Summer 2018

WELCOME TO OUR SUMMER NEWSLETTER

Murray's Musings

Welcome to our summer newsletter! This morning I sat here contemplating life; I watch the sunrise—it was a beautiful, beautiful sunrise—and was reminded again what a wonderful feeling it is to be alive. MY journey over the past two years has led to my having three back surgeries; the last one just a few weeks ago in order to repair and replace broken hardware from a previous surgery. If anybody thinks this is a cakewalk, talk to me first!

But while I've been recovering, I've been catching up on my reading (always a silver lining). I'm always keen to learn the latest research in agriculture, whether it's GMOs, soil health or nutritional supplements for livestock. I recently finished reading two articles about GMOs in *Nature Medicine.* The articles examined CRISPR-Cas9. CRISPRs are specialized starches of DNA. Cas9 is an enzyme that acts like a pair of molecular scissors—it can cut strands of DNA. In agriculture, CRISPR technology is used in crops to improve yield, drought tolerance, and nutritional properties. The researchers (Sweden's Karolinska Institute and Novartis) tested CRISPR on human cells (retinal and stem cells, respectively). The found that editing cells' gnomes with CRISPR-Cas9 may increase the risk that the altered cells, intended to treat disease, will trigger cancer. If's you're interested in this subject, you can read more here : https://www.scientificamerican.com/article/crispr-edited-cells-linked-to-cancer-risk-in-2-studies/

From an agricultural perspective, we need to be aware of GMO crops and stay on top of the research.

As farmers, one of the most important tools we can use is our observation of our animals. Our animals are connoisseurs of hay and feed. Observing changes in their behaviour and feeding regimen can tell you a log about what's going

Cont'd on page 2...

2018 CUSTOMER APPRECIATION DAY!!

WEDNESDAY, JULY 11th AT BIO-AG HEAD OFFICE.
COME OUT AND ENJOY THE FUN FROM 11:00 - 3:00!
Lunch Served 11:30-2:00

Please place orders by **Wednesday July 4th** for pickup at customer appreciation day.

Murray's Musings... *continued from page 1*

on with your soil, or even the grain you've purchased. For example, this spring we were traded some hay bales from another farm. On paper, the other hay looked better, but as soon as we fed it to our cattle, they began taking up significantly more seaweed & mineral.

Animals will show you what they are deficient in, as well as if they received an excess of a certain nutrient. A few years ago, I bought a replacement calf for a beef cow. No sooner had it arrived, the calf began showing symptoms of polio. Polio in cattle can be caused by a number of factors, including a diet with too much sulphur. Dietary levels above 0.4% are known to cause polio in cattle. Lucky for us, we had a lot of chicory growing on the property, and were able to provide the calf with this thiamine-rich plant. Within three days, that calf was up and nursing on the cow!

In Western Canada, several large operators are now using **Bio-Lac** as hay silage preservative. We are happy to hear that the farmers our there are excited about this product and are seeing a benefit on their farms. We have a product here that will help us in our endeavours to produce better quality crops with fewer molds and hopefully none at all. It's certainly all goes back to the soil!

This summer is going to be hot and dry. In Texas and Oklahoma, famers are already moving cattle, selling cows, and reducing herds because of the drought. **Bio-Lac** can really help your animals thrive during time of heat stress. It's been shown to maintain butterfat during time of high heat. Kathrine's article on heat stress in cattle and poultry is sure to offer you a lot of help as temperatures soar in Southern Ontario.

I want to leave you with some encouragement and remind you not to worry about being late making hay; the alfalfa is only coming to bloom as we speak.

Enjoy the newsletter and I hope you are able to make it to our customer appreciation day on July 11th.

~Murray Bast, Founder

Heat Stress - Learn How to Keep Your Cool

Article By: Dr. Kathrine Stoeckli

As we approach the summer months, it is time to start thinking about how to mitigate the effects that the hot summer days can have on our livestock. In this article I will focus on dairy cattle and poultry.

Let's start with dairy cattle. Signs of heat stress include excessive standing (not wanting to lie down), fast breathing (>75 breaths/minute) and a reduction in feed intake. Cows in severe heat stress will exhibit open mouth panting, drooling and hang their tongues out. Cows can only sweat at 10% the rate humans can. Heat stress can also result in decreased growth in heifers, loss of body condition and a drop in milk production. Hot weather will make it challenging to get cows pregnant, it can reduce the birth weight of calves, and in severe cases, it can lead to abortions.

