Ceptor Animal Health News

Volume 16, Issue No. 1, March 2008 — ISSN1488-8572

Serving Ontario through veterinary science, technology transfer, outbreak investigation and animal health surveillance

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Ministry of Agriculture, Food and Rural Affairs

Ontario

Ceptor is published by: Veterinary Services Unit, Animal Health and Welfare Branch, Food Safety and Environment Division, OMAFRA

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OVC Researchers Looking for Ontario Calf-Study Herds

Cindy Todd and Dr. Ken Leslie, Ontario Veterinary College, University of Guelph

The first two weeks of a calf's life produce significant hurdles in rearing and doctoring dairy calves. Our research aims to identify challenges and opportunities to help Ontario's veterinary practitioners, producers, and calves. To do so, we invite you to recruit client-participants for a herd-level study on nutrition and health of the pre-weaned dairy calf. In particular, we would like to recruit farms feeding acidified milk and other dairy producers interested in calf-management programs. Your clients will receive information about serum total protein levels and fecal pathogens in their calves and a gift for participation. Our dairy industry will benefit from summary information provided by the research.

Thank you for considering our request and helping with our research. To facilitate farm visits during the summer of 2008, would you please contact us **prior to April 11, 2008**. Please contact Cindy Todd, Department of Population Medicine, University of Guelph, Guelph, Ontario. N1G 2W1, Tel.: (519) 824-4120 ext. 54192, E-mail: ctodd@uoguelph.ca.

Circovirus Inoculation Program Update

Janet Alsop, Veterinary Services Unit, OMAFRA,

The Circovirus Inoculation Program (CIP) will reimburse Canadian swine producers for up to 50% of the costs of diagnostic testing and circovirus vaccination if the herd is confirmed as affected with PCVAD during the time period March 1, 2006 to December 31, 2008.

If a herd began vaccinating before the date that the program was announced (November 15, 2007), a report from the herd veterinarian confirming clinical signs of PCVAD will be accepted as confirmation of disease. If a herd began vaccinating after November 15, 2007, confirmation of diagnostic testing is required. A single positive PCR result on serum or tissue is one of the tests acceptable as a diagnosis of PCVAD.

Since it is often difficult to obtain evidence of infection after the herd has been vaccinated, if the veterinary clinic or the Animal Health Laboratory has stored serum that was collected prior to vaccination, this can be

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submitted and will be accepted under the CIP. On the application form, in Part C – Diagnostic Testing, Date Herd Examined, the date recorded should be the date on which the samples were collected. Thus, a positive result from these samples will extend the date of eligibility for vaccine reimbursement to that date or to March 1 2006, whichever is later.

At the time of writing, the CIP Program Information and Eligibility Criteria document was being revised and it is recommended that veterinarians contact CIP administration at 1-800-667-8567 for current requirements before collecting and submitting samples.

Rethinking Sow Aggression

Tim Blackwell, Veterinary Services Unit, OMAFRA

One advantage cited for housing gestating sows in stalls is that stalls completely eliminate injuries due to fighting. Conventional wisdom holds that the natural behaviour of sows leads them to establish dominance hierarchies through aggressive encounters when they are housed in groups. A recent paper by Estevez, *et al*. presents an alternative hypothesis to this commonly held belief. Dr. Estevez argues that animal behaviour is dynamic, adjusting to varying social and environmental conditions. Animals do not automatically expend energy and risk injuries in aggressive encounters unless they perceive a benefit associated with such activity.

There are distinct benefits that accrue to wild animals from living as a group. These include increased foraging opportunities and protection from predators. There are also costs. When resources such as feed, water, or safe resting areas are in high demand, aggression provides a higher proportion of the restricted resources to the successful aggressor. A group member unable to compete for the restricted resources will leave the group if the benefits of remaining in the group do not outweigh the costs.

In livestock agriculture, if resources are restricted, individuals unable to compete cannot elect to leave a group. However, aggression remains rare when resources are perceived to be abundant. Aggressive encounters also decrease when group size is large and resources are widely distributed over space and time. In these situations, no advantage is gained from engaging in a large number of aggressive encounters while the remainder of the group accesses the widely distributed resources.

A number of different group-gestation-housing systems in Ontario demonstrate these principles in practice. Floor feeding groups of 12 or more sows with feed distributed widely over a large feeding floor (> 20 square feet per sow) is successful because there are no piles of feed to hoard or guard. In these systems, only "scramble competition" without fighting produces a reasonable return on energy expended. Four to eight times-a-day feeding on a smaller feeding floor (12 to 15 square feet per sow) distributes the feed over both time and space and reduces the level of hunger with which the sows approach a feeding event. Barrier walls on a single feeding floor or feeding floors separated by a centre dunging alley allow sows to access feed in smaller social groups where they feel more comfortable. Double feeding sows on the day before and the day of mixing creates the perception of abundant resources. Specific combinations of these strategies have also worked extremely well on farms.

The idea that sows are not "hard wired" to fight is a new concept for many of us. If we begin to associate aggressive encounters as arising when there are real or perceived restrictions on feed, water, or preferred resting spaces, we can create group-housing systems that minimize or eliminate the need to remove sows that "don't fit in." The behaviour of sows adjusts to the pressures of their social and physical environment. If

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sows do not perceive that resources are restricted, or if the resources are distributed so that the sows perceive no benefit from fighting, aggressive encounters can be all but eliminated. As the swine industry moves forward into an era where consumers are more and more likely to reject gestation-stall housing, putting these concepts into practice is necessary and beneficial.

Estevez I, Andersen I-L, Naevdal E. Group size, density and social dynamics in farm animals. Applied Animal Behaviour Science 2007; 103:185-204.

Out-of-Season Breeding in Small Ruminants

Dr. Jocelyn Jansen, Veterinary Services Unit, OMAFRA

There are a limited number of protocols that can be used by producers and veterinarians to stimulate out-of-season breeding in small ruminants. Options include: hormones (progestogens), ram or buck effect, light manipulation and combinations of the above. All have advantages and disadvantages.

