National FFA Convention - Dairy Nutrition Scenario
October 2017

Scenario: You received a call from Floyd F. Atkinson, owner of FFA Dairy, LLC. , located in the Midwestern US. Mr. Atkinson is having some challenges with the nutrition of his fresh cows and calves and would like you to evaluate his farm to see what suggestions you have for improvements.

Part 1: Fresh Cows

FFA Dairy, LLC has 1750 total Holstein dairy cows with the milking herd housed in barns with free stalls. The farm has a rolling herd average of 26,500 lbs of milk. They typically average 3.85% milk fat and 3.1% protein with a SCC of 180,000. The cows are milked 3 times a day in a double-30 parallel milking parlor. The free stalls are bedded with sand, and the cows are utilizing their stalls well. The barn is properly ventilated and the outside daily high temperatures have been averaging 50 °F. Cows in the milking herd are averaging a body condition score (BCS) of 2.5 when they are moved into the high lactation group and close up dry cows have a BCS of 4.0.

FFA Dairy, LLC is feeding the same TMR ration to all lactating cows except for the fresh cows that are receiving a TMR formulated especially for their nutritional needs. The fresh cow ration was properly balanced by a nutritionist to meet the nutrient needs of the fresh cows and contains alfalfa haylage (Table 1), corn silage, grain, protein supplements, feed additives, vitamins, and minerals. The TMR is 60% forage on a dry matter basis and contains the same feed supplements as the lactating cow ration as well as choline, methionine, and bypass fat. Close up dry cows are being fed anionic salts the last 3 weeks of their dry period and the incidence of clinical milk fever has been very low.


Fresh Cow Pen at FFA Dairy, LLC at 1:00 pm.

Cows are fed their TMR once a day at 6:00 am. Feed is pushed up every 2 hours throughout the day until 10 pm at night. A picture of cows eating at the feedbunk at 1:00 pm is shown to the right.

After calving, all of the cows are moved into the fresh pen where they will remain for 14-21 days. The fresh cow pen has 90 stalls and 144 feet of feedbunk space. There is 1 waterer that is 8 ft in length and 2 ft wide placed along one of the walls in the pen.

The fresh cows have been getting off to a slow start and have low milk production compared to the herd average. Their daily dry matter intakes are below expectations. A veterinarian has checked the cows and confirmed that there are no contagious disease issues. A subset of the fresh cows have been tested during the first 2 weeks of lactation to determine the concentration of ketones in the urine. The tests have shown that 8% of cows have high ketone levels, 60% have moderate ketone levels, and 32% have normal ketone levels.

In addition to an overall evaluation of the fresh cow nutrition program, Mr. Atkinson has a few specific questions for you:

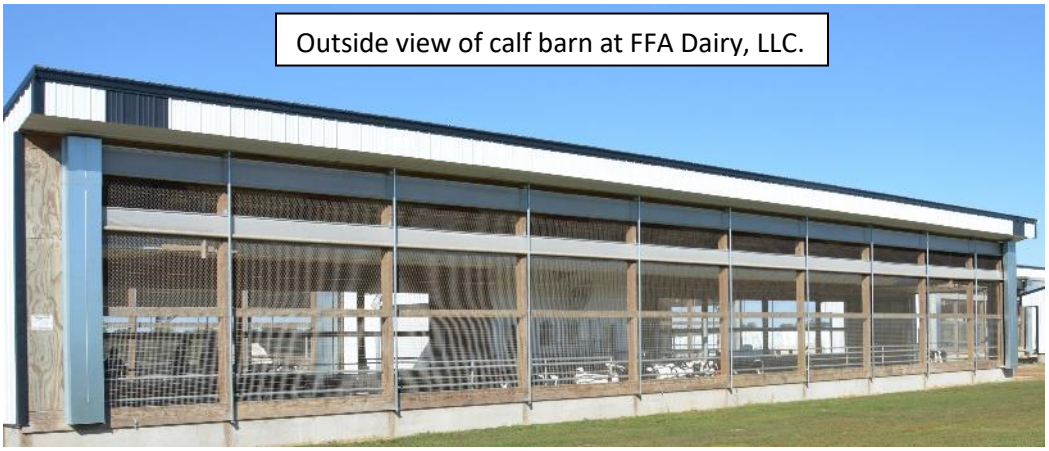
- What are the greatest challenges that need to be addressed to help the fresh cows improve?

- How would you go about changing the management program to correct the challenges you have identified?

Table 1. Chemical analysis of the alfalfa haylage being fed to the fresh cows and lactating herd.

Alfalfa Haylage		Date of Analysis 10/12/2017
Moisture	%	61.1
Dry Matter	%	38.9
pH		4.4
		Dry matter basis
Crude Protein	%	18.2
Soluble Protein	%	52.6
Acid Detergent Fiber	%	38.5
Neutral detergent fiber	%	46.9
NDFD, 30 hr	% of NDF	39.4
Calcium	%	1.30
Phosphorus	%	0.28
Magnesium	%	0.31
Potassium	%	2.51
Nitrate	%	negative
Aflatoxin	ppb	negative
DON	ppm	negative

Part 2: Feeding the Baby Calves



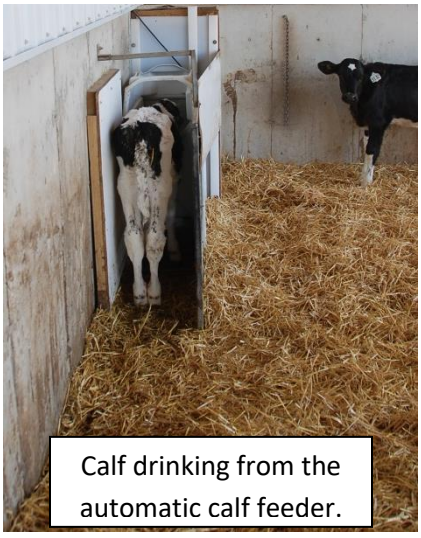
Outside view of calf barn at FFA Dairy, LLC.

Mr. Atkinson hired a new Calf Manager 6 months ago and recently promoted an employee to manage the calving facility. For cross training purposes, 3 employees were reassigned to the calving facility in the last 2 months.

Calves in the group pen with the automatic calf feeder.

Calves remain with their dam for the first 8 to 12 hours and then are moved to a pen in the maternity barn at which time they are fed one, 2-liter bottle of colostrum.

At 1 day of age, they enter the calf facility. The calf raising facility consists of 6 separate barns each equipped with an automatic calf feeder and one pen of calves per barn. There are also individual pens in one barn for new calves entering the facility. Calves are housed in individual pens and fed transition milk after entering the calf facility.



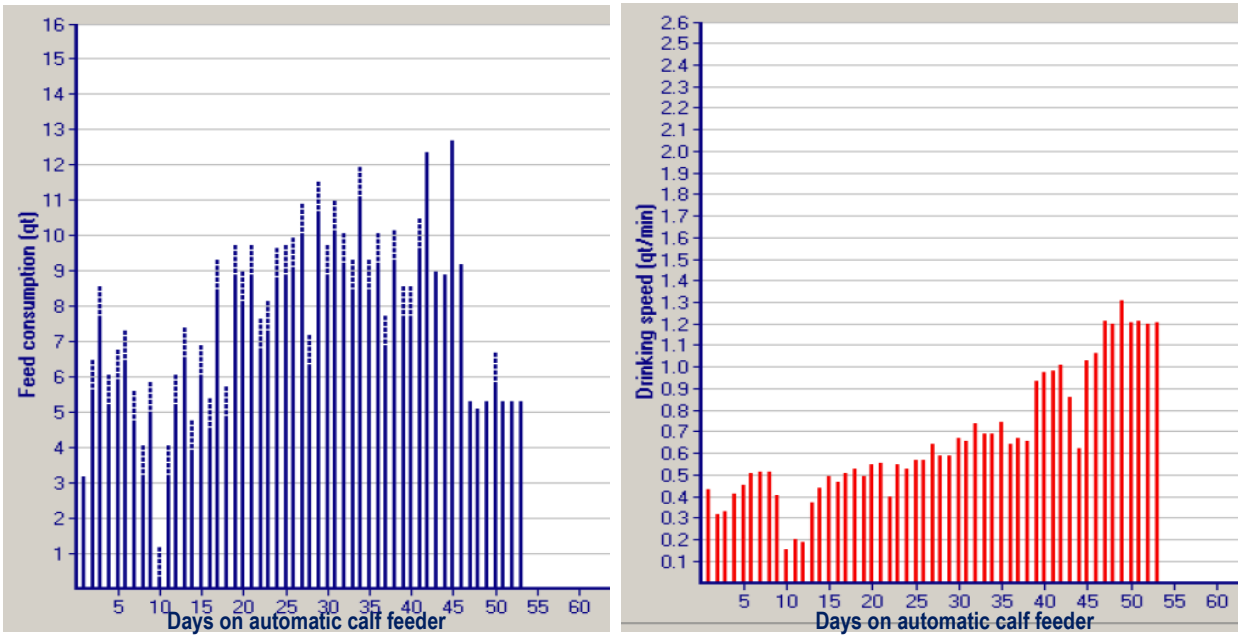
Calf drinking from the automatic calf feeder.

Calves are hand-fed using a bottle for 2 days or until they are nursing well, after which they are placed in a group pen. Pens contain 28 to 30 calves of similar age per group and calves are fed through an automatic calf feeder. The automatic calf feeder allows the calves to nurse reconstituted milk replacer multiple times daily and records the amount of milk consumed and drinking speed. The amount of reconstituted milk replacer is increased over the first week on the feeder. After the first week, calves may receive between 10 to 13 liters (2.5 to 3.25 gallons) of reconstituted milk replacer. At weaning time, the amount of reconstituted milk replacer is decreased over a period of 10 days. All calves receive a properly formulated, high-quality, palatable calf starter free-choice. Free-choice water is available at all times.

Recently, the morbidity and mortality rates within the first 3 weeks of life have increased tremendously. Records from last year show that only an occasional calf died and only a few were treated for diarrhea or respiratory disease.

- Mr. Atkinson and the new calf manager are very concerned and would like your suggestions of what to change to correct the issue.

- Attached are the feed consumption and drinking speed graphs from the automatic calf feeder for calf number 820. At what age did this calf become noticeably ill? Today, calf #820 is 57 days old.



Figures 1a & 1b – Feed consumption and drinking speed graphs for calf 820 from the automatic calf feeder.

Answer Key:

FFA Dairy, LLC has several positive strengths. The cows are comfortable and the barn is designed to help cool the cows. They have fairly good production, good milk components, and a low SCC.

The greatest challenge that Mr. Atkinson is having relates to subclinical ketosis in the fresh cows. The subclinical ketosis may be caused by numerous issues. These issues may include:

Cows are over-conditioned as they enter lactation:
The BCS of the close up cows is 4.0, so they are too heavy entering lactation. This is most likely a result of the single TMR cows are being fed throughout their lactation, and feeding at least 2 rations to the lactating cows (a high & low group) could help to decrease the extra weight gain in later lactation. Cows could have also had difficulty breeding the last lactation and may have long lactations/high days in milk. The cows could also be overfed during their dry period.

Not enough waters or water space:
Minimum recommendations are to have 2 ft of tank space for every 20 cows in the pen (and some recommendations are to provide much more than that). Also, there should be at least 2 waterers in each pen to prevent dominant cows from stopping less dominant cows from drinking.

Not enough feed bunk space:
Recommendations are for fresh cows to have 30 inches of bunk space per animal. On average, there will be about 80 cows in the fresh pen at any given time on this dairy operation, resulting in less than 22 inches of bunk space per cow.

Feed availability:
The picture shows a low amount of feed available in the middle of the day (in addition to the overcrowding in the pen). The farm may not be providing enough feed for the cows.

- Availability of feed overnight – The last push up for the feed is at 10 pm, which will most likely result in the cows not being able to reach their feed for numerous hours throughout the night. In addition, feed may not be available throughout the night.
- Cows could be fed 2 times per day. This would increase feed availability later in the day and provide an opportunity to give cows additional feed if needed.

Close up dry cow diet:
Although the scenario does not give many details about the close up ration, the close up ration would need to be evaluated to determine if it is a palatable diet that the cows are readily consuming. The close up diet may not be properly balanced, too high in energy, or allow sorting of the ration resulting in not consuming enough fiber.

There is no dry hay/long-stem forage in ration:
The list of dietary ingredients states that the forages being fed are haylage and corn silage. Dry hay, or long stem forage, would increase the effective fiber in the diet to increase rumination and slow down passage rates.

Additional details:
The sample of alfalfa haylage provided is low in crude protein and high in fiber (ADF & NDF) with a low NDF digestibility. This poorer quality haylage could also be limiting performance of the fresh cows as it is slowly digestible and will result in less energy.

First lactation and older cows are all housed together in the fresh cow pen. Splitting the cows into separate pens would increase bunk space for the cows and would decrease competition for the first lactation cows.

The scenario states that cows are not experiencing chronic milk fever. However, there is still a possibility of some subclinical milk fever cases in these fresh cows.

Part 2 – Calves:

Changes suggested to decrease mortality/morbidity in calf facility.

Colostrum Management:
Calves are not fed (1) an adequate amount of colostrum (4 quarts or liters), (2) within 6 hours of life, (3) more than likely their first meal includes nursing the dirty dam, and (4) the scenario does not state if the quality of colostrum was evaluated. Colostrum management is critical for the calf to acquire passive immunity to fight off disease.

Training of Personnel in Calving Facility:
Since the calf management issue begins with improper colostrum management, newborn calf management protocols should be reviewed. The next step is to train these personnel as to protocols for newborn calf management (and other aspects of calving mgt protocols) and explain why these protocols need to be followed as written.

Another possibility in addition to poor colostrum management:
Hoses and nipples need to be sanitized and replaced on a routine schedule for the automatic calf feeder.

Calf #820:
Calf #820 became ill on day 10 on the feeder. This calf was 14 days old (10 days on feeder plus 4 days hand-fed before entering group housing pen). Today the calf is 57 days old and the printout shows that it is day 53 on the feeder.

Other notes:
Hay does not need to be fed to these calves. The starter is properly formulated with a fiber source (either whole oats or another fiber source) and the calves are being well bedded with straw (as seen in the pictures).

Cleaning of the barn between groups would be important. This scenario is designed as an all-in, all-out operation, but the pens should be properly cleaned and disinfected between groups.

The 28-30 calves per pen is greater than is typically recommended for the amount of calves on an automatic calf feeder. Adding additional pens to reduce the number of calves per pen could help to reduce competition and improve calf health.