Dairy cows begin experiencing heat stress at only 20° Celsius if humidity is high and at about 24° Celsius at 50% humidity. The effects are worse with intermittent bouts of heat as we commonly see here in Southwestern Ontario.

The most significant effect of heat stress in dairy cattle is that it leads to rumen acidosis. Acidosis means that rumen pH is recurrently too low, or in other words, too acidic. This occurs for a number of reasons. First, altered respiration (breathing fast and heavy) leads to a loss of CO_2 which is part of buffering capacity. The kidney responds to lower CO_2 by kicking out the bicarb that is ordinarily needed to buffer the rumen. The reduction in feed intake and slug feeding (visiting the bunk much less and/or only visiting when cooler) will cause rumen pH to fluctuate enormously. If the cow is drooling, then she is losing bicarb through saliva that never makes it to the rumen. When a cow is in heat stress and is breathing fast, she simply cannot easily chew her cud and this leads to a decrease in rumen efficiency and depression in butterfat.

Due to the decrease in feed intake, some think it wise to increase the density of the diet by feeding more grain. This is a big mistake. The high grain diet, without enough fiber, will additionally increase the risk for acidosis. Acidosis not only makes the

Cont'd on page 3...

Heat Stress—Learn How to Keep Your Cool... continued from page 2

cow feel unwell but it can also lead to increased cases of laminitis. Both increased standing time, and bouts of rumen acidosis during hot weather, will bring on sore feet. Lameness usually becomes very obvious in late summer to early fall.

I came across some interesting research on the manifestations of heat stress in dairy cows.

Question: Why does the milk yield decrease?

Answer: It is actually not only caused by the reduction in feed intake, there are other direct effects of heat. This was proven in a study where cows that were feed-restricted (they were fed the same amount of feed as a heat stressed cow but they were not under heat stress) still produced more milk than those that were heat stressed. It was also discovered that cows that are heat stressed DO NOT increase their non-essential fatty acids (NEFAs) like a restriction fed cow usually would. The heat stressed cow does not mobilize adipose tissue even though it has gone off feed, but blood insulin increases. This is hard to explain because insulin usually mirrors feed intake. The answer leads us to her digestive tract!

During heat stress, blood is directed to the extremities to maximize heat dissipation from the body. But this means there is less blood flow to the internal organs, including the digestive tract. Intestinal cells are very sensitive to a lack of oxygen and nutrients that result from decreased blood flow. What happens when there is inadequate nutrition to the intestinal cells is that the cells begin to die off and the integrity of the gut is compromised. The gut becomes "leaky." This is bad news because now the bacteria and their products (endotoxins), which are usually contained in the intestines, can easily make their way into the bloodstream. This causes a chronic inflammatory response similar to what happens to a cow with toxic mastitis, but not as acute. Endotoxins in blood is what increases blood insulin. I will explain why in a bit.

A heat stressed cow is similar to a transition cow. But if I had to choose, I would rather be a transition cow because transition cows are "metabolically flexible." This means that when they are in early lactation and their energy requirements are not being met by feed intake, the body responds by telling the pancreas to reduce insulin output. This then stimulates her to mobilize fat and with the help of the liver, provide ketones that are a source of energy for her organs while the glucose can go to the mammary glands for milk production. In the heat stressed cow, the endotoxins cause the pancreas to make more insulin than it should and there is no signal for her to mobilize fat stores. So the glucose that is available goes to her organs instead of to her mammary glands and her milk production drops. What also happens to a heat stressed cow is that, because she cannot derive energy from fat, her muscle begins to get broken down and metabolized into glucose and toxic urea. Urea then increases in her blood, which can have many detrimental effects, including failure of embryo implantation, laminitis, and overall increased inflammation. You could check to see if this is happening by measuring milk urea nitrogen (MUN).

Acidosis also damages rumen papillae thereby reducing the absorption of required nutrients such as volatile fatty acids (VFA's) to make into glucose.

Having an unhealthy digestive tract makes cows more susceptible to infectious challenges such as E. coli, salmonella and cryptosporidium. It also decreases the overall efficiency of the cow, as her energy is redirected to fight off these challenges.

There is a group of beneficial bacteria called lactic acid bacteria that protect intestinal cells from these harmful infectious pathogens and increase the efficiency of fermentation in the rumen. They attach themselves to intestinal cells and provide protection to the intestinal lining by reducing the ability for endotoxins to enter the bloodstream. This makes them very valuable in reducing the harmful effects that heat stress can have on the health of the dairy cow.

