

Incorporating Grass into Silages for Dairy Cows

by Jim Leverich, Dave Combs, Randy Shaver and Dan Undersander

Introduction

Recent improvements in grass varieties for silage production, interest in improving fiber digestibility in dairy rations, the need to properly supplement corn silage based rations, and a desire improve nutrient management on dairy farms, have helped generate numerous questions about the positioning of grass and grass/legume silages for dairy cows. Grasses and grass/legume mixtures can be used successfully in dairy rations while at the same time reducing soil erosion and improving nutrient management performance on dairy farms. The purpose of the article is to pose the often-asked questions on this topic and provide responses.

How will inclusion of grasses into lactating cow diets affect production, cow health and income over feed cost?

Inclusion of grasses into lactating cow diets should not adversely affect milk production as long as grasses are harvested early enough to maintain quality and the rations are balanced properly. Cow health may improve in certain instances as cows may receive more effective fiber, which may stimulate improved rumination. This should improve rumen health, which would improve overall cow health. Inclusion of grasses in a dairy cow diet can help reduce high non-fiber carbohydrate (NFC) concentrations often associated with corn silage based rations.

Income over feed cost may improve if you choose grasses which are high yielding and if they are harvested in a timely manner. Grasses can improve overall forage yields, and quality will be maintained if they are harvested on time. Income over feed cost will decrease if grasses are harvested too late and (or) if low yielding varieties are selected. Today's grass varieties can yield much higher than varieties from the past.

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What risks are associated with introducing grasses into the ration and how is the harvest window affected?

There are some risks to introducing grasses into your forage system. These risks can be overcome by good management. Grasses can mature very quickly and lose quality quicker than alfalfa, so choice of a late maturing grass variety if mixed with a legume and timeliness of harvest are critical. Grass tetany is also a risk with grasses, but is usually not an issue unless grass comprises over 50% of the diet which is unlikely except for some dry and transition cow rations. This problem can be overcome through dietary magnesium supplementation.

Managing the silage fermentation is very important with grasses, because they may be coarser than alfalfa and corn silages and thus not packed as easily. Adequate moistures at chopping (60%-65%) is crucial. Grasses often appear different than legumes at any given moisture content and operators often misjudge moisture and harvest either too wet or too dry. Moisture should be measured with a Koster moisture tester or microwave oven until experienced in harvesting grass for silage. Proper packing is critical to ensuring that the oxygen is removed from the crop so that it can ferment properly. Grasses tend to be sucked through the chopper, thus the chop length may end up longer than desired. A shorter chopping length setting on the chopper may be necessary to ensure the forage is chopped at a 3/8 inch theoretical length so the forage will pack well. Grasses ensiled too wet (>65% moisture) are more prone to clostridial spoilage.

Can I make high quality silage from grass and grass/legume mixes and how will yields be affected?

Wilted grasses are lower in soluble carbohydrates than wilted alfalfa or whole corn plant. As a result, care must be taken to ensure that silos are filled quickly, packed well and tightly covered. Moisture content of ensiled grass silages should be in the range of 60 to 65 % to ensure adequate packing and optimal fermentation. Untreated grass silages will also tend to be less stable at feed-out than alfalfa silage. Bunker faces should be managed carefully, especially in summer to reduce

aerobic losses. Silage inoculants that contain *Lactobacillus buchneri* have been shown to improve aerobic stability of grass silages. These inoculants are more effective when grasses are ensiled on the wet side (60 to 65% moisture) than when ensiled too dry (less than 55% moisture).

Yields of grass legume stands will be at least equivalent to legume stands and under some circumstances grass legume fields may yield slightly more than legume only fields.

What are the dairy cattle feeding advantages/disadvantages of producing grasses separately compared to in legume/grass mixtures?

Producing and storing grass and legume silages separately allows them to be sampled analyzed separately for determination of nutrient composition so that their use can be optimized through ration formulation. Keeping them separated in storage can be difficult, however, and requires extra management for two silages rather than one through harvest, storage, and feed-out. In particular, each silage must be stored in a separate structure (bunker or tube), each of which must be fed from sufficiently rapidly to avoid spoilage on the face. While the agronomic benefits of growing legumes and grasses together in the same field will be lost, harvested legume/grass mixtures will have greater variation nutrient composition due to variation in the proportion of legume versus grass in the mixture and variation in their relative maturities at harvest. The increased variation of field grown mixtures will need to be assessed through frequent silage sampling and analysis, and addressed through ration formulation as necessary.

What are the agronomic and nutrient management advantages/disadvantages of seeding grass/legume mixture compared to seeding legumes alone?

One of the largest benefits to seeding grasses with legumes is reduced soil loss. The inclusion of grass in legume stands can reduce soil losses by up to 50% and improve water quality immensely. The greater ground cover helps to hold water on the field which means nutrients are more likely to stay on the field rather than being lost to the environment through soil erosion and runoff. This reduces the amount of fertilizer which needs to be purchased and improves the farm's overall nutrient management plan.

What are the agronomic and nutrient management advantages/disadvantages of grasses separately compared to in legume/grass mixtures?

