



## Precision Feeding and Grasses

Precision feed management (PFM) combines accurate feed management with environmental sustainability. Because most of the forage in NY State is either grass or alfalfa-grass, PFM must focus on the timely harvest of these forages, along with minimizing overfeeding of nutrients.

PFM is defined as: *The continual process of providing adequate, not excess, nutrients to the animal and deriving a majority of nutrients from homegrown feeds through the integration of forage management and feeding, for the purpose of maintaining environmental and economic sustainability.*



More than one dairy farmer in NY State has switched from confined feeding to a pasture system, believing this change involved less management and a more leisurely lifestyle. The myth is quickly dispelled; profitable grazing involves as much or more management. There is no way to escape planning, budgeting and balancing to maintain a functional dairy farm.

### Implementing PFM

Implementation involves monitoring. Feed and herd production testing records are essential, in order to assess your current status. An effective assessment of the situation leads to

development of a tactical plan. Tactics and implementation require integration. Crop advisors, nutritionists and anyone else involved in managing the dairy operation must be aware of each other's requirements and limitations.

### Measuring and Managing PFM

There are a set of benchmarks that can be used to help monitor progress in accomplishing the goals of PFM.

1. NDF intake (% of body weight):  $\geq 0.9\%$
2. Forage (% of the diet):  $\geq 60\%$
3. Homegrown feeds (% of the diet):  $\geq 60\%$
4. Ration P (% of requirement):  $< 105\%$
5. Diet crude protein:  $< 16.5\%$
6. Milk urea N (mg/dL): 8-12
7. Calving interval:  $< 13$  months
8. Cows dead or culled  $< 60$  d in milk:  $< 5\%$

Both environmental and economic benefits result from continually achieving these benchmarks. Manure N and P excretion will be minimized, positively impacting whole farm mass accumulations of these nutrients. Maximizing use of home-grown grass and other feeds will improve income over feed costs.

### High Forage Diets

Diets high in forage lead to healthy cows. They will not lead to high milk production unless the forage is consistently high in quality. Grass should be 50-55% NDF, while alfalfa should be 38-42% NDF. Corn silage should be 30-35% starch. High quality forage will have high fiber digestibility, required for high intake.

The amount of high quality forage needed must be estimated in advance. High forage diets require approximately 25-30 lbs of forage dry matter per day, or 5.5-6.5 tons of dry matter per cow per year. The next step is to

estimate how many acres are needed of each forage type. This requires knowledge of each field's yield potential. Fields can vary from 2-6 tons of grass or alfalfa-grass dry matter per acre. Be conservative with grass yield estimations, as grass yields are more sensitive to seasonal-to-season variation in droughty periods than alfalfa.

### Management Tools

Sufficient data needs to be collected to allow monitoring of benchmarks.

Routine measurements include:

- Crop yields, weighing loads or bales
- Forage testing, multiple times per year
- Dry matter intake, determined regularly
- Monthly milk testing
- Body condition scores, several per year
- Body weight at calving
- Net income over feed costs

Electronic planning tools are available for:

- Crop rotation planning
- Forage inventory budgeting
- Ration balancing
- Nutrient management planning

### One Step at a Time

There is an up-front investment in assessing your individual situation and developing a strategic plan. The plan must be developed with assistance from all individuals involved in the farm operation, so that plans are achievable. However, all desired changes do not need to happen simultaneously. Initially focus on tactics that will produce the most productive results and/or are easiest to implement. Changes should complement the overall goals of the individual dairy.

### Delaware County Example

In a region where nutrient management issues are particularly sensitive, the Delaware County PFM project focused on mass nutrient balance over several years. Before PFM, these dairies averaged 55 pounds more P per cow at the end of the year than they had at the start of the year. This phosphorus excess made nutrient management planning problematic.

After several years of precision feed management, these farms averaged 19 more pounds of P per cow at the end of the year, compared to the start of the year. A similar large reduction was found in nitrogen, making

it much easier to meet nutrient guidelines.

### Summary

Precision feed management is time-consuming intensive management, but investment in this system will gradually lead to environmental and economic stability. It may take three to five years to fully implement PFM, but it is a never-ending process. To succeed with PFM, considerable effort needs to be invested in managing grass for high forage quality. After high quality grass forage is realized, the gradual process of adjusting dairy rations to minimize overfeeding of nutrients will maximize nutrient efficiency.

### Additional Resources

- 2011 Cornell Guide for Integrated Field Crops Management. Electronically accessible at: <http://ipmguidelines.org/Fieldcrops/>.
- Cerosaletti, P.E., D.G. Fox, and L.E. Chase. 2004. Phosphorus reduction through precision feeding of dairy cattle. *J. Dairy Sci.* 87:2314-2323.
- Ghebremicheael, L.T., P.E. Cerosaletti, T.L. Veith, C.A. Rotz, J.M. Hamlett, and W.J. Gburek. 2007. Economic and phosphorus-related effects of precision feeding and forage management on a farm scale. *J. Dairy Sci.* 90:3700-3715.

### 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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