Bio-Lac contains lactic acid bacteria. It is an "abiotic". It will help protect against endotoxins entering the blood stream, increase rumen efficiency and has also been shown to maintain butterfat during times of high heat!

Seaweed is another product that acts as a probiotic in the intestinal tract. Studies have shown that seaweed can reduce the detrimental effects of heat stress.

Along with the above nutritional additives, there are many other management changes that can help reduce heat stress:

- Provide clean, fresh drinking water. Clean your water containers often to encourage consumption. Increase the number of water sources available. Same goes for salt! Ensure at least 50% of your salt source is loose [not blocks] in hot summer weather.

- Feed more often, keep feed fresh, and prevent feed from heating up. Keep the feeding area cool – use sprinklers and/or fans. Provide ample feed during cooler times, such as overnight.
- Do milking and feeding before the heat sets in, or add fans to the parlour.
- Enhance ventilation and cooling strategies in the barn – use sprinklers and/or fans.
- Don't crowd the animals. Waiting to be milked is a time when cows may be crowded — increase cooling in this area, or crowd them less.
- Feed high quality forages to reduce heat of digestion - ensure fibre levels are still adequate. Never just increase grain.
- Provide ample shade. Note: if they are crowded in the shade because the shaded area is too small, the cooling capacity is lost.
- Consider pasturing in the evening or overnight. If the barn is cool, feed them in there for the day! Luckily we don't have too many consecutive hot days in this area.
- **Apple Cider Vinegar**- this can be added to the ration to reduce the effects that high MUNs have on the body. This is also a good idea to feed alongside lush pasture.

Don't forget about your young stock! Calves and heifers are affected by high temperatures, hot sun and high humidity just like the milking herd. Heat stress in calves and heifers can reduce feed intake and increase maintenance energy needs (energy used to cool the animal) that can lead to poor growth. It can also lead to compromised immunity which predisposes them to disease. At a body temperature of 108 F the calf will suffer from heat stroke and will likely die.

Management changes that can be implemented for heat stress abatement include:

- Provide shade - ensure calves have an area that is out of direct sunlight. If kept in hutches, especially the polyurethane ones, they must be placed in the shade or at the very least covered with a shade cloth. Allowing calves access to an area outside the hutch will also let them regulate their own body heat. It is important to protect calves from solar radiation.
- Move air – optimize ventilation by opening up hutch vents and doors and placing hutches further apart to increase air circulation. You can also place a block under the back wall of the hutches to get more air movement inside the hutch. If indoors: use appropriately-placed fans and utilize or install curtains. Also ensure that calves can escape direct sunlight in their pens.
- Offer plenty of fresh water – for sick calves provide electrolytes. It is also beneficial to provide electrolytes if you notice calves have been sweating. Easiest way to prevent disease in calves – pre-emptive electrolytes!
- Keep feed fresh – place divider between water and starter/grains
- Feed and handle calves during cool times of the day
- Use shavings or possibly even sand for bedding during hot summer months - heat will dissipate more easily.
- Consider feeding extra milk/replacer – calves consume lesser amounts of starter when they are hot and will use energy to try and keep their bodies cool. Feeding more milk will help make up for this and maintain growth rate.

Below, are a few strategies for mitigating heat stress in poultry.

Signs of heat stress in poultry include panting, throat fluttering, holding out wings and reduction in feed intake. Reduced egg shell quality and growth are also indicators that your birds may be struggling.

- Provide plenty of clean, fresh water, extra ventilation and/or ample shade.
- Feed majority of feed at cool times.
- Reduce crowding and increase the number of water sources. High humidity is very stressful for poultry, therefore on hot days it is important to reduce humidity in barns by increasing ventilation and reducing bird density.

Feed intake will also decline: ensure layers get enough calcium and meat birds get enough energy. What happens to layers in heat stress is that egg shell quality is significantly reduced. This is due to a reduction in feed intake and also CO2 loss when they have to breathe faster to dissipate heat. This alters calcium metabolism in their bodies and doesn't allow them to put calcium on their egg shells effectively. Increasing dietary calcium alone will not help egg shell quality.

Some nutritional strategies to mitigate heat stress in poultry include:

- Adding **Nutri-Mins** to water- provides lost electrolytes and important vitamins such as vitamin D.
- Add **Bio-Lac** to feed to increase digestive efficiency and protect gut from bacterial challenges.
- Add **apple cider vinegar** to water to aid in calcium absorption in layers.
- In severe heat you can add **Vitamin C** to water to scavenge free radicals produced by physiological effects of heat dissipation.