Production of the only licensed hormonal sponge product (Veramix® sponges) in Canada for sheep and goats was discontinued in November of 2007. This has had a negative impact on the industry's ability to market dairy and meat products all year round. Presently, the only sponge-like alternative is the EAZI-BREED™ CIDR® Sheep and Goat Device. However, until this product is licensed in Canada, an Emergency Drug Release (EDR) Application and Fee Form from the Veterinary Drugs Directorate (VDD) must be submitted by the flock veterinarian for producers wanting to use this product. Once approved by VDD, the veterinarian must fax the EDR approval form along with a completed order form to Pfizer Animal Health Australia. An approved EDR authorizes Pfizer Australia to sell a limited quantity of CIDRs to that practitioner. The cost of each EDR is $100. To mitigate the costs, **up to five small flocks/herds** or one large flock/herd can go together on one EDR application with a maximum total of **300 devices per EDR**. Additional costs include processing, shipping and handling from Australia, the cost of the CIDR itself and the applicator. The CIDRs have been assigned a **24-hour milk and meat withdrawal time** by the EDR program.

Producers and their veterinarians will need to begin the process well ahead of the time the product is required (4 to 8 weeks) – which with this product is generally the winter and spring months when small ruminants are seasonally anoestrus. EDR application and fee forms can be accessed at the following website: www.hc-sc.gc.ca/dhp-mps/vet/applic-demande/form/edr-dmu_form_cp-pc_e.html

Practice-Based Survey of the Selenium Status of Bred Heifers and First-Lactation Cows in Ontario Dairy Herds

Ray Reynen, Listowel Veterinary Clinic, Listowel, ON

Practitioners from the Listowel Veterinary Clinic conducted a study during the summers of 2004 and 2005. The objective of our study was to evaluate dairy heifer feeding programs to ensure adequate selenium status of bred dairy heifers before their first lactation in herds in the Listowel area.

Herds included in the study had heifers on a formally balanced ration (to meet NRC specifications) for at least two months, had sufficient numbers of bred heifers and did not feed leftovers from the lactating herd to these animals.

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In 2004, serum samples collected from 10 heifers in each of 10 enrolled herds were tested for selenium at the Animal Health Laboratory in Guelph, Ontario. Results were classified as deficient if selenium values were less than 0.07 (ug/ml). Those with levels of 0.08 or higher were considered adequate.

Of the 100 samples tested in the summer of 2004, 99 of 100 heifers were classified as deficient based on the levels of selenium detected.

In 2005, serum was collected from 10 first-lactation animals in the same 10 herds. If possible, the animals sampled in 2004 were sampled again. To make sufficient numbers if the same animals were not available, then additional animals of approximately the same cohort (those now fresh and later days in milk) were sampled to make 10 animals per herd. In addition, five heifers new to the study, between breeding and calving age, were sampled from five of the herds.

Of the 100 animals in the follow-up cohort, 52 were classified as being deficient because they had selenium levels less than 0.07. Of the 25 new heifers, 23 were also classified as deficient.

We concluded that, in these 10 herds, most bred heifers were selenium deficient during these two years. It seems likely that the ration as balanced and provided did not supply adequate levels of selenium for these animals. Among the first-lactation animals, the rate of deficiency was less, but still of concern.

Currently, we suggest that feeding programs for heifers may not supply adequate selenium in many herds. This may be because mineral feeding levels are minimized because of cost, feed selenium content may be overestimated (hence allowed feeding supplement levels still don't meet heifer needs) or that rations are not delivered to, or accessed by, heifers in ways that allow adequate mineral intake.

Selenium is added to heifer mineral formulations to supply 0.3 ppm as is legally allowed. If higher levels are recommended, they can be scripted to a feed mill or feeding directions can be changed (scripting is highly recommended) to compensate for these inadequacies. Some practitioners have resorted to feeding dry cow mineral to heifers in late pregnancy to provide adequate selenium supplementation. Selenium feeding and blood levels in Ontario heifers deserve a closer look.

Softening of Cattle Hoof Soles and Swelling of Heel Horn by Environmental Agents (Abstract)

Submitted by Neil Anderson, Veterinary Services Unit, OMAFRA

Bovine soles and shavings from the heel were used in laboratory tests that examined the softening and swelling effects of rainwater, cow slurry (faeces plus urine), urine, silage effluent, and washings from recently laid concrete. Formalin, glutaraldehyde and butyraldehyde were compared for their ability to prevent softening induced by water, urine or urea plus 2-mercaptoethanol. Exposure to rainwater, slurry or urine for 72 h softened the soles on average by 16, 13 and 14 Shore Durometer Units. Silage effluent had less softening effect on soles (7 Shore Durometer Units), and pre-treating heel shavings with silage effluent reversed the swelling effect of water. Washings and scrapings taken from 3- and 7-d-old concrete surfaces prepared from Portland cement, caused swelling in heel shavings by a factor of 1.5 and 1.3. Formaldehyde, glutaraldehyde and butyraldehyde pre-treatment reduced the sole softening effect of urea plus 2-mercaptoethanol in cow soles. Formaldehyde and glutaraldehyde pre-treatment reduced the sole softening effect of urine, and formaldehyde was effective at reducing concrete washings-induced swelling. The findings are relevant to solar bruising and ulceration in cattle.

Gregory N, Craggs L, Hobson N, Krogh C. Softening of cattle hoof soles and swelling of heel horn by environmental agents. Food and Chemical Toxicology 2006; 44(8):1223-1227.

Unlace Your Boots to Understand the Origins of Sole Ulcers and White Line Abscesses

Neil Anderson, Veterinary Services Unit, OMAFRA

Recent revelations about the origins of sole ulcers and white line abscesses should be welcome news to the feed industry. Rightly or wrongly, laminitis from feed-related acidosis has borne the major blame. However, new information points to a normal happening, *the parturition effect*, non-inflammatory changes in connective tissue of the claw. This new information should focus our attention on prevention of component causes of claw horn disruptions such as calving-time management or hazards within barns.

