

# Managing Variability in Feed Ingredients and Feed Delivery

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The impact of the feeding program on financial success of the dairy herd will likely increase in the future. Increased feed prices demand more efficient utilization of both forage and supplemental concentrate resources. Additionally, environmental pressures provide incentives to reduce overfeeding of nitrogen and phosphorus to reduce these nutrients leaving the farm. Under these conditions, improved feeding management on the farm results in a win: win scenario where reductions in overfeeding can enable dairy producers to be better stewards of the environment.

Improved feeding management is the result of science and application of these new tools. Research has resulted in the development of nutritional models which enable us to meet the nutrient requirements of the lactating dairy cattle with tremendous accuracy. Historically, most dairy cattle rations have incorporated larger margins of safety to assure that maximum milk yield was obtained. These new models describe the factors influencing milk yield more accurately and enable reductions in the concentration of nutrients in many dairy cattle diets. A recently completed study of Virginia dairy herds adopting the use feed management software found that more accurate feeding resulted in improved whole farm nutrient balance for nitrogen and reductions in the levels of phosphorus in diets by 19%. This study also revealed considerable challenges in the feeding management and a disconnect between the diet formulated by the nutritionists and its implementation by the feeder and subsequent consumption by the cow.

Ultimately, improved economic and nutritional efficiency is achieved when one achieves maximal utilization of nutrients delivered to the farm. Therefore the successful manager must achieve the following:

- Control shrink. Reduce losses of nutrients during harvest of forages, storage, feeding mixing and delivery.
- Maintain quality of the feed between storage and consumption by the cow.
- Accurately define the nutrient composition of ingredients used in the ration.
- Accurately estimate the digestibility of the nutrients consumed by dairy cattle.
- Transmit relevant information to the nutritionist on a timely basis to permit formulation of rations which promote high nutrient and economic efficiency.

- Monitor the mixing and delivery of rations to assure compliance with recommendations of the nutritionist.
- Monitoring animal performance and transmitting information to the nutritionist and management personnel.

This panel will feature three individuals from dairies located in the Southeast, High Plains and Pacific Northwest. Each manager has provided a perspective of their approach to feed management which has proved to be successful for their resources. Contact information and a brief synopsis of their operations follows:

**Michael Pedreiro – Dairy Production Systems – High Springs, FL.** Michael was raised on a dairy farm in the San Joaquin Valley in California. He has degrees from Modesto Jr. College and Cornell. Michael interned with Aurora Dairy while at Cornell and became Assistant Operations Manager with Aurora before assuming his current position as Executive Vice President and Chief Operating Officer for Dairy Production Systems (DPS) which has facilities in 5 southern states (TX, MS, GA & FL) with over 12,000 lactating dairy cattle. The focus for Michael's presentation will be on routine monitors and the use of owner created software which enables them to evaluate their feeding program and to make timely management decisions. Their operation is unique in that Michael is involved in management of feeding programs on five dairies in geographically different areas of the south. Key components of feed management at DPS are:

- Timely evaluation of forages and supplemental feeds
  - Dry matters on all forages (i.e. - corn silage, rye grass haylage, sorghum silage, coastal haylage) are measured in a microwave oven every Monday, Wednesday, and Friday.
  - Penn State Shaker Box particle analysis and dry matter check is conducted on all milking group TMR's (Fresh, High & Late Lactation) on Wednesday of each week.
  - These results are entered into the DPS feed module software and emailed once/week to the nutritionist and Michael along with daily dry matter intakes and % refusal for each pen.
  - Wet Forage samples are sent to Cumberland Valley Analytical Services Lab every month to be tested for ADF, NDF, NDF 30 hour digestibility, starch and 7 hour starch digestibility, and fermentation acids.
- A feed module spreadsheet developed by DPS management and their nutritionist in 1993 is used to enable them to track the following measures:
  - Dry matter intake by cow groupings
  - % refusal by cow groupings
  - Ingredient usage
  - Ingredient inventory

- Analyzed nutrient composition with expected nutrient composition of all forage and concentrate ingredients
- Pen counts
- Feeder load sheets for accuracy
- Feed costs on a per cwt of milk, per unit of dry matter basis as well as daily feed costs.

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**Kyle Averhoff – Royal Dairy – Garden City, KS.** Kyle was raised on a 200 cow dairy in Stephenville, TX. He received his B.S. from Tarleton State and a M.S. degree from the University of Florida. Kyle spent three years with Monsanto Dairy Business working with producers in southern California and southwestern Kansas. He joined Royal Dairy as its manager in 2003. He works with 5 partners and key managers to develop and implement key areas of direction and focus for the dairy. Royal Dairy is a western style open lot dairy housing 6,300 milking animals and 7,000 heifers. They ship 13,000,000 lb. of milk monthly and employ 60 people. Currently average production is 74 lb. / cow with 120,000 SCC, and feed efficiency of 1.39. Annualized 21 day preg rate is 24%.

