Utilizing Cover Crops for Forage: Overwintering Annuals

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Utilizing cover crops for stored or grazed forage can be a win-win, allowing for the capture of nutrients and a more immediate return on the costs associated with planting cover crops. In dairy systems, winter cover crops and, specifically, overwintering annuals can retain nutrients from fall manure applications and what remains after corn silage production. With these nutrients captured in the plant, the farmer has the choice of incorporating them back into the soil, harvesting the spring forage, or letting the four-legged harvesters graze it.

Winter triticale stand planted in October at USDFRC, Prairie Du Sac, WI. *Photo: Jose Franco.*

As with all enterprises on the farm, one should consider the end goal and manage for it. If the goal of the winter crop is for the dual purposes of cover and forage, there are some key considerations. These include species selection, seeding date and rate, and harvest timing and planning the crop rotation to accommodate an additional forage crop.

Species selection. Species selection should be based on three primary factors: the ability of a cover crop to reliably overwinter; to align with one's planting windows (first between the previous crop's harvest and the onset of cold weather, then between the cover crop and the next crop); and to provide flexibility in optimal harvest time (striking a balance between desired quality and yield).

Winter small grains such as winter cereal rye, winter wheat, and winter triticale are some of the most commonly grown winter cover crops because they can reliably overwinter in the Midwest. Winter rye provides the greatest flexibility in fall planting date and can be successfully planted as late as October, November or later in some locations. Winter triticale and winter wheat should be planted before mid- to late-September in most areas of the Upper Midwest. Some small grains will mature earlier in spring, allowing for more time to plant the subsequent cash crop. For example, research suggests cereal rye reaches the boot stage seven days earlier than winter triticale and wheat in the spring (though this is variety dependent). This allows for a greater planting window for the following crop, but fast-maturing species such as winter rye will be less forgiving when it comes to harvesting during the optimal window (high quality, high yield) in the spring. In this regard, winter triticale is superior because quality declines at a slower rate than winter wheat or rye, allowing for greater harvest flexibility in the spring. Winter triticale can, however, delay planting of the next crop as it may not be harvested until late-spring or later because of delays in reaching yield/quality targets or unfavorable weather conditions for harvesting or grazing.

Seeding date and rate. In small grains, seeding date impacts fall tiller production which then impacts spring biomass production. Tiller counts can account for 60% of yields in small grains, so earlier planting dates (September-October) will allow for more tillering, as well as greater root production, and result in greater yield potential. Although species such as winter cereal rye can be successfully planted later, dry matter (DM) yield is usually reduced with later plantings. A reduction in biomass also translates to a reduction in erosion control and other soil benefits, resulting in less biomass for nutrient retention/storage and weed suppression. Delayed planting can also result in a delay in spring maturity. A one-month delay in fall planting may result in a one-week delay in heading date.

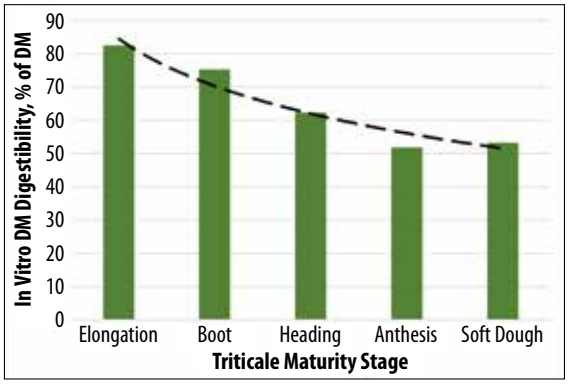
Interseeding cover crops into standing corn is one strategy to optimize planting windows and get a cover crop established before silage harvest. Interseedings at corn vegetative stages have found some success, though shading can become an issue and reduce cover crop biomass. Interseeding into later corn reproductive stages just before harvest may be optimal for cover crop establishment, but this will depend on seeding method, getting good seed-to-soil contact, and moisture conditions. The use of shorter-season corn hybrids that provide an opportunity to establish winter cover crops after harvest is generally not recommended in the Upper Midwest due to overall lower yields compared to longer-season hybrids. However, as technologies and research efforts advance, these recommendations will continue to be refined.

Seeding rates can be adjusted based on the intended use of the winter cover crop. Oftentimes, higher seeding rates are used when covers are planted with the intent to harvest for spring forage and can result in higher DM yields. If planted early, however, lower-seeding-rates may result in similar or, even, superior yields because of greater fall tillering and greater spring growth, though variety selection will also factor into this.

Timing of spring harvest. Timing forage harvest in the spring is critical for striking a balance between optimal yield and nutritive value and for allowing a sufficient planting window for the subsequent crop. Weather and water-holding capacity of soils will also play a role. In wet seasons and wetter soils, growing and harvesting a cover crop for forage can help take up excess moisture and aid in planting the next crop. During dry conditions or in drought-prone soils, forage cover crops may need to be terminated earlier to conserve water.

For small grains, fiber digestibility, net energy of lactation (NE_L), and other key measures of nutritive value are highest at the vegetative stage and lowest at the milk stage (Figure 1). Determining optimal harvesting time when accounting for a balance in nutritional needs and forage yield are farm-specific and will often be determined by the class of livestock. For instance, in the case of triticale, harvesting at boot stage will provide superior-quality forage for lactating cows. The added benefit of this earlier harvest time is that it also provides sufficient time to plant a corn crop.

Figure 1. Digestibility declines with maturity in winter small grains (data for triticale as an example).



In summary, overwintering cover crops can have dual purposes, providing forage in addition to conserving soil and being beneficial for the environment. Cover crops present forage production opportunities, but these goals require the farmer to consider species selection; seeding date and rate; as well as the domino effect it has on the crops managed in the rotation. Work continues to refine systems that integrate winter cover crops, such as exploring innovative methods to interseed cover crops to improve stand establishment and biomass production while reducing negative impacts on primary crops.