For more than a decade, Ossent and Lischer have been studying claw diseases and reporting about claw horn disruption (ulcers and white line disease). The following diagram (**Figure 1**) and accompanying text explain what happens with laxity of connective tissue in the claw.

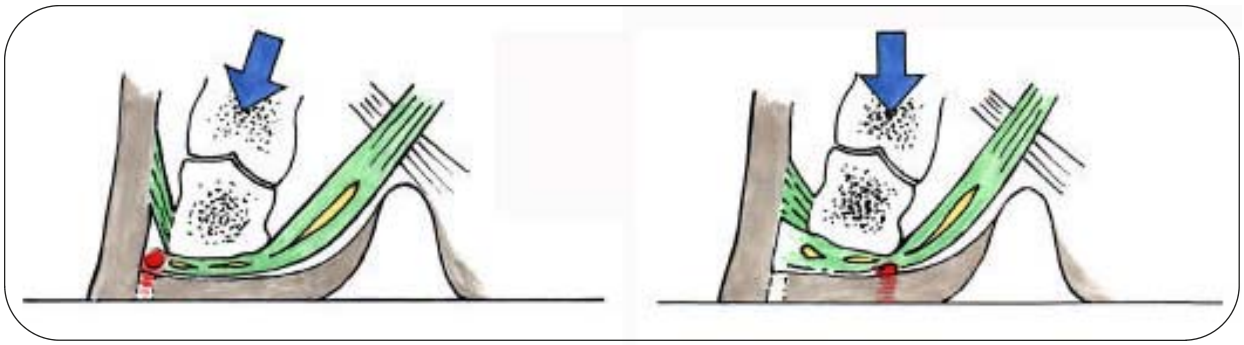

Figure 1. A schematic drawing of the transverse section of the claw at the level of the tuberculum flexorium shows how the abaxial side of the third phalanx is suspended by connective tissue between the bone and the inside of the claw capsule. A cuff of connective tissue that encloses the longitudinal fat cushions and extends into the distal interdigital ligaments supports the axial side of the third phalanx. Increased mobility of the third phalanx within the claw capsule due to alterations in the elastic properties of the collagen tissue lead to contusions of the corium, mainly under the abaxial and plantar edges of the third phalanx.
Left side. A walking cow (loose housing system) with base-wide stance moves her feet unnaturally (wider than her rump) to make room for the udder. This movement results in a lateral impact, which may cause haemorrhage in the corium adjacent to the abaxial edge of the pedal bone; especially when the suspensory apparatus is too elastic and unstable. Weeks later, this haemorrhage becomes visible in the white line.
Right side. Cows in tied stalls, however, shift their weight from one claw to the other. This exerts more vertical forces on the suspensory apparatus. In these cows, contusion of the corium occurs more at the plantar aspect of the pedal bone, which may predispose to sole ulceration at the "typical site".

In 2007, Knott and colleagues discovered that changes in connective tissue at the claw-pedal bone interface are unrelated to diet and are a normal occurrence. Here is the abstract.

Abstract. This study investigated effects of housing, diet and parturition on the biochemistry, biomechanics and pathology of feet of maiden, pregnant and lactating dairy heifers. Strength/laxity, laminar morphology, connective tissue (CT) biochemistry and sole lesions were assessed. Although no animals became clinically lame, severity of sole lesions was significantly greater in heifers housed in cubicles vs. straw yards, and in lactating/pregnant heifers vs. maidens. These effects were additive. Cubicle housing and parturition each increased CT metabolism (and were additive), and altered CT composition. Similarly, both impaired the biomechanical resilience of the hoof. There were no effects for diet. The results indicate that parturition/lactation causes non-inflammatory changes in CT that impair resilience of the feet to external stresses associated with poor housing. This "parturition effect" appears to be unrelated to change in diet and relatively brief, unless exacerbated by additional

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stresses of housing. Thus heifer lameness may be significantly reduced through short-term, low-cost improvements in husbandry around the time of calving.

Neither producers nor their advisors can halt the *parturition effect* on claws. However, they need to understand the effect and find ways to minimize contusions during the period of laxity of the pedal bone within the claw. Let's start by unlacing our work boots and walking routes taken by our cows in their workplace. Make it a parade of veterinarians, producers, contractors, designers, engineers, and nutritionists. To find hazards, it's best to experience pressure on feet in sloppy-fitting boots while stepping up or down, turning 90 degree corners in parlors, pushing for feed, fleeing a boss cow or bull, lurching from an injection, jumping a gutter, stepping out of a stall, or slipping on a floor. Parade routes should include several types of barns, various marching speeds, and happen over several days or weeks. Debriefings should include findings and recommendations from each sloppy-booted participant/expert. From our findings, we should take action. We need to use new research information to educate about predisposing causes of lameness, to design and to build claw-friendly barns. For the benefit of Ontario's cows, let's unlace our boots, head for the barn, and take the first steps.

Figure 2. Try walking in unlaced boots to simulate the laxity of the pedal bone within a claw.

1. *Lischer CJ, Ossent P. Pathogenesis of sole lesions attributed to laminitis in cattle. Proceedings of the 12th International Symposium on Lameness in Ruminants, Orlando, FL, USA. January 2002:82-89.*
2. *Knott L, Tarlton JF, Craft H, Webster AJF. Effects of housing, parturition and diet change on the biochemistry and biomechanics of the support structures of the hoof of dairy heifers. The Veterinary Journal. 2007; 174(2):277-287.*

Digital Dermatitis Strategies – Steps to Developing Effective On-Farm Programs

Ann Godkin, Veterinary Services Unit, OMAFRA

Establishing effective Digital Dermatitis (DD) treatment programs requires the use of effective chemicals AND the establishment of suitable treatment intervals for the herd. Practical treatment programs need to balance efficacy, labour intensity and cost effectiveness.

Most clinical trials on use of footbaths for treatment or prevention of DD have focused on demonstrating the efficacy of products over a short time of intensive use. More information is needed describing the use of these products as part of ongoing, on-farm programs.