Please feel free to contact myself or the Bio-Ag team if you have questions or would like to know the specific feeding rates of our products. We can also help rebalance your rations for the summer months and consult on individual strategies for your herd or flock. Keep yourselves and your animals cool!

- kathrine@bio-ag.com

For Sale

- Grade Brown Swiss 40+ Cow herd with replacements
- 700 gal Mueller tank
- 4 Dairy Master Units
- 2 Pulsators & controller
- 4 glass whey jars

Clare Wagler

519-595-4364

No Sunday Calls

Dates to Remember

July 2nd
Bio-Ag Closed for Canada Day

July 4th
Order deadline for products to pick up on CA Day

July 11th
Customer Appreciation Day
11:00am-3:00pm
Lunch Service 11:30-2:00

August 6th
Bio-Ag closed for Civic Holiday

September 3rd
Bio-Ag closed for Labour Day

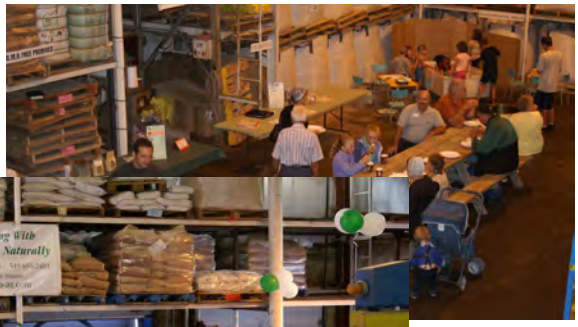
September 11th-13th
Bio-Ag Attending Canada's Outdoor Farm Show in Woodstock, ON

YOU'RE INVITED!!!!

CUSTOMER APPRECIATION DAY

July 11th, 2018 from 11:00am to 3:00pm. Bring the whole family!

- Visit with staff, dealers & suppliers
- Lunch served from 11:30 to 2:00
- Door prizes
- Children's play area
- Kids activities



Savings 5% Discount Details:

- For **current Retail accounts**, on all items bought & paid for by cheque or cash that day.
- 2% discount applies to Visa, MasterCard, Debit.
- Customers must be in attendance to receive discount.

Event Location:

Bio-Ag Head Office

1400 Greenwood Hill Rd,
Wellesley, ON, N0B 2T0

Featured Information Sessions:

11:30 *- Learn about Summer mastitis and remedies– with Dr. Kathrine Stoeckli*

12:30 *- Young Ruminant Health and Summer nutrition- with nutritionist Thevika Sebastian and Dr. Kathrine Stoeckli*

2:15 *- Black Earth Applications on Your Crops—with Luke Serbina from Black Earth Humic, AB Canada*

Thank You!

From the President...

On July 3, Bio-Ag is going live with our brand new website- www.bio-ag.com. The site boasts an online product catalogue which returning customers can use to quickly place orders. We hope this will make placing your orders a whole lot easier for you. We'd love to hear your feedback, so for the month of July, customers participating in the online survey will be entered in a draw to win a $50 account credit.

We are also excited to announce the launch of our blog. This month, you'll find great tips from our staff veterinarian (Dr. Katherine Stoeckli) about how to combat heat stress in dairy cattle and poultry. Keep in touch to learn more about soil heath, livestock nutrition, and new products.

In the meantime, there's a great article on the impact of glyphosate on rats <**https://glyphosatestudy.org/press-release/global-glyphosate-study-pilot-phase-shows-adverse-health-effects-at-safe-doses/**>. A recent pilot study showed that ingestion of glyphosate at acceptable daily levels can alter sexual development, genotoxicity, and impact the intestinal microbiome. <**https://ehjournal.biomedcentral.com/articles/10.1186/s12940-018-0394-x**>

If you are concerned about the negative effects of glyphosate on your animals, Bio-Ag offers two products that can help their intestinal microbiome. Feeding Bio-Lac and seaweed encourages beneficial bacteria in the gut.

We look forward seeing you at Customer Appreciation Day on July 11th.

