

Top Ten Issues for Dairy Consultants

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Defining the top ten issues that dairy consultants face, makes for a very subjective list. However, having worked with dairymen for over 20 years now, it will be easy to present my list. Hopefully, it will be thought provoking and maybe even stimulate a few arguments! This list may not be the most scientific of lists, but it will be a very practical one. It will contain issues that I have been faced with. Some I have been able to solve, some not.

Item number one has to be dry matter intake, as anyone who routinely balances rations for dairy cows knows. Farmers have all kinds of reasons for not measuring dry matter intake, but actually it is not that difficult to do, but not all that exciting either. The first piece of information that is required is to know the dry matter of the feed. When a total mixed ration is fed, this is a very easy number to get. There are several published methods for measuring dry matter at the farm level. In my opinion the simplest and most straight forward method is the Koster Tester. This is a very simple device that includes a scale, a heater with a fan and a sample container. By the way, I have no dog in this fight and get no benefit for this endorsement. I have seen these things used for years and in my mind they are simple and plenty accurate for what we want to accomplish. It takes about 30 minutes and gives a good number to work with. If you do not want to buy a Koster tester here is a reference for a microwave method:
<http://www.agry.purdue.edu/Ext/forages/publications/ID-172.htm>

Dairymen are prone to blaming the feed every time their cows go down 3 pounds of milk. In many cases they are right. It is the feed! Not the feed that came on that truck though, it is the feed that came out of their bunker. Silages are notorious for changing in DM. As more and more material is unloaded and we move back through the silage mass, DM is just about assuredly going to change. Here is a simple example of what may happen. Say we have a ration in which the cattle are being fed 55 pounds of 35% DM corn silage. This means that these cows are getting 19.25 pounds of DM from this silage. One night we get big rainstorm with 2 inches of rain on this uncovered bunk. Maybe the DM on the face that is fed the next morning drops to 30%. The herd is still being fed 55 pounds but the DM has dropped from 19.25 down to 16.5 pounds. All of a sudden one morning we are cutting back on the DM by 2.75 pounds. When Degussa Amino Cow[®] is used to look at this difference, it shows that energy intake drops 1.84 Mcal NEL per day. Since this group is taking in more water, they will probably increase intake somewhat, but not enough to make up for this loss in energy. If the actual NEL intake drops by 1 Mcal, this is about what it takes to produce about 3 pounds of milk. So, it rains, silage is wetter, but we do not know that, so we feed the same pounds and milk drops 3 pounds in the tank. It must be the feed! Yes, it must be.

Having a simple tool available to measure dry matter in the silage can easily head off these kinds of losses. The most progressive dairymen I know, check silage dry matter every day and TMR dry matter every day. They also make sure to record these numbers. This may seem like an obvious point, but it is surprising how this important data can go without being written down in a log with the date. When it is time for planning or for determining forage inventories, this kind of data is extremely useful.

The next thing on my list is water. Check them all every time you walk the cows. First of all are they clean? I am convinced that green stuff growing up from the bottom of a water tank cuts back on intake of water. Often in the summer you can smell water that has that green stuff in it. Take a handful and hold it up to your nose and sniff. If it smells funky to you, I submit that cows will not drink enough. Cleaning water tanks is a pain. Nonetheless, it is an important job. New barns mostly have easy to clean troughs of some kind that dump and are easy to scrub. The reality is, that most dairies do not have new barns, so they are working with large galvanized cattle tanks. These tanks while inexpensive are a hard to clean. I would suggest that if the farmers you work with do not have a routine program to clean out these tanks, convince them to replace old fashioned tanks with easy to clean, dumping troughs.

