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Foundation

Dairy and Veal Healthy Calf Conference

2020

PROCEEDINGS

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A message from the Chair

Wow, who would have guessed that when we started planning the ninth biennial **Building the Foundation: Dairy and Veal Healthy Calf Conference (HCC) 2020** in January that we would be switching gears to an online event by Spring. As many of you are repeat attendees of this very exciting event, you know how important this is to our dairy and veal producers. Furthering knowledge and education in calf management is a top priority for Veal Farmers of Ontario (VFO). With a virtual event this year, we hope to continue our momentum of addressing some of the challenges in calf management to find solutions for raising strong, healthy calves both male and female. Yes, it is not the event we hoped for, but we want to make it the best event we can host virtually. This year our reach has been bigger than ever because it is a virtual event. In the past we have been limited by geography and if there is one positive side to COVID-19 it is how we can help educate people from all over North America on the importance of raising healthy calves. From the agenda you will see, we have a dynamic lineup of expert speakers who are some of the most respected professionals in the field of calf management. Considering the circumstances, we are very fortunate that we are still able to bring this level of expertise to you without anyone risking their safety. It is the support of our generous sponsors that allows us to continue to deliver this important event.

Since we are not able to host a traditional tradeshow, I ask each of you to take some time over the next little while to contact our sponsors and talk to them about their products and services. Be sure to thank them for sponsoring this important event. The HCC is the premiere calf event in Ontario, VFO has spent many years advancing calf research and promoting calf management to keep calf care at the top of producer's minds. As your calf care partners, VFO has made a concerted effort contributing extensive resources into the development of calf care materials to improve the health and welfare of all calves in Ontario and now North America whether for dairy replacements, the veal or dairy-beef markets. VFO strongly supports and invests in calf research to develop practical, on-farm protocols for producers. Included in your registration you will receive electronic copies of our calf care resources available for download. For those producers in Ontario you will be receiving a hard copy of **Building the Foundation for Healthy Calves II** in the mail. This is a follow up resource to the first manual produced in 2004, lots has changed! If you don't already be sure to follow our Calf Care Corner Facebook page which is well over 11,000 followers, and demonstrates not only how much our reach has grown since the 2018 event, but highlights our position as your calf care partner.

Sincerely,



Pascal Bouilly , Chair

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Building the Foundation

Dairy and Veal Healthy Calf Conference 2020

AGENDA

Tuesday, November 24th, 2020

- 9:30 a.m.** Virtual zoom conference link opens
- 10:00 a.m.** Welcome
- 10:05 a.m.** Title sponsor presentation: attributes of calf electrolytes
- 10:20 a.m.** **Bioactives in colostrum: understanding the science**
Dr. Michael Nagorske, Saskatoon Colostrum Company
- 11:15 a.m.** **Effects of early socialization and proper nutrition**
Dr. Joao Costa, University of Kentucky
- 12:15 p.m.** Closing remarks and adjournment

Pre-recorded presentations

How to motivate change: working with staff and advisors

Dr. Steve Roche, Acer Consulting

Zero-zero calf care: zero treatments, zero loss

Dr. Jodi Wallace, Ormstown Veterinary Hospital

Nutritional management of calves through weaning

Dr. Mike Van Amburgh, Cornell University

Maximizing the value of male dairy calves

Kendra Keels, Veal Farmers of Ontario

Pre-recorded presentations will be 30 minutes long.

Live talks will be followed by a brief, moderated Q&A.

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Dr. Mike Nagorske



Bioactives in colostrum: understanding the science

Bioactives has become an industry buzzword and new research is demonstrating the importance of bioactives in colostrum in fighting pathogens and increasing immunity. However, many producers still struggle to understand the practical importance of bioactives that can be lost in the research's scientific jargon. Dr. Nagorske will break down the latest research and reinforce the importance of colostrum in calf health and disease resistance.

Michael grew up on a grain and cattle farm in Southwestern Minnesota. He attended the University of Minnesota where he received his DVM and B.S. in Veterinary Science. He also served a lead role on the Veterinary Services Team which was responsible for the animal health, surgeries and husbandry procedures. He had a strong passion for the continuous improvement of maximizing genetic potential in young calves through nutrition and disease mitigation, and that passion is still with him today. He enjoys challenges as it relates to calf health and nutrition in beef and dairy operations. As Director of Research for SCCL, it has been a standard of his to utilize evidence-based approaches for solutions, as well as challenge and influence research to provide the best answers for the problem's producers endure.



Your calf care partners

Dr. Joao Costa



The success of a dairy calf starts at birth: effects of early socialization and proper nutrition

Ready to make the transition to group-housed calves? Early paring has been shown to increase weight gain in calves. Already grouping your calves but seeing some health or behaviour problems? Group housing calves is not as simple as putting all your calves into one pen. Dr. Costa will give insight into grouping calves, why grouping calves can be beneficial, when calves should be grouped, and the long-term health benefits of group housing.

Dr. Costa is an assistant professor in the department of animal and food sciences at the University of Kentucky. He holds a PhD of philosophy in animal science from the University of British Columbia. His work and research focuses on animal science, with emphasis on applied animal behavior, nutrition, and precision technologies. He has a deep interest in the understanding and design of animal production systems, sustainable approaches to animal production, nutrition and the behavior of farm animals.

To access Dr. Costa's slides please click the links below.

[Part 1](#)

[Part 2](#)

[Part 3](#)



Your calf care partners

Aaron Keunen



Attributes of effective calf electrolytes

Aaron is a graduate of Ridgetown College, University of Guelph and is a part owner at Mapleview Agri Ltd., a family owned business specializing in the manufacturing of milk replacer. Aaron is also a part of Keunen Cattle Ltd and TruVital Animal Health, a new venture that focuses on the development and distribution of scientifically validated animal health products across Canada. Through TruVital Animal Health their goal is to develop a brand of effective and innovative health products that encourage antibiotic stewardship and effective on farm management protocols

Attributes of Effective Calf Electrolytes

Aaron Keunen – TruVital Animal Health

Diarrhea & Dehydration

- Diarrhea represents approximately 57% of mortality in neonatal calves (NAHMS, 2007)
- Causes of diarrhea:
 - Viral (Rota, Corona)
 - Bacterial (Salmonella, E.coli)
 - Parasitic protozoans (Cryptosporidium)
 - Nutritional
- Regardless of cause, they all lead to the same result – dehydration
- Symptoms of dehydration include:
 - Sunken eyes
 - Lethargic, depressed
 - Skin tent > 1 second
- Heat or transport stress will also lead to fluid loss



Dehydration in Neonatal Calves

| % dehydration | Demeanor | Sunken eye | Skin tent |
|---------------|-----------|------------|--------------|
| <6% | Normal | None | None |
| 6-8% | Depressed | 2-4 mm | 1-3 seconds |
| 8-10% | Depressed | 4-6 mm | 2-5 seconds |
| 10-12% | Comatose | 6-8 mm | 5-10 seconds |
| >12% | Dead | 8-12 mm | >10 seconds |

NC STATE Veterinary Medicine

Choosing the right electrolyte

Diarrhea causes the most deaths in neonatal calves. It is a major cause of mortality in calves, and it is often associated with dehydration. Dehydration can be caused by a variety of factors, including diarrhea, heat stress, and transport stress. Dehydration can lead to a variety of health problems, including weakness, lethargy, and even death. It is important to recognize the signs of dehydration early and to provide fluid therapy as soon as possible. There are several electrolyte solutions available for calves, and it is important to choose the right one for the calf's condition. Dr. Smith advocates an electrolyte that contains enough sodium to rehydrate the calf, glycine or acetate to help with sodium absorption in the intestine, an alkalinizing agent to correct the drop in blood pH (acidosis) that occurs with diarrhea, and energy, as most diarrheic calves are in a state of negative energy balance.



Hoard's Dairyman article, April 10, 2018

- Dr. Smith advocates an electrolyte contains:
- Enough sodium to rehydrate the calf
 - Glycine or acetate to help with sodium absorption in the intestine
 - Alkalinizing agent to correct the drop in blood pH (acidosis) that occurs with diarrhea
 - Energy, as most diarrheic calves are in a state of negative energy balance

When?

- Before, during, and after heat stress
- Higher risk periods to assist with subclinical issues
- On the onset of diarrhea, need to stay hydrated to prevent dehydration from occurring
 - During diarrhea calves lose essential minerals, nutrients, and fluids and these need to be replaced frequently



How?

- Feed via bottle first, twice daily for cases of diarrhea, more feedings is better than larger individual feedings
- Last resort esophageal tube feeder – make sure calf is standing to avoid overflow into lungs
- Minimum 2 L of water + electrolyte solution per feeding
- Electrolytes are formulated to provide a full dose to ensure proper absorption of electrolyte components
- In addition to oral fluids, severely dehydrated calves should be given intravenous fluids





Key Components

- Blood Buffers / Alkalinizing Agents
- Energy (Glucose)
- Sodium
- Potassium
- Glycine
- Balanced Strong Ion Difference

Energy – Dextrose (glucose)

- Dehydrated calves are in a state of negative energy balance
- Necessary as a carrier for proper sodium absorption into the blood
- Glucose can significantly affect osmolarity – oversupplying may lead to adverse effects

Sodium

- Sodium is lost in the feces and needs to be replenished to properly rehydrate the calf
- Requires glucose and/or glycine to act as carrier to get from intestine into blood



Potassium

- Potassium stores are excreted in the feces with fluid loss
- Depleted potassium may lead to muscular weakness
- Potassium is typically lost faster than sodium

Glycine

- Works similar to glucose to assist with sodium absorption
- Acts as a carrier for sodium to cross over from intestine into blood stream

Blood Buffers

- Study was conducted at Mapleview Agri Ltd's research facility in Palmerston, Ontario
- n= 45 calves
- Calves were enrolled in study when they had diarrhea classified as 2 consecutive fecal scores of 2 (runny, spreads easily) or one day of 3 (liquid, void of solid material) (McGuirk, 2008)
- Electrolytes administered until fecal score returned to 1 (semi formed or pasty) or 0 (normal)
- Upon enrollment calves were administered either a powdered "Basic Bicarbonate" (BBP), powdered "Mixed Buffer" (MBP), or a liquid "High Sodium Acetate" (HAL)
- All electrolytes had 50 mmol/L of blood buffers and included glycine
- Blood measurements were taken and assessed at enrollment (first electrolyte administration), 1, 8, and 24 hr following first treatment of electrolyte

This project has been reviewed and accepted to the Journal of Dairy Science for publication - (Wood et al, 2020)



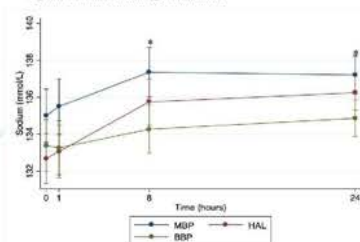
Blood Buffer Formula Comparison

| Buffers (mmol/L) | BBP | MBP | HAL |
|--------------------|------|------|------|
| Sodium Bicarbonate | 50.7 | 33.8 | |
| Sodium Citrate | | 8.4 | |
| Sodium Acetate | | 6.3 | 50.1 |
| Potassium Citrate | | 1.9 | |
| Total | 50.7 | 50.4 | 50.1 |

Formulas all contained adequate glycine, sodium, chloride, energy, and had a balanced strong ion difference

Results – Sodium

Predicted sodium means by electrolyte groups from mixed repeated measures linear regression model.



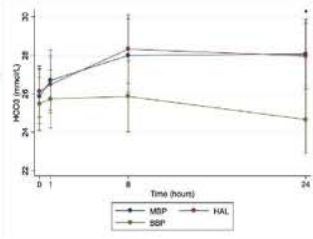
Normal Sodium ranges for healthy neonatal calves is 133.3 to 140.2 mmol/L (Dillane et al., 2018)

BBP = Single Buffer Bicarbonate
MBP = Mixed Buffer
HAL = Single Buffer High Acetate

* denotes a significant difference between the BBP and MBP group

Results - Bicarbonate

Predicted total bicarbonate means by electrolyte groups from mixed repeated measures linear regression model on 45 calves.

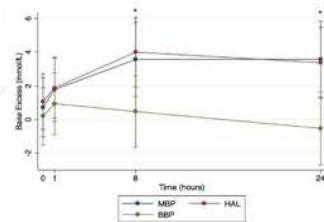


Normal Bicarbonate ranges for healthy neonatal calves is 26.3 to 34.1 mmol/L (Dillane et al., 2018)

* denotes a significant difference between the BBP and MBP group

Results – Base Excess

Predicted Base Excess means by electrolyte groups from mixed repeated measures linear regression model on 45 calves

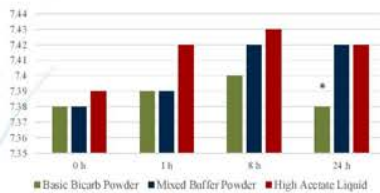


Normal Base Excess ranges for healthy neonatal calves is 2.6 to 10.8 mmol/L (Dillane et al., 2018)

* denotes a significant difference between the BBP and MBP group

Results – Blood pH

No statistical differences were observed, although a numerical difference was noted at 24 hr between MBP and BBP.



Normal blood pH range for healthy neonatal calves is 7.37 to 7.47 (Dillane et al., 2018)

* denotes a tendency for a difference between the MBP and BBP (P = 0.06)

Project Conclusions

- Sodium levels were greater at 8, and 24 hrs, (P < 0.05) post enrollment for calves fed MBP vs BBP
- Calves fed the BBP had lower Bicarbonate levels 24 hr post administration than MBP and HAL (P < 0.05)
- Base excess was lower in the BBP vs the MBP (P < 0.05) indicating metabolic acidosis
- No statistical differences were observed in regards to pH although the BBP took numerically longer to raise pH vs MBP & HAL
- MBP and HAL equally rehydrated calves and corrected metabolic acidosis increasing pH
- BBP electrolyte was unable to properly correct metabolic acidosis

BBP = Single Buffer Bicarbonate
MBP = Mixed Buffer
HAL = Single Buffer High Acetate

Comparison - Basic Salt Electrolyte

- Price \$0.40 - \$0.80 dose
- Encourages water intake
- Decreases stress (movement, transport, vaccination, hot climate, birth) by replacing basic electrolytes and lost fluids
- Provides little energy
- Little or no buffers – only sodium bicarbonate less than 50 mmol/L.
- No glycine for proper sodium absorption
- Unbalanced strong ion difference (SID) – poor absorption from gut to blood

Summary: Products are cheap and available and may be adequate for reducing stress and encouraging water intake. Attractive based on price but will not properly rehydrate calves adequately and is not acceptable for oral rehydration therapy.

Comparison – Single Buffer Sodium Acetate Electrolyte

- Price \$2.20 - \$4.00 dose
- Includes glycine for proper sodium & potassium absorption
- Properly corrects metabolic acidosis in dehydrated calves
- Provides potassium to restore depleted body stores
- Single source blood buffer consists of sodium acetate
- Greater than 50mmol/L buffers
- Properly balanced SID
- May be at risk for product degradation and hardening when exposed to any moisture or humidity

Summary: More expensive electrolyte but still contains essential criteria for proper rehydration via oral therapy. Risk of product hardening when exposed to moisture or humidity in storage. Adequate electrolyte choice but not necessarily economically beneficial.

Comparison - Mixed Buffer Electrolyte

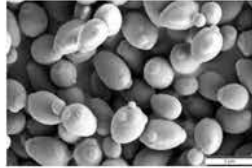
- Price \$1.75 - \$4.00 dose
 - Includes glycine for proper sodium & potassium absorption
 - Properly corrects metabolic acidosis in dehydrated calves
 - Provides potassium to replenish depleted body stores
 - Blood buffers consist of sodium acetate, sodium bicarbonate, sodium citrate, potassium citrate
 - Greater than 50mmol/L buffers
 - Properly balanced SID
 - Product is stable - less likely to harden, easy to handle
- Summary: Contains essential criteria for rehydrating calves. A good choice for oral rehydration therapy on dehydrated calves. Equivalent in performance to expensive single buffer sodium acetate based electrolytes.

Vitamin Supplementation

- Vitamin E has been linked to immune response and improved performance measures:
 - Increase white blood cell production, and decrease eye and nasal discharge (Eicher, JDS, 1994)
 - Lower Vitamin E level at birth increased risk of mortality (Torstein, 2011)
 - Increase growth rate linked to Vitamin E depletion (Nonnecke, USDA/ARS)
- Vitamin C has shown to:
 - Reduce ocular and nasal discharge (Eicher, Morrill, JDS 75:1635)
 - Reduce diarrhea (Sahinduran, ACTA Vet Brao 73), (Seife, J Vet ed B43)
- B Vitamins have shown to:
 - Improve the rate of growth on veal calves (Gizard et. AL, 1993. Livestock Production Sciences 34: 71-82)

MOS Supplementation

- MOS (Mannan Oligosaccharide) or cultured yeast *Saccharomyces cerevisiae* have shown to:
 - Reduced incidence of diarrhea and fever (Magalhães, et al, 2008)
 - Improved feed intake (Henrichs et al, 2003)
 - Lower pre-weaning raising costs (Magalhães, et al, 2008)



Product Development - Truvitalyte

- Contains adequate blood buffers to correct metabolic acidosis and increase blood pH
- Scientifically formulated to meet electrolyte requirements for potassium, sodium
- Energy source (dextrose) while maintaining acceptable osmolality
- Balanced strong ion difference between
- Research has shown:
 - Corrected acid-base levels in the blood that indicated metabolic acidosis
 - Increased sodium and bicarbonate levels after administration
 - Effectively rehydrated calves
- Available with MOS and Vitamin supplementation for improved immune response



The Strong Ion Difference is the difference between the sums of concentrations of the strong cations and strong anions.
 $[SID] = [Na^+] + [K^+] + [Ca^{2+}] + [Mg^{2+}] - [Cl^-] - [Other\ Strong\ Anions]$

Truvitalyte

FOR USE IN MAINTAINING PROPER ELECTROLYTE BALANCE IN CALVES

Instructions: Mix 115 grams (1 level scoop) of Truvitalyte electrolytes into 2L of warm water and administer orally, twice daily. Administer by bottle or esophageal tube feeder. For use in dairy or beef calves.

Instructions: Mélanger 115 grammes (1 cuillère de niveau) d'électrolytes Truvitalyte dans 2 L d'eau tiède et administrer par voie orale deux fois par jour. Administrer au biberon ou au tube oesophagien. Pour veaux laitiers ou de boucherie.

Net Contents: 5kg (43 Doses)

Expiry: 16 months from manufacture date
 Expiration: 16 mois à compter de la date de fabrication

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Active ingredients per liter

| | |
|--------------------|---------|
| Dextrose | 77.720g |
| Sodium Chloride | 8.340g |
| Glycine | 6.670g |
| Sodium Bicarbonate | 5.670g |
| Sodium Citrate | 4.650g |
| Potassium Chloride | 3.680g |
| Calcium Acetate | 2.720g |
| Sodium Acetate | 1.760g |
| Potassium Citrate | 1.140g |
| Magnesium Sulfate | 0.170g |

Excipient ingredients
 Saccharin Sodium, Silicon Dioxide

Ingredients acids per liter

| | |
|-----------------------|---------|
| Dextrose | 77.720g |
| Dextrose or sodium | 6.143g |
| Glycine | 6.114g |
| Bicarbonate of sodium | 5.270g |
| Citrate of sodium | 4.320g |
| Chloride of potassium | 3.080g |
| Acetic acid | 2.270g |
| Acetate of sodium | 1.760g |
| Chloride of potassium | 1.140g |
| Sulfate of magnesium | 0.172g |

Ingredients non mélangés
 Saccharine sodique, dioxyde de silicium

Storage: Store in original 5kg bag, opened promptly by closed when not in use.
Consignes: Protéger contre l'humidité. Ouvrir le sac rapidement et fermer soigneusement lorsqu'il n'est pas utilisé.

Warning: Keep out of reach of children
 Mise en garde: Garder hors de la portée des enfants

Truvitalyte-MAX

FOR USE IN MAINTAINING PROPER ELECTROLYTE BALANCE IN CALVES

Instructions: Mix 115 grams (1 level scoop) of Truvitalyte-MAX electrolytes into 2L of warm water and administer orally, twice daily. Administer by bottle or esophageal tube feeder. For use in dairy or beef calves.

