Regional Dairy Newsletter

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Questions about the content of this newsletter? Call Emily Myers at 518-353-4949

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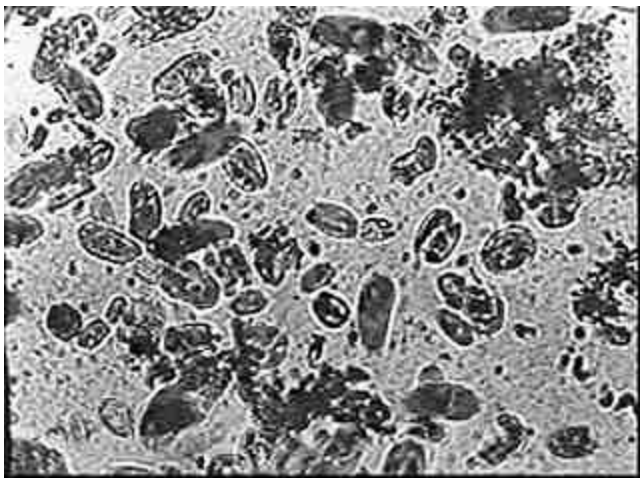
Improve Efficiency on Your Farm with Ionophores

Emily Myers, CCE Regional Dairy Specialist

In today's depressed economy efforts to decrease costs can help squeeze finances through tight times and also bring milk supply back into equilibrium with demand. However, some effort to cut costs can be more detrimental to the dairy than others. I sometimes hear dairymen say that there is no point in increasing milk production/cow because we already have too much milk in the country. This might be true if every farm in the country was planning on keeping all of their cows, however it can be looked at in a very different manner.

Producing the SAME amount of milk with FEWER cows always has the potential to decrease input costs and increase profitability. When viewed this way, increasing efficiency doesn't necessarily have to lead to surplus milk in the country, but rather fewer cows, a smaller impact of dairying on the environment and lower cost milk production. This trend has already been happening over time, with cow numbers decreasing and milk production increasing over the past 50+ years. Improved genetics, cow comfort, health care, nutrition, technology and overall farm management have been big players in the industry and are likely to continue so.

Ionophores are another tool that dairymen can use to help increase efficiency on their farms. This technology has come under some scrutiny because ionophores are technically antibiotics capable of modifying the microbe population in the rumen.



Rumen Microorganisms

Monensin, one of the most widely used ionophores for dairy cattle, was registered in December 1975 with the commercial name of Rumensin (Elanco Products Co.), intended to increase feed efficiency of feedlot cattle (Tedeschi et al., 2003). In fact, Monensin has proved extremely useful, with some studies reporting increased feed efficiencies in beef cattle of 8-10% (Goodrich et al., 1984).

Studies in lactating cattle supplemented with Monensin report increased milk production of 6 lbs/day in pastured cows with no increase in dry matter intake (Beckett et al., 1998; Lean and Wade, 1997). Other studies with TMR fed cows report an average dry matter intake decrease of 3%

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accompanied by a milk production increase of 2.6% (Ruize et al., 2001; Ramanzin et al., 1997), resulting in an increase in efficiency of 5.7%. Decreased body weight loss in early lactation and earlier first ovulation after calving have also been reported for cows fed Monensin (Tallem et al., 2002).

Ionophores like Monensin are believed to cause a shift in the microbial population toward gram negative bacteria resulting in increased production of the volatile fatty acid (VFA) propionate. This shift in VFA's often results in improved feed efficiency (greater weight gain and/or milk production with less feed), has been reported to decrease methane production by as much as 25% (Owens, 1980; Tedeschi et al., 2003) and efficiency of protein nitrogen utilization by 3.5% (Bergen and Bates, 1984). Decreasing methane production and increasing efficient protein utilization (which results in lower urea excretion from cows) can have huge implications when we look at the impact of dairy farming on the environment. Monensin can also be used to combat coccidiodsis in dairy calves and heifers; a disease that costs dairymen about $400 million worldwide each year (Jolley and Bardsley, 2006).

Concerns Regarding Ionophores

One of the major issues with Monensin is that it is highly toxic to horses. If horses are on the farm and have a chance of being exposed to dairy cow grain it would not be recommended to use Monensin.

Another concern that many dairymen have is that ionophores like Monensin can cause milk fat depression under certain circumstances. If the diet contains a high amount of concentrate, corn, or unsaturated fatty acids; if the diet is limited in physically effective fiber; or if cows are experiencing very high rumen passage rates, Monensin can cause a significant drop in milk fat.