The third thing on my list is water. Do the water tanks fill fast enough? If the first few cows that come up to a tank drink it down to a low enough level, and it fails to fill fast enough, the rest of herd, while they will not die of thirst, will not consume as much water as they might, if the tank filled faster. Limiting cows on water intake even just a little bit, cuts down on milk production. The typical float switches hooked to a garden hose do not fill a tank fast enough. The first group of cows that surround this tank after milking can often drink it down a foot or more. The next set of cows will take it down even further, then the next group is looking at the bottom while the garden hose dribbles in water. Cows will drink between 30 and 50% of their daily water intake within an hour of milking (Waldner and Looper). It has been reported (Falk, 2004) that a cow producing 100 pounds of milk will drink over 45 gallons of water when the temperature is 80F. For an example say there are 100 cows in a high production group. In this barn there are two water tanks one at each end of a row of free stalls. These tanks are the typical 4' by 2' by 10' long tanks. These tanks hold about 500 gallons full to the brim. This means that for a 2' deep tank, there are 20 gallons of water per inch of depth. So at normal fill, it is 4" below the top, thus it has 400 gallons of water. Cows need to submerge their muzzle to drink and it takes about 3" of water to submerge. Thus we subtract another 60 gallons, to cover the bottom. This says there is a net of 340 consumable gallons in the tank. Look at one of these tanks and you will see that if both ends are open and available for drinking, six cows can drink at once. Maybe five if a couple of cows are very dominant. Six high producing cows, drinking 30% of 45 gallons, means the first six cows will consume almost 24% of the available water in the tank. So with two tanks 12 out of 100 cows have consumed a quarter of the water available. The next 12 drink another 24% and you can see what happens here. The typical universal float valve used on these tanks supplies up 300 gallons of water per hour! That assumes that there is 60 psi of water pressure. In many cases the garden hose supplying water to these tanks would not squirt five feet! So

there is no way that valve is supplying 300 gallons per hour. Even if it was, it is going to take 32 minutes for this valve to refill the water consumed by 12 cows.

The fourth thing on my list is water. If you watch a bunch of cows, especially after milking, you will see the dominant animals head right for the trough. The more docile animals will follow and wait behind them. When the dominant animals are finished they will often head for the feed bunk, a free stall or out onto the lot if available. In cases where cows can go out onto a lot, I believe that the less dominant animals will drink, but their urge, being herding animals and all, to follow the boss cows is so strong, that they will not consume maximum water. I have no scientific evidence for this, but I have watched and studied cow behavior for a long time and I am convinced this is true. If cows are allowed out on a lot, keep the herd penned up after milking until they all have finished at the water tank. Then open the gate and let them out. I have used this little trick more than once to get a few more pounds of milk. I am sure it is due to increasing water intake by the less dominant animals.

It is a well established fact, that water intake directly influences dry matter intake. Obviously, water restriction will restrict milk production.

The next thing (fifth) on my list is changing the ration when something else changes. It seems that when ever something goes on to influence production i.e. the cows go down in milk, the first thing farmers want their nutritionist to do is to change the ration. Other than the issues with dry matter that were discussed above, it is rare that a ration needs to be changed. The first thing to do after going through all possible DM issues is to walk out in the barn. Look for the simple things. Is there enough bunk space for all cows to eat comfortably? Is the TMR heating in the bunk? Just feel it with your hand. Cows do not like hot feed. Is there separation going on to an extreme degree? In that case, some cows will be getting too much grain and others will be getting too little. This can be a result of mixing the TMR too long, incorrect loading sequence etc. Is the barn overcrowded? Are there too many cows for the number of stalls? Overpopulating is all the rage in lots of areas, but it takes very good management to get away with it.

Is it too hot in the barn? Are the fans running? A cow's body temperature peaks at about midnight. Many farmers in an effort to control power costs are tempted to shut down the fans in the evening when the temperature drops a bit. This is exactly the wrong thing to do. As the cows get hotter, the fans shut down, making it that much harder for them to cool themselves. Effect? Reduced feed intake.

None of these problems are related to the grain mix, or the ration composition. They are all management issues. Do not be tempted to change a ration that has been working well just because you can not figure out what else may be going on. Losing three pounds of milk is a whole lot easier than getting it back. Making ration changes out of desperation is usually a bad move. Believe me, I have done it and it has never worked, unless there was a good reason to do it.