Instructions: Mélanger 115 grammes (1 cuillère de niveau) d'électrolytes Truvitalyte-MAX dans 2 L d'eau tiède et administrer par voie orale deux fois par jour. Administrer au biberon ou au tube oesophagien. Pour veaux laitiers ou de boucherie.

Net Contents: 5kg (43 Doses)

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 Expiration: 16 mois à compter de la date de fabrication

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Active ingredients per liter

| | |
|--------------------|---------|
| Dextrose | 88.200g |
| Sodium Chloride | 8.340g |
| Glycine | 6.670g |
| Sodium Bicarbonate | 5.670g |
| Sodium Citrate | 4.650g |
| Potassium Chloride | 3.680g |
| Calcium Acetate | 2.720g |
| Sodium Acetate | 1.760g |
| Potassium Citrate | 1.140g |
| Magnesium Sulfate | 0.170g |

Excipient ingredients
 Saccharin Sodium, Silicon Dioxide

Ingredients acids per liter

| | |
|-----------------------|---------|
| Dextrose | 88.440g |
| Dextrose or sodium | 7.400g |
| Glycine | 6.950g |
| Bicarbonate of sodium | 6.170g |
| Citrate of sodium | 5.180g |
| Chloride of potassium | 3.770g |
| Acetic acid | 2.720g |
| Acetate of sodium | 2.000g |
| Chloride of potassium | 1.300g |
| Sulfate of magnesium | 0.172g |

Ingredients non mélangés
 Saccharine sodique, dioxyde de silicium

Storage: Store in original 5kg bag, opened promptly by closed when not in use.
Consignes: Protéger contre l'humidité. Ouvrir le sac rapidement et fermer soigneusement lorsqu'il n'est pas utilisé.

Warning: Keep out of reach of children
 Mise en garde: Garder hors de la portée des enfants

Summary

- Not all electrolytes are equivalent
- Proper formulation is crucial to provide proper absorption of key nutrients lost as a result of diarrhea
- Calves require adequate electrolytes to recover from dehydration and correct acidemia
- Electrolytes are the most effective aid when combating electrolyte imbalances and dehydration
- Ask your supplier if you are unsure of components

References:

- [Brennan, A. J. "Effect of Various Osmolalities on Antitoxin in Neonatal Calves with Diarrhea and Dehydration." *Journal of Dairy Science*, vol. 80, no. 11, Dec. 1997, pp. 3068-3070. \[https://doi.org/10.3168/jds.S0022-0302\\(97\\)3068-0\]\(https://doi.org/10.3168/jds.S0022-0302\(97\)3068-0\)](#)
- [Chapman, W. A. "Effect of NaCl, KCl, and CaCl₂ on Performance, Health, and Hydration of Dairy Calves." *Journal of Dairy Science*, vol. 81, no. 4, Apr. 1998, pp. 1047-1050. \[https://doi.org/10.3168/jds.S0022-0302\\(98\\)3068-0\]\(https://doi.org/10.3168/jds.S0022-0302\(98\)3068-0\)](#)
- [Hobbs, R. D. "Effects of Concentration and Duration of Lactation on Dairy Calves Supplemented with Vitamins A, Vitamins E, and B Complex in Vitamins." *Journal of Dairy Science*, vol. 81, no. 1, Jan. 1998, pp. 104-107. \[https://doi.org/10.3168/jds.S0022-0302\\(98\\)3068-0\]\(https://doi.org/10.3168/jds.S0022-0302\(98\)3068-0\)](#)
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Reference: 1. Dunn TR, Olivett TL, Renaud DL, et al. 2018. The effect of lung consolidation, as determined by ultrasonography, on first-lactation milk production in Holstein dairy calves. *J Dairy Sci*;101(6):5404-5410.



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*Donald Sockett, DVM, MS, PhD, ACVIM, Wisconsin Veterinary Diagnostic Laboratory, "Sanitation for calf scours prevention," John Maday, Bovine Veterinarian, January 14, 2015

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Dr. Steve Roche



Team management & motivating change: working effectively with staff and advisors

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Steve is the Director and Principal Consultant for ACER Consulting and has a vision for improving animal health through applied research and creative communication. His mission is to develop and deliver evidence-based solutions to motivate on-farm change and improve animal health and welfare. Steve earned his PhD in epidemiology from the Department of Population Medicine at the Ontario Veterinary College. He also holds a MSc in epidemiology, and BSc in zoology from the University of Guelph.



Your calf care partners

Team Management & Motivating Change

Working effectively with staff and advisors

Dr. Steven Roche
ACER Consulting
November 24, 2020



Overview

What's motivating on-farm behavior?

How can you leverage your team and advisors?



Getting to Know Me

- MSc and PhD in epidemiology from the Ontario Veterinary College
- Founded ACER Consulting in 2013 (www.acerconsult.ca)
- Adjunct faculty at the University of Guelph
- Special interests in:
 - Extension / knowledge translation and transfer
 - Understanding producer and veterinarian mindset
 - Influencing on-farm behaviours to improve animal health and welfare
 - Calf health management
 - Biosecurity and infectious disease management



Steven Roche
PHD, MSc

A Changing Industry

The Canadian Dairy Industry in 1987 vs. 2017:

Number of farms with milk shipments: ~38,000 to ~11,000
 Number of cows: ~1.4 million to ~945,000
 Number of heifers: ~643,000 to ~450,000



A Changing Industry

National quality assurance programs



Regulatory and policy changes



A Changing Industry

Emphasizing:



Staff Training



Protocol Development & Record Keeping



Working with Advisors



Calf Care Changes

- Health in female dairy calves may be improving
 - Decreasing mortality rates – 12% to 4%
 - Morbidity remains as high today as in 1980's
- Changes in management
 - Feeding more colostrum and milk consistently, milk replaces more common
 - Housing systems – hutches and group systems
- Care of male dairy calves has evolved
 - Less common for dairy farmers to raise their male calves
 - Many producers reporting similar treatment of male and female calves
- Antibiotic use and resistance remains a growing concern



A Producer Perspective

- Pneumonia and diarrhea remain the biggest challenges
- Changes: ventilation, hygiene, colostrum mgmt., tx/vacc. protocols
- Most are testing for FPT – some unsure of how to use the information
- Frustrated with low calf prices – supportive of building relationships



A Veterinarian Perspective

- Inconsistent emphasis on calf health
 - Some prioritize calf health through programs and routine discussion
 - Some only discuss calf health when prompted to
- Challenges motivating farmers
 - Comes from vet's own belief in ability & farmer willingness
- Facilities and labour viewed as biggest challenges impacting health
- Need to change the culture of vet med to incorporate calf health



Motivating Change & Effective Communication Are Increasingly Important

The stakes are higher and farm management is getting more complex.



Communication & Motivation



With staff (family and employees) and advisors





Assumptions & Fatal Flaws



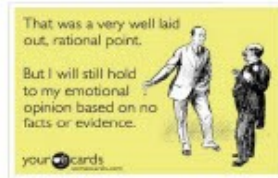
Stop Talking and Start Listening

We're too eager to provide recommendations and impart our knowledge



A Challenging Assumption

We assume education & awareness are lacking
AND
That behavioral decisions are rational



You cannot reason people out of positions they were not reasoned into



Think About It

Is a lack of knowledge preventing these behaviors?



Think About It

J. Dairy Sci. 104:3329-3347
<https://doi.org/10.3168/jds.2016-11917>
 Published online before print: November 17, 2017

Invited review: Determinants of farmers' adoption of management-based strategies for infectious disease prevention and control

Caroline Sibon,¹ Amanda James,¹ Steven Balle,¹ David F. Kellon,¹ Cindy L. Adams,¹ Karin Greif,¹ Ben J. Eribon,¹ Grant Renselink,¹ Theri J. G. M. Lam¹ and Roman W. Rossow¹

Knowledge is far from sufficient for behaviour change



Providing information, when it's not needed = nagging! (reactance)



People often require motivation, not information...

Too Many Assumptions

We often (incorrectly) assume team/staff/advisors preferences, wants, and needs



Leads to poorer communication and team management

Too Many Assumptions

- Why didn't producers participate?
 - "My nutritionist never brought it up"
 - Why not? Assumed it wasn't of interest/wouldn't go for it

ASSUME

Too Many Assumptions

- Why didn't producers participate?
 - "My nutritionist never brought it up"
 - Why not? Assumed it wasn't of interest/wouldn't go for it
- Why does this producer feel that scouring is a normal thing for calves?
 - "My vet never mentioned it so I didn't think it was an issue"

ASSUME

Too Many Assumptions

- Why didn't producers participate?
 - "My nutritionist never brought it up"
 - Why not? Assumed it wasn't of interest/wouldn't go for it
- Why does this producer feel that scouring is a normal thing for calves?
 - "My vet never mentioned it so I didn't think it was an issue"
- Why did you put 2 calves in one pen?
 - "They were bull calves and they're not valuable to the dairy"

ASSUME



We Don't Know the Barriers



It's all about mindset

Attitudes, experiences, and beliefs that we have about a given task or problem

Leveraging Your Team

Working with your staff

Conversation

We rarely ask... we're more comfortable telling



Open Communication

Lead by example

- Be open and transparent – what are your expectations?
- Explain why – communicate your goals and philosophy
- Be consistent and clear – make it routine!



Open Questions

Open-ended questions to elicit 'change talk'

- What are some of the reasons for making a change?
- What will happen if you don't make a change?
- What is it that makes you even consider changing?
- If things worked out exactly the way you want, what would be different?
- What are the pluses and minuses of changing or not changing?



Open Communication

Conflict resolution is easier to manage

- The first one to raise their voice loses the argument
- A calm and considerate approach leads to the fairest solution



Build Trust & Rapport

- Rapport enables better conversation
- The #1 way to build trust with your employees is to demonstrate that you care
- Practice active listening
- Show empathy
 - Demonstrate you see their perspective



"I know exactly how you feel."



Trust & Rapport

- Nonverbal communication is so important!
 - Eye contact, welcoming position, body position



Mutual Understanding

How much does your staff know about you?

Do they understand your goals, roles, expectations?

Are they aware of your on-farm priorities?