In its ability to modify rumen microbes, unfortunately Monensin also tends to modify some of the microbes that are responsible for biohydrogenation of unsaturated fats in the rumen. Decreases in the populations of these bacteria (specifically *Megasphaera elsdenii* and *Butyrivibrio fibrisolvens*) make large amounts of unsaturated fatty acids harder for the rumen to process before flowing into the intestine, a problem that can be exacerbated by high rumen flow rates or inadequate chewable fiber (Harfoot and Hazlewood, 1988). Although this can become a problem for some farms, if milk fat is currently at or above 3.8 on your farm, research indicates that cows are not already teetering on the edge of milk fat depression and addition of Monensin may have no effect on milk fat percentage (Hutjens, 2005).

The final concern that I will address is that of bacterial resistance to antibiotics. Many consumers are concerned that repeated feeding of low doses of antibiotics like Monensin to dairy and beef cattle will result in bacterial resistance to antibiotics in the environment, posing a potential health threat to humans and animals alike. It is true that excessive use of some antibiotics in both human and animal medicine has lead to bacterial resistance; however, ionophores function in a different biological manner than the antibiotics used to treat bacterial infections in humans. Ionophores act by changing the ionic gradient across microbial

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cell membranes, making it difficult for these microbes to survive due to the energy that must be exerted by the microbe to correct this ionic imbalance (Pressman, 1976). The action of Monesin could be very roughly described as being similar to putting a fresh water fish in a salt water tank. Some microbes naturally contain a membrane bound enzyme and/or an outer membrane allowing them to handle this ionic imbalance and survive; they are "resistant" to the antibiotic by nature, resulting in the positive effects that we see when we feed ionophores (Russell and Strobel, 1989). The bacteria that survive just happen to be the ones that result in propionate production and increased efficiencies.

Antibiotics used in human medicine function in a multitude of actions from blocking protein formation inside the bacteria to destruction of the bacterial cell membrane, depending on the antibiotic used. No antibiotics currently used for human medicine function as ionophores however, making the danger of ionophore resistant bacteria for human health very minor. In addition, microbes that show resistance to ionophores are reported to still be susceptible to other classes of antibiotics like those used in human medicine (Russell and Houlihan, 2003).

Addition of Monensin to the ration can cost as little as 2-5 cents per head per day and has a potential return of 6-10:1 (Hutjens, 2008). No matter the price of milk, it is still profitable, efficient and smart to spend 5 cents and get more than 5 cents in return, all while reducing the environmental impact of dairy farming.

Ionophore Quick Facts

- Ionophores cost 2-5 cents per head per day and can have a return up to 10:1
- Ionophores help to increase efficiency by as much as 5.7% in dairy cattle and 8-10% in beef cattle
- The environmental impact of ionophores is significant. Both decreased methane production and urea excretion have been reported with ionophore use
- Ionophores are an inexpensive way to combat coccidiosis in calves and heifers
- Due to a different mode of action compared to antibiotics used in human medicine, bacterial resistance to ionophores poses minimal to no risk for human health

Predicting Corn Harvest by Corn Silking

Joe Lawrence, CCE Agronomist, Lewis County

Recording when your fields silk can help predict when it will be ready for silage harvest.

A rule of thumb is 6-7 weeks from silking to silage harvest. A more accurate way to assess this may be to record growing degree days.

Bill Cox at Cornell has looked at this topic on the basis of GDD. For a 96-100 day corn it took 750 GDD (800 GDD for a 101-115 day corn) from tasseling/ silking to silage harvest. This data is based on his trials at the Aurora Research Farm.

Though I do not know of any work done on shorter day hybrids, given this data we could expect it would take 750 (or slightly less) GDD for shorter than 96 day corn.

This article was originally printed in the August 2010 Lewis County Ag Digest.

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Summer Milk Fat Depression

Larry Chase, Cornell Pro-Dairy and Emily Myers, CCE Regional Dairy Specialist

In addition to the total milk yield drop that is often seen in the heat of summer, milk fat can also be affected. Heat stress on dairy cows may push them into sub-acute or acute rumen acidosis, resulting in changes in rumen function that lead to milk fat depression. When cows are overheated they pant and often chew less.

Decreased chewing leads to lower saliva production and less saliva going to the rumen means that the wonderful acid buffering effect of that saliva will be lower in a heat stressed cow. Also, many cows are moved onto pasture in the spring and this highly digestible feed source contains unsaturated fat and can move through the rumen very rapidly, once again resulting in potential for milk fat depression.