Item number six, relates to ration balancing with high corn silage diets. In the southeast many dairies feed high corn silage diets, due to a lack of alfalfa and poor quality grass hays and grass silages. High, in this case means about 60 pounds as fed. Many dairies are capable of growing enough corn silage to feed these levels but in my experience it is a difficult thing to keep thing going smoothly at these high levels. There are no good answers to this problem the way I see it. The nutrition consultant has to work within the parameters that the farm allows. Often in this part of the world these very high corn silage diets are the rule and the nutritionist has no choice in the matter. Many of these silages tend to be on the wet side and may be stored in an uncovered bunker. When corn silages less than 30% dry matter will provide the major or maybe all of the forage many problems will be faced. There will tend to be increases in DA's, foot problems due to what I call semi-founder. A more scientific term has been used which is called SARA (Nordlund et al). This stands for semi-acute rumen acidosis, or semi-founder. In this case the cows are not completely victims of laminitis, but the feet will become soft and they will be prone to bruising and damage to the foot. Also, the hoof wall will have a tendency to separate from the rest of the hoof. Many of these cows will be culled due to chronic foot problems and actual foot rot that is caused by the softening of the foot. The only measures that I have had work at all in these cases are the following. First of all, have a hoof trimmer visit the farm on a regular basis to trim and work with cows that seem to be showing lameness. Secondly, I have had some success with a foot box in the return alley from the milking parlor. The box should contain a mixture half hydrated lime and half copper sulfate. This mix seems to draw moisture out of the foot and make the hoof harder. In addition, the copper sulfate may have some antimicrobial activity and help control foot rot somewhat. The box takes management too. The mix tends to set up and get hard. In order to be effective it must be broken up to put the mixture back into a powder. Foot baths work well too, but many of these tend to be ignored and they turn into cess pools after a while.

Another problem that is experienced with these extremely high corn silage diets is reproduction. It is not clear if these low fiber, high starch diets have some metabolic effects or if the decreased reproductive performance is related to the fact that many of these cows have sore feet and do not show heats. Often in herd fed this way the farmer may resort to using bulls after breeding AI once or twice.

These diets are a major problem to deal with, but they are also a reality in many herds.

Number seven is related to silage variability. We discussed dry matter issues at the start, but there are a few more items that are problems for the consultant. The first of these issues is silo face management. At certain times of the year, the number of milking cows may be low, or the number of fresh cows, eating a lot of feed is low. When this happens, the amount of corn silage fed every day goes down. When this happens, molds that are present virtually everywhere are able to flourish and grow into the face of the silo. The old rule of thumb is that at least 6" of silage must be removed from the face of the silo every day in order to keep this problem in check. It seems that the reduced cow numbers often come about in the summer when temperatures are already high, thus

encouraging mold growth. It is at these times that we will see fluctuation dry matter intake. This fluctuation is probably due to the presence of mycotoxins. I will not even attempt to go into the problems that various mycotoxins can cause. Suffice it to say, that in many cases they influence intake. When facing conditions like this the best solutions that I have been able to come up with are these two. In the first case it may be possible to cover up half of the bunker face with plastic and stop feeding from the full face. This of course assumes that the bunker is covered to start with, which is not always the case. The second solution involves spraying the cut face after loading out silage with some type of organic acid. Propionic acid seems to be the best choice. Farmers I have worked with use a backpack/pump up type sprayer to mist the surface after removing silage. It is important that eye protection and a respirator be worn while doing this. Propionic acid, even diluted is corrosive. The acid itself in the silage does not seem to hurt intake, but it works pretty well to inhibit mold growth.

Not only does silage change in dry matter it changes in nutritional composition in other ways too. Changes in corn silage nutrients from the top to the bottom of 11 corn silage bunkers have been studied (Stone, 2003). It was reported that when these bunkers were broken into three regions, upper, middle and lower. They found that the dry matter varied among regions, as did crude protein, ADF, NDF as well as volatile fatty acids. These differences are probably due to the fact that bunkers are filled from the bottom to the top in layers. So the different regions may well be from different fields on different days etc. The point is, we tend to assume that when we go out to take a silage sample in November that we are safe using this analysis all winter. Clearly this is a bad assumption. I do not have the page space or time to go in to the difficulties of sampling. One of the worst things I have seen dairy consultants do however is asking the farmer to get a silage sample and send it in. Consultants must study sample taking methods, sample preservation etc, so that the data they use to balance rations represents the material being fed as closely as possible. There are lots of recommendations available that help with these issues. This web address describes a good method

<http://www.uwex.edu/ces/forage/cornsilage/sample.htm>

The eighth issue is related to reproduction. Assuming all the nutrient needs of the cow is met for the appropriate level of production; the ration itself has little to do with reproductive performance. You will still continue to have farmers suggest phosphorous level is not adequate for cows to show heat, conceive what ever. This can simply be called a "rural myth". If you are feeding NRC levels of P, adding more will not increase breeding efficiency, it simply will not. There seems to be good evidence (Lucy, 2003) that the major nutritional effect on reproduction is energy intake. This article also indicates that high milk production does not seem to influence reproductive efficiency. This has been my experience also. I have found that the highest producing herds are also the best managed herds and the best fed. These herds also seem to have the lowest services per conception and except for one rare experience that I had in Florida, you will generally not see bulls in herds of high production.