Feedback & Recognition

Feedback from supervisors is routinely identified as one of the most important motivators for staff

- Recognition doesn't always mean cash incentives
 - More money ≠ increased motivation and productivity
 - "Thank you" and supportive statements go a long way
- Feedback doesn't always have to be positive
 - Recognize effort and provide constructive feedback



Team Meetings

- Hold regular and 'open' team meetings
- Assign responsibilities
 - Who will lead the meeting?
 - Who will follow up?
- Set a focus
 - Orient around goals and needs
 - Examples: Protocol review, change in practice, general update
- Consider the family dynamic – do you need an outside voice?
- Involve advisors



Affirmations

Normalize their concerns

Affirm the positive aspects of their mindset



Reflections

Use reflections and summaries to highlight discrepancies

- Cognitive dissonance = contradictory beliefs and behaviors
- **Busy vs. Important:** busy is a decision, you make time if it's important
 - It's not about finding time



Leveraging Your Team

Working with your veterinarian



Your Vet's Mindset



Mutual Understanding

How much does your vet know about you?

Do they understand your goals, roles, expectations?

Are they aware of your on-farm priorities?



The Opportunity



Setting Goals

Identify the desired outcome → What do you hope to achieve?

Clarify and articulate the goal → What's the reality?

Chunk it out → What are realistic mini goals?

Explore options → What different actions could you take?

Identify support → Who can offer support when needed?

Plan → What is your commitment? What will you do?

Evaluate → What are your success indicators?



Take Home Messages

- Motivation is more than education
- Routine and consistent communication is key
- Team meetings are crucial to success
- Recognize a job well done and provide constructive feedback
- Be explicit with your advisors about your goals, and prioritize it!
- Walk before you run

Thank you!
Any Questions?



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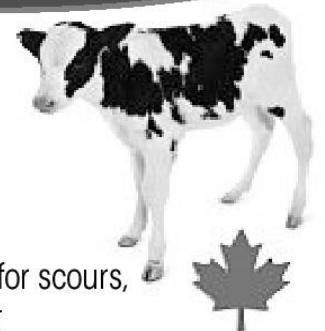
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Dr. Jodi Wallace



Zero-zero Calf Care: zero treatments, zero loss

Nobody likes having sick calves on the farm. It is time consuming, costly, emotionally draining, and stressful. The closer we get to zero-zero, the more enjoyable and profitable calf raising can be. In her talk Dr. Wallace shares her vision of how producers can bring their operations closer to zero mortality.

Dr. Jodi Wallace grew up on a dairy farm in Herdman, Quebec. In 2002, she obtained her degree in Veterinary Medicine from the University of Guelph. She completed a Masters of Veterinary Science from the University of Montreal in 2009. Dr. Wallace is a veterinarian and associate owner at the Ormstown Veterinary Hospital. As well as everyday veterinary practice, Dr. Wallace does calf health and milk quality consultations, conferences and seminars for dairy producers and veterinarians throughout Canada and abroad. Dr. Wallace is also a dairy producer. She lives with her husband and four kids on their dairy farm, Anderson Farms/Silverstream Holsteins, in Howick, Quebec. Anderson Farms are focused on Zero-Zero calf health.

Dr. Mike Van Amburgh



Nutrition and nutritional management of calves through weaning

At weaning, calves face significant stress due to changes in their diets, housing, and environments. As a result, calves may lose weight, eat less, and become more susceptible to infection. The key to limiting this post-weaning slump is to minimize stress. Dr. Van Amburgh will share ways to reduce weaning stress, the impacts of starter mixes, and how manure can be a good indication of weaning success.

Mike Van Amburgh is a Professor in the Department of Animal Science and a Stephen H. Weiss Presidential Fellow at Cornell University where he has a dual appointment in teaching and research. His undergraduate degree is from The Ohio State University and his Ph.D. is from Cornell University. He teaches multiple courses and leads the Cornell Dairy Fellows Program, advises approximately 50 undergraduate students and is the advisor for the Cornell University Dairy Science Club. He has authored and co-authored over 70 journal articles and many conference proceedings and is the recipient of several awards.



Your calf care partners

Growth Objectives, Nutrient Requirements, And Weaning Management of Calves

Mike Van Amburgh and Rodrigo Molano

Dept. of Animal Science

Email: mev1@cornell.edu; cell: 607-592-1212



Overview of today's discussion

- Introduction - Growth objectives
- Body composition – what tissue are we focused on
- Starter formulation and weaning length
- Review a few studies
- Summary



What are your growth objectives?



340 lb (154 kg) @ 91 days

Averaged 2.87 lb/d (1.3 kg/d)
from birth

Growth Benchmarks to Optimize First and Subsequent Lactation Milk Yield

Birth to weaning: double body weight at minimum

Breeding and Pregnancy: 55-65% mature BW

Post-calving BW first lactation: 82 to 85% mature BW
Goal is to achieve 82% of mature size to achieve 80% of mature cow milk yield – minimize nutrient use for growth during lactation

Mature weight determined at middle of 3rd and 4th lactation – 80 to 200 days in milk on healthy cows, not cull cows

Van Amburgh et al., 1998, 2019; Fox et al., 1999; NRC, 2001

Body Composition Data Sets Available for Use in Evaluation and Model Building Total of 451 calves and heifers

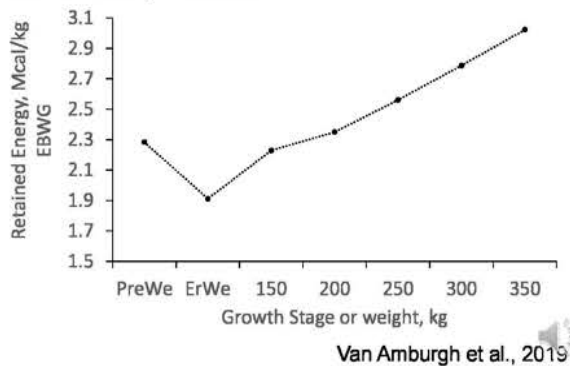
| Study | n | BW range, kg | Titration | Breed |
|----------|----|--------------|-------------------|-------|
| Blome | 33 | 40 - 70 | Energy | H |
| Diaz | 60 | 40 - 105 | Energy | H |
| Tikofsky | 30 | 40 - 85 | Fat: Carb | H |
| Bartlett | 48 | 45 - 60 | Energy & Protein | H |
| Bascom | 33 | 30 - 42 | Protein & Fat | J |
| Mills | 36 | 46 - 88 | Fatty acids | H |
| Stamey | 42 | 40 - 100 | Energy & Protein | H (W) |
| Meyer | 78 | 40 - 350 | Energy | H (W) |
| Smith | 27 | 123 - 320 | Fat – CLA vs Sat. | H (W) |
| Waldo | 64 | 170 - 328 | Energy | H (W) |

Nutrient Requirements of a 45 kg Calf Under Thermoneutral Conditions

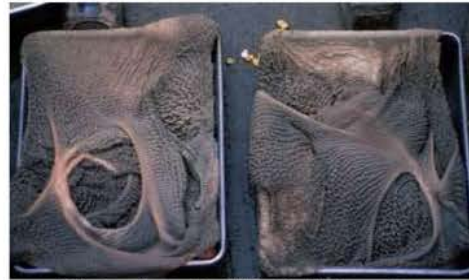
| Rate of gain, lb/d/ kg/d | ME ^a , mcal/d | DMI, lb/d | ADP, g/d | CP, g/d | CP, % DM |
|-----------------------------|-----------------------------|--------------|-------------|---------|----------|
| 0.44/0.2 | 2.35 | 1.12 | 87 | 94 | 18.0 |
| 0.88/0.4 | 2.89 | 1.40 | 140 | 150 | 23.4 |
| 1.32/0.6 | 3.48 | 1.67 | 193 | 207 | 26.6 |
| 1.76/0.8 | 4.13 | 1.98 | 235 | 253 | 27.5 |
| 2.20/1 | 4.80 | 2.39 | 286 | 307 | 28.7 |

Van Amburgh and Drackley, 2005

Energy gained in the body of calves and heifers during different stages of growth and EBW of dairy heifers.



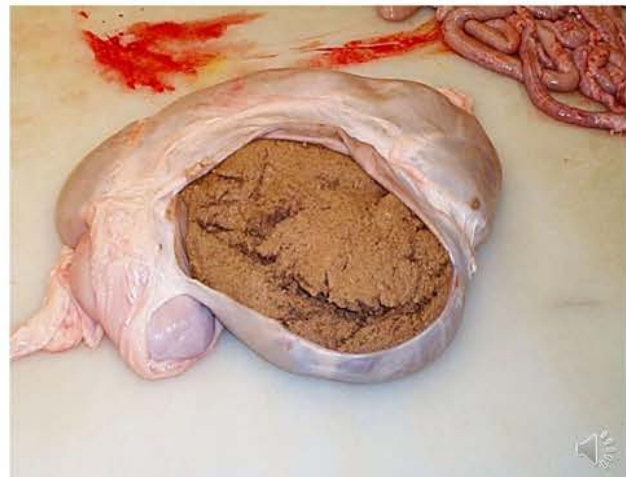
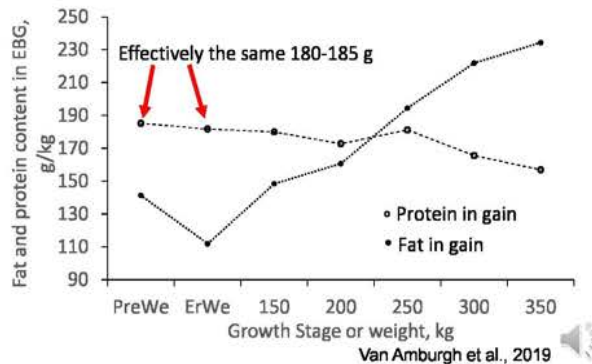
What does energy and protein requirements look like during development of the GIT?



Photos from Dr. Akira Saito from Japan

Have two data sets: Stamey et al
Meyer et al.

Protein and fat contained in the body of calves and heifers during different stages and body weight



Weaning and Dry Matter Intake of Starter

- Behavior is most likely the primary factor affecting a majority of the studies that have evaluated calf starter intake and preferences.
- A calf under natural conditions would learn to consume feed from the dam and be encouraged and taught to do so as it developed and became physiologically ready for that type of diet.
- Several studies have been conducted on feeding behavior of grazing animals and it is clear that the dam teaches the calf what to eat and how to eat under those management conditions (Howery, L. D., et al. 1998; Provenza, 2005).
- Under most of the conditions we offer calves starter grain, there are barriers to learning that affect the how the calf views and accepts the starter grain as a food source.

