Health, Productivity, and Management of Calves on Ontario Beef Cow-Calf Herds

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Introduction

A mail survey in 1983 highlighted the need for further investigation of the health, production, and husbandry on Ontario cow-calf farms (1). Bench-mark levels of health and production, and insight into factors affecting their variability, were needed to better assist practitioners and cow-calf producers in the setting of the South, Western, Central and Eastern regions of Ontario (2).

Most calf management decisions are made in the interest of the group rather than the individual. With this in mind, the Bench-Mark project was designed with the herd as the unit of interest (3). This is relevant to the theme of the 1988 AABP Conference since veterinary practitioners usually market their services and advice to individual herds, not to individual animals. This distinction is not obvious until you think of a herd as a "package" of calf management factors/practices (breed, calving, location, vaccinations, herd size, etc.). The success of each package can be represented by its calf health and production measures (i.e. preweaning mortality/morbidity, herd average adjusted weaning weights, pounds of calf per female exposed). It makes intuitive as well as statistical sense to compare a large number of these packages, rather than individual animals, to determine *how* herds are doing, *what* they are doing, and begin to learn *why* certain herds have better calf health/productivity than others. Herd summaries of calf performance can be calculated from counts of disease occurrence and lists of calf weights from even the crudest records and the worst cases of re-tagging.

This presentation is based on a preliminary analysis of calf health and production data from an observational study of 200 cow-calf herds (1986-88) in Ontario, Canada. The purpose of this paper is to present common levels of calf mortality/morbidity and production from birth to weaning, common levels of calf management practices, and preliminary identification of factors affecting calf health and production on cow-calf farms.

Materials and Methods

Much of the materials and methods of this project is discussed in an earlier paper (3). The data were entered into dBase III+ and most of the descriptive results and data subsets were generated using this software (4). BMDP Statistical Software was used for further descriptive statistics, logistic and multiple stepwise regression analyses (5).

Calf Management

Table 1 summarizes the calf management practices amongst the study farms for 1987. Most of the study farms are calving the majority of the calves in April, May, and June. Only 10% have their peak calving months during the last six months of the year. The type of housing during the neonatal period tends to be more open than during the calving season. Although most producers are overwintering cattle in the primary calving location, about half have a policy of moving the calves out of the primary calving location within the first month of life. A shift in frequency of observation occurs from 65% of the producers checking females due to calve more than twice daily to 72% checking the cow-calf pairs once daily or less when the calves are at least one month old.

About one-third of farms are castrating calves under one month of age and about 40% are either dehorning under one month of age or raising polled calves. Farms practicing early castration had a significantly higher herd average adjusted weaning weight (HAAWW) versus those castrating one month to weaning. Early dehorning was not significantly associated with HAAWW. Although interesting, these, or indeed any univariate associations, should be viewed with caution. Confounding variables such as breed type, herd size, and use of implants may distort the unconditional association between selected factors and HAAWW. Over the next year, more detailed analyses will further examine these associations.

The most common vaccines used on calves are IBR/PI3 and Clostridial sp. vaccinations, and over a third of producers were not vaccinating the calves. The most common antiparasitics were an ivermectin based product or a topical systemic warble treatment, but 22% of farms did not treat the calves with any antiparasitic.