Currently 4% formalin footbaths are the most commonly used type of footbath in the Netherlands. The motivation for the Dutch study described below was to explore alternatives to antibiotic and formalin use as antibiotics have been prohibited from use in footbaths in the Netherlands since 1998, and formalin can have adverse effects on the health of farmers.

Four herd treatment programs, done in one experimental dairy herd over 24 weeks, were compared. Cows in different treatment groups were managed and fed similarly. Contact between cows and manure from different groups was prevented. All cows were observed daily for lameness. The hind feet of the cows were examined in a chute every third week and graded for DD presence and severity. The reference group of

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cows was milked in a robotic milker (2.8 times daily) and was walked through a footbath of 4% formalin at least twice on one day each week. All other cows were milked in a parlour. Group 1 cows went through a 4% formalin bath one day (two milkings) every other week. Group 2 cows had their feet and slatted floors cleaned with a water-pressure spray on days 7, 28 and 90. After each cleaning, cows stood for 20 minutes in a walk-in bath containing a 2% commercial product. Group 3 cows went through a 2% commercial product footbath one day per week (two milkings) and Group 4 cows walked through a 3% sodium carbonate solution two times, one day a week.

The cows given the reference treatment (4% formalin footbath, twice daily for one day per week) appeared to have the best overall results (fewer cows advanced to more severe lesions, more cows remained lesion free for the whole time) compared to Groups 1 (4% formalin, one day, every other week) and 3 (2% commercial product, one day, every week). Group 2 cows (feet cleaned, 20 minutes in commercial product footbath) had similar outcomes to the reference group in many categories.

Parity was a very important risk factor for new DD lesions within the treatment groups. Young cows (parities 1 & 2) had a higher rate of new lesion development than cows third parity and older, in the reference and all treatment groups.

This study suggests that formalin, in spite of its disadvantages, remains a standard to which other treatment products should be compared for efficacy. Additionally, the frequency of treatment and the cleaning of feet and flooring may be as important as the product chosen. Herds with high turnover of older cows will continue to be at high risk of new DD cases if the herd consists predominantly of first and second lactation cows.

Holzhauer M, Dopfer D, De Boer J, van Schaik G. Effects of different intervention strategies on the incidence of Papillomatous Digital Dermatitis in dairy cows. Vet Rec 2008; 162:41-46.

Footbath Failure for Digital Dermatitis Treatment – Reviewing the Reasons

Ann Godkin, Veterinary Services Unit, OMAFRA

Digital Dermatitis (DD) remains a nagging concern on many Ontario dairy farms. Lameness is costly and treatment is frustrating. Frequently footbaths are used for treatment and prevention, but the number of inquiries we receive about perceived failures suggests that "tune-ups" on the proper use of a footbath are needed periodically.

A study of footbaths on 18 Dutch dairy farms (40 to 140 milking cows), where the concentration of formalin was measured before use and six more times after sequential milkings, provides insight into how footbaths can go wrong. Footbaths fail to perform as expected when:

- **The initial concentration of the preventive product is not adequate**. The Dutch study measured the concentration of formalin in footbaths prior to their use. The goal was to achieve a 4% concentration - only 8 of 18 (44%) achieved this. Among the 18 herds the pre-treatment formalin concentration ranged from 0.9 to 9.6%. By the time of sampling after the 2nd milking, only two herds had a footbath formalin concentration greater than 4%.

  This suggests that mixing instructions were not understood, calculations were incorrect, footbath volume was not known or instructions were not followed.

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- **Too many cow passages occur**. In the same study, the measured concentration of formalin in the baths used by these herds decreased by about 50% after 2.4 days, which was equivalent to about 300 cow passages. As a rule of thumb, this means that herds with 300 cows need to change the bath after every milking, while herds with 50 cows should change it after six milkings, and so on.
- **Footbaths are too small**. To be effective, a footbath should be 3 m long, 0.8 m wide and 0.15 m high. Shorter footbaths allow cows to step around or over the baths. Shallow footbaths hold a lesser volume of solution and prevent adequate contact of the chemical with the heels and the interdigital space of the foot. In the Dutch study, 50% of the baths were too small.
- **Concentration reduces over time**. A 10°C rise in ambient temperature will result in a 2 to 3 times increase in formalin evaporation. A drop in bath volume due to evaporation or splashing, where baths are topped up by the addition of water, also decreases the concentration of formalin below the effective level. Topping up, if needed between changes, should be done by adding more 4% formalin solution.
- **Footbath solution is replaced by dirt and manure**. In some of the herds on the footbath study, the concentration of formalin was much reduced, yet the volume of solution did not drop. Spilt and splashed solution was replaced by urine, dirt and manure. The amount of "replacement" that occurred depended on the cleanliness of the feet entering the bath. Volume maintenance does not mean that formalin concentration has been maintained.

It is a good time to review footbaths and foot bathing with your dairy clients.

1. Review mixing instructions. Check that the concentration math is correct. Make sure volume or weight measures of product are correct.
2. Ask about the frequency of bath solution replacement.
3. Measure the size of the footbath (dimensions and volume).
4. Inspect the cleanliness of the feet after milking. If not clean enough, can they be cleaned in the parlour with a hose, or does a second footbath with clean water need to be added ahead of the treatment bath.
5. Lastly, write out and teach a protocol that will bring success.

Holzhauer M, Sampimon OC, Counotte GHM. Concentration of formalin in walk-through footbaths used by dairy herds. Vet Rec 2004; 154(24):755-756.

Foot Bath Concentration Calculator

Neil Anderson, Veterinary Services Unit, OMAFRA

Thanks to Dr. Ken Nordlund and Dr. Nigel Cook at the University of Wisconsin, dairy producers and veterinarians have access to a handy calculator to determine the quantity of chemical to mix into their footbath. The user inputs the dimensions of the footbath in feet and inches and the calculator generates the capacity in gallons. The calculator has a list of 28 commonly used chemicals and recommended mixing instructions. These are used to calculate and present the quantity (weight, volume or packs) of chemical to add to the footbath.