Weaning and Dry Matter Intake of Starter

- Our way of managing that learning has been to limit the nutrients from milk or milk replacer in an effort to enhance hunger so they are encouraged to consume nutrients from other sources.
- Having calves of somewhat varying ages in group housed conditions helps with the learning process because the older calves provide lessons in eating behavior for the calves not yet experienced enough to understand where and what the starter grain might be.
- Creating an environment that allows calves to teach each other about starter grain intake is essential to enhance nutrient delivery and weaning efficiency in dairy calves and help avoid any post-weaning energy balance problems.

Weaning and Dry Matter Intake of Starter

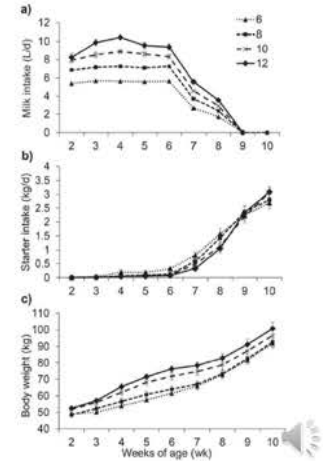
- Adding flavors and odors to starter grain helps this process, especially for calves fed grain in situations where they receive no visual feedback about what other calves are doing.
- Making sure all nutrient requirements are met by the starter is also important – industry not willing to pay for that yet
- Other options are enzymes that enhance digestibility and reduce digestive stress

Weaning protocol

- Gradual reduction of Liquid feed
- Weaning duration At least 10 d

More gradual reduction in liquid feed and a little more time to allow the rumen to expand

Rosenbergh et al., 2017

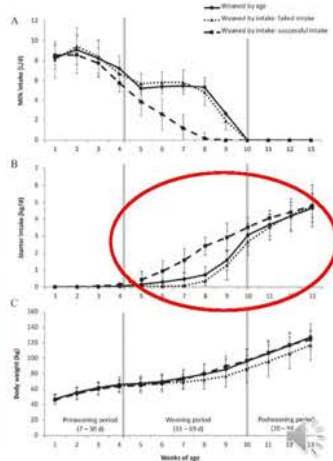


Lengthening the Weaning Period

- Age vs Grain intake
- Evaluated grain intake and used that to reduce milk feeding over a 5 week period



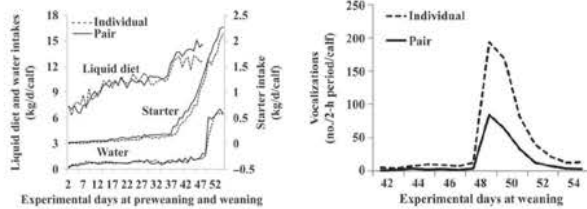
Benetton et al., 2019



Housing: Group behavior vs isolated



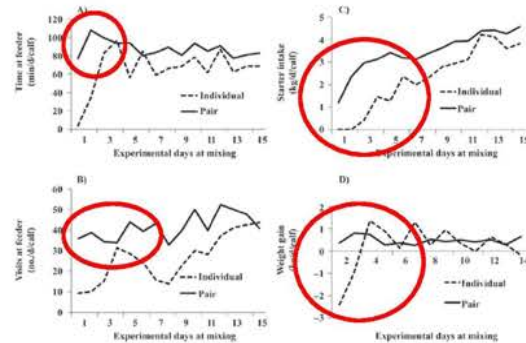
Individual vs Pair housing



Reduced weaning distress by social buffering

De Paula Vieira et al., 2010

Individual vs Pair housing



Pairing/Grouping increases calves' behavioral flexibility

De Paula Vieira et al., 2010

Weaning study based on calf feedback about starter intake thresholds/targets

- Calves fed 12 L milk/d to 30 d on auto-feeders
- Calves then decreased 25% to 9 L/d
- Starter fed free choice
- Step downs for milk occurred at three different starter intake target: 0.23 kg, 0.68 kg and 1.3 kg per day over 3 days with a 50% variance.
- Calves had 84 days to reach the final target and if not meeting, milk was decreased over 7 d (91 d weaning).
- All calves in pens until 105 d

Neave et al. 2019 JDS

Weaning study based on calf feedback about starter intake thresholds/targets

Development of solid feed intake

| Measure | Mean | SD | Range |
|---|------|------|---------|
| Age to consume 40 g/d of solid feed, d | 36.0 | 12.8 | 18 - 75 |
| Age to consume 225 g/d of solid feed, d | 47.2 | 10.9 | 33 - 78 |
| Age to consume 675 g/d of solid feed, d | 53.4 | 10.4 | 37 - 81 |
| Weaning age (consume 1,300 g/d solid feed), d | 59.1 | 9.6 | 44 - 84 |

Neave et al. 2019 JDS

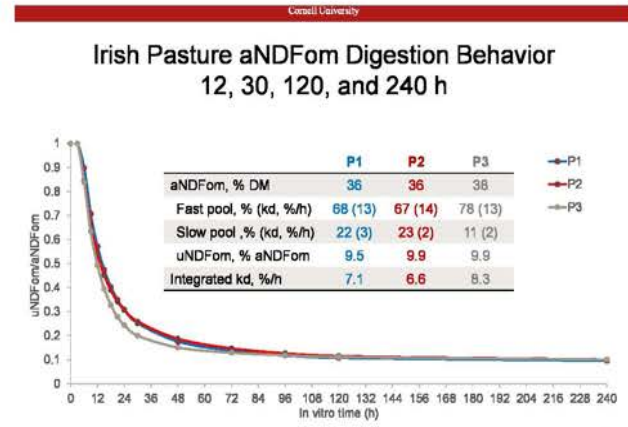
Weaning study based on calf feedback about starter intake thresholds/targets

| Total feed intake | Mean | SD | Range |
|----------------------|-------|------|---------------|
| Milk DMI, kg | 47.0 | 11.4 | 28.1 - 76.8 |
| Calf starter DMI, kg | 141.7 | 36.5 | 58.3 - 257.2 |
| Growth | | | |
| ADG, kg | 1.0 | 0.11 | 0.75 - 1.2 |
| Final weight, kg | 147.3 | 15.8 | 118.7 - 186.8 |

Neave et al. 2019 JDS

Starter chemical composition – somewhat random sampling from 2008 to 2019

| Authors | % DM | | | |
|---|------|-------|--------|-------------------|
| | NDF | Sugar | Starch | Sol. Fiber (*cal) |
| Hill et al., 2008 | 38.4 | 5.2 | 15.6 | 5.7 |
| | 15.4 | 5.1 | 43.5 | 11.1 |
| Chapman et al., 2016 | 15 | 6.1 | 40.4 | 11.3 |
| Hill et al., 2016 | 12.6 | 7.7 | 51.2 | - |
| Mean starch content of studies and treatments: 37.8% | | | | |
| Do we believe that is an acceptable starch content? | | | | |
| Dennis et al., 2018 | 15.9 | 6.2 | 37.2 | 10.3 |
| Quigley et al., 2019 | 15.5 | 7.3 | 38.4 | 7.5 |
| Gelsinger et al., 2019 | 15.1 | 5.6 | 47.2 | - |
| | 25.3 | 6.2 | 35.3 | 3.4 |
| Benetton et al., 2019 | 18.3 | - | 37.3 | - |
| Hu et al., 2019 | 14.5 | 6.0 | 43.9 | 4.0 |



Pasture grass feed chemistry

| Item | Irish Summer Grass |
|---------------------------------------|--------------------|
| DM, % | 18.5 |
| Chemical composition (% of DM) | |
| Crude protein | 19.1 |
| Crude fat | 3.10 |
| aNDFom | 33.9 |
| pdNDFom, %NDFom | 90.7 |
| Starch | 1.2 |
| Soluble fiber | 12.4 |
| Sugars | 24.6 |
| Ash | 8.79 |
| ME, Mcal/kg | 2.74 |



Starter Nutrient Content

| | % Dry Matter |
|-------------------------|--------------|
| CP | 25.6 |
| Sol CP | 6.2 (24.9) |
| aNDFom | 21.0 |
| ADF | 10.0 |
| Starch | 21.2 |
| Sugar | 14.9 |
| Soluble fiber | 5.0 |
| Ether extract | 4.4 |
| ME allowable gain, kg/d | 1.16 |
| MP allowable gain, kg/d | 1.13 |

Rodrigo's base calf starter

| Pellet ingredients | Amount, kg | % of DM | DM kg |
|-----------------------------|------------|---------|--------|
| Wheat midds | 0.6 | 0.199 | 397.09 |
| Soyplus | 0.6 | 0.199 | 397.09 |
| Canola meal | 0.2 | 0.066 | 132.36 |
| Sugar | 0.1 | 0.033 | 66.18 |
| Dried whey | 0.18 | 0.060 | 119.13 |
| Blood meal | 0.12 | 0.040 | 79.42 |
| Metaspart dry | 0.022 | 0.007 | 14.56 |
| Minerals | 0.02 | 0.007 | 13.24 |
| Vitamins ADE | 0.01 | 0.003 | 6.62 |
| Rumensin premix | 0.01 | 0.003 | 6.62 |
| Flavor enhancer | 0.01 | 0.003 | 6.62 |
| Molasses | 0.1 | 0.033 | 66.18 |
| Fat | 0.02 | 0.007 | 13.24 |
| Yeast cell wall | 0.02 | 0.007 | 13.24 |
| External ingredients | | | |
| Beet pulp shreds | 0.4 | 0.132 | 264.73 |
| Flaked corn | 0.61 | 0.202 | 400.71 |

Rodrigo's calf starter (modified for Europe and Japan)

| Pellet ingredients | Amount, kg |
|------------------------------------|------------|
| Wheat midds | 0.478 |
| Ground maize | 0.382 |
| Wheat flour | 0.099 |
| Soyplus | 0.404 |
| Canola meal | 0.148 |
| Sugar - dextrose | 0.1 |
| Dried whey | 0.18 |
| Lactose | 0.1 |
| Corn gluten meal 60% | 0.197 |
| Metaspart dry (methionine) | 0.022 |
| Minerals | 0.01 |
| Vitamins ADE | 0.01 |
| Rumensin premix | 0.01 |
| Flavor enhancer | 0.099 |
| Molasses - beet | 0.02 |
| Fat - corn oil | 0.02 |
| Yeast cell wall | 0.02 |
| External ingredients | |
| Beet pulp shreds | 0.493 |
| Barley flakes | 0.287 |
| Aji-Pro L (rumen protected lysine) | 0.03 |

