Use Cover Crops for Hay

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Cover crops have become a popular option, providing vegetative cover and building soil on land traditionally left black or in stubble after harvest. Annual plant species offer the majority of cover crop options, serving a dual function in livestock/cropping systems. A cover crop can be a single plant species or a mixture of different complementing plants. Goals include reducing wind/water erosion, suppressing weeds and improving soil quality and fertility. Benefits include rapid growth in poor conditions, supplying residual cover and organic matter to the soil surface/sub-surface, enhancing soil structure and capturing nutrients from deep within the soil. Cover crops also improve physical, chemical and biological soil properties for subsequent cropping years.

Livestock producers can select annuals that serve as a cover crop, as well as a forage source. Selecting appropriate annual species or a mix of species can provide additional gain in a livestock/cropping system that can either be grazed or hayed.

Selecting Annuals for Late-Season Hay

When developing an annual hay crop following a cash crop harvest, a minimum of 45 growing days are needed, but 60 are preferred. Moisture is critical for success, as the cash crop could have harvested much of the soil moisture. Good moisture during early development drives the success or failure of the second crop. If growing days are limited to 45-60 days, cool-season annuals are recommended (e.g., forage oats, forage barley, spring triticale). Forage production is similar between these three cereals, with forage barley being the highest producer in many northern U.S. and southern Canadian studies. However, recent seed costs of forage barley and triticale show a cost/lb of forage produced up to three times greater than forage oats (Table 1).

Mixing a legume with a cereal can increase soil building properties and nutritional feed quality. However, be cautious of the added expense. Most legumes planted late in the season provide <1,000 lbs/ac of harvestable feed. Purchase a low cost legume if possible as supported in a North Dakota trial where legumes were seeded mid-July with a late-July germination and killing freeze October 8 with ~70 growing days (Table 1).

When the growing season is >60 days following the cash crop harvest, options are greater including warm-season forage crops. If the growing season is limited to 60 days, foxtail and proso millets provided the greatest forage production. If there are 70-90 days, sorghum-sudan hybrids, sudangrass and pearl millet can be options. Sorghum-sudangrass BMR produced the greatest amount of forage among warm-season annuals in a North Dakota study (Table 2). Seed costs were similar between sorghum-sudan and foxtail millets, both were lower than sudangrass. Economic efficiency is essential in a forage production/livestock system. Most producers want cheap input costs and high returns, so balancing the cost is important.

Table 1. *Forage production and seed input cost for selected annual, cool-season cereal and legume crops seeded during the summer of 2009 near Mylo, ND.*

Cool-Season Cereal[1]	Lbs/Ac Produced (100% DM)	Input Costs ($) from Seed/100 lbs Produced	Legume[2]	Lbs/Ac Produced (100%DM)	Input Costs ($) from Seed/100 lbs Produced
Forage Oats	4,670	0.21	Forage Soybean	5,863	0.85
Forage Barley	5,199	0.67	Hairy Vetch	1,372	1.46
Spring Triticale	4,795	0.69	Field Peas	1,132	1.17
			Cow Peas	421	11.88

[1]Harvested in hard dough stage at 70+ growing days. [2]Harvested in vegetative growth stage and ~70 growing days.

With 60+ growing days, creating a mixture of cool- and warm-season grasses and legumes provides diversity and a palatable/nutritious forage for most livestock. Do not be afraid to combine 3-6 (or more) annuals. Each species will have different growth characteristics that build and protect soils and still provide adequate forage.

Selecting Annuals for Early-Season Hay the Following Year

Productive growing conditions following harvest often last <45 days. However, livestock producers can plant a hay-type cover crop to harvest in the spring. These are termed 'winter annuals' and are often comprised of cereal crops. Austrian winter pea, hairy vetch and crimson clover are winter annual legumes with fair to good winter hardiness and are typically seeded with a winter cereal, when hay is desired. Red clover, seeded with winter cereals, has also been a popular, short-lived perennial legume. Winter rye, triticale and wheat are popular annual forages seeded 30-45 days prior to the typical frost-free date. These annuals grow into the fall until a hard freeze, regrow the following spring and are harvested as hay. Studies have shown winter rye produces the most forage in the fall; however, all three produce comparably the following spring. Winter rye is considered the hardiest and least susceptible to winter kill. Winter wheat is considered the least hardy based on the current varieties.

Warm-season cash crops such as corn, soybeans, edible beans and sunflower are often planted directly after the hay harvest. Use caution when planting winter rye if a corn or sorghum crop is to follow as it can negatively impact corn and sorghum production.

Table 2. *Forage production and input cost of the seed for selected annual, warm-season forage crops seeded during the summer of 2009 near Mylo, ND.*

Warm-Season Annual[1]	Lbs/Ac Produced (100%DM)	Input Costs ($) From Seed/100 lbs Forage Produced
Sorghum-Sudan BMR	8,084	0.15
Sudangrass	6,535	0.26
Foxtail Millet-Siberian	5,797	0.12
Foxtail Millet-German	5,591	0.16

[1]Harvested during heading stage at 90+ growing days.

Summary
Cover crops provide an opportunity for livestock producers to build soil and produce harvestable forage. Select an annual that best fits the operation and growing days, using mixtures when possible. Be cautious of high seed costs. Available soil moisture is critical. If soil moisture conditions are low and the forecast for rain is poor, planting a cover crop strictly for the purpose of a forage crop is not recommended. Germination will be poor, forage production will be low and the economic cost will be unfeasible.

Fertilization is recommended for the cover crop. Producers should not assume sufficient fertilizer remains following the cash crop harvest. Conduct a soil fertility test to determine if deficiencies are present and fertilize appropriately.