

Windrow Grazing

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Windrow grazing may be an economical alternative to feeding baled hay. This NebGuide discusses potential forages and strategies for windrow grazing.

Harvested feed costs can be one of the largest expenses to cattle producers. Windrow grazing, sometimes called swath grazing, is a management practice that can significantly reduce harvesting and feeding costs. Swathing the crop and leaving the windrows in the field eliminates the costs of baling and hauling bales off the field while reducing labor and equipment costs associated with feeding. Grazing windrows in the field also returns some nutrients and organic matter from consumed forage back to the soil where the crop was grown.

Precipitation Patterns

In Nebraska, 75-80 percent of seasonal precipitation falls in the six-month period from April through September. Only 20-25 percent of precipitation falls from October through March (see *Figure 1*). This seasonality of precipitation allows for swathing forage crops in early fall and preserving them through the fall and winter with minimal deterioration

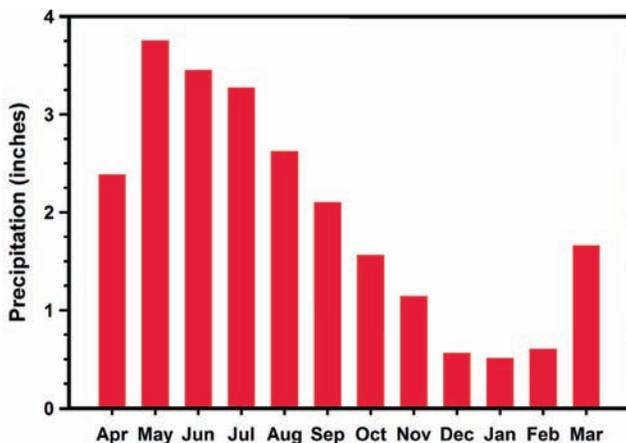


Figure 1. Nebraska monthly precipitation: 30-year annual average is 23.60 inches (1971 – 2000). Source: “Historical Climatology Series No. 4-2 State, Regional, and National Monthly Precipitation Weighted by Area 1971-2000 (and previous normals periods)” National Climatic Data Center, Asheville, North Carolina.

in quality due to weathering. Across Nebraska, the average amount of precipitation increases from west to east. Greater average precipitation in eastern Nebraska does increase the risk of windrow deterioration compared to drier conditions in western and central Nebraska. Snowfall from October through March can be quite variable; however, extended periods when snow cover would prevent windrow grazing are limited.

Windrowed Forage Quality

Research conducted from 1997 through 1999 on a sub-irrigated meadow at the University of Nebraska Gudmundsen Sandhills Laboratory (GSL) near Whitman, Nebraska, found that crude protein content of forage (10.6 percent) in windrows and bales was similar during all sampling months (September through February); however, the crude protein content of standing (stockpiled) forage declined to 5.7 percent by February (see *Figure 2*).

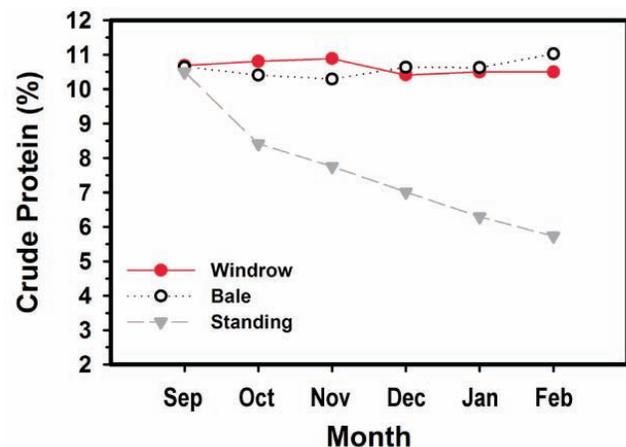


Figure 2. Crude protein content for windrowed, baled and standing meadow forage from September through February. Source: Volesky et al. 2002.

Performance of Cattle Grazing Windrowed Forages Compared to Those Fed Baled Hay

The performance of weaned calves and bred heifers that grazed windrows of forage cut in early fall was equal to or better than the performance of cattle fed forage baled as hay

from the same location, according to two studies conducted in the High Plains region (*Table I* and *Table II*).

Table I. Body weights and gains of calves grazing windrows or fed baled meadow hay. Source: Volesky et al. 2002.