Formula modified for regions where blood meal and related ingredients are not allowed

B-Vitamin experiment through weaning

Calves fed up to 12 L of milk replacer per day (28% CP, 15% fat, Excelerate, MSG Inc.) 3x per day feeding, 15% solids

Four liter bottles

Calf starter ad libitum

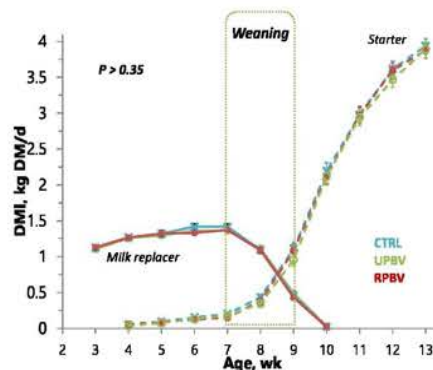
Weaned over 21 days starting at day 49

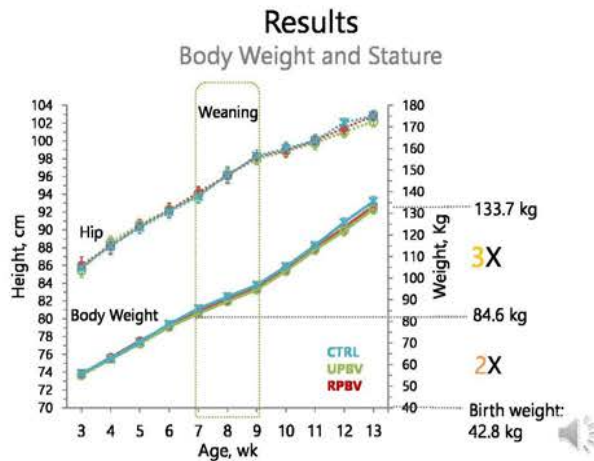
Calves on treatment diets for 91 days

Study evaluated B vitamin requirements – no significant effects of B vitamin supplementation

Results

Dry Matter and Energy Intake





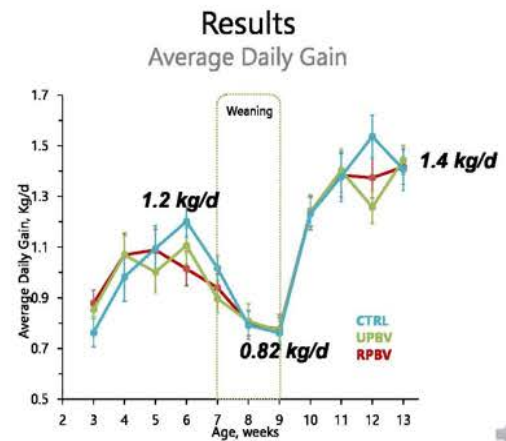
Results

| | RPBV | UPBV | CTRL |
|--------------------|-------|-------|-------|
| Pre-weaning | | | |
| (Wk 7) Wt, kg | 84.85 | 83.48 | 85.75 |
| ADG, kg/d | 0.91 | 0.86 | 0.91 |
| MR intake, kg/d | 1.23 | 1.18 | 1.23 |
| Grain Intake, kg/d | 0.05 | 0.05 | 0.09 |
| DMI, kg/d | 1.27 | 1.27 | 1.32 |
| Feed Efficiency* | 0.67 | 0.65 | 0.68 |
| Weaning | | | |
| (Wk 9) Wt, kg | 95.60 | 94.60 | 96.78 |
| ADG, kg/d | 0.77 | 0.77 | 0.77 |
| MR intake, kg/d | 0.82 | 0.86 | 0.82 |
| Grain Intake, kg/d | 0.73 | 0.64 | 0.77 |
| DMI, kg/d | 1.54 | 1.50 | 1.59 |
| Feed Efficiency* | 0.51 | 0.52 | 0.47 |

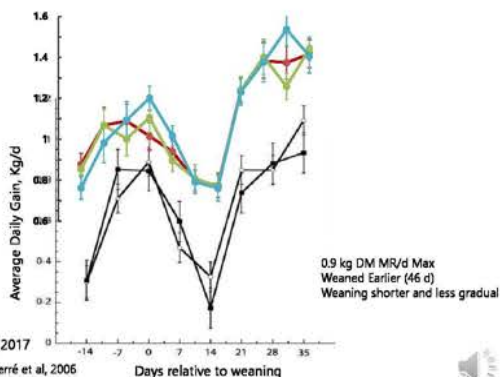
Results

| | RPBV | UPBV | CTRL |
|---------------------|--------|--------|--------|
| Post-weaning | | | |
| (Wk 13) wt, kg | 133.39 | 132.03 | 135.66 |
| ADG, kg/d | 1.36 | 1.32 | 1.41 |
| Grain Intake, kg/d | 3.13 | 3.09 | 3.18 |
| Feed Efficiency* | 0.43 | 0.43 | 0.44 |
| Overall | | | |
| ADG, kg/d | 1.00 | 1.00 | 1.00 |
| DMI, kg/d | 1.91 | 1.86 | 1.95 |
| Feed Efficiency* | 0.53 | 0.52 | 0.53 |

*kg ADG/kg DMI



"Post-weaning Slump" can be Reduced by altering the starter formulation and lengthening the weaning process



Molano et al, 2017
Adapted from Terré et al, 2006

Amino acid (Methionine and Analogues) experiment through weaning

Calves fed up to 3 gallons of milk replacer per day – 3x day feeding (28% CP, 15% fat, Excelerate, MSG Inc.)

Four quart bottles

Calf starter ad libitum

Weaned over 14 days starting at day 7

Calves on treatment diets for 91 days

Starter formulation

| Ingredient inclusion, %DM | Control | HMBI | HMTBa | RPM |
|---------------------------|---------|------|-------|------|
| Calf Starters | | | | |
| Pellet ingredients | | | | |
| Wheat midds | 22.2 | 22.2 | 22.2 | 22.0 |
| Soybean Meal | 6.9 | 6.9 | 6.9 | 6.8 |
| AminoMax Pro | 13.6 | 13.6 | 13.6 | 13.5 |
| Sugar | 3.4 | 3.4 | 3.4 | 3.4 |
| Dried whey | 6.2 | 6.2 | 6.2 | 6.2 |
| Blood meal | 5.9 | 5.9 | 5.9 | 5.8 |
| MetaSmart (HMBi) | - | 0.7 | - | - |
| RumenSmart (HMTBa) | - | - | 0.4 | - |
| Minerals | 1.2 | 1.2 | 1.2 | 1.2 |
| Vitamins ADE | 0.3 | 0.3 | 0.3 | 0.3 |
| Bovatec | 0.3 | 0.3 | 0.3 | 0.3 |
| Flavor/odor enhancer | - | - | - | - |
| Adisseo Vanilla | 0.3 | 0.3 | 0.3 | 0.3 |
| Fat | 0.7 | 0.7 | 0.7 | 0.7 |
| Celmanax | 0.7 | 0.7 | 0.7 | 0.7 |
| Beet pulp shreds | 13.8 | 13.8 | 13.8 | 13.7 |
| Flaked corn | 21.0 | 21.0 | 21.0 | 20.8 |
| Molasses | 3.7 | 3.0 | 3.3 | 3.7 |
| Smartamine (RP Met) | - | - | - | 0.3 |

+ 0.16% DM Metabolizab e Met

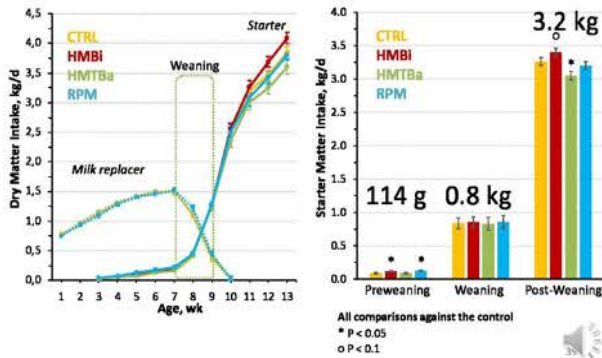


Calf Starters Composition

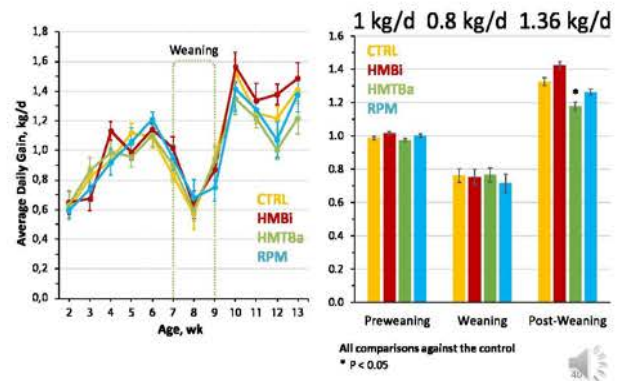
| Chemical Composition, % DM | Control | HMBI | HMTBa | RPM |
|----------------------------|---------|------|-------|------|
| DM, % AF | 88.7 | 88.6 | 88.3 | 88.7 |
| Crude Protein | 24.8 | 25.2 | 25.0 | 24.5 |
| Crude Fat | 3.3 | 3.2 | 4.1 | 3.4 |
| aNDFom | 21.2 | 20.6 | 20.9 | 21.5 |
| Starch | 20.6 | 18.8 | 18.6 | 20 |
| Soluble Fiber | 7.7 | 9.3 | 9.1 | 8.4 |
| Sugars | 14.8 | 15.0 | 14.7 | 14.6 |
| Ash | 7.7 | 7.9 | 7.7 | 7.5 |
| ME, Mcal/kg | 2.5 | 2.5 | 2.5 | 2.5 |

* Met and other AA analysis in progress.