By using the calculator, producers may assure proper concentrations, put economies into treatments, or assure efficacy of the chemicals.

To view and use the calculator, please refer to the following website:
www.vetmed.wisc.edu/dms/fapm/fapmtools/6lame/Footbath_dose_calculator.xls

Strap-Lock Prevents Unauthorized Use of Drum Pumps

Neil Anderson, Veterinary Services Unit, OMAFRA

PVC pumps for drums make dispensing safer for alkalies, acids and detergents. However, unguarded pumps present a hazard to the careless and the curious of all ages. A strap-lock and a padlock should make the farm workplace safer for employees, visitors and children.

A strap-lock secures the pump handle in the down position. The addition of an inexpensive padlock provides an extra level of security.

PVC pumps are available in several sizes and often dispense one, five or eight ounces per stroke. Some have a unique no-drip spout.

The strap-lock often is included with a new pump. If not, it is available as a separate purchase. Strap-locks are available from sellers of alkalies, acids and detergents. It is an important piece of farm safety equipment.

Swelling of Cattle Heel Horn by Urine (Abstract)

Submitted by Neil Anderson, Veterinary Services Unit, OMAFRA

Objectives: To understand the likely mechanisms responsible for heel horn softening when cattle stand in their own effluent. To examine the effectiveness of some footbath chemicals in preventing heel horn softening.

Procedure: Shavings from the heels of cattle were used in a laboratory test to examine the swelling effects of cow urine, urea, sulfide and ammonia. Formalin, glutaraldehyde, glyoxal, zinc sulfate, copper sulfate, alum, tannic acid and a compound containing nitrocellulose plus nylon were compared for their ability to prevent swelling in heel shavings induced by urea plus 2-mercaptoethanol.

Results: Cow urine caused heel horn to swell. Urea caused swelling at concentrations normally found in cow urine. Sulfide caused swelling at concentrations normally found in cow slurry. Low concentrations of ammonia solution also resulted in swelling. Formalin and glutaraldehyde prevented swelling induced by high concentrations of urea plus 2-mercaptoethanol. Copper sulfate had a moderate anti-swelling effect. Zinc sulfate, alum, tannic acid and nitrocellulose plus nylon were relatively ineffective in preventing swelling.

Conclusions: Cow urine can cause degradation of heel horn in cattle feet. The chemical agents that cause this could be urea, sulfide anions and ammonia. Degradation by urine can be prevented by pretreating heel horn with formalin. Glutaraldehyde may be an effective noncarcinogenic alternative to formalin.

Gregory, NG. Swelling of cattle heel horn by urine. Aust Vet J 2004; 82(3):161-163.

Calving Area the Greatest Risk to the Spread of Johne's Disease

Jocelyn Jansen and Ann Godkin, Veterinary Services Unit, OMAFRA

Results of Part 2 of the Johne's Disease (JD) Prevention Project in Ontario dairy herds found that calves were exposed to the most risks for infection during the first two months of life. The first day of life was the time with the highest number of risks. Risk factors identified during the risk assessment included:

- not separating calves from their dams within 30 minutes of birth (23% of herds reported keeping a calf with the cow between 12 and 48 hours)
- allowing calves to nurse
- having no specific strategies for dealing with JD clinical or test-positive cows at calving
- having more than one cow in a maternity boxstall at a time, calves born in group calving pens or other cow contact areas
- the need for more bedding in maternity areas
- feeding less than four litres of colostrum within six hours of birth and
- pooling the colostrum.

Calving area scores for the 353 Ontario project herds ranged between 9 (best) and 109 (worst). The total risk points possible were 156. The average score was 58. For many herds, the calving area score contributed to over 50% of the total risk for the spread of JD identified in the herd. For the best 10% of herds on the project, calving area risks contributed to 39% of the overall risk, while for the bottom 10% of herds, the calving area contributed to 66% of the overall risk identified in the herd.

Not surprisingly, fifty percent of the veterinary recommendations made following the risk assessment dealt with maternity-area risks identified after the farm visit. The most frequent recommendation dealt with the prompt separation of the calf from the cow's environment prior to standing and nursing. Many veterinarians recommended the creation of a "mini-pen" to place the calf in. Other suggestions included calf boxes/carts, rubber tubs, or simply removing the calf from the maternity area to another empty pen. Producers were found to be quite creative in their solutions to this issue. The second most frequent recommendation dealt with colostrum feeding—feeding more of it within six hours of birth, making sure it was collected cleanly and that it was from "low-risk" cows.

Long-Term Observation of a Dairy Herd Going Through a Johne's Disease Control Program

Jocelyn Jansen, Veterinary Services Unit, OMAFRA

The importance of a John's Disease (JD) prevention and control program, in particular calving-pen management, was highlighted in a 2008 published study, where researchers observed a Johne's-positive herd extensively over a 20-year period. The herd, consisting of mostly Guernsey's, started on a JD control program in 1984.

Management recommendations included clipping hair and udders of cows prior to calving, cleaning maternity pens between calvings and separating the calf from the cow within one to two hours of birth. Colostrum was collected from washed udders and calves were fed milk replacer. Calves were housed separately from the cow barn, boots were cleaned prior to feeding calves and no leftover cow feed was fed to heifers less than one year of age. Only JD test-negative animals were purchased. In addition, a herd screening program involving semi-annual fecal cultures was started. Animals were culled based on the results of the testing.

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Herd prevalence dropped sharply from 60% to less than 20% in the first 5 years, but then the prevalence levelled off at 10%. Following the analysis of years of data, researchers found that calves born to test-positive dams or calves exposed to the manure from infected, shedding animals that had recently calved in the maternity pen, were at greatest risk of becoming infected and continuing the spread of JD in the herd. While the information from this study is only from one well-managed herd, it gives us much needed insight into the infection dynamics of this chronic disease.

Benedictus A, Mitchell RM, Linde-Widmann M, Sweeney R, Fyock T, Schukken YH, Whitlock RH. Transmission parameters of Mycobacterium avium subspecies paratuberculosis infections in a dairy herd going through a control program. Prev Vet Med 2008; 83:215-227.

