



# Feeding Alfalfa-Grass to Dairy Cows

Many dairy farms in the Northeast have land that is not well suited to growing pure alfalfa, primarily due to inadequate soil drainage. Perennial grass mixtures with alfalfa minimize alfalfa heaving, and fill in to maintain yield when alfalfa declines in the stand.

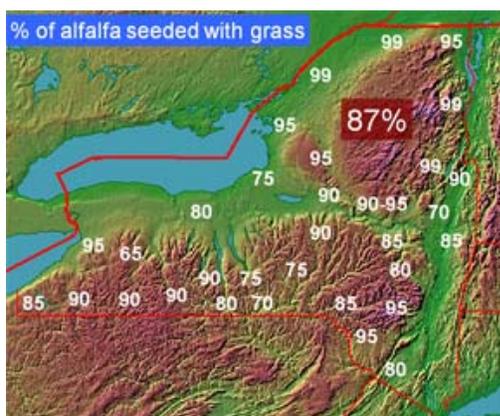


Figure 1. Estimates of alfalfa acreage seeded with perennial grass across NY State. The average for NY State was 87% in 2005.

The agronomic yield potential of tall fescue in NY is approximately one ton/acre higher than all other perennial cool-season grasses. We studied the effects of various mixtures of alfalfa and tall fescue silages, fed to dairy cows to provide 1.1% of body weight as forage NDF in the diet.

Table 1. Forage composition and diets.

Forage	NDF	CP	NEL
Fescue	56%	17%	0.58
Alfalfa	34%	23%	0.67

100% alfalfa forage
67% alfalfa forage
33% alfalfa forage
100% fescue forage

Lactating Holstein cows, 129 days in milk, were fed one of four diets (Table 1). Diets were in the range of what is considered a

normal diet for a high producing dairy cow in the USA. Diets were balanced to meet minimum requirements for CP, energy, and minerals. Cows were milked three times daily.

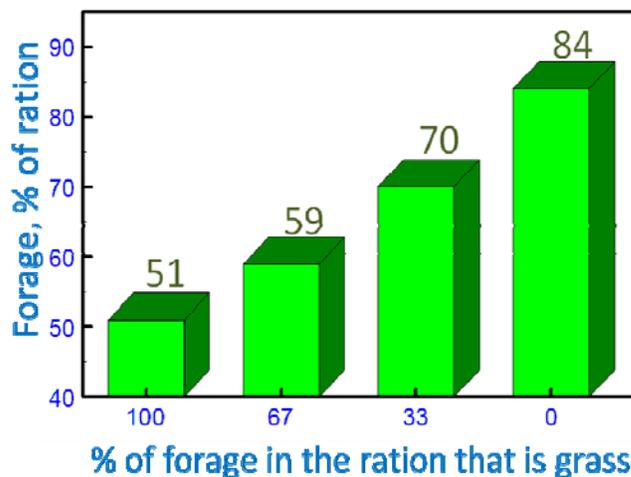


Figure 2. The amount of forage in each diet varied by mixture.

The maximum amount of forage allowed in the diet with 100% grass was 51% (Fig. 2). Low NDF in the alfalfa forage limited the amount of concentrate that could be fed in the 100% alfalfa diet, resulting in a very high forage:concentrate ratio. Mixed forage diets were intermediate in regards to amount of forage allowed in the diet.

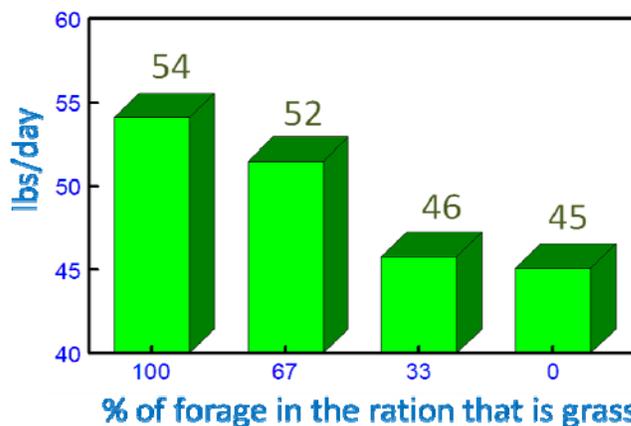


Figure 3. Daily dry matter intake by diet.