Trial year	Item	Treatment	
		Windrow grazing	Bale-fed
1997-98	Initial weight, lbs	449.00	447.00
	Final weight, lbs	531.00	507.00
	Total gain, lbs	82.00	60.00
	Daily gain, lbs/day	1.17	0.86
1998-99	Initial weight, lbs	443.00	449.00
	Final weight, lbs	486.00	487.00
	Total gain, lbs	43.00	38.00
	Daily gain, lbs/day	0.57	0.53

¹Research conducted at Gudmunsen Sandhills Laboratory near Whitman, Nebraska. The average daily gains of calves grazing forage in windrows along with meadow regrowth was equal to or better than calves fed baled hay in a dry lot.

Table II. Bred heifer performance grazing millet windrows or fed baled millet hay. Source: Munson et al. 1999.

Trial Period	11/5 - 12/3	12/3 - 12/31
Treatment	Daily gain (lbs/day)	Daily gain (lbs/day)
Bale feeding	0.86	0.42
Windrow grazing	1.17	0.45

¹Thirty heifers were assigned to each treatment in this study. Research was conducted at the Eastern Colorado Research Center located near Akron, Colorado. Differences were not detected for weight changes between bale feeding and windrow grazing treatments for any of the time periods. In this situation, grazing windrows provided similar heifer performance as feeding baled hay.

Planning for Windrow Grazing

The following factors should be considered when planning to windrow graze:

- annual or perennial forage options available;
- class of livestock desired to graze (calves, yearlings, mature cows, etc.);
- time of year the forage will be grazed;
- livestock performance goals; and
- livestock water and fencing needs.

Forages for Windrow Grazing

Both perennial and annual forages can be used for windrow grazing. Hay meadows can be grazed in the spring and swathed in the early fall. Grazing meadows early in the spring will delay forage maturity, allowing for higher quality forage to be harvested when swathing in late summer or fall. Warm-season annual forages such as foxtail millet, sorghum-sudangrass hybrids or sudangrass, and cool-season annuals such as barley or oats have been used for windrow grazing. When annual forages are used, time planting so forages reach the boot to dough stage of maturity just prior to the average date of first frost. Harvest during the boot stage

for higher forage quality or dough stage for extra tonnage. In Nebraska, with adequate rain or irrigation, oats or barley planted in late July to early August will reach heading stages by about mid-October.

Time and Method of Windrowing for Fall and Winter Grazing

Swath forages in early fall when nights are cool to prevent mold growth. If windrows are to be grazed through the winter, make windrows high and dense to reduce weathering loss. It may be helpful to rake two windrows together if forage yields are less than 1 ½ tons per acre or swather head-width is small. Rake windrows directly after swathing so they “rope” together. Tight, heavy, dense windrows will seal down and be less susceptible to being picked up and scattered by the wind. When possible, swath the crop so windrows lay parallel to prevailing winds. Raising the swather cutter bar to cut forage at higher stubble heights also will reduce losses from hay rotting in the windrows, as stubble will hold the windrows up and keep hay from lying directly on the ground.

Windrow Grazing Forages in the Spring

Windrow grazing of winter annuals in the spring has been successful. With winter annuals such as rye, swath in early to mid-May to capture quality forage before rye reaches advanced stages of maturity. Begin grazing windrows and any regrowth shortly after swathing as needed. Windrow deterioration may begin quickly because of the greater likelihood of rain during May and June, so rapid use of the windrows may be desirable.

Sampling and Testing Windrowed Forages

Before grazing, sample and test the quality of windrowed forage. Use this information to adjust the amount fed to meet the animal’s nutrient requirements and to know if additional supplement is needed to meet performance goals. If annual forages are to be grazed in the windrow, test nitrate and prussic acid levels before grazing to be sure that the forage is safe. Use caution when grazing windrowed forages that have moderate levels of nitrates. If windrowed forage is wet due to precipitation, the feed seems to be more toxic because some of the nitrate has already been converted to the more toxic nitrite before being consumed.

Control Windrow Grazing Using Temporary Electric Fence

Using temporary electric fence in rationing out the windrows will help to efficiently utilize forage and minimize waste. Allow cattle up to one week’s allocation of feed to reduce waste due to trampling and cattle bedding on the windrows. Make adjustments depending on class of cattle and weather conditions. A single-strand electric fence is often adequate to separate cattle from grazed and ungrazed windrows. A double-strand electric fence with one ground and one hot wire

may be needed when the soil is dry or snow cover is present. A variety of temporary electric fence posts, wire, tools and equipment are available to simplify the task of building and moving temporary electric fence.

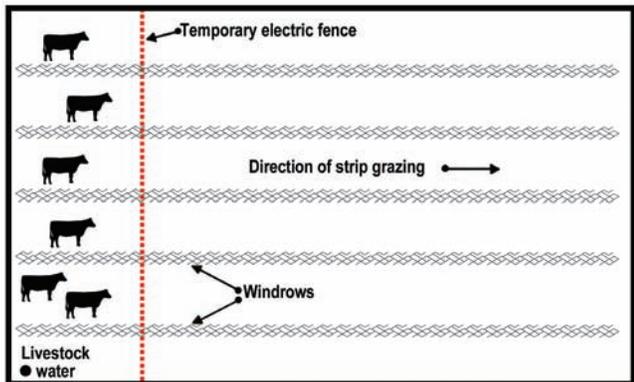


Figure 3. Strip grazing plan for allocating windrows.

Amount of forage per unit length of windrow would vary depending on hay yield and the area used to form a windrow. If hay yield was 2 tons per acre and windrows were 30 feet apart, 1 foot of windrow would contain about 3 lbs. of forage. If a producer wanted to allot 30 lbs. of forage per head per day and included 10 percent waste, this would result in a suggested allocation of about 10 to 12 feet of windrow per cow per day.

Economics of Windrow Grazing vs. Feeding Baled Hay

Windrow grazing can significantly reduce harvesting, feeding and labor costs associated with feeding hay. The difference in costs for windrow grazing versus feeding hay will vary between operations. The following example assumes a two-ton-per-acre yield and 200 cows consuming 30 pounds of forage per head per day. Costs listed below are on a cost per ton basis.

Table III. Cost per ton of forage for harvest and delivery to cattle.

Windrow Grazing		Harvesting and Feeding Baled Hay	
Swathing	\$5.00	Swathing	\$ 5.00
Fencing & Labor	\$3.00	Baling	\$10.70
		Hauling Bales off Field	\$ 2.00
		Feeding Bales with Labor	\$ 7.50
Total	\$8.00/Ton	Total	\$25.20/Ton

Using windrow grazing saves \$17.20 per ton of hay fed. This is equal to a savings of \$51.60 per day for 200 cows or \$0.26 per cow per day. Fencing and labor costs assume moving fence every three days for one hour at \$9.00 an hour for labor expense. The estimated cost of an electric fence charger and material is \$2.00 per ton. This example assumes fence material and charger are used over a 10 year period. Costs for harvesting and feeding baled hay are calculated using rates found in the 2004 Nebraska Farm Custom Rates EC823, a UNL Extension publication.

Expected Waste with Windrow Grazing

The amount of forage that cattle waste when grazing windrows will vary, depending on the weather, quality of forage available, class of grazing animals and how frequently and tightly restricted the feed is rationed out. The amount of forage wasted with windrow grazing can range from less than 5 percent to more than 30 percent. This compares to dry matter hay loss estimates ranging from 15 percent to more than 40 percent, with baling and feeding dependent upon storage and delivery methods. The amount of acceptable waste with windrow grazing must be balanced with the labor required to move fence and the performance goals for the animals grazing. Mature cows or cattle with lower nutrient requirements can be used to “clean up” windrows when excessive forage waste is left behind by grazing calves or stocker cattle.

Frequently Asked Questions

- Q. When you swath the hay or forage crop and leave it laying in the field, won't the hay just rot in the windrow?
 - A. *This can be a concern. Plan for the crop to be swathed in late-summer or fall and cut at a higher stubble height so that windrows are not lying directly on the ground. This will help reduce potential problems. Risk for windrow deterioration does increase with high rainfall.*
- Q. What happens if we get snow? Can I still graze the windrows?
 - A. *If the cattle know that the windrows are there, they will graze the windrows through the snow, as long as the snow has not crusted. If the snow crusts or if ice is present, breaking the crust next to the windrow can help the cattle get to the feed.*
- Q. If I am windrow grazing on a perennial hay meadow, will the grass underneath the windrow be killed?
 - A. *There will be minimal damage to the perennial grass underneath the windrow when swathing occurs in late summer to early fall since the majority of the growing season has been completed.*
- Q. Won't the cattle just trample and pick through the windrows resulting in a lot of wasted feed?
 - A. *Controlled, strip-grazing of the windrows is essential to minimizing the amount of waste.*
- Q. How do I move and use electric fence when the ground is frozen?
 - A. *A pointed rod that can be driven into the ground or a portable drill with a concrete bit to open holes to drive electric fence posts into frozen ground have reportedly worked well. Galvanized 1/16 inch cable, polywire and polytape work well as an alternative to wire for temporary electric fence that is going to be moved frequently.*

References

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- Thomson, W. V. 1999. Reducing harvesting costs using windrow grazing. Proc. The Range Beef Cow Symposium, Greeley, CO, XVI:61-66.
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Additional Information

- An Introduction to Swath Grazing in Western Canada. 2004. Alberta Agriculture, Food and Rural Development Agdex 420/56-2.

This publication has been peer-reviewed.

UNL Extension publications are available online at <http://extension.unl.edu/publications>.

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