

Beef Calf Stillbirth / Weak Calf Syndrome Survey - Spring '07

2/8/07

Purpose: To determine if a unique set of lesions detected in Canadian beef calves are present in similar dead calves from beef herds in the five northwestern states.

Calves for Sampling:

- Stillborn at term or dying within 24 hours of birth of unknown causes
- Not experiencing severe dystocia due to fetal oversize or malpresentation
- Sufficient tissue integrity for histology (e.g., not slipping hair, have subcutaneous or organ cavity gas, be malodorous or show other evidence of autolysis on gross postmortem, such as hemoglobin imbibition).
- Healthy dam

Target Herds:

- Beef cow-calf herds in Idaho, Montana, Oregon, Washington and Wyoming
- Reasonably well managed beef herds comprised of mostly home-raised cows using management and feeds typical of their area
- Only one calf from each herd unless a "storm" is underway and the first calf is not representative.
- To obtain samples from a broad area, we prefer that each beef cow-calf practitioner submit no more than 4 calves, preferably from 4 separate herds but no more than 2 from the same herd.

Supporting Materials:

- **Stillbirth Submission Form** (24K pdf)
(<http://www.vetmed.wsu.edu/courses-jmgay/documents/StillBirthSubmissionForm.pdf>)
 - Please print off, fill in and submit with samples
 - **Note that it calls for a broader set of tissues**
- **Pictorial Sampling Guidance** (Dr. Gary Haldorson, 1 MB pdf)
(<http://www.vetmed.wsu.edu/courses-jmgay/documents/StillbirthSampling.pdf>)
- Sampling kits are available if needed
- **WADDL Information**
 - User's Guide
(http://www.vetmed.wsu.edu/depts_waddl/userguide.asp)
 - Diagnostic Specimen Shipping Regulations
(http://www.vetmed.wsu.edu/depts_waddl/shipRegs.asp)
 - Sample Submission
(http://www.vetmed.wsu.edu/depts_waddl/shipRegs.asp)

Compensation:

- The project will provide a WADDL sampling kit (\$15) free upon request and will pay the sample shipping fee, the WADDL accession (\$10) and the WADDL lab fees for complete abortion workup (~\$112.50 out of state) on up to 4 calves, no more than 2 per herd, that meet the criteria above.
- When the research funds are exhausted, (~100 calves) a notice will appear here and on this website <http://www.vetmed.wsu.edu/courses-jmgay/>

Investigator Contact Information:

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Please don't hesitate to contact us if you have any questions or comments.

Background and Significance:

Perinatal calf death is a major economic cost to the beef industry, second only to reproductive failure (Toombs et al., 1994). Perinatal mortality occurs both at a background rate in a majority of herds and as a "storm" in a minority. The sporadic occurrence of these storms has long been a serious problem for beef cow-calf operations (Kasari and Wikse, 1994). The national USDA NAHMS Beef '97 survey found that of surveyed beef herds with 100 to 299 cows (641 herds), 35% lost 2.0 to 4.9%, 21% lost 5.0 to 9.9% and 4% lost 10% or more calves preweaning (NAHMS, 1997). Of survey herds with over 300 cows (196 herds), 42% lost 2.0 to 4.9%, 19% lost 5.0 to 9.9% and 3% lost 10% or more. The most significant causes as perceived by the producers, accounting for 80% of the losses, were weather (20%), unknown (17%), respiratory problems (16%), digestive problems (14%) and calving (14%). Fully 78% of these losses occurred before 3 weeks of age.

The cause of a significant proportion of this mortality remains unknown and thus the means for prevention also remain unknown. Often under the label "weak calf syndrome", considerable research has been performed to identify a primary etiology, infectious or nutritional, for these perinatal losses that were not due to an established primary cause, such as severe dystocia or *E. coli* septicemia, without success. Information that may provide the basis for new research hypotheses is emerging from a large Canadian study of 205 beef cow-calf operations. Three papers from this study were recently published (Gow and Waldner, 2006, Waldner, 2005, Waldner and Campbell, 2005).

At the 2006 Western Canadian Bovine Practitioners Conference in Calgary, Alberta, the investigators presented their preliminary findings with respect to perinatal calf mortality. The mean proportion stillborn, which they defined as death at or within 1 hour of birth, was 2.6% with the lowest 5% of the herds experiencing none and the highest 5% of the herds experiencing 6%. The mean preweaning calf mortality beyond this period was 3.6%, the lowest 5% of herds experiencing none and the highest 5% experiencing greater than 8%.

In those calves whose death was not due to another cause, such as severe dystocia or an infectious pathogen, the investigators noted the occurrence of a unique set of associated lesions. The purpose of this pilot survey is to determine if this unique set of lesions occurs in stillborn and calves dying in the immediate postnatal period in beef cow-calf herds in the five northwestern states and, if so, to estimate their prevalence in such calves whose death is otherwise unexplained. If these lesions are present in a significant proportion, this pilot study will provide the preliminary data for further studies to establish the etiology and to develop intervention strategies against this long standing problem. Preliminary findings from the Canadian study suggest that this unique constellation of lesions is associated with herd nutritional factors.

The WADDL accession form for abortions is modified to include those additional samples that were collected for histology in the Canadian study (eyelid skin, cervical spinal cord, salivary gland, sciatic nerve; Clark 2006a, 2006b). The stillborn calves experiencing perinatal death will be processed with the same diagnostic procedures as those experiencing earlier fetal deaths or abortions. To capture information on potential herd management risk factors from those herds experiencing outbreaks we will follow-up with a management factor questionnaire modified from the one that we used in the *Neospora* seroprevalence study (Sanderson et al., 1996, 2000).

We request that veterinarians take samples from herds that they regard as reasonably well managed herds comprised of mostly home-raised cows using management and feeds typical of their practice area. To increase the breadth of samples, we prefer that each herd only contribute only dead calf unless a "storm" is underway and the first calf sampled is not representative. To increase the likelihood of detecting the specific lesions of interest over the other causes of death in the sampled population, we have established the above criteria. Although in the Canadian study mortality associated with this emerging syndrome was observed in older calves, the likelihood of the death potentially being due to enterotoxigenic *E. coli* or other causes increases significantly beyond 24 hours of age. Severe dystocia, meaning that mechanical traction, physical repositioning or a cesarean section were required, due to fetal oversize or malpresentation, is well established and prevalent causes of perinatal mortality. If stillborn, to have sufficient tissue integrity for histology the calf cannot be slipping hair, have subcutaneous or organ cavity gas, be malodorous or otherwise show evidence of autolysis on gross postmortem.

Upon arrival at WADDL, the samples will be processed under normal WADDL procedures for abortions to have the best chance of establishing the cause of. As soon as the WADDL tests are completed we will provide them to the respective cooperating veterinarian. Two 200 gram portions of fresh liver will be held at -70° C for later trace mineral and vitamin analysis, depending on the presence of the target histopathologic lesions. Per WADDL procedure, we anticipate that up to 20 of these will be sent as a batch to the Michigan State University Diagnostic Center for Population and Animal Health for vitamin analysis. A Tissue Trace Mineral Screen will be performed on this same subset by the University of Idaho Analytical Sciences Laboratory.

At the conclusion of the laboratory processing, the results will be tabulated and the proportion of cases presenting the various lesions summarized. At the end of the pilot study, we will provide a summary of findings to all participants.

Literature Cited:

- Clark, EG (2006a). Bovine fetal and calfhood necropsies. 3 pgs. In: Conference Notes, Western Canadian Association of Bovine Practitioners 15th Annual Conference, January 19-21, 2006, Calgary, Alberta.
- Clark, EG (2006b). The benefits of bovine aborted fetal and calfhood histopathological examination. 8 pgs. In: Conference Notes, Western Canadian Association of Bovine Practitioners 15th Annual Conference, January 19-21, 2006, Calgary, Alberta.
- Gow S, Waldner C (2006). An examination of the prevalence of and risk factors for shedding of *Cryptosporidium* spp. and *Giardia* spp. in cows and calves from western Canadian cow-calf herds. *Vet Parasitol* 137(1-2):50-61.
- Kasari, TR, Wikse SE, eds. (1994). Perinatal Mortality in Beef Herds. *Vet Clin North Am Food Anim Pract.* 10(1), 185 pgs.
- NAHMS (1997). Part II: Reference of 1997 Beef Cow-Calf Health & Health Management Practices, page 14. On-line at <http://nahms.aphis.usda.gov/beefcowcalf/beef97/bf97pt2.pdf> on website Beef Cow-Calf index page at <http://nahms.aphis.usda.gov/beefcowcalf/>
- Sanderson MW, Gay JM (1996). Veterinary involvement in management practices of beef cow-calf producers. *J Am Vet Med Assoc* 208(4):488-91.
- Sanderson MW, Gay JM, Baszler TV (2000). *Neospora caninum* seroprevalence and associated risk factors in beef cattle in the northwestern United States. *Vet Parasitol* 90(1-2):15-24.
- Toombs RE, Wikse SE, Kasari TR (1994). The incidence, causes, and financial impact of perinatal mortality in North American beef herds. *Vet Clin North Am Food Anim Pract.* 10(1):137-46.
- Waldner, CL (2005). Serological status for *N. caninum*, bovine viral diarrhea virus, and infectious bovine rhinotracheitis virus at pregnancy testing and reproductive performance in beef herds. *Anim Reprod Sci* 90 (3-4): 219-242.
- Waldner CL, Campbell JR (2005). Use of serologic evaluation for antibodies against bovine viral diarrhea virus for detection of persistently infected calves in beef herds. *Am J Vet Res.*66(5):825-34.