Disease Season

George E. Staples

Popular opinion equates winter weather with disease problems.

Incidental information collected during a three year study of illness and death among young calves offered at auction in North Dakota does not confirm the popular notion that winter weather is the culprit involved in most death losses. The calves chosen for this study were not at cow's side and were two weeks of age or younger. Most of these calves subsequently were hand reared by the purchaser.

PROCEDURE

Blood samples were taken at the auction market and returned to the laboratory where some of the more critical tests were performed within a few hours following collection. Twenty-nine different tests and observations were performed on blood and serum from each calf. Auction personnel[1] kindly supplied name and address of purchaser so a questionnaire could be mailed two weeks following purchase. On the basis of the returned questionnaires the calves were placed as: well (those never observed to be sick); sick (those showing symptoms of illness but recovering); or died (those deceased at the time the report was returned). Comparisons were made between health-status categories and results of the tests and observations.

Collection periods were arbitrarily divided into seasons: fall included collections after September 21 and ending December 15; winter after December 15 and ending March 20 and spring after March 20 and ending June 20, with most collections made in March, April and May. Since few calves were available collections were discontinued in the summer.

It is pertinent that most calves originate from and are purchased by farms within a 25 mile radius of the auction and very few are offered for resale during the period covered by the questionnaires and reports. This means a minimum of exposure and stress as compared to marketing circumstances in some areas.

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[1]Grateful appreciation is acknowledged for the excellent cooperation and assistance of Merwy John, manager of the Valley City Livesotck Auction and his secretary and staff, and to Alvin Hornbacher and Darrell Hornbacher, their secretary and staff of the Jamestown Livestock Auction, who made this study possible.

Reports (returned questionnaires) were secured on the health status of 393 calves during the three year period. Reports were unobtainable on only 1.7 per cent of the calves sampled. Thus, if all calves lacking reports had been in any one health status category, it would not greatly affect the results. From the reports, 35 calves (8.9%) had died from disease, 83 calves (21.1%) had been ill but recovered, giving a morbidity rate of 30.0% (those sick plus those which died). There were 275 (70%) with no health problems. Table I summarizes morbidity and mortality for three years.

Table 1 shows that the percentage of death loss was highest during the fall in every instance except one (Auction No. 2 1967-68). Winter losses were lowest when the three years were combined, even though winter also produced the highest percentage of animals which were observed to be sick but recovered.

Possible reasons for these seasonal differences in death losses among these young calves are many. It is possible that herdsmen expect more trouble in the winter so are more alert to illness, treat it

Table 1. Morbidity and mortality of calves for three years.

	Number Collected	No. Died	% Died	No. Sick	% Sick	No. Sick and Died	% Morbidity
1965-66							
Fall	40	3	7.5	7	17.5	10	25.0
Winter	30	2	6.7	10	33.3	12	40.0
Spring	33	1	3.3	10	30.3	11	33.3
Total	103	6	5.7	27	26.2	33	32.0
1966-67							
Fall	10	2	20.0	4	40.0	6	60.0
Winter	40	1	2.5	9	22.5	10	25.0
Spring	57	4	7.0	11	19.3	15	26.3
Total	107	7	6.5	24	22.4	31	29.0
1967-68 (Auction No. 1)							
Fall	52	14	26.9	8	15.4	22	42.3
Winter	23	1	4.4	6	26.1	7	30.4
Spring	33	3	9.1	7	21.2	10	30.3
Total	108	18	16.8	21	19.4	39	36.1
(Auction No. 2)							
Fall	13	0	0	1	7.7	1	7.7
Winter	30	0	0	4	13.3	4	13.3
Spring	32	4	12.5	6	18.7	10	31.2
Total	75	4	5.3	11	14.7	15	20.0
Total No. 1 and No. 2							
Fall	65	14	21.5	9	13.8	23	35.4
Winter	53	1	1.9	10	18.9	11	20.0
Spring	65	7	10.8	13	20.0	20	30.8
Total Auction 1 & 2 (67-68)	183	22	12.0	32	17.4	54	29.5
Grand Total (By Seasons) (3 years)							
Fall	115	19	16.5	20	17.4	39	33.9
Winter	123	4	3.3	29	23.6	33	26.8
Spring	155	12	7.7	34	21.9	46	29.6
Three Years Total (Combined Seasons)	393	35	8.9	83	21.1	118	30.0

more promptly or perhaps provide better shelter and other care when the weather is definitely on the severe side. Some observers feel that changeable weather such as encountered in the fall and spring is more difficult for the animal to adapt to, and more conducive to disease development, than is the more severe but less variable winter weather. Other rather doubtful possibilities would include such possible though improbable circumstances as the poorest husbandman purchasing calves each of the three falls (at one auction at least) and the best husbandman purchasing calves in the winter.

Table 2 infers another factor which may provide a partial explanation. Immune lactoglobulins and gamma globulins are thought to be measurements of immune substances found in the blood of young animals. Comparing the per cent sick and died with the seasonal blood value for immune lactoglobulin would suggest that the cow may produce more immune substances during the stress of winter and pass these to the calf through the colostrum (calves themselves are reportedly poor at forming their own immune fractions prior to 8 weeks of age). The gamma globulin values would not support this theory. The high value for per cent sick in the winter would suggest increased immunity during this season to account for the fewer fatalities.

Table 2. Lactoglobulin, gamma globulin values.

	Units Immune Lactoglobulin	% Calves Died	% Calves Sick	% Gamma Globulin
Fall	79.1	16.5	17.4	23.7
Winter	92.8	3.3	23.6	20.9
Spring	89.7	7.7	21.9	21.0

If gamma globulin is a better measurement of immune fractions than is immune lactoglobulin (nobody claims to know for certain the "best" means of measuring immunity), this information would indicate that increased stress and challenge factors in the fall (when gamma globulin is highest) more than offset any advantage supplied by the increased serum gamma globulin.

Whatever the reason for the seasonal difference in death loss among young calves, practical application of the foregoing information does not suggest that the herdsman drop his guard in the winter. Rather it points out the need for better attention to housing, management, feeding and disease prevention details in the fall and spring when some may least expect trouble. It also casts doubt on the commonly accepted idea that winter is a particularly bad time to purchase and rear hand-fed calves, providing they are not subjected to undue stress and exposure.

Residual Effect Of Zinc Fertilizer On Corn Grain Yield

Armand Bauer

In a previous paper it was reported that corn grain yield was increased by zinc fertilizer in 1966 when applied immediately before or at planting on some soils in southeastern North Dakota (1). A band application of one pound of zinc (Zn) from Na_2Zn EDTA increased yields 12 to 14 bushels per acre at two sites. Data in this paper showed that corn grain yield was increased in 1967 at one of these two sites by zinc fertilizer applied broadcast prior to planting of the 1966 crop. Grunes et al. (4) found that corn grain yield was increased in 1956 by zinc applied just before planting in 1954, at the Deep River Development Farm at Upham, North Dakota. Zinc sulfate ($ZnSO_4$) was drilled to a depth of 3 inches and in rows 6.5 inches apart at a rate supplying 15 pounds Zn per acre.

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Methods

The residual effect of the zinc fertilizer was determined at three sites. Except for thinning to the desired population and harvesting and processing of a representative sample, the cooperators performed all the necessary operations. Plant