



## FORAGES FOR ALL SEASONS

### Cereal crops - management for supplemental and emergency forage

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Cereal crops, grown primarily for grain, are well adapted to Wyoming. These crops include wheat, triticale, rye, oat, and barley. Because they grow primarily during the cool season, they are less apt to encounter drought. They can provide grazing in as little as four to six weeks but can also be used as hay, silage, or green chop. In some areas they are an important source of grazing prior to allowing a crop to mature its grain. Many acres of small grains, particularly wheat, have been grazed out due to poor grain prospects. Oat and barley are used extensively in Wyoming as companion crops for the spring seeding of alfalfa and other perennial forages.

Cereals can add flexibility to the forage-livestock program. They can be used to extend the grazing season, provide early grazing before perennials are available, allow deferment of range grazing, provide an alternative to early-spring grazing of meadows, and can also supplement range, pasture, and perennial hay crops in years of short forage supply.

#### **Adaptation and cultivars**

All cereals are annuals. Winter (fall-planted) cereals are generally more productive than spring types mainly because they take greater advantage of spring precipitation. Wheat is the most commonly grown winter annual in Wyoming. Winter rye is popular in some areas as a dual-purpose cover crop and grazed forage. It has wide tolerance to adverse weather and soil conditions. Cereal rye is not popular in wheat-growing areas because volunteer grain can contaminate wheat fields. Triticale, a cross of wheat and rye, does not volunteer, produces at least 20% more forage than wheat, and is higher in forage quality than rye or wheat. It has ex-

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*Barley*



*Oat*

cellent winter hardiness. Barley and oat need to be planted in the spring in Wyoming. Oat is better suited than barley to delayed spring planting. In fact, oat can be planted as late as July and produce a good forage crop. Barley is even more susceptible to Russian Wheat Aphid than wheat and can be severely damaged if the aphid is present in the area.

Although not grown for grain at elevations above 6,000 feet, these crops are excellent forage crops at higher elevations in which corn, sorghums, and other warm-season annuals are not suited. For example, in Laramie (7,300 feet), average oat hay yield over a five-year period has been 5.4 tons/acre.

Because they are adapted, varieties of cereal crops grown for grain can be used for forage. There are winter and spring varieties of wheat

and triticale. It is important to plant only winter varieties in the fall. Winter varieties planted in the spring will remain vegetative, but will not be productive. Winter varieties of oat and barley are not winter hardy in Wyoming. Taller-growing and later-maturing varieties of oat (Otana, Monida) tend to be higher producing but are more apt to lodge under irrigation. Awnless or hooded varieties of barley (Haybet, Westford, Horsford) are preferred, particularly for hay production, as they cause fewer feeding problems. Progress is being made in the development of awnless wheat and triticale varieties. Small grain awns can cause irritation to the eyes and soreness in the mouths of animals fed hay.

### **Fertilization**

Fertilizer application should be based on soil tests. Wheat, triticale, and rye have similar requirements and will respond similarly to a given amount of fertilizer. Oat requires a slightly higher fertility, and barley requires the highest fertility. Irrigated cereals will need more fertilizer than dryland production because of the higher production potential. High levels of nitrogen fertilizer can result in nitrate accumulation, particularly if the crop encounters drought. Nitrate accumulation to the toxic level is less likely but can still occur under fully irrigated conditions.

### **Seedbed/Establishment**

Fall-planted cereals can be seeded two to three weeks earlier than for grain production, particularly if fall and winter grazing is desired. Cereals need to be planted as early as the soil can be worked in the spring in order to obtain good tillering and a dense stand. Tillering requires cool temperatures. Seeding rates for maximum forage production needs to be 30 to 50% higher than for grain production. If the seeding date in the spring is delayed, the seeding rate should be increased to compensate for reduced tillering. Seed should be drilled in rows spaced 7 to 14 inches and between 1 and 2 inches deep. The

seed should be treated with one of several fungicides available. Be sure to check on grazing restrictions (ie, time interval before grazing).

### Weed control

Early-planted cereals are excellent weed competitors, which is the reason they are used as companion crops for establishing perennial forages. More herbicide options are available and more opportunity exists for “cleaning up” weeds if these crops are grown alone. Also, grazing is an effective control for some weeds. Check labels or call local county extension offices for tips on herbicide use and precautions.

### Grazing

The cereals are very high in nutrient content from early greenup until jointing. They will typically contain 25 to 30% or higher crude protein. Therefore, limited grazing might be the most effective method of utilizing these forages.

Cereals should not be grazed until plants are 6 to 8 inches tall. At least 3 inches of plant growth should be maintained for winter cover. Spring greenup of winter wheat and triticale will be slightly earlier than crested wheatgrass. After the spring grazing and before the plants start to joint (elongate their stems), the crop should be allowed to grow. Optimum time for final grazing is between the boot and milk stages.

Successful grazing of cereal crops requires several precautions: 1) Grass tetany (sometimes referred to as wheat pasture poisoning) is associated with a nutrient imbalance which results in a deficiency of magnesium (Mg) and/or calcium (Ca). It occurs when lush grass including wheat and other cereals are grazed. The problem is most prevalent with cows just before or after calving and is worse with older cows, 2) Bloat, though not as common as legume-induced bloat, occurs with wheat and other cereals in the leafy stage, particularly in stocker cattle. Bloat seems to be most common under the same crop conditions as

grass tetany occurrence. Immature, rapidly growing forages are commonly low in magnesium and are more likely than more mature forage to cause bloat. The naturally high potassium content of the cereals contributes to the deficiency of Mg and Ca. Nitrogen, which is normally high in young growth and elevated further with nitrogen fertilizer, can also intensify Mg and Ca deficiency as well as bloat incidence, 3) Nitrate can accumulate under drought stress. Nitrate accumulation is generally at a peak at the boot stage and gradually declines as the crop matures; however, nitrates can pose a problem with the grazing of immature forage, even with adequate water. If uncertain, take a representative sample before grazing. See *Managing Forage to Reduce Nitrate Poisoning of Livestock* for further information.

Both tetany and bloat can be reduced if cereal grazing is delayed until spring growth is at least 6 inches tall, if grazing is limited to two to three hours per day following hay feeding, and if nitrogen fertilization is delayed until after the initial spring grazing. A daily magnesium supplement starting a week before cereal grazing will reduce the incidence of tetany. An anti-foaming bloat protection agent can be used to reduce the incidence of bloat. The same precautions that are used for avoiding legume bloat should be followed. Animals should not be turned onto lush pasture hungry or when pasture is wet from dew or rain.

In western Canada, late-planted (June) barley is swathed in September and grazed in the winter. Cows there performed similarly to those fed barley silage but at considerably less cost. Barley has not been evaluated in this way in Wyoming. Oat would likely be better suited to this method of extending the grazing season in Wyoming.

Small grain (cereal) pasture is a very valuable forage resource but requires careful management to be utilized effectively.

## Mechanical harvesting

All cereals lose palatability and crude protein content from the boot stage through the milk stage. The maximum amount of protein per acre comes during the late milk to early dough stages, and maximum forage yield is at the soft-dough stage. After that, leaves are lost and nutrient contents and dry matter yield diminishes. For hay or silage, triticale and wheat should be harvested at early heading and barley and oat at

the soft-dough stage. If cereal is used as a companion crop and a perennial forage is undersown, harvest immediately if the crop starts to lodge. Ideal moisture content for silage stored in bunker or concrete silos is 65-70% moisture. Therefore, forage harvested at early heading may need to be field wilted, while forage harvested at the soft-dough stage can be direct cut and ensiled.

**Table 1.** Cultural practices for cereal crops grown for forage.

Crop <sup>3</sup>	Use	Seeding date	Seeding rate <sup>1</sup>		Potential hay yield <sup>2</sup>
			Dryland	Irrigated	
Winter wheat, rye, triticale	Pasture	Aug. 1-Sept. 15	50-60	110-130	–
	Hay, silage	Aug. 1-Sept. 15	50-60	110-130	3-5
Spring oat <sup>4</sup>	Pasture	Early spring	60-75	120-130	–
	Hay, silage	Early spring	60-75	120-130	2½-4
Spring wheat, triticale <sup>5</sup>	Pasture	Early spring	70-90	130-150	–
	Hay, silage	Early spring	70-90	130-150	2-3½
Spring barley	Pasture	Early spring	70-90	140-160	–
	Hay, silage	Early spring	70-90	140-160	2-3

<sup>1</sup>With spring seedings the higher rate should be used with delayed planting dates.

<sup>2</sup>Use the lower figure for dryland and the higher for irrigated conditions.

<sup>3</sup>Crops can be planted in mixtures with Austrian winter peas for improved crude protein and forage quality. Seeding rate should be 3:1 cereal:pea ratio, based on number of seeds planted: i.e., 3:1 cereal:pea seeds per foot of drilled row.

<sup>4</sup>Spring oat can also be planted in late June or early July alone or in mixtures with rape or turnip for fall-winter use. No more than 30 lb/acre of oat seed should be used (under irrigation) if a perennial forage is undersown. Oat companion crop is not recommended under dryland.

<sup>5</sup>Winter varieties of these cereals should not be planted in the spring, as they will not be very productive.

<sup>6</sup>For hay and silage use, rye and triticale should be harvested at the boot or early heading stage. Oat should be harvested at the soft-dough stage. Oat harvested at the boot stage is more apt to be high in nitrate than at later stages.

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