The following is correspondence from Dr. Larry Chase at Cornell University regarding the frequent reports of milk fat depression during the summer here in NY:

Dr. Chase: We are getting a lot of reports of herds with lower milk fat. Some of this is the normal drop in milk fat that starts in the late Spring through early Fall. This pattern has existed for 30+ years when looking at the milk fat % in the Federal Order data. I went to the Northeast Federal Market website and pulled down some milk component values on an order basis. The average % milk fat was 3.77% in February, 3.73 in March, 3.67 in April and 3.62 in May. June data is not available but could again drop some. With the current heat stress on cows, the drop could be larger than normal.

A panting cow is exhibiting signs of considerable heat stress

Cows enjoying sprinklers and fans next to the head locks can be cooled while eating

The best thing dairy producers can do to combat heat stress is to use fans, sprinklers, etc. to keep cows as cool as possible. This is also a good time to evaluate water availability in herds. Water intake may go up 20-50% in heat stress situations.

Can the water system supply this extra water? Is water pressure adequate to refill water bowls and waterers when a lot of cows are drinking? Ration adjustments could include some added fat (provides energy but a low heat of digestion), using highly digestible forages and considering things like yeast and direct fed microbials. There may also be an advantage to shifting feeding times so that fresh feed is fed at a cooler time during the day.

2009 Dairy Farm Business Summary - Preliminary Results

Emily Myers, CCE Dairy Specialist; Jessica Prosper, CCE Farm Business Educator

The Cornell Dairy Farm Business Summary Program has recently released some of the preliminary numbers for the 2009 summary, not too surprisingly with more negative signs than everyone would like to see. For farms under 100 cows the average cost of production was just over $21/cwt. For larger farms (100-500 cows) the cost of production was just under $18 and for farms with 500+ cows it was just under $17.

When compared to a milk price of less than $13/cwt, it becomes apparent that the majority of dairies lost money last year.

The following information was compiled by Jessica Prosper who is a Farm Business Management educator in Franklin and St. Lawrence Counties. Some rows have been removed due to space constraints.

The Department of Applied Economics and Management of the New York State College of Agriculture and Life Sciences at Cornell University and the County Extension Associations cooperate in sponsoring the Dairy Farm Business Summary and Analysis Project. The project is funded in part by the New York Farm Viability Institute.

For more information about the Dairy Farm Business Summary or for a complete report contact:

Jessica Prosper, Farm Business Management Educator at (518)483-7403, jlr15@cornell.edu

Or

Anita Deming, Farm Business Management Educator at (518)962-4810, ald6@cornell.edu

New York Dairy Farms With Less Than 100 Cows, 2008 and 2009 Preliminary Average of 38 Farms*

Selected Factors	2008	2009
Average number of cows	63	65
Milk sold per cow	18,997	18,223
Total cost of producing cwt. of milk	$22.95	$21.13
Net milk price	$18.33	$12.51
Net farm income without appreciation	$30,455	$- 9,709
Labor & management income per operator/manager	$ - 5,692	$ - 38,304
Farm debt per cow	$2,790	$3,112

New York Dairy Farms With 100 to 500 Cows, 2008 and 2009 Preliminary Average of 54 Farms*

Selected Factors	2008	2009
Average number of cows	248	259
Milk sold per cow	23,003	22,983
Total cost of producing cwt. of milk	$19.38	$17.09
Net milk price	$18.46	$12.92
Net farm income without appreciation	$158,993	$- 37,308
Labor & management income per operator/manager	$ 40,369	$ - 71,824
Farm debt per cow	$2,649	$2,936

New York Dairy Farms 500 or More Cows, 2008 and 2009 Preliminary Average of 64 Farms*

Selected Factors	2008	2009
Average number of cows	248	259
Milk sold per cow	23,003	22,983
Total cost of producing cwt. of milk	$19.38	$17.09
Net milk price	$18.46	$12.92
Net farm income without appreciation	$158,993	$- 37,308
Labor & management income per operator/manager	$ 40,369	$ - 71,824
Farm debt per cow	$2,649	$2,936