Does the Presence of the Cow Influence the Absorption of Immunoglobulin by the Neonatal Calf?

Doug Veira, Agriculture and Agri-Food Canada, Agassiz, BC

It is recognized that allowing the new born dairy calf to suckle its mother is undesirable because the amount and quality of colostrum consumed is unknown, often resulting in failed passive transfer. Removing the calf from its mother at birth also has the benefit of reducing the opportunity for transfer of pathogens to the calf. Older research suggested that, when calves were fed an equal quantity and quality of colostrum, the presence of the cow enhanced immunoglobulin (Ig) absorption by the calves by as much as 70% [(1)]. We were interested in examining this phenomenon in light of the present recommendations on early separation of cow and calf to prevent disease transmission and the knowledge that large numbers of calves suffer from failed passive transfer [(2)].

Groups of three calves were fed 85g colostrum/kg body weight (e.g., 45-kg calf was fed 3.8L) of a unique batch of colostrum by esophageal feeder two hours after birth. One of each of the three calves was removed from the cow after either 30 minutes, six or 24 hours, respectively. For calving, the cow and calf were housed in an individual calving pen. Once separated, the calves were transferred to individual calf pens. During the first 30 minutes, the cow was allowed to lick the calf, but no suckling was permitted. Subsequently, calves that stayed with their dam were put in a feed trolley bedded with straw, from which the wheels had been removed (see picture). The cow and calf could interact physically, but the calf was prevented from suckling and exposure to the cow's feces. A blood sample was collected at 24 hours after birth and later analysed for IgG, IgA and IgM by ELISA.

Serum IgG levels in calves at 24 h averaged 21.6, 23.8 and 23.0 mg/mL for the 0.5-, six- and 24-hour treatments respectively (**Figure 1**). All calves had successful passive transfer (IgG levels > 10 mg/mL) with treatment averages > 20 mg/mL.

Unlike the observation of Selman, *et al.* [(1)], the time calves spent with their mothers had no effect on IgG absorption. There is no definitive reason for the difference between the two experiments; however, there are some differences that may have contributed to the different outcomes. Compared to the calves in the experiment of Selman, *et al.*[(1)], our calves had an extra 15 minutes of grooming time with their dams before being removed to a calf pen or the feed trolley. While some grooming took place when calves were in the feed trolley, it was not as vigorous as that occurring immediately after birth before the calf could stand. While the feed trolley allowed contact between calf and cow, the interactions probably would not have been as extensive as that occurring with a calf with freedom to roam the pen even if it was muzzled as in the case of

(Continued on page 13)

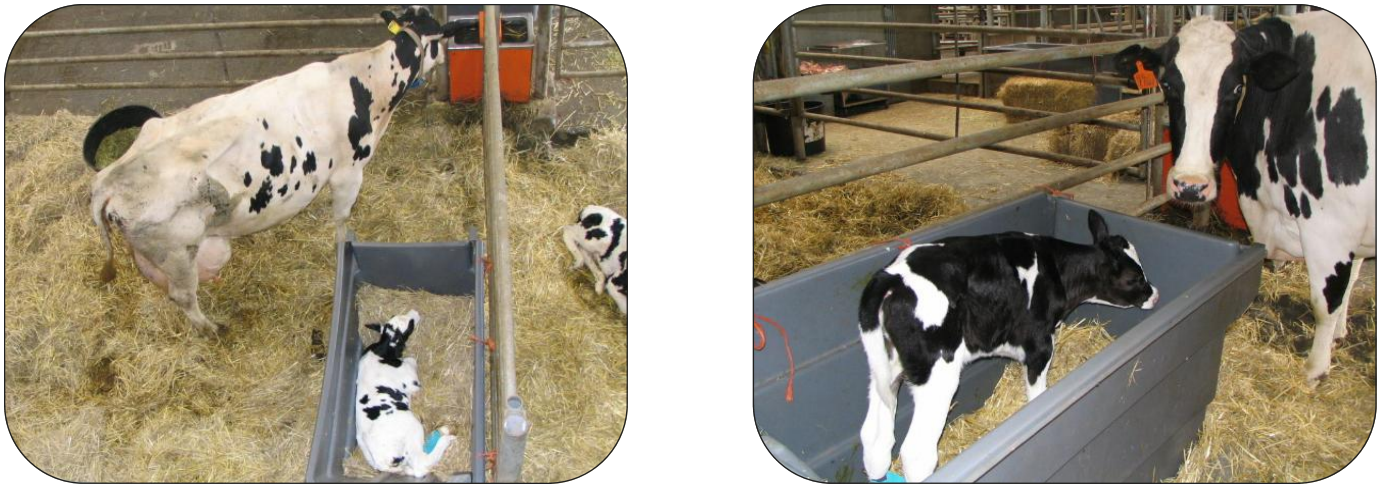

Figure 1. Pictures showing the feed trolley being used to separate calves from cows.

Selman, *et al.*[1]. Probably of greater importance was the difference in quantity of colostrum fed. Selman, *et al.* [1] fed 2.5 L of colostrum (IgG 68g/L) to a 45-kg calf, whereas we fed 3.8 L of higher quality (89.5 g IgG/L) colostrum. Perhaps the influence of the mother only occurs at lower immunoglobulin intakes.

Given the levels and quality of colostrum recommended today, the results of this experiment suggest that the presence of the mother imparts no benefit in terms of immunoglobulin absorption by the calf.