There are all kinds of wonderful feed supplements in the marketplace that sometimes claim to improve reproduction. I have to say, that I have never lost a pound of milk nor decreased reproductive performance when I pulled any of these additives out of a ration. So without starting a battle, I would suggest that before you recommend any magic elixirs, that you think very carefully about it and demand to see unbiased research trials showing clearly that the stuff works. If you ask for this kind of information, very few can produce it.

There are two very important things that a nutritionist can do to influence reproduction. The first is to see to it that the herd is on an outstanding dry cow and transition program. Again, I will not attempt to go through these scenarios here. However, if there is any reason to suspect the dry cow/transition cow program, fix it! Cows that deliver their calves with short labors will be healthier and stronger after they give birth. These cows will also have a better appetite and start taking in feed more quickly. It has been my experience that short labor is a key to getting that cow going quickly. A good transition program goes a long way toward helping a cow deliver quickly and easily.

The second important thing that a nutritionist can do to influence reproduction is to stress heat detection. Admittedly this is a management issue not a feeding issue, but the nutritionist gets blamed for poor reproduction. It has been my experience that often poor reproduction is a result of poor heat detection. Find out who is responsible for heat detection. Talk to that person and find out specifically how they are doing the heat detection task. If that individual needs training, be prepared to train him.

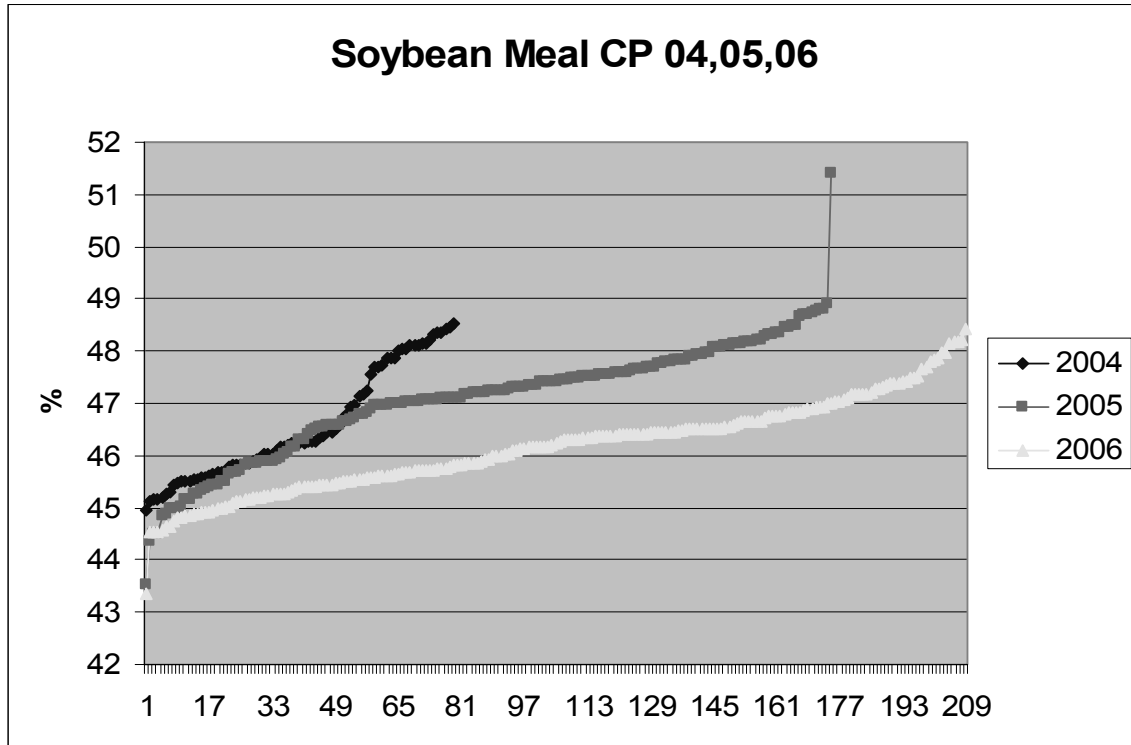
Of course there are other things to be done in the reproduction area, but I feel that these are two that the nutritionist can have a strong impact on. Other things to keep in mind are these: 1. How is the semen being stored? 2. Is the N₂ level in the semen tank high enough? 3. Who is doing the insemination? 4. How long after heat is detected is the insemination being done? 5. Are they splitting straws? I am sure there are other things that I have not thought of at this moment, but rest assured, if the cows are not breeding it is your fault!