Concentrates typically increase milk production by allowing for higher dry matter intake (Fig. 3). The lower proportion of forage in the all-grass and mostly grass diets allowed for a higher level of carbohydrates in those diets. Despite similar NDF contents, diets differed in the amount of lignin and indigestible fiber in the each diet.

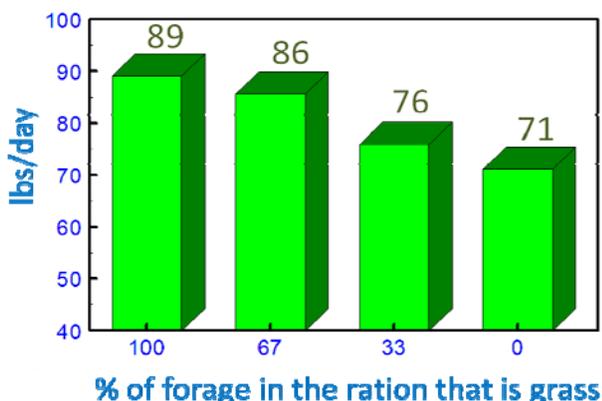


Figure 4. Daily milk production by diet.

Milk production increased linearly with increasing fescue:alfalfa ratio in the diets. (Fig. 4). With a 34% NDF alfalfa forage, milk production could be increased by replacing some of the alfalfa with a higher fiber forage, allowing for more concentrates in the diet.

One cow on each diet was ruminally-fistulated, and forage incubated in nylon bags in the rumen were used to determine rate of digestion. Rate of digestion has higher for alfalfa (0.076/hour) than fescue (0.045/hour). Extent of fescue digestion was considerably higher than that of alfalfa. Digestibility of NDF (2000-2010 averages, DairyOne Cooperative, Inc., Ithaca, NY) is over 10 percentage units higher for grass silage over legume silage, at either 30 or 48 hours.

There were no differences in milk fat due to diet, but milk true protein increased as the percentage of grass increased in the rations. Alfalfa had higher protein solubility, resulting in decreased protein efficiency.

### Other Feeding Trials

In other dairy feeding trials we have conducted using alfalfa with higher NDF content, alfalfa produced as much milk as good quality grass forage. Cows did not differ in DM intake in these trials, even though alfalfa diets had a

higher level of indigestible fiber. The higher indigestible fiber in alfalfa was offset by a slower rate of digestion in grass.

### Summary

With grass forage of reasonably high quality fed at equal levels of NDF in the diet, grass silage can replace alfalfa in the diet of high producing dairy cows, with a positive effect on milk production. Depending on grain prices this could be a positive economic benefit (See Grass Information Sheet #34), but may negatively impact nutrient management. The best option to address all these issues is to feed a grass-legume mixture.

### Additional Resources

- 2011 Cornell Guide for Integrated Field Crops Management. Electronically accessible at: <http://ipmguidelines.org/Fieldcrops/>.
- Cherney, D.J.R., J.H. Cherney and L.E. Chase. 2002. Influence of lucerne/fescue silage mixtures on milk production of early-lactation Holstein cows. *J. Anim. Feed Sci.* 11:555-564.
- Cherney, D.J.R., J.H. Cherney and L.E. Chase. 2004. Lactation performance of Holstein cows fed fescue, orchardgrass or alfalfa silage. *J. Dairy Sci.* 87:2268-2276.
- Jonker, J.S., D.J.R. Cherney, D.G. Fox, L.E. Chase, and J.H. Cherney. 2002. Orchardgrass versus alfalfa for lactating dairy cattle: production, digestibility, and N balance. *J. Appl. Anim. Res.* 21:81-92.

### Disclaimer

This information sheet reflects the current (and past) authors' best effort to interpret a complex body of scientific research, and to translate this into practical management options. Following the guidance provided in this information sheet does not assure compliance with any applicable law, rule, regulation or standard, or the achievement of particular discharge levels from agricultural land.

For more information



**Cornell University  
Cooperative Extension**

Grass Management Manual  
<http://forages.org>

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