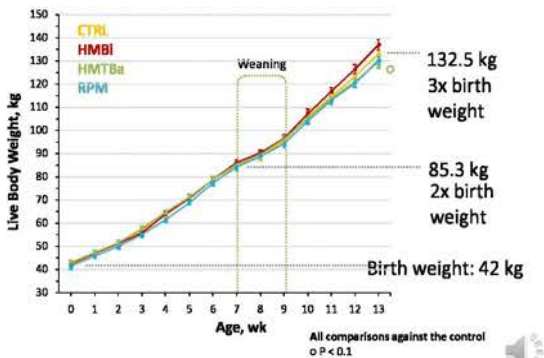
Dry Matter Intake, kg/d



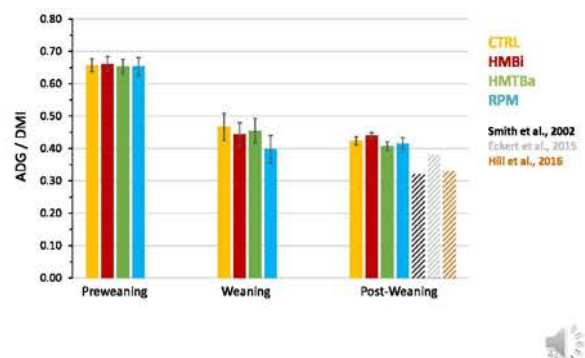
Average Daily Gain, kg/d



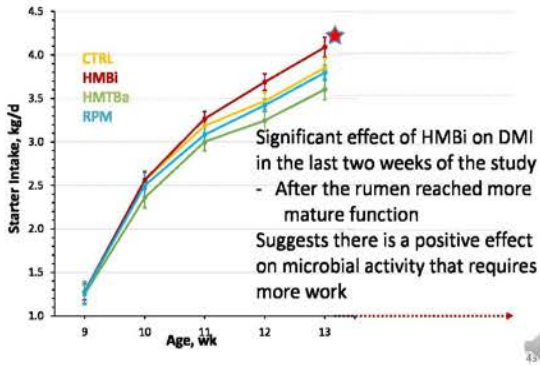
Body Weight, lb



Feed Efficiency



Future Studies: Post-Weaning



Take Home Thoughts

- Calves have more growth potential that we are allowing them to realize
- Weaning management needs to evolve to longer duration
- Calf starter formulation needs to evolve to meet all tissue requirements and encourage feed intake and promote rumen and tissue growth
- Need to consider other aspects such as behavior, technologies related to intake, AA requirements and digestibility

Take Home Thoughts

- Will have to accept a higher per ton cost to achieve greater returns – focus on feed efficiency and health
- Need to minimize post-weaning lag to optimize growth and minimize respiratory and other immune system related problems

Thank you for your attention



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Reference: 1. Dunn TR, Olivett TL, Renaud DL, et al. 2018. The effect of lung consolidation, as determined by ultrasonography, on first-lactation milk production in Holstein dairy calves. *J Dairy Sci*;101(6):5404-5410.



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Kendra Keels



Maximize the value of male dairy calves

Is this calf fit to ship? What practices can be implemented on farm in the first nine days to ensure the health and marketability of male dairy calves? In her talk, Kendra will highlight some of the key aspects to improving the value of male dairy calves, maximizing returns.

Kendra has close to thirty years working in the veal and dairy industries. Since joining Veal Farmers of Ontario in 2006 as the Industry Development Director, she has been involved with many aspects of improving calf care and veal production, with a focus on welfare. Kendra is married with two adult daughters.

Maximizing the value of male dairy calves



Terminology

- **Veal cattle**-all cattle in veal production
- **Veal-meat** from veal cattle
- **Calf**- birth-up to six months of age
- **Dairy-beef**-finished live weight around 1500lbs
- **Bob calf**-a male calf that will be raised as veal or dairy-beef-male dairy calf
- **Weaning**-switching a calf from milk to solid feed
- **Grain-fed veal**- veal cattle that eat grain once they are no longer fed milk
- **Milk-fed veal**- veal cattle that are fed milk for the whole production period



What's changed

- LOTS!
- COVID-19
- Restaurant sector decline
- Veal industry had a downturn prior
- ON and QC-32% decrease since peak production
- Lack of slaughter capacity Eastern Canada
- Ryding-Regency licence cancellation (only federal plant harvesting veal in Ontario)
- Concern for quality of male dairy calves
- "Marketing of male dairy calves" report by National Farmed Animal Health and Welfare Council

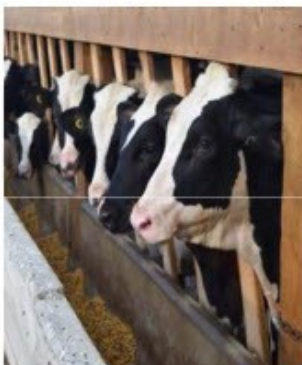


Male dairy calves

- 50% of the offspring are male dairy calves "bob"
- Need milk
- What to do with the males?



Options



- Veal
- Dairy-beef
- Start male dairy calves (precons)

Two types of veal

Milk-fed and grain-fed

- Milk-fed veal is marketed approx. around five months of age. dress 280lbs(123kg)
- Grain-fed veal is marketed approx. around eight months of age. dress 419lbs(190kg)
- Veal is defined after harvest must dress less than 190kg- does not specify milk-fed or grain-fed veal



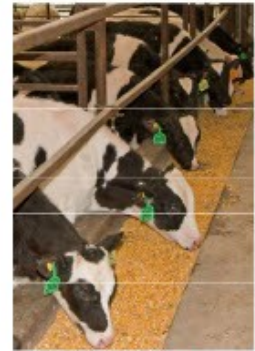
Milk-fed veal cattle



- Milk-fed veal cattle are fed milk replacer throughout the whole growing period-never weaned (taken off milk)
- Milk-fed veal cattle consumes ~300kg of milk replacer and 50-200kgs of fibre/calf

Grain-fed veal cattle

- Grain-fed veal cattle are fed on a commercial milk replacer or whole milk diet until they are weaned around 7-8 weeks of age. They are then transitioned to a grain ration



Feed consumption-grain-fed veal

- Consume 25kg of milk replacer
- 25kg of calf starter
- 250kg of supplement(protein)
- 750kg of corn



Grain-fed veal

- Grain-fed veal is unique to Canada
- Raised in groups
- Similar to beef production
- Not dehorned
- Not castrated
- Yield 54.5%



Dairy-beef



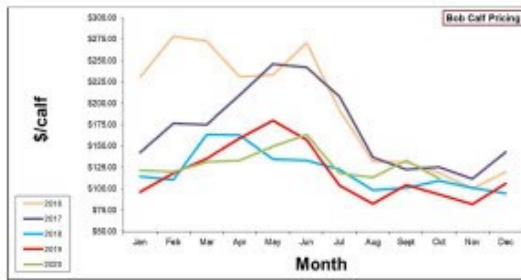
- Dehorned
- Castrated
- Demand for beef breeds like Black Angus
- Belgium Blue always brings a premium
- Dress weight 900 lbs on the rail-Holsteins-58% yield
- Beef cross around 1000 lbs. yield 59%

Market report- sent weekly

- Available at <https://vealfarmers.ca/>
- Members have it emailed directly current male dairy calf pricing.
- What's the current price of male dairy calves?
- What's the price of finished grain-fed veal?
- What's the market in 7-8 months?



Bob calf pricing



- Green line 2020



Finished price compared to bob calf pricing



- September to December is the strongest veal market, so calves from seven months prior have greater demand
- Price per lb., finished veal price and bob calf price trend in the same direction



Welfare definition

- "An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from unpleasant states such as pain, fear and distress"



Co-mingling



- Challenges
- Naive immune system
- Not sure of colostrum status
- Co-mingled with multiple calves
 - Pickup
 - Assembly points or sales barns
 - Final destination
 - New group of calves
 - Transport stress-reduces immunity

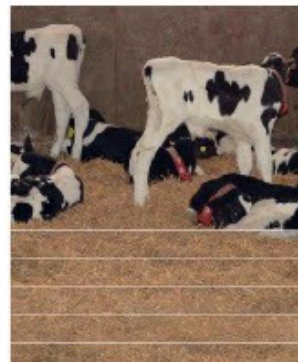
- A lot for a stress for a calf with a possible weak immune system-susceptible to disease

Industry issues

- Some sales not taking calves less than 90lbs
- Some sales stopped selling male dairy calves
- On-farm euthanasia



Concerns



- Need to reduce antibiotic use!
- Category I-medically important to human health
- Antimicrobial resistance-humans
- Not easy
- Need to start with stronger, healthier calves

Reducing risks

- Ensure male dairy calves have colostrum
- Over 90lbs
- Antibiotic usage-what have they been treated with already?
- Dehydration
- Navels
- Early disease detection
- Cleanliness
- When in doubt take the temperature
- 38.5°C



Navels



Dry and healed!



- U of G study
- 26 percent of male calves had a significantly enlarged navel with heat, pain, moisture or malodorous discharge when examined at arrival to a veal facility.
- Research shows that calves with navel infections have a greater risk of dying and lower growth rate
- Clean, dry and well bedded!



Ontario Calf Health Improvement Program (CHIPs)

- OMAFRA funding to develop a dairy calf education program for bovine veterinarians
- Goal of improving the health and welfare of dairy calves
- Resources and workshops for vets; updated calf resources
- Vet portal on calfcare.ca for protocols



Calf care protocols

- Work with veterinarian!
- Bovine respiratory disease and pneumonia treatment protocol
- Calf vaccine protocol
- Cleaning and biosecurity protocol
- Diarrhea treatment protocol
- Dry cow vaccine protocol
- Euthanasia protocol
- Navel check list



Bovine respiratory disease and pneumonia treatment protocol template

| Clinical Sign | Level | Score |
|--------------------------|----------------------------------|-------|
| 1. Cough | None or induced | 0 |
| | Spontaneous | 2 |
| 2. Discharge from nose | None | 0 |
| | Any | 4 |
| 3. Discharge around eyes | None | 0 |
| | Any | 2 |
| 4. Ear Position | Normal, ear flick, or head shake | 0 |
| | Ear droop or head tilt | 5 |
| 5. Breathing | Normal | 0 |
| | Rapid or difficult breathing | 2 |
| 6. Rectal Temperature | <39.5 °C | 0 |
| | ≥39.5 °C | 2 |

Bovine respiratory disease and pneumonia treatment protocol template

Prepared for: _____

By: _____

Clinic: _____

Date: _____

Detection:

Early signs of respiratory disease may be subtle but affected calves usually:

- Coughing
- Fever
- Nasal discharge
- Increased respiratory rate
- Decreased appetite
- Fever (≥39.5 °C)

A calf should be treated with an antimicrobial if a calf scores ≥5.