The herd is fed with 2 – 1400 Cu. Ft. vertical mixers. There are three feeder shifts from 4 AM TO 8 PM and 12 trained feeders. The Feed Watch system from Valley Ag Software is used. Feeding management at Royal Dairy is centered on a management philosophy emphasizing inventory and quality control, routine monitoring and hiring, training and retaining excellent people. Subjective evaluation and use of objective measures are used in all areas of feeding management. The biggest challenges at Royal Dairy are:

- Wind and moisture
- Changes in DM% of wet feeds
- Managing feed bunks around pen count changes.
- Improving Milk: Feed ratio.

Key components of inventory management involve weighing and recording all incoming forages and supplements and monitoring utilization through the Feed Watch program. This information is used to predict weekly as well as annual feed utilization. Deviations from expected utilization are cause for timely intervention. Inventories are evaluated weekly and orders made according to usage. Once a month inventories are reconciled between calculated inventories and amount on hand.

Quality control begins with maintaining feed quality by minimizing adverse effects of weather and feed handling to provide ingredients of predictable quality to the cows. Routine monitors involve the following:

- Daily feed area visits by managers in which bunks are scored for consistency of the mix as well as level of refusals.
- Dry matters are estimated for all wet feeds and forages twice weekly.
- Once weekly particle size is evaluated on silages and TMR's.
- Urine pH is evaluated on pre-fresh cows.
- Once monthly forages are sent off for evaluation
- TMR samples are routinely obtained for evaluation.
- Scales on TMR mixers are evaluated periodically.

Key features used from Feed Watch are:

- Inventory received and fed
- Global adjustment of TMR's when changes are detected in DM's of forages and wet byproducts.
- Daily estimates of pen or group dry matter intakes.
- Bunk management involving scheduling and routing of mixer trucks.

Key monthly goals for feed management are:

- Feeder loading accuracy
  - <4% of ingredients loaded beyond 200 lb. of target weight
- Grain Shrink
  - <2.5% / ingredient
  - Bagged ingredient usage reconciles within 1 ton of predicted usage.
- Forage shrink
  - Pit silos
    - As fed shrink of <9%
    - Shrink increases with storage time and moisture appreciation
  - Bags
    - As fed shrink of <8%
    - Greatly impacted by weather.
- Milk: Feed ratio of >1.39.

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**Dick Bengen – Ruby Ridge Dairy – Pasco, WA.** Dick is the owner and manager of Ruby Ridge Dairy located in south central Washington. The dairy originated in Whatcom County in northwestern Washington in 1967. Increasing urban development and the desire to expand resulted in moving the dairy to its current location in the early 2000's. The dairy houses over 2300 lactating dairy cattle and 2,100 heifers. It consists of 2200 acres of pivot irrigated land of which 1900 is used for production of corn silage, earlage and alfalfa. The first, 5<sup>th</sup> or 6<sup>th</sup> cuttings

are harvested as haylage with the remainder as hay. Dick emphasizes the need to harvest forage of high quality and consistency. A 500 hp chopper and two 17 ton tractors are used to harvest and pack silage. Silos are capped every day with all spoilage removed. Silos are faced twice daily to provide fresh forage with minimal heating and losses from the silo face.

The move to a new location provided the Bengen's with an opportunity to design a feeding system which focused on insuring precision and accuracy in the ration delivered to all animals on the farm. This facility features a large stationary ration mixing facility with the potential to mix ten different milk cow rations three times daily, two dry cow rations twice daily and six different heifer rations fed once daily. The system can mix rations of varying batch sizes and is easy to operate. Key features of this system are:

- A 14 bay commodity shed with capacity to hold one rail car. There is a conveyor at the bottom of each bay leading to the central mixing facility
- Forages are moved from the bunker silos to the mixing facility using a forage box and yard goat tractor.
- All rations are mixed in the central mixing facility enabling close supervision by management.
- All conveyors for forages and supplemental feeds feature load cells which weigh ration ingredients prior to mixing.
- Mixed rations are delivered by boxes without scales.

Dick notes that this system has enabled them to:

- Reduce feed loading time by 60%
- Improve accuracy of mixed rations when compared to those specified by the nutritionist
- Reduce shrink to less than 2%
- Train employees more readily and successfully. Seven different people are involved in feed mixing and delivery. In most cases employees can be trained within 3 sessions.
- Improve ingredient management in that oldest feed is always fed first.

I would note that it is a challenge to visualize what the Bengen's have accomplished without observing the operation visually. Dick's presentation will feature many digital images of the feeding system.