Seeding grasses and legumes separately allows each to be managed and harvested in the optimum for that crop rather than compromising on management and harvest timing. Stands of pure grass can improve nitrogen nutrient management on farms. Liquid manures, which generally have high soluble nitrogen components, can be spread on grass stands and the grasses will utilize the nitrogen efficiently and help to prevent losses of nitrogen to the environment. Grasses generally do not suffer from the wheel traffic damage during manure spreading that alfalfa does.

On grass fields which are low in phosphorus, higher rates of manure may be applied to meet phosphorus needs on these fields. In legume grass mixes this may not be possible because the extra nitrogen applied from the higher manure rates along with the legume nitrogen credit would exceed the field's nitrogen recommendation.

In farming systems where nitrogen has to be purchased to provide an optimum nutrient management plan, grass/legume mixtures will be a better choice. Nitrogen will be provided by the legume reducing nitrogen fertilizer costs.

What percentage of grass should be included in the ration?

This depends on the quality of the silages being fed. When excellent quality grass silage is available, it can replace as much as one-third of the corn silage and alfalfa silage in rations for high producing cows. If the NDF content of the grass silages is higher than 45-50 %, the amount of grass that can be used will drop dramatically.

Are high quality grasses a better alternative than adding straw or co-product feeds, such as soy hulls, as a source of fiber?

High quality grasses silages contain 45% to 50% neutral detergent fiber (NDF) and the digestibility of the fiber should be greater than alfalfa or corn silage fiber. Grass fiber will be similar to straw fiber in 'effective fiber', but grass fiber digestibility will be nearly twice that of straw fiber. As a result, grass fiber can provide important 'scratch factor' to stimulate cud chewing with less rumen fill limitation of dry matter intake than straw. The fiber in

co-product feeds, like beet pulp and soy hulls, is highly digestible, but because of their small particle size co-products do not provide as much effective fiber as grass silages.

Will the inclusion of grass or grass/legume silages in the ration improve milk fat test?

Partial replacement of high quality corn silage and (or) alfalfa silage with a high quality grass silage may increase ration NDF content, reduce ration NFC content, and increase ration particle size. Together these changes may improve rumen function and milk fat test.

Do ration specifications need to be changed when feeding grass and/or grass/legume silages?

Higher NDF digestibility for grass than legume silages may allow the cow's nutrient requirements to be met with rations containing a greater total NDF and NDF from forage. The cow's requirement for physically-effective NDF may be more easily met with some grass silage in the ration if the particle size of the ration is increased.

Are certain lactation groups more suited to grasses and/or grass/legume mixtures than others?

Early-cut, high quality grass silage should be suitable as a component of any lactation group. Late-cut, low quality grass silage will have increased NDF content and reduced NDF digestibility, energy content and intake potential, and thus should be avoided for high-group rations.

Are there differences in mineral requirements with grasses versus legumes?

Grass silages are not the best feed for dry cows because they can contain high concentrations of potassium (like alfalfa), which can trigger milk fever in older cows. Potassium concentrations in grasses will be especially high if high rates of manure have been applied to grass stands. However growing grass on a field for several years is an excellent way to draw down soil potassium and to produce low potassium grass silage (see www.uwex.edu/ces/forage/pubs/lowK.htm). Phosphorus levels are typically similar to P found in alfalfa and corn silage while calcium concentrations in grasses are typically very low.

How do I select grasses to plant with alfalfa?

Grass varieties vary widely in yield, seasonality of yield, maturity (earliness of harvest) winterhardiness and disease resistance. Selecting appropriate high yielding grasses is critical to improving production and profitability when including grasses in your seeding mixtures and crop rotations. Select a late maturing tall fescue, orchardgrass, or meadow fescue for seeding with alfalfa. Select according to winter hardiness, yield, and yield distribution during the season, and select a rust resistant variety information on these characteristics for specific grass varieties can be found at <http://www.uwex.edu/ces/forage/>.

Seeding rates of 6 lbs/acre for tall fescue or meadow fescue or 4 lb/a for orchardgrass will give 25 to 30 seeds per square foot which, when mixed with 10 to 12 lb/a alfalfa, should be adequate for a stand. If seeding pure grass stands we would recommend 15 lbs/a of tall fescue or meadow fescue and 10 lb/a of orchardgrass.

Timely harvest is also very important with grasses. Harvest grass/legume mixtures for dairy cattle feeding when the grass begins to head or the alfalfa reaches bud stage on first cutting. Harvest later cuttings according to the stage of the alfalfa, since the grasses do not head a second time. If harvesting for heifers or beef harvest grass just after heading has begun.

Can I over-seed thin or winter-killed stands of alfalfa with annual grasses?

Thin stands of alfalfa can be over-seeded with annual grasses (Italian ryegrass or festolium). This over-seeding can be done early in the spring with a no-till drill. You can drive over the stand and see Italian ryegrass for festolium into the stand at the rate of 10 to 15 lbs/acre. Overseeding other grasses will have minimal effects on yield since they take 60 to 90 days to establish.



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