TABLE 1. Calf Management

	Percentage of Herds	
Primary calving month		
Jan., Feb., Mar.		24%
April		42%
May, June		24%
July—Dec.		10%
Housing	**At calving**	**Neonatal period**
Closed barn	20%	13%
Barn and yard	31%	28%
Barn and pasture	19%	19%
Pasture	30%	40%
Movement from calving area		
Not moved		53%
Moved within 1 week		27%
Moved 1 week to 4 weeks		20%
Overwintered in neonatal location		76%
Observation of cows	**During calving**	**One month to weaning**
2x daily	65%	8%
2x daily	20%	20%
1x daily	11%	39%
Every other day or less	4%	33%
Antibiotics used	**Calf Diarrhea**	**Respiratory**
Rarely	25%	31%
Penicillin	17%	30%
Tetracycline	7%	14%
Trimethoprim	30%	13%
Chloramphenicol	4%	5%
Other	17%	7%
Newborn		
Navels treated		45%
Vitamin E/Selenium		65%
Age at castration		
Not done		13%
Under one month		19%
One month to weaning		51%
At weaning or after		17%
Age at dehorning		
Not done		10%
Under one month		10%
One month to weaning		32%
Weaning or after		27%
Polled		21%
Creep feeding used		30%
Calfhood vaccinations		
Respiratory type		42%
Clostridial type		50%
Leptospirosis		5%
Rabies		5%
BVD		6%
No vaccines to calves		35%
Antiparasitic use		
Ivermectin		43%
Levamisole type		8%
Topical systemic type		36%
Topical		3%
Flytags		27%
No antiparasitic to calves		22%
Implanting calves		31%
Predominant breed type of calf crop		
Small		25%
Medium		37%
Large		38%

The most common firstline antibiotic treatments for calf diarrhea were trimethoprim/sulphonamide products. The firstline respiratory treatments most commonly used were penicillin based (these data were collected nearly two years after the use of chloramphenicol was prohibited in Canada.)

About one quarter of the farms were preconditioning over 75% of calves within a herd. Preconditioning was defined according to the Ontario Ministry of Agriculture and Food guidelines (6). These require vaccination for IBR/PI3 and Clostridial Sp., dehorning, castration, and introduction to stored feeds—all at least 3 weeks prior to weaning, treatment for warbles prior to sale and retained ownership for at least 30 days after weaning.

Preliminary analyses of data from a cohort study (1987-88) investigating the association between preconditioning and calf health has shown that farms preconditioning calves are at risk of a higher level of morbidity over the two-month period surrounding weaning. Further analyses will focus on the nature of this finding in terms of the surgical, feeding, and vaccine components of preconditioning (7), as well as its impact on weaning weight.

Measures of Health and Production

Table 2 summarizes the health and production measures for the study farms in 1987. Mortality rates were calculated for calves in three periods: 24 hours to 4 weeks of age (neonatal period), 4 weeks of age to weaning, and weaning to 3 months after weaning. Stillbirths were calves born dead or dying within 24 hours after birth. About 85% of the mortality before weaning is occurring from birth to 4 weeks of age. Of the farms studied, 71% retained many (>50%) calves for at least three months after weaning. This may partially explain the low mortality during the first three months after weaning.

Table 3 lists the potential risk factors considered in a preliminary analysis with neonatal mortality as the health measure of interest. Calving location and region of Ontario were the factors associated with neonatal mortality. A primary calving location of a barn with a yard was associated with the highest neonatal mortality compared to the other housing categories. This may be related to 80% of farms calving in a closed barn and moving the cow-calf pairs to another area within the first month versus most cattle calving in a barn and yard and remaining there for at least the first month. The Western and Central regions of Ontario were associated with higher levels of neonatal mortality as compared to Southern and Eastern Ontario farms. Region is a complex variable that may reflect weather, pasture, and housing factors, among others.

Treatment rates were used to estimate morbidity due to diarrhea and respiratory problems. The study farms were divided into a low morbidity group of 134 farms that

treated 3 or less calves for neonatal diarrhea and a high morbidity group of 58 farms that treated 4 or more calves.

TABLE 2. Measures of Health and Production

Health	Mean (n=187)
Stillborn Rate	3.8%
Neonatal Mortality	2.3%
One Month to Weaning Mortality	1.1%
Total Preweaning Calf Losses	7.2%
Neonatal Diarrhea Treatment Rate	8.8%
One Month to Weaning Diarrhea Rate	1.1%
Neonatal Respiratory Treatment Rate	1.0%
One Month to Weaning Respiratory Treatment Rate	3.9%
Weaning–3 Months Postweaning:	
Morality Rate	0.5%
Treatment Morbidity Rate	8.0%
Production	**Mean (n=159)**
Herd Average Actual Weaning Weight	500 lbs.
Herd Average Adjusted Weaning Weight	550 lbs.
Lbs. of Calf per Female Exposed to Breeding	413 lbs.

Table 3 lists the risk factors that were considered in a preliminary analysis with the two levels of morbidity as the outcome. Large breed types had 3 times the risk of the higher morbidity level than that of the small breed type. Farms using a barn with a yard were three times as likely to be associated with the higher morbidity level than those using other types of primary calving locations. Farms with their primary calving months as May or June were three times less likely to have the higher neonatal morbidity level than those calving in January, February, and March.

The pounds of calf per female exposed to breeding (LBCFEXP) is a measure of herd production which represents the reproductive success of the herd, calf survivorship, and the ability of the calves to gain weight. Investigating this global measure may not be useful because of the complexity of the factors that influence its herd-to-herd variability. Undoubtedly, LBCFEXP varies with the genetic potential of the herd and has been shown to be associated with culling policy (8). In this preliminary analysis, Eastern Ontario farms and, not surprisingly, the number of calves dying before weaning were associated with lower LBCEXP (Table 4). Future analyses will examine the major calf-related components of this measure separately (e.g., neonatal calf mortality rate and herd average weaning weight).

TABLE 3. Factors Associated with Neonatal Mortality and Morbidity

Factors Used in Analyses	Neonatal Mortality	Neonatal Morbidity
Calving Location	***	*
Season	ns	***
Herd Size	*	**
Breed Type	ns	**
Region of Ontario	*	ns
Overwinter in Neonatal Area	ns	ns
Movement from Calving Area	ns	ns

TABLE 4. Factors Associated with LBS of Calf per Female Exposed (LBCFEXP) and Herd Average Adjusted Weaning Weight (HAAWW)

Factors Used in Analyses	LBCFEXP	HAAWW
Region of Ontario	*	ns
Total Preweaning Mortality Rate	***	ns
Breed Type	ns	***
Grazing Hayfields	ns	*
Pasture Rotation	ns	ns
Creep Feeding	ns	ns
Total Preweaning Respiratory Rate	ns	ns

*** significant p<.01
** significant p<.05
* significant p<.10
ns not significant p<.10

Herd average adjusted weaning weight (HAAWW) is a herd measure of production derived by calculating the arithmetic mean of the individual 200 day adjusted weaning weights. Individual actual weaning weights are converted to actual average daily gains, then adjusted for age of dam, breed of dam, and multiplied by 200 days to arrive at a 200 day adjusted weaning weight (9).

In the preliminary analysis with HAAWW as the outcome, large breed type and having the cow-calf pairs graze hay aftermath were both associated with higher HAAWW (Table 4).

Under 20% of the herd-to-herd variability of the production measures LBCEXP and HAAWW were explained by the factors considered in this analysis. This may be due to the different genetic potentials among the study herds, but in general more detailed follow up is needed to uncover the role of other calf management practices in explaining the variability of these production measures.

Conclusions

The Bench-Mark project has collected calf data on a sufficient number of herds to provide common levels of calf health and production cross-classified with local factors such as breed type, region, herdsize and calving season (e.g., an expected total pre-weaning mortality rate for a primarily Simmental herd calving in the winter in Western Ontario is 6.7%). Comparing a herd's calf health and production to local levels can be a strong marketing tool for a practitioner who is not afraid of collecting a few numbers on a sheet of paper. Preparing a yearly summary of herd level counts of events with the appropriate denominators to assess calf herd health should not pose a time management problem. Once the expertise is developed and access to local levels of health and production is available, a practitioner should charge his/her regular fee for this service.

The Ontario Ministry of Agriculture and Food provides a step-by-step procedure for calculating calf health and production measures in a recent extension publication (10). This can be readily adapted to a computer spreadsheet for those with access to a personal computer. Whatever the method of data collection, it should be flexible and simple enough to capture the interest of the typical producer.

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