Number nine is ingredient variation. We feed all kinds of by products on dairies with more in the pipeline. Every single one of them is variable to one extent or another. Take soybean meal for example. Most nutritionists have a number for crude protein in mind for soybean meal. Probably they have used the same number for many moons. However, ignorance is bliss. Soybean crude levels have been summarized (Degussa, 2007) and the differences in crude protein are startling. For example, the crude protein in HiPro soybean meal from the 2006 crop year is a full 1% lower than it was in the 2005 crop (Table 1). This difference is even more clear when the data is plotted (Figure 1).

Table 1. Soybean Meal Crude Protein %

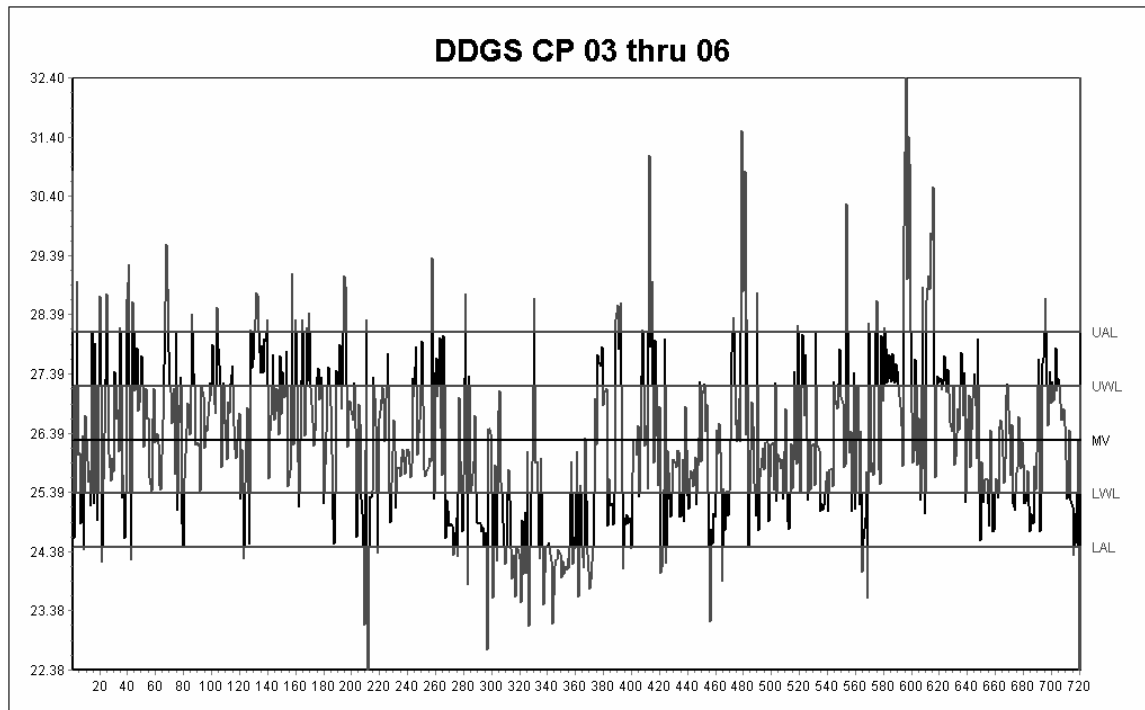
	2004 n=81	2005 n=175	2006 n=209
Crude Protein %	46.7	47.2	46.2

Figure 1. Soybean Meal Crude Protein % in 3 Crop Years



Distillers grains with solubles (DDGS) are becoming more and more common with the opening of new ethanol all over the US. Figure 2 shows the crude protein levels in over 700 samples of DDGS analyzed in the Degussa amino acid laboratory since 2003. The line labeled MV is the mean, UAL is ± 1 SD and UAL is ± 2 SD. The point is that using book value analytical data for byproduct ingredients will lead to dairy rations that are either under or over in important nutrients. In today's ingredient marketplace (mid Jan 2007) with corn and soybean meal showing dramatic price increases, nutritionists do not have the luxury of using book values for nutrients. Recognizing that it costs money to have ingredients analyzed, failing to use correct values for byproducts costs even more.