Bovine respiratory disease and pneumonia treatment protocol template

Give ___ mL of _____ by _____ injection
 once | once per day for ___ days.

If no improvement is noted in 48 hours, please give ___ mL of _____ by _____ injection once | once per day for ___ days.

If no improvement is noted in 48 hours, please contact.

Calf feeding



- Gone are the days of 2l per feeding
- 4l per feeding!
- 150gr/litre
- Fed at body temp- 38.5-39°C
- Do not tube feed milk
- Outside calves get more milk
- Stay warm and grow

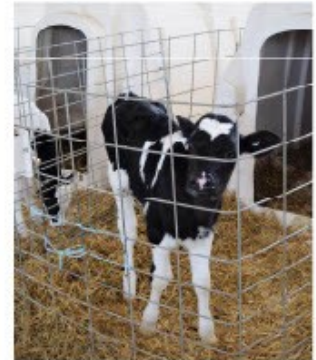
Outside calves



- Calf jackets
- Improves overall health and welfare

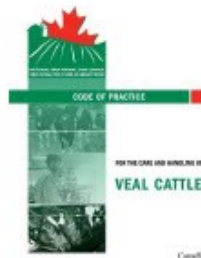
Bedding

- Imperative to have preventative measures in place
- Clean maternity pen area
- Clean and dry
- 3-4" shavings base with 12" straw on top
- Do the "kneel test"
- When in doubt add more straw!



Veal Code of Practice

- Released Fall 2017
- Great advancement for the veal industry
- **Industry standard**
- Science based
- Includes starting calves for the dairy-beef market



Veal Code of practice

- Effective December 31, 2020
- Group housing of calves must take place as young as possible and not later than 8 weeks of age.
- Tethering of calves is prohibited.
- **Must have an area outside of the hutch**



Transportation

- Governed under CFIA
- Updated Health of Animals regulations (Transport of Animals)
- February 20, 2020
- Marketing of Male Dairy Calves Report by NFAHW Council
- Working group with CFIA
- On going calf transportation research
- Did not exist



New transportation regulations

- Calves leaving the dairy farm
- >8 days going to a sale barn
- <12 transport time from the time last fed to final destination
- **Unfit**
 - Only transported to receive veterinary care
 - **Wet navel is unfit**
- **Compromised**
 - Isolated from other animals
 - Loaded individually
 - Transported for kill or receive care- no assembly yards



Compromised and Unfit

| Compromised | Unfit |
|---|---|
| 1. A calf that has or appears to have a wet navel | 1. In an outbreak |
| 2. An open wound | 2. Signs of dehydration or hyperthermia |
| 3. A calf that is severely dehydrated | 3. Signs of hypothermia or hyperthermia |
| 4. A calf that is severely emaciated | 4. A calf that is severely injured |
| 5. A calf that is severely ill | 5. A calf that is severely ill |
| 6. A calf that is severely injured | 6. A calf that is severely injured |
| 7. A calf that is severely injured | 7. A calf that is severely injured |
| 8. A calf that is severely injured | 8. A calf that is severely injured |
| 9. A calf that is severely injured | 9. A calf that is severely injured |
| 10. A calf that is severely injured | 10. A calf that is severely injured |
| 11. A calf that is severely injured | 11. A calf that is severely injured |
| 12. A calf that is severely injured | 12. A calf that is severely injured |
| 13. A calf that is severely injured | 13. A calf that is severely injured |
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| 16. A calf that is severely injured | 16. A calf that is severely injured |
| 17. A calf that is severely injured | 17. A calf that is severely injured |
| 18. A calf that is severely injured | 18. A calf that is severely injured |
| 19. A calf that is severely injured | 19. A calf that is severely injured |
| 20. A calf that is severely injured | 20. A calf that is severely injured |

Unfit calves summary

- Non-ambulatory
- Fracture
- Lameness
- In shock
- Laboured breathing
- Open wound
- Sustained injury
- Extremely thin
- Exhibits signs of dehydration
- Exhibits signs of hypo/hyperthermia
- Signs of a fever
- Hernia
- **Unhealed or infected navel**
- Bloated
- Exhausted
- Cannot be transported without causing suffering

Marketing

- Focus on the quality of calves you're sending-control of what you send
- Communicate with your sales barn or drover
- Follow market pricing
- What's the market 8 months from selling the calf
- Is the calf fit to ship?
- If the calf needs to stay on the farm longer put the infrastructure in place to give the flexibility to do that
- Work with licenced dealers so you're protected under the Ontario Beef Cattle Financial Protection Program



Breeds

- Sexed semen and genomics
- Make it feasible to guarantee top cows have heifer calves
- Sexed semen and beef crosses-choose for male
- What about the future?
- Supply and demand
- Black angus
- Belgium blue



Are you NOT getting what you think you should

- Ask yourself the following questions?



Is the calf healthy?

- Is it bright, alert and well-hydrated?
- Does the calf have a normal temperature?



Colostrum

- Was it fed colostrum at birth?
 - Feed four litres within six hours of birth
 - First feeding should be as soon as possible
 - All calves should be treated the same



Is it over 90lbs?

- Strong and healthy
- Standing and walking on all four legs



Does the calf have a dry healed navel?

- If the navel is unhealed the calf is unfit and cannot leave the farm unless to receive care recommended by a veterinarian



Does the calf have scours?

- Do not ship!
- Treat, if necessary, observe meat withdrawal



Is the calf eight days or older?

- **Yes**-the calf can go to a sale barn or assembly centre
- **No**-the calf is prohibited from going to a sale barn or assembly centre
- Recommended to send birth and when the last time the calf was fed records



When was the calf last fed?

- Is the calf in good body condition?
- Does the calf have a full abdomen?



Does the calf have an ear tag?



- Male dairy calves leaving the farm may be identified with a single RFID approved beef ear tag.
- Right ear

VEALE of Ontario
Your calf care corner

MAXIMIZING THE VALUE OF MALE DAIRY CALVES

Deliver your ship-out these questions

- 1. IS THE CALF HEALTHY?**
 - Monitor diet and body condition
 - Monitor calf's rumen and feces
 - Do not feed
- 2. WAS THE CALF FED COLostrum AT BIRTH?**
 - All calves should receive colostrum
 - Best feeding is within 2 hours of birth
- 3. IS THE CALF OVER 20 LBS?**
 - Good body condition
 - Monitor calf's rumen and feces
- 4. DOES THE CALF HAVE A DRY HEADED NAVE?**
 - A dry headed navel is a sign of a weak immune system
 - A dry headed navel is a sign of a weak immune system
- 5. DOES THE CALF HAVE A FULL TUMM?**
 - A full tummy is a sign of a healthy calf
 - A full tummy is a sign of a healthy calf
- 6. DOES THE CALF HAVE AN EAR TAG?**
 - A calf should have an ear tag
 - A calf should have an ear tag

FOR MORE INFORMATION VISIT WWW.CALFCARE.CA

#calfcare #calfcare #calfcare

Assessing calf health

Observe

- Appetite
- Manure
- Posture and demeanour
- Eyes, ears, nose and coat
- Navel

Check

- Hydration
- Rectal temperature
- Breathing

Assessing calf health www.calfcare.ca

Observe

Appetite

Manure

Posture and demeanour

Eyes, ears, nose, and coat

Navel

Check

Hydration

Rectal temperature

Breathing

Calf care resources

- We have many dedicated resources on calf management
- Print, website and Facebook @calfcarecorner
- Follow our journey on improving calf health for all calves
- Monthly articles in the Milk Producer
- Calf Care Corner monthly e-blast

www.calfcare.ca

CalfCare.ca
Off to a healthy start

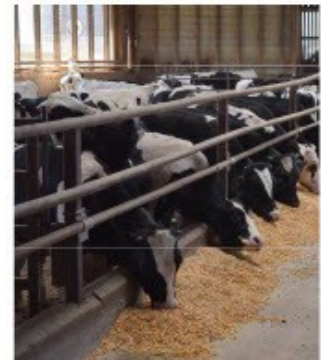
Brand new look, same great content! CalfCare.ca brought to you by Best Farmers of Ontario, is your toolbox for addressing challenges with calf health, welfare and nutrition. Our resources help to help your dairy calves reach their full potential.

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Are you connected?

#CalfCareCorner @CalfCareCorner @OntarioDairy

VFO initiatives

- As we create more opportunities to grow demand for Ontario veal and address issues with processing capacity, our farmers will feel the effects of a more stabilized market
- We are all in this together!



Change

- The industry has changed, and we all need to change with it.
- Just when you think you have it figured out it changes!



Thank you

“Your calf care partners”

Questions



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Reference: 1. Dunn TR, Olivett TL, Renaud DL, et al. 2018. The effect of lung consolidation, as determined by ultrasonography, on first-lactation milk production in Holstein dairy calves. *J Dairy Sci*;30(6):5404-5410.

HEALTHY CALVES
PART OF DAIRY WELLNESS

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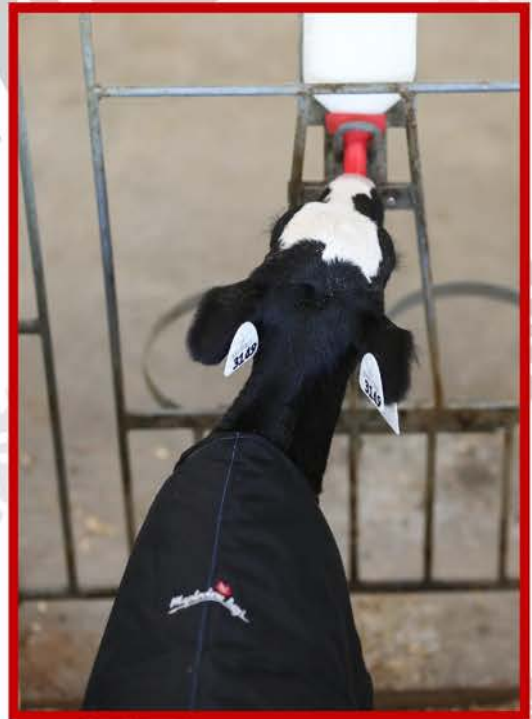
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