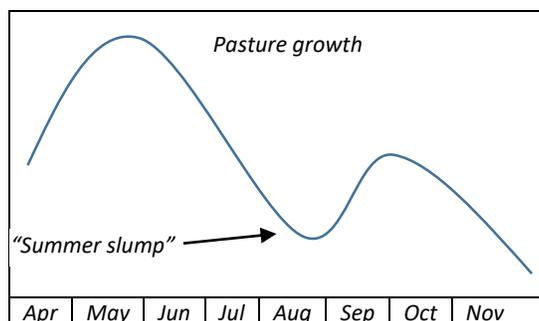


INCREASING HIGH QUALITY HOMEGROWN FEEDS FOR THE ORGANIC DAIRY FACT SHEET SERIES

Use of “Alternative Forages” on Certified Organic Dairy Farms in the Northeast

Introduction

One of the requirements of being certified organic is that ruminant animals over the age of six months must receive an average of not less than 30% of their dry matter intake from pasture over the grazing season for a minimum of 120 days per year. In addition to meeting this requirement, many organic dairy farmers are interested in ways to both enhance and extend the grazing season to minimize off-farm purchased feeds and maximize the home-grown fresh forages fed to their animals. There are a number of conditions that further drive farmers to look for alternative forages on their certified organic dairy operations. A major situation is the “summer slump,” a period during the grazing season when recovery periods slow for cool season pasture perennials, such as Timothy, orchardgrass, and clover, and therefore, they decline in productivity. Another is climate change; the Northeast U.S. continues to face increasingly extreme and unpredictable weather conditions that can impede adequate forage production throughout the growing season.



To maintain or increase forage availability throughout the season, farmers are looking to diversify their home-grown forage options throughout the year through the use of “alternative forages.” In the Northeast, the term “alternative forage” generally refers to annual crops that are planted for grazing as well as for stored feed to supplement existing feedstocks. Maintaining adequate on-farm forage supplies across the entire season requires the use of multiple species and strategies.

This factsheet provides information on managing “alternative forages” including warm-season grasses, brassica species, and small grains, in the Northeast.

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Warm-Season Annual Grasses

To maintain forage production during the “summer slump,” warm-season annual grasses are a must. These grasses are typically planted in early June and can be grazed or harvested as stored feed (hay, silage, or grain) once or twice during the season, depending on the weather. They do require hot weather to grow and can grow very rapidly to outcompete weeds. Although they require modest fertility rates, their extensive root systems make them excellent scavengers of nutrients that would otherwise be unavailable to most other crops.

Sudangrass, Forage Sorghum, and Sorghum-Sudangrass Hybrids

Sudangrass is often a popular summer annual as it establishes quickly, produces a lot of biomass, and has an extensive root system that can scavenge nutrients and water. Sorghum-sudangrass hybrids have been gaining in popularity over sudangrass recently as these hybrids produce yields similar to sudangrass but are leafier and produce less seed, making them of higher forage value. To further increase digestibility, some brown mid-rib (BMR) varieties have been developed. Sudangrasses and sorghums should be seeded into soils that are about 65°F with adequate moisture at a depth of about 0.5 to 1 inch. These grasses can be grazed or harvested for hay; however, care should be taken when grazing these species as they contain toxic prussic acid. Prussic acid concentrations are highest in young plants, particularly leaves, and increase with frost damage. Therefore, it is recommended to only graze or harvest these species for green chop once they have reached 18 to 24 inches in height; if frost occurs, do not allow grazing for at least 10 days. These species are generally safe when ensiled. At heights above 36 inches, these grasses begin to produce seed heads, and crude protein and digestibility levels will drop dramatically. To maximize forage yield, quality, and regrowth, maintain a stubble height of 10 inches. They can also be harvested for hay when they reach 30 to 36 inches; however, the high biomass production of these grasses can make curing difficult.

Millets



Grazing Japanese millet.

Millet is another warm-season grass that can be grazed or harvested as stored feed. It tends to grow more slowly than sorghum and sudangrass; however, it can tolerate more acidic soils and does not contain prussic acid. Millet should be established as early in the growing season as possible when soil temperatures have warmed to about 65°F to ensure adequate establishment. It should be seeded at about 20 pounds per acre at a depth of 0.5 to 1 inch. Seed can be drilled, no-till seeded, or broadcast and cultipacked. If nitrogen is to be applied, it should be done in multiple, smaller applications after grazes to avoid over-fertilization and potential problems with nitrate accumulation. Proso, foxtail, pearl and Japanese millets are the common types used for livestock feeds. Proso and foxtail millets are often ensiled as they have shorter grazing seasons and tend not to produce as much biomass as pearl and Japanese millets. Millet can be grazed when it reaches a height of about 18 inches. It should not be grazed below

10 inches if regrowth is desired. As nitrate accumulation can be an issue in this crop, it is not recommended to graze millet under 6 inches in height or after droughty conditions.

Teff

Teff is a relatively new crop to the Northeast. It is native to Ethiopia where it is grown as a cereal crop in traditional foods. It can be grazed or harvested as stored feed. It does not have issues with prussic acid or nitrates. Teff's thinner stems allow for faster hay curing than millet or sudangrass. It should be seeded at around 6 pounds per acre at a shallow depth of 0.25 inches as the seed is quite small; seeding deeper than 0.5 inches will likely result in very poor stand establishment. Cultipacking after seeding may be beneficial in providing adequate moisture to the seed. Teff can be grazed or harvested approximately 50 to 55 days after seeding depending on weather. Before grazing, test the stand—by pulling on a handful of the grass—to see if the roots have established enough to withstand grazing. For optimal forage production, do not graze or harvest below 5 inches as this will stunt the crop. Subsequent harvests should be possible in another 45 to 50 days after the first graze/harvest.

