Longer Grazing, Fewer Weeds, More Forage

Rye pasture opens window to an extended grazing season, more forage and fewer weeds.

Story by ***Ed Haag***

Rye has always been considered a fiercely competitive, high-production grain; but now, by planting the winter version of this cool-season annual in the spring, cattle graziers, too, can benefit from these decidedly desirable traits.

"By seeding the rye in the spring, you can be grazing in six to eight weeks," says Bart Lardner, research scientist at the Western Beef Development Centre, University of Saskatchewan, Saskatoon, Sask., Canada. "That helps deal with the midsummer slump one often gets with your perennial pastures."

He adds that the beauty of seeding a winter variety in spring is that the plant functions as a biennial with all its energy focused the first year on producing leaf mass.

"Because the winter variety must be vernalized (exposed to prolonged winter conditions) in order for it to initiate seedhead growth, that first year we just see a whole lot of vegetative growth," Lardner says. "We can graze midsummer, and if we get a little rain we can get a second grazing before winter sets in."

The following spring, the producer can benefit from good moisture conditions and early spring regrowth for good spring grazing for cow-calf pairs.

Lardner notes that spring-planted winter rye works particularly well as a cleanup or transition crop before replanting to perennial pasture or hay production.

"Rye does great for weed control, because it is so aggressive," he says. "It is the ideal crop to break your weed cycles."

A fierce competitor

Rich Zollinger, North Dakota State University (NDSU) Extension weed specialist, agrees. He sees winter rye as the most competitive small-grain crop for weed control in North Dakota, and he encourages its use as a biological tool in planned weed-management programs.

"Winter rye provides much more effective weed control than spring-seeded small grains and more than winter wheat," he says. "For some producers and on some weedy fields, rye plus cultural practices can provide very cost-effective weed control."

He notes that North Dakota producers have reported success in controlling wild oats, ragweed, dandelion, common lamb's-quarter, redroot pigweed, Canada thistle and quackgrass. Zollinger attributes this to rye's ability to germinate rapidly and outgrow its competition.

In addition, plant researchers have extracted chemical compounds from the rye plant that inhibit weed seed germination. While the importance of these chemicals in field conditions has not been clearly demonstrated, Zollinger comments that they probably do have some allelopathic (production of substances toxic to weeds) effect on weeds competing with rye.

Feeding & Feedstuffs

Like Lardner, Zollinger says winter rye is most effective when it is part of a comprehensive rotational system. While NDSU researchers have had limited experience planting winter rye in the spring, the same crop planted in the fall between two half-season fallow periods has proven to be an effective measure in controlling annual weed infestations.

"A rotation of fallow-winter rye-fallow-spring grain will effectively reduce annual and perennial weed numbers," he says, adding that some crops can be substituted for one of the fallow periods when there is adequate moisture. "Corn, millet or buckwheat can be substituted for the second fallow to increase proportions of cash crop. Fallow can be reduced and cropping increased in periods of normal or above-normal precipitation."

Zollinger points out that for perennial weed problems, the fallow-winter rye-fallow-spring grain or at least spring grain-winter rye-fallow-spring grain rotation should be considered.

To maximize the rye's effectiveness in outcompeting both annual and perennial broadleaf weeds, Zollinger recommends applying a broadleaf herbicide after planting.

"It is best to hit the weeds when they are just sprouting," he says. "That is usually when the rye is in the two- or three-leaf stage."

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Table 1: Production of fall rye pasture measured as dry-matter yield

	DM yield, kg/ha	DM yield, lb./acre
Pasture 1	5,633	5,025
Pasture 2	7,460	6,654
Pasture 3	6,712	5,987
Pasture 4	5,851	5,219
Avg. yield	6,414	5,722

He cautions that a producer should not follow winter rye with winter rye or winter wheat in a rotation, because this could precipitate problems with volunteers.

Spring-planted winter rye

While planting winter rye in the spring for fall grazing is a relatively new concept, the practice has been thoroughly evaluated by Lardner and his colleagues at the Western Beef Development Centre in Saskatchewan.

One study involved seeding 170 acres of winter rye seeded in the middle of May. Prior to then, livestock manure was applied at the rate of 60 tons per acre, representing 432 pounds (lb.) of nitrogen (N) per acre, 156 lb. of phosphate per acre, 492 lb. potassium (K) per acre and 168 lb. of sulfur (S) per acre. Rainfall prior to grazing was 11.2 inches (in.) with an additional 2.2 in. received during the grazing period.

Fifty-four days after planting, the field was cross-fenced with an electric strand into four equally sized paddocks of 42.5 acres to allow for rotational grazing; 393 steers (780 lb. ± 5 lb.) were released on the first paddock. Eleven days later the first group of steers were returned to the feedlot for finishing and a second group of 342 steers (715 lb. ± 6 lb.) was placed on the remaining fall rye pastures.