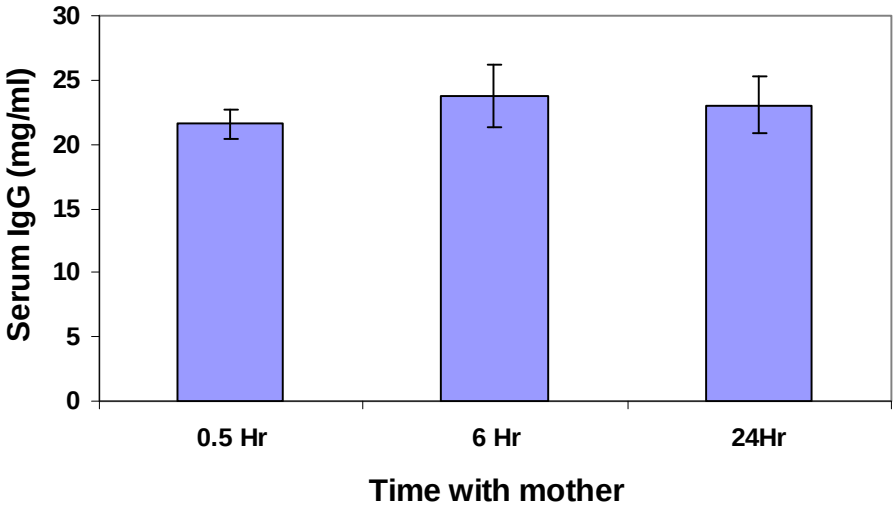

Figure 2. Effect of time calves spent with their dams after birth upon the 24-hour serum IgG levels (mean +/- SE) after receiving similar levels of IgG in colostrum.

1. *Selman IE, McEwan AD, Fisher EW. Absorption of immune lactoglobulin by newborn dairy calves. Res Vet Sci 1971; 12: 205-210.*
2. *Wallace MM, Jarvie BD, Perkin NR, Leslie KE. A comparison of serum harvesting methods and type of refractometer for determining total solids to estimate failure of passive transfer in calves. Can Vet J 2006; 47:573-575.*

Bovine Viral Diarrhea Infection Introduced to Dairy Herds in Finland with Frozen Semen from Acutely Infected Bulls in an AI Stud

Ann Godkin, Veterinary Services Unit, OMAFRA

Preventing the introduction of new diseases is a critical component of effective biosecurity programs. To be successful, routes of entry for the disease of interest must be identified and blocked. Typically AI using frozen semen has been considered to be of low risk for disease transmission in dairy herds.

Bovine viral diarrhea (BVD) virus is an infection that usually enters a herd by the addition of a transiently or persistently infected animal. Finland conducts annual surveillance for BVD by testing bulk-milk samples from all dairy herds for BVD antibodies. As part of this program, when positive herds are identified, the herds are investigated to identify the disease epidemiology. A recent investigation showed that the semen collected from two acutely infected bulls in an AI stud likely carried the infection into new herds.

Two non-PI bulls, born in seronegative herds, were housed together in one AI stud and semen collection was started at about two years of age. During the time the bulls were in collection, a persistently infected (PI) animal was identified in this herd. Trace back from herds that became positive for BVD on annual testing showed that batches of semen collected within two weeks of the introduction of the PI animal were positive for BVD virus (virus isolation) and caused seroconversion in 10 of 154 herds where the semen was used. In most of the herds, only the inseminated cow seroconverted. In two herds the infection spread to at least one other cow or calf. Two healthy calves and one suspected PI calf resulted from the breedings with the suspect semen. In the herd where the suspected PI calf was born, three more PI calves were born seven to eight months later.

It has previously been shown that PI bulls can shed BVD virus in semen and cause infection and seroconversion of cows after insemination. This Finnish report shows that acutely infected bulls can also shed the virus in semen collected during the acute phase of the infection, and that ultimately this semen can introduce infection into new herds. Infection introduced by this means may die out but also has some ability to spread to other animals within the herd. Infection of a pregnant cow, and production of a PI by this means, can perpetuate the infection in the herd.

Herd owners in Ontario with "closed herds" frequently do not consider the use of frozen semen in an AI program as being a threat to their herd's health status. While disease introduction by semen is likely rare, the Finnish experience shows that it is possible. Countries like Finland, where BVD prevalence is extremely low, vaccination is not done, and where annual disease surveillance is routinely conducted, can help us to learn about these potential routes of transmission and the frequency of their occurrence. This information can be used to define the risks of disease transmission associated with such commonly accepted practices, such as the use of frozen semen in an AI program.

For veterinary practitioners with herd owners who have "closed herds," this information may be useful to increase their understanding of infectious disease prevention strategies.

Rikula U, Nuotio L , Laamanen UI, Sihvonen L. Transmission of bovine viral diarrhea virus through the semen of acutely infected bulls under field condtions. Vet Rec 2008; 162:79-82.

What's All That Scratching About?

Bob Wright, Veterinary Services Unit, OMAFRA, and
Dan Kenney, Ontario Veterinary College, University of Guelph

Horse owners are commonly confronted with horses that have sore and sometimes itchy legs. Horse breeds, such as the Clydesdale and the Shire, with feathers, the long hair around the fetlock and pastern areas, are prone to chorioptic mange.

The differential diagnosis for these cases could include:

- Conditions colloquially known as "grease heel", "scratches", pastern folliculitis, exudative dermatitis or mud fever. The results of culture and/or biopsy commonly yield Staphylococcus or Dermatophilus.
- Photosensitization, induced by plants, such as alsike clover, St. John's wort;
- or plants containing pyrrolizidine alkaloids.

Usually these conditions are not as pruritic as chorioptic mange (*Chorioptes equi)*. Mites can be identified by applying "Scotch Tape" to the skin and viewing them under the microscope. Clinical signs of mange include irregular skin lesions, severe itching and sometimes biting of affected skin areas, and decreased feed consumption. The skin lesions start mainly as an erythematous area, followed by the development of papules and crust formation. The affected areas may also have a secondary bacterial dermatitis, which can make the primary diagnosis challenging. Horses with mange, however, often traumatize their legs as a result of the severe itchiness.

Treatment

The first thing, and often the most difficult, is to determine the primary problem. Commonly a bacterial folliculitis will exist, which must be treated. The last thing an owner with a show horse wants to see is the veterinarian getting out the clippers to "get down" to the problem. Depending on the extent of the dermatitis, clipping, scrubbing and peeling off the scabs may be necessary. The removal of scabs can be facilitated by the use of a serrated grapefruit knife. The curved blade and serrated edge, when applied along the skin surface, will remove scabs quickly and is safer than using a scrub brush and scalpel blade.