Brassicas

Kale, Rape, Turnip and Swedes



Fall brassica.

Brassicas can be used in the fall to extend the grazing season into cooler weather. As a broadleaf crop, they work well as a rotational crop in grass-based systems. Brassicas can be planted in August. They can be drilled in 6 to 8 inch rows at a depth of about 0.5 inches as the seeds are quite small. Seeding rates should be lowered when mixing brassicas with small grains. Grazing can begin when plants are about 12 inches in height which, depending on the species, is about 70 to 120 days after planting (longer for kales and swedes). Brassicas should be grazed in short intervals to ensure regrowth can be achieved. These crops are highly nutritious and digestible—for example, the above ground vegetation of kale and rape can be up to 25% protein and 60 to 80% total digestible nutrients (TDN). The roots of turnips and swedes are lower in protein (up to 15%) but 80 to 85% TDN. Because of their high nutrition and digestibility, these crops should be slowly introduced to grazing animals with short grazing periods to avoid bloat and other disorders. As such, it is helpful to think of brassicas as more like a concentrate than forage. If grazing lactating cattle, brassicas should not constitute more than 50% of their dry matter intake (DMI) to avoid off-flavors in the milk. For other livestock, brassicas should account for no more than 75% of the diet. More fibrous feeds should be supplemented when grazing brassicas. They can also be mixed with oats or other small grains to provide a more balanced diet.

Small Grains

Small grains such as oats, wheat, rye, barley, and triticale can also be utilized for forage. Although they are typically seeded as nurse crops to establishing perennial forages, when planted alone, they can provide decent yields and quality similar to other cool season grasses. Both spring- and fall-seeded varieties of these species are available; however, rye, wheat, and triticale are typically fall seeded and barley is typically seeded in the spring due to questionable winter survival. Oats can be seeded at either time depending on need; they will grow in the fall but will not overwinter under our northern growing conditions.

Spring-seeded Grains: Barley, Wheat, and Oats

Spring grains are planted around the end of April or beginning of May in our region when soil temperatures are cool. It is important to plant as soon as possible to ensure good establishment. Seeding rates are typically 125 to 150 pounds per acre (on the higher side during spring planting). They should be planted at a depth of 1 inch with a grain drill or a broadcast seeder followed by a cultipacker to cover the seed. Harvest timing for small grains is crucial to ensure high quality and yield. Generally, harvesting in the flag leaf to boot stages provides the highest forage quality, although at a slight yield disadvantage. The flag leaf stage is when the flag leaf—the top-most leaf on the stem just below the seed head—emerges. The boot stage is just prior to seed head emergence; it is when the seed head is developing but is enclosed by the sheath, appearing as an enlarged or swollen area near the top of the main stem.

If high yield is a priority over forage quality, then grains can be harvested in the late dough stage—when the seed head produces a doughy substance when opened. Harvesting in earlier dough stages will provide a compromise between yield and quality. The table below shows yield and quality differences of various grains harvested between the boot and dough stages. It is important to remember to check your grains frequently when they begin to reach these stages as they can often develop from boot to late dough stages very quickly. If they are harvested after the late dough stage, they will be of poor forage quality and may be too dry to ensile. Note that different grain species mature at different times; for example, barley is the first to mature, followed by wheat, and then oats a couple of weeks later.

Fall-seeded Grains: Rye, Triticale, Wheat, and Oats

When fall seeding small grains, seeding rates can be slightly lower (125 pounds per acre) than in spring as there is typically less competition from weeds. Oats do not survive the winter in this region but can be planted in the late summer if fall grazing or extra forage is needed.

Other fall-seeded grains—cereal rye, triticale, and wheat—should be planted by mid-September to ensure establishment before the onset of cold weather. However, if seeded too early, the plant will grow too vigorously leading to low root energy reserves and poor winter survival. Fall-seeded grains can be grazed once they reach 8 inches in height and should not be grazed lower than 3 to 4 inches as to better ensure winter survival. These fall-seeded grains can also be grazed in the spring once they reach a height of at least 8 inches again.

In general, there are yield and quality trade-offs associated with different harvest timing. Harvesting in the flag leaf to boot stages provides the highest quality but at a slight yield disadvantage. The flag leaf stage is when the uppermost leaf on the stem just below the seed head emerges; the boot stage is when the seed head is developing but is still enclosed by the sheath, appearing as an enlarged or swollen area near the top of the main stem.

If high yield is a priority over quality, then grains can be harvested in the late dough stages when the seed head produces a white, doughy substance when squeezed. Harvesting in earlier dough stages will provide a compromise between yield and quality. It is important to remember to check grains frequently when they begin to reach these stages as they can often develop from the boot to the late dough stages in a matter of days. If they are harvested after the late dough stages, they will be of poor forage quality and may even be too dry to ensile.

In Summary

Organic dairy farmers in the Northeast can face a host of challenges to producing high quality feed in sufficient quantity throughout the growing season, but annuals can be used as alternative forage crops to provide feed in early and late season, and during the summer slump. Many of these alternative crops also provide flexibility in how these feedstocks are used—as a grazed forage; as stored hay, haylage, or silage; and even a grain crop—making them an attractive option for farmers.

Citations used to develop this fact sheet can be found in the “Literature Review: Alternative Forages for Organic Dairies,” posted at <http://www.uvm.edu/extension/cropsoil/organic-farming>.

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