

Opportunities for Double Cropping in Dairy Forage Systems

Matt Akins, University of Wisconsin-Madison

The use of annual crops within a dairy forage system provides flexible options and opportunities for two crops in a growing season. Management of each crop can impact the subsequent crop depending on timing of planting and harvest, fertility, and other factors. Consider these potential double-crop options as well as tips for successful management.

1st crop: winter cereal grain forage, mid-late May/2nd crop: corn silage, late May-early June. This combination is likely the most popular option for double-cropping forages in the Midwest. The choice of species (e.g., rye, triticale) depends on timing and experience, with rye often maturing sooner than triticale. However, there are significant differences among varieties, so be sure to check with your seed company about variety maturity timing. Farmers should be aware of herbicide restrictions from the previous crop, as some herbicides have longer rotation intervals, and the use of certain cereals as forage may be restricted. A main key to a high-yielding winter cereal forage crop is an early planting date to allow for greater tillering prior to winter. Based on Wisconsin research (fyi.extension.wisc.edu/forage/planting-winter-rye-after-corn-silage-managing-for-forage), planting in September allows more time for root and tiller development, and thus greater winter cover and spring forage yields. Later plantings provide less forage and soil protection.

- Manure can provide needed nutrients for the crop. If time allows, manure can be applied prior to planting. But if timing is late (i.e., late September), the cereal can be planted first with manure applied after emergence. Use of liquid manure (5,000-7,000 gals/ac) is suggested if applying after emergence; semi-solid manure may smother the crop. The cereal forage crop can have high nutrient removal rates with estimates of 52 lbs N, 18 lbs P₂O₅, and 80 lbs K₂O per ton forage dry matter based on the previously mentioned Wisconsin research.
- Cereal forages have harvest flexibility depending upon desired quality and yield (i.e., harvest at boot stage for lactating cows, milk to soft-dough stage for dairy heifers or beef cattle). Harvesting later will increase yield, but an earlier cereal forage harvest at boot or flowering in mid-late May is suggested to improve success of the corn silage crop. Later harvests may require using shorter-maturity corn hybrids to allow the crop to reach maturity before a frost, especially if you intend to plant another winter cereal or forage cover crop after corn silage harvest.
- Corn silage management should be adjusted slightly with increased risk for armyworm from the previous cereal crop and potential limited N availability due to the cereal crop taking up much of the soil-available N. Corn yields can be reduced when double cropped with cereal forages, so keep this in mind when estimating crop production and inventory needs. However, the total yield of the cereal forage and corn silage crop typically meet or exceed the corn silage crop.

1st crop: winter cereal grain forage, late-May to early June/2nd crop: warm-season annual or cocktail forage mix, early June. Similar management would apply to the cereal grain forage as discussed previously, however, a later potential harvest could be taken as the warm-season annual (e.g., sorghum, sorghum-sudangrass, sudangrass, millets, teff) needs to be planted into a warmer seedbed (ideal minimum 65°F) in late May or early June depending on location.

- Keys to success with summer annuals include proper location/soil conditions (avoid poorly drained soils), seeding depth to ensure a fast emergence (depends on each species), and adequate fertility with 45-60 lbs N/ac needed per cutting in a multi-cut system or 120-150 lbs N/ac for a single harvest system.
- Harvest management of the warm-season annual or cocktail mix depends on the quality and yield needs of the operation. Forage sorghum is suggested to use a single harvest system, similar to corn silage, as it has limited regrowth potential. Harvest at soft-dough stage and 65-70% moisture is suggested, as the sorghum berries are difficult to process and have poor digestibility at hard-dough stage.
- Sorghum-sudangrass is flexible since it can be harvested using a single or multi-harvest system. If looking for high-quality forage with higher protein and fiber digestion, use a multi-cut system with 2 cuts, most likely at 30-36" high (40-45 days post planting and 30-35 days after). Leaving a 6" residue will help with a quick

regrowth. If needing forage for pregnant heifers or dry cows, consider using a single harvest system either by cutting/wilting in mid-late September or direct harvesting once the crop is mature or 7-10 days after a killing frost. Be aware of potential nitrate and prussic acid toxicity with frost-killed sorghum crops and manage appropriately.

- Other summer annuals (e.g., sudangrass, millets, teff) are best suited for a multi-cut system. If a cocktail mix with warm- and cool-season annuals (e.g., Italian ryegrass, clovers) is used, then an additional fall harvest is possible and the cool-season annual will provide better winter cover than a summer-annual monoculture. If using summer-annual forage for lactating cows, a BMR type is suggested to improve fiber digestion and intake.

1st crop: cereal grain harvest, mid-late July/2nd crop: fall-grown oats or spring barley, mid-July to early August.

Many dairies still grow wheat or other small grains to sell the grain and harvest straw for bedding or feeding. With cereal grain harvest often in mid-late July, this opens a window for a late-summer/early fall crop of oats or spring cereal grain (often barley). This would also be a good time to apply manure in mid-summer to reduce applications in fall.

- Based on Wisconsin data, the optimal time to plant oats or spring barley is no later than the first week of August to maximize forage yields (fyi.extension.wisc.edu/forage/fall-grown-oat-forages-cultivars-planting-dates-and-expected-yields). The selection of an oat cultivar will depend on the planting date, with a later-maturing forage type having higher yields for earlier planting dates (mid-July to first week of August). Earlier maturing grain types have higher yields for later plantings after the first week of August. Ideally, the crop should be planted by August 10.
- Soil moisture at planting is important for early growth, so be sure the seed is planted at the correct depth to reach moisture. If in a drought, wait for adequate moisture.
- Harvesting of fall-grown oats or spring barley usually occurs in early October to mid-November. Grain-type oat cultivars planted in mid-late July will often become reproductive and reach a suitable moisture (<70%) for a direct silage harvest by mid-late October. However, if planted in early-mid August, the likelihood is much lower for a direct silage harvest. A later-maturing forage type oat likely won't reach adequate silage moisture until November. Grazing is a great option with tight strip-grazing needed to minimize trampling of accumulated forage. Harvest or grazing should occur prior to heavy snow, as the crop will lodge. Oat forage quality can be excellent with high fiber digestibility from cool growing conditions and high sugar content due to the plant's hardening process before winter.