Heat Damage and Spontaneous Combustion in Forages

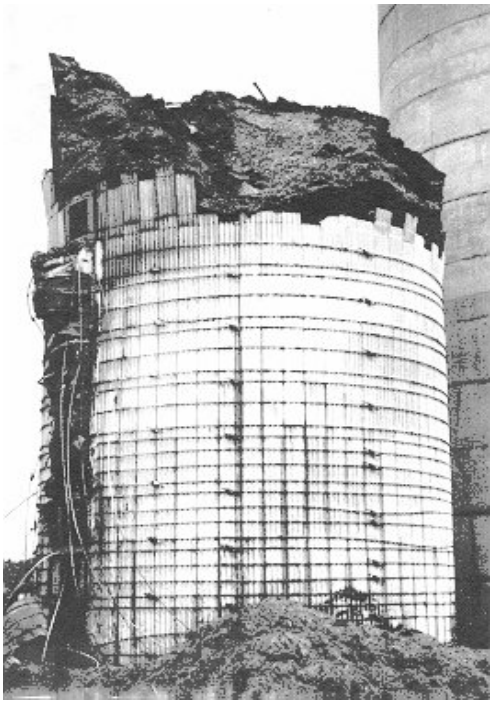
Emily Myers, CCE Regional Dairy Specialist

Barn fires are certainly no laughing matter. Both human and animal lives can be lost and the cost of damage to buildings and forage are immense. Anyone that has witnessed or been in a barn fire knows how incredibly frightening and devastating they can be.

Although spontaneous combustion of forage is not extremely common, it does happen from time to time and can be prevented. More commonly forages will become heat damaged without catching fire. Although heat damage alone may not pose a direct threat to lives, the economic impact is still considerable and the chance of fire is more likely if heating is occurring, so every measure should be taken to avoid it.

Heating in forages occurs when the forage is put up too wet or too dry. For hay this means danger below a dry matter content of 80%; although large bales are more prone to heating due to their mass and limited air flow and should be even drier (> 85% DM) than small square bales. For silage, DM content above 45-50% is getting on the dry side and could become suspect. Often times heat damaged silage is found on the top of the silo where the silage has dried out and been exposed to air.

When forage is stored in a DM range that is either too dry or too wet for that type of storage method, it allows air to continually enter the forage.



A silo damaged by a silage fire.

Packing silages tightly can help alleviate this problem, but as you may know, dry silage is difficult to pack effectively. Normally the aerobic microorganisms (those that need oxygen) are rapidly killed in silage once it enters active fermentation and the oxygen is used up in the silo. In hay, the forage is usually too dry for microorganisms to survive, so the forage is maintained in a steady state by drying.

When hay is too wet or when silage is dry and not packed tightly, it allows aerobic microorganisms to survive in the moisture and oxygen present in the forage. When aerobic microorganisms survive and grow, they consume sugars and starches and produce heat. This decreases the quality of the forage by using up highly digestible carbohydrates and the heat produced damages proteins so that they will no longer be digestible by the cow. Due to the fact that sugars and starches have been consumed, the NDF (fiber) content of the forage increases, although there is no evidence that heat damage reduces the digestibility of NDF. Heat damaged forage often appears darker than normal and will have a smell similar to tobacco.

To determine if heat damage has occurred in silage or hay you can use visual signs or smell, but a more accurate method is to test forage for acid detergent insoluble protein (ADIP) also called acid detergent insoluble nitrogen

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(ADIN). This measurement is often included in normal forage analysis. An ADIP value that is 10% or more of the total crude protein in the forage indicates that significant heating took place and the milk producing ability of that forage has been reduced.

To keep forages from heating, ensiling or baling at the correct DM is a critical step. Packing silage tightly to exclude oxygen and using a preservative on hay can also help to reduce the likelihood of heating if you know that the dry matter of the forage is a little off from where it should be.

Future News and Events

CALF MEETING AT MINER INSTITUTE

What: Picnic and Current topics in calf raising
Who: Sam Leadley, PhD
Where: Miner Institute Dairy Barn
When: July 26th, Monday, at 6:30 pm
Details: Sam Leadley is a recognized expert in raising healthy calves from Attica, NY. He has a monthly column in NE Dairy Business and publishes the calving ease online newsletter. Sam will give a presentation at the Miner Institute Dairy Barn on the evening of July 26th. Dr. Kevin Tobey and Norvartis are sponsoring Dr. Leadley's trip. Alltech will be providing the beverages. David Burnham and FCI are doing the cooking and providing the sides. Palmer Vet Clinic will provide the burgers and dogs. Miner Institute is providing facilities and Dr. Leadley's housing.
Food and beverages will be available from 6:30 pm. Dr. Leadley will give an informal presentation starting around 7:30. Help spread the word!
Please email **gwpvet@aol.com or call 561-1893** with a head count of those attending. This is a great opportunity to learn practical tips from an expert with out traveling, get some food and drink and catch up with your fellow dairymen. Bring your questions!

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