~Parry Bast, President

MONTHLY SPECIALS - 5% OFF

JUL → **Protein Feed 120 ml**

Protein Feed Supplement

AUG → **Nutri-Mins 946ml & 3.79L**

NUTRI-MINS

SEP → **Bio-Lac Dry & Liquid 25kg, 1L, 4L & 20L**

Bio-Lac

RECIPE CORNER

Zucchini Cauliflower Salad

Servings: 8

Salad Ingredients
3 Cups Diced Zucchini
1/2 Cups Diced Celery
1/4 Cups Diced Onions
1/2 Cups Green Pepper
1/2 Cup Red Pepper
1-1/2 Cup Cut Cauliflower

Salad Dressing Ingredients
1/3 Cup Vegetable Oil
2/3 Cup Vinegar
1/2 Cup Sugar
Salt and Pepper to Taste
Dash of Italian seasoning (optional)

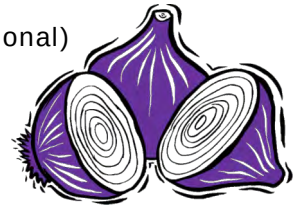
Combine all salad ingredients in a large bowl; set aside.

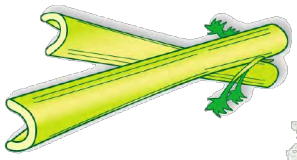
Prepare dressing by boiling all ingredients for 5 minutes.

Let cool then pour over vegetables.

Stir to coat.

Chill for 4 hours or over night to blend flavors.





Keep in touch with Bio-Ag, and let Bio-Ag keep in touch with you!

Bio-ag is proud to be part of the electronic / social media age.

We have some very informative and exciting videos on our You Tube channel, Please watch them when you can and feel free to subscribe to our channel.

We also have a Facebook page for both Bio-Ag Consultants and Norman's Naturals, as well as Twitter accounts (Bio-Ag and Norman's Naturals).

We post product specials and information, as well as sharing many interesting articles we think you'll enjoy reading. Please "like" and follow us so we can grow and share together.

John Smoll's Best Bio-Ag Memories

* Many years of Murray and John travelling together, holding educational meetings and making Farm-calls.
* Summer of 2011, when our family vacationed together with Murray & Florence in Arizona and Utah – visiting the Grand Canyon, Redmond Minerals and more .

"Freight / Border-crossing fees have not yet out-weighed the advantages of working with Bio-Ag.

We appreciate the continued good working-relationship connection between Bio-Ag Consultants & Dist. and Natural Feeds & Fertilizers "

- John Smoll

Do you have something you'd like to share in our newsletter - an event or a classified advertisement?
You can email your submission to rosemary@bio-ag.com. Or mail them to us at P.O. Box 189, Wellesley, ON, N0B 2T0. Thank you!
Bio-Ag reserves the right to edit based on length & content

Bio-Ag values your business and understands how important receiving good service is. This is just one reason that we continue to offer our gold-standard delivery and drop off service. However, due to continually increasing fuel costs, we will have to raise our delivery fees across the board.

Please see below for the new delivery fee structure, which will take effect **July 3, 2018**:

Delivery Zone Fee Structure [Fees are based on distance from Bio-Ag's Wellesley Location]	**Stop Charge + HST**	**Minimum Order [pre-tax & Shipping]**	**Free Delivery Qualifier**
ZONE 1 – 40 km or less from Bio-Ag. ie.Mitchell, Atwood, Stratford, Listowel, Moorefield, Alma, Elora, Ayr, Kitchener, some of Cambridge, Woodstock, Embro, St Marys	$28.00	$100.00	$175.00
ZONE 2 – 40 km to 80 km from Bio-Ag. ie. Guelph, Brantford, some of Hamilton, Delhi, Tillsonburg, London, Exeter, Clinton, Wingham, Teeswater, Mount Forest, Orangeville, Caledon	$33.00	$125.00	$300.00
ZONE 3 – 80 km to 140 km from Bio-Ag. ie. Kincardine, Port Elgin, Owen Sound, Chesley, Collingwood, Fleshterton,Wasaga Beach, Barrie, Alliston, St Catherines, Welland, Port Dover, Simcoe, St Thomas, West Lorne, Petrolia, Watford	$41.00	$300.00	$400.00
ZONE 4 – 140 km to 200 km from Bio-Ag. ie. Ridgetown, Chatham, Dresden, Wiarton, Gravenhurst, Orillia, Uxbridge, Port Perry, Lindsay	$48.00	$600.00	$625.00

Delivery Day	**Confirmed Order Day**
Monday	**Preceding Wednesday morning**
Tuesday	**Preceding Thursday morning**
Wednesday	**Preceding Friday morning**
Thursday	**Preceding Monday morning**
Friday	**Preceding Tuesday morning**

Bio-Ag Consultants & Distributors Inc.
1400 Greenwood Hill Rd
Wellesley, On
N0B 2T0

1.800.363.5278
www.bio-ag.com
orders@bio-ag.com