Thirty-eight days later that second group of steers was removed from the pasture. Forage dry matter (DM) yield was determined after each paddock rotation from five randomly sampled 0.25-square-meter quadrants (Table 1). Samples were dried, weighed and submitted for quality analysis. Forage crude protein (CP), digestible energy (DE), acid detergent fiber (ADF) and total digestible nutrients (TDN) are reported in Table 2.

Paddocks 1, 2 and 3 were grazed twice and Paddock 4, once. Forage production of the fall rye averaged 5,722 lb. per acre, or 2.9 tons per acre of dry matter, providing 66 animal grazing days per acre.

"Rye is widely adapted when compared to the other small grains," Ransom says. "For instance, rye is not affected by the very acidic soils like wheat can be. It will grow in many places wheat won't."

— Joel Ransom

High-quality forage

Lardner points out that it is likely that the very high crude protein levels (32.8% recorded on Aug. 12) were a direct result of the amount of manure applied on the field prior to seeding. This premise is supported by the data collected from another spring-planted winter-rye study. With lower manure application rates, crude protein was reported to test at 27% in early July, dropping to 12% by mid-September.

In spite of the 32.8% crude protein levels in the rye, Lardner notes that the weight gain on the second group of steers averaged 1.9 lb. per day. He speculates that the low ADF levels associated with the lush pasture may have precipitated a high rumen turnover of nutrients, resulting in reduced animal utilization of the high forage protein levels. This is supported by the fact that the average weight gain, in the other rye study that was not subjected to such heavy nutrient loading, was 2 lb. per day.

Late grazing is weather dependent

In mid-October it was decided by research staff that the paddocks had recovered enough biomass to graze 105 weaned calves, providing an additional 25 days of annual pasturing into early November.

"Whether or not we have a chance to get a second grazing opportunity depends on precipitation and temperature," Lardner says. "You can see a substantial amount of regrowth if you get enough fall rain and it stays warm."

He notes that as a cool-season grass, rye will grow until the air temperature drops to 39° F. Late-season grazing should commence when the rye is 6 inches (in.) in length and can continue until the stand is 3-4 in. tall. This leaves sufficient leaf mass for continued growth and recovery in the spring.

Lardner warns that turning animals out on poorly drained soils in wet weather can quickly lead to crown damage, stand loss and reduced spring growth. He adds that late fall grazing often involves intensive management practices in order to maintain the health of the stand through the winter and into the spring. This includes rotational or strip grazing — a practice that helps preserve the stand's integrity and allows for more efficient utilization of the available rye forage.

By May, researchers had determined that enough early spring regrowth had occurred on the four paddocks to warrant another 15 days of grazing cow-calf pairs.

Where, when, how

Because late fall and early spring grazing occurs when, in most locations, there is a greater likelihood of higher precipitation than in the summer months, Lardner suggests locating on higher ground with good drainage to minimize any irreversible grazing damage to the rye stand.

Joel Ransom, NDSU Extension agronomist for cereal crops, sees one of the real benefits of planting rye as annual forage is its ability to grow and actually thrive in a wide range of soil types and environments. "Rye is widely adapted when compared to the other small grains," Ransom says. "For instance, rye is not affected by the very acidic

Table 2: Quality of fall rye pasture.

Date	*CP, %	DE, Mcal/kg	ADF, %	TDN, %
July 10	30.7	3.13	25.1	71.9
July 15	33.1	2.95	29.2	67.5
July 22	22.3	3.00	28.3	68.4
July 28	24.0	2.91	29.7	66.9
Aug. 6	32.7	3.31	21.9	75.3
Aug. 12	32.8	3.31	21.4	75.8
Aug. 18	31.4	3.35	21.2	76.0
Nov. 9	27.9	3.44	19.3	78.0

*CP = crude protein; DE = digestible energy; ADF = acid detergent fiber; TDN = total digestible nutrients.

PHOTO BY ED HAAG

►Cool-season annuals like rye offer new grazing opportunities.

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While rye will germinate any time there is enough moisture and light units to facilitate growth, Ransom notes that some times are better than others if the goal is producing as much leaf mass as possible. "Rye is a cool-season annual, so you want to get [it] seeded as soon as you can in the spring," he says. "You tend to get better tiller development if you plant earlier rather than later."

Rye's adaptability applies not only to its planting environment but also to the practice of planting itself. Ransom notes that rye can be established by drilling into conventionally tilled fields or with minimum tillage following other crops. Some Northwest agronomists have even seen success drilling rye directly into chem-fallow sod if enough moisture is available to allow for both the decomposition of the newly killed plant material and the germination needs of the newly planted rye seed. Seeding rates for spring-planted winter rye run up to 2 bushels (bu.) per acre. Even higher rates are recommended for some weed control programs, Ransom says.

Because rye is an excellent scavenger of nutrients already resident in the soil it usually does not require the higher rates of nitrogen associated with other small grains. For those who plan to mix their nitrogen directly with their rye seed at planting, Ransom does have the following advice.

"Keep your nitrogen down to less than 10 pounds or there is a real risk of burning your seed," he says. "Any more than 10 pounds of N you need to knife it in between the rows or band it in below the seed."