Practitioners have recommended a variety of treatments, including a variety of disinfectant, anti-inflammatory, anti-parasitic and antibiotic products.

Two recent research papers present treatment options for chorioptic mange. In a study by Osman and Hanafy, "clinical and parasitological cures for mite infestation were obtained within two weeks in both moxidectin and ivermectin treated groups with a 100% recovery rate." They concluded in their study that "moxidectin oral gel is effective and a good alternative for the treatment of chorioptic mange in the horse."

In a second study by Rendle *et al*., horses were treated with 0.3 mg/kg doramectin (Dectomax; Pfizer) on two occasions 14 days apart by subcutaneous injection or by spraying with fipronil 0.25 percent solution (Frontline; Merial) to the level of the stifles and elbows. The authors indicated that, by day 28, there were no behavioural signs of chorioptic mange in any of the animals, and there were significant reductions in the numbers of mites in both groups.

However, there were no significant reductions in the mean lesion score in either group. There was no significant difference between the effectiveness of the two treatments.

(Continued on page 16)

For further details, consult the original reference. Remember:

- Doramectin is not approved for use in horses in Canada and use of this product would entail extra-label or off-label use with all of its ramifications.
- Practitioners in the UK suggest using no more than 10 mL at a single injection site. Injectable and pour-on formulations of doramectin are licensed for use in cattle in Canada. The injectable contains 10 mg/mL while the pour-on contains 5 mg/mL. This would mean that an 1800-lb (818-kg) Clydesdale would require 245 mg or 24.5 mL of doramectin.
- In the early 1980s, the equine ivermectin injectable product was removed from the market, due to death of horses from Clostridia infection following spread from contaminated injection sites.
- Frontline (fipronil) by Merial is not currently available in Canada.

Products can only be used in any form of an extra-label manner under the direct supervision of a veterinarian.

1. *Osman SA, Hanafy A. Clinical and therapeutic studies on mange in horses. Amer SE Vet Parasitol 2006; Oct 10, 141(1-2):191-195. Epub 2006 Jun 19.*
2. *Rendle DI, et al. Doramectin and fipronil in the treatment of equine chorioptic mange. Vet Rec 2007; 161(10):335-338.*

Nutrition and Nutrient Requirements of Horses

Bob Wright, Veterinary Services Unit, OMAFRA

The 6th revised edition of *Nutrient Requirements of Horses* was published in 2007 by the National Research Council. A great deal of new information has been added since the last edition in 1989. It covers every aspect of horse nutrition, from how horses drink to the daily requirements of horses by weight. There probably is no better review of the latest scientific literature on most aspects of horse nutrition. This is a must for your library. It can be ordered from www.nap.edu, by fax (202) 334-2451, or by contacting your local bookstore and requesting ISBN 10: 0-309-10212-X or ISBN 13: 978-0-309-10212-4 hardcover. The list price is $99.95. The 341 pages provide the most up-to-date summary and recommendations on equine nutrition.

A free computer program for determining the nutrient requirements of horses was developed as a companion to the book and is available at http://nrc88.nas.edu/nrh/.

For those with an interest in nutrition counseling, download a 30-day free trial of the 2007 Creative Formulation Concepts Inc. ration-balancing software. This program will store nutrient analyses of local feeds and provides an excellent template for balancing rations. www.creativeformulation.com/cfchorse.php

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Continuing Education/Coming Events

March 28-30, 2008	17th Annual Northeast Dairy Production Medicine Symposium—Production Medicine in a Time of Change, Embassy Suites Hotel, Syracuse, New York.. www.nedpms.org
April 1-3, 2008	Expanding Horizons: Dairy Calf and Heifer Conference, Dairy Calf & Heifer Association, Mayo Civic Center, Rochester, Minnesota. www.pdhga.org/2008conference.htm
April 7 & 8, 2008	4th Annual Conference on Organic Dairying and Dairy Research, Alfred College, University of Guelph, Alfred, Ontario. www.alfredc.uoguelph.ca/Plone
April 10, 2008	Ontario Agri-Business Association (OABA) and Ontario Association of Bovine Practitioners (OABP) Joint Spring Meeting, Holiday Inn, Guelph, Ontario. www.oabp.ca
April 15 & 16, 2008	16th Annual Kentucky Equine Research Conference—Facing Today's Nutritional Challenges, Advanced Management of Gastrointestinal and Metabolic Diseases, Lexington, Kentucky. www.ker.com/conferences/index.html
April 28, 2008	Animal Welfare Research Symposium, Lifetime Learning Centre, Ontario Veterinary College, University of Guelph, Guelph, Ontario. Contact Kim Sheppard, Communications Coordinator for the Campbell Centre, ksheppar@uoguelph.ca or Prof. Georgia Mason, Canada Research Chair in Animal Welfare, gmason@uoguelph.ca
May 27-29, 2008	13th Annual Dairy Health Management Certificate Program Update Meeting, Ontario Veterinary College, University of Guelph, Guelph. Ontario. Contact Stephen LeBlanc, (519) 824-4120 ext. 54594, sleblanc@uoguelph.ca
May 28-30, 2008	International Symposium on Beef Cattle Welfare, Manhattan, Kansas. www.isbcw.beefcattleinstitute.org
June 13 & 14, 2008	Ontario Hoof Trimmers Guild Annual Meeting, Ramada Inn, Guelph, Ontario. www.ontariohooftrimmersguild.com
July 7-11, 2008	American Dairy Science Association and American Society of Animal Science Annual Meeting, Indianapolis, Indiana adsa.asas.org/meetings/2008
September 25-27, 2008	American Association of Bovine Practitioners 41st Annual Convention, Charlotte, North Carolina. www.aabp.org
December 6-10, 2008	American Association of Equine Practitioners 54th Annual Convention, San Diego Convention Center, San Diego, California. www.aaep.org/convention.htm

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Deadline for next issue: May 23, 2008

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