Figure 2. DDGS samples (n=722) CP from 2003 through 2006 from Degussa lab



In an actual dairy ration example that was created with Degussa AminoCow® Ver3.5 , the CP in DDGS was in the matrix at 29% on a dry matter basis. The ration met the cows needs for CP but was slightly deficient (-1 gram) in lysine. The Lys/Met ratio was 3.01. This ration is balanced for a 1430 pound cow producing 80 pounds of 3.6% fat milk. When the CP in the DDGS was dropped to 26%, the Lys/Met ratio increased to 3.03, but now the diet is deficient 5 grams in Lys and 2 in Met. It is hard to say how much milk this might represent, assuming dry matter intake did not fall too. The point is, knowing what the nutrient density of the byproducts consultants are working with is critical. Guessing or using book values, is not good enough.

Finally, item ten. This is being able to work within the parameters that each farm is capable of. It is easy to head into a new dairy with great ideas and great suggestions for improvement. Consultants work hard to get new accounts, then they are ready to start working miracles, increasing milk production, getting butter fat up, raising conception rate etc. etc. The reality is that some farmers and some farms can not deal with change. You may have great ideas and see clearly how you can make a producer more money right away or over the next few months, but he may not be able to conceptualize and incorporate these changes. I once did the nutrition work for a dairy that had three Harvestores. In the summer this dairy always had production problems, dry matter intake would fall, the TMR would heat in the bunk and milk would go down. The problem was that this farmer refused to close the door on those silos after unloading feed. He fed twice a day and especially in the summer when keeping intake up is always a problem, the cows would fall ten pounds of milk by July 4th. This silage coming out was always hot

and sometimes it would steam, even in the summer, due to oxygen exchanging with the inside of those big tubes. I could not convince him to close those doors. He said his father, who had built the dairy never closed them and neither would he. This is a perfect example of a consultant coming in with great ideas and good rations on a good herd of cows that could perform well. They always did fine once the weather cooled off and the silage secondary fermentation slowed down. However, as long as he refused to close those doors, there was nothing I could do to improve production in the summer. I provided him with carefully balanced rations, finely tuned for maximum production, but cows will not eat hot feed. He would do almost everything else I suggested, but leaving those door open just killed production in the summer. We finally agreed to disagree and I left. In fact he sold out a few months later.

There are other cases where the dairy itself cannot handle certain changes that the consultant suggests. In another case I worked with a dairy that I got due to consistent production problems. I studied this farm closely, got new analysis of the forages, and formulated a custom grain mix that matched the nutrient needs well. I felt that I had this dairy on track for dramatic improvement. The cows started going up in milk a few pounds and both the farmer and I were excited. Then they stalled out and we could not do any better. After more study it occurred to me, after visiting the farm enough times that the milking interval was peculiar. They milked at 8:00AM and again at 4:00PM. As soon as I figured this out, I told my client that he had to adjust his milking interval to 12 and 12, rather than 16 and 8 hours. He said no. I did everything I could to convince him. I brought him data showing clearly that milking interval is important and other information providing estimates of what kind of milk he was losing by not evening up this interval. He would not change! After a year of fighting this battle I was worn down and frustrated when one of the farm hands told me why he refused to change. The farmer's son who was becoming a partner in the dairy loved to coon hunt in the fall. Thus he would be out all night and he had told his father that if he had to get up early in the morning to milk he would leave the dairy to get a job in town. Thus the father agreed to adjust the milking interval to meet the son's demands. He was embarrassed to tell me this and it was only through good luck that I found out the reason a year later. Yes, it makes no sense, but it is very real. This dairy was giving up a lot of pounds of milk for a reason that made a lot of sense to the owner. I never mentioned to the farmer that I had found out why he would not change the milking interval, I just dropped the subject. A good salesman does not embarrass his customers, nor does a good consultant make his client feel inadequate in any fashion. Dairy nutrition consultants are selling service and expertise, keep this lesson in mind.

To be a successful consultant, not only do you have to know a lot about nutrition, management, reproduction and ration balancing, but you also have to be able to figure people out. After all the technical things that dairy consultants have to deal with, probably the biggest challenge is the personality of the client. If you listen and ask questions long enough, that client will tell you what he wants to do, what he can do, what he will do and most important of all, what he will not do.



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