (www.ag.ndsu.edu/carringtonrec/documents/annual-reports/2014-annual-report; page 31).

After evaluating small plot research trials conducted with rye forage and double cropping, we started looking at how to take the proof of concept from the plots to a field scale model.

In the fall of 2015, a 30-acre field at the NDSU Carrington Research Extension Center was seeded to "Rymin" winter rye at a rate of 70 lbs/ac, following a buckwheat crop. The fall soil test indicated 40 lbs/ac available N; an additional 80 lbs/ac N was applied. The goal was to harvest the rye crop in the spring as silage for comparing winter rye and corn silage in feedlot finishing diets for yearling steers, followed by double cropping with an annual forage crop for use in fall grazing. Additionally, one acre of the field was fenced with temporary fencing for rye grazing observations.

Beginning May 10, ten yearling heifers and three, dry, mature beef cows, averaging 1,155 lbs, were grazed for ten days on one acre of rye designated for grazing. The estimated average available dry matter was 1.14 tons/ac. The regrowth on June 10 was estimated at 1.5 tons DM/ac and was grazed with six yearling steers for 15 days. Initial observations indicate grazing sooner along with higher stocking densities, to more fully utilize the rye forage, would have been more effective for both grazing timings.

On June 16, the remaining 29 acres were cut, wilted, chopped and bagged for silage. The average yield was estimated to be 3.5 tons DM/ac. The forage quality measured was: 8% crude protein, 37% ADF, 61% NDF, 62% TDN. The rye was a few weeks past anthesis at the time of harvest. Quality will be higher if rye is cut at anthesis. While timing is critical for rye harvest and re-seeding of the second crop to maximize forage quality

and production from both crops, logistics and weather conditions can cause delays in both harvest and re-seeding windows. The field was reseeded to German millet at a rate of 20 lbs/ac on June 24. On September 15, the German millet was swathed, allowed to dry and three windrows were combined to be used for fall and winter grazing of mature beef cows. Although not determined, estimated forage yield from this second crop is approximately 2 tons DM/ac.


Rye silage in an ag bag.

Rye silage is currently being fed in a feedlot trial to evaluate rye silage compared to corn silage in steer finishing diets. Seventy-one head of 990 lb steers are being fed diets with either corn silage (19% of diet DM) or rye silage (11% of diet DM) as the forage base. The steers have gained an average of 5 lbs/head/day. Animal performance, feed efficiency, and carcass data will be evaluated at the end of this feeding trial. Amazingly, we were able to harvest the rye crop in the spring and start feeding it in the feedlot within a few weeks. Corn silage used in this trial was harvested the previous fall. In addition to the feedlot research, we also have a year-round drylot cow herd at the research center. We produced more rye silage than was needed for the feedlot trial and have been feeding rye silage in our drylot cow rations throughout the summer. These cows will also be used to swath-graze the millet crop that was re-seeded following the rye harvest. Rye can fill the gap to provide forage between corn silage harvests.


Chopping rye for silage.

Overall, this demonstration project has allowed us to take research from the plots to a field scale proof of concept. It showed the dual cropping role rye can play in utilizing a small number of cropland acres for harvested forage and grazing production. Additionally, it demonstrated how feedlots and drylot cow/calf operations can utilize a small number of cropland acres as a forage base for silage, hay, or grazing. Ultimately, it demonstrated the quantity and quality of forage that can be raised in a semi-arid short growing season when winter rye is a key component of the production system. *This is a twist to the Reuben your cattle can ruminate on!*