Beef Session IV

Feedlot

Aspects of Computer Usage in Beef Herd Health

Dr. Larry Hollis, *Presiding*

Herd Records and Their Use in Monitoring and Improving Herd Productivity

Gary P. Rupp, *D.V.M., MS.*
Diplomate ACT
Robert W. Field, *D.V.M.*
Department of Large Animal Medicine and Surgery
College of Veterinary Medicine
Texas A&M University
College Station, Texas

When requests are made to veterinarians as herd health-management professionals by cow-calf producers for comprehensive programs many thoughts come to mind. The most important area involves the current level of production in the clients business and our ability to improve it. Is the outfit a "productive, efficient, market driven, risk-management operation"? Although this combination of frequently used words is somewhat overwhelming at first thought, it defines the direction of thinking in today's agri-business oriented livestock enterprise.[1] The demand for consultation and direction in food animal production is increasing.[2 3 4 5 6 7 10] How is a ranching enterprise evaluated and what is the basis for making recommendations for improvements where deficiencies are found? Herd records. Information reflecting unique situations in each herd provide facts and give direction. Records are necessary for an objective business-like approach to the cow-calf enterprise.

Although it is possible to form certain opinions about herd performance if only the total number of cows in the herd and the weight of their calves sold at weaning is known, this information is of minimal value in determining the level of production efficiency for the herd. Which cows weaned calves, which cows weaned the best calves, did they do so the previous year? How many cows failed to settle during breeding and how many that were diagnosed pregnant failed to calve? What percent of calves died, when did they die and why? These are only a few of the basic questions that must be answered for each herd if a reasonable assessment of herd productivity is to be made. The final analysis requires comparing expenses with each level of production to evaluate economic efficiency. In order to make meaningful recommendations and monitor responses a careful analysis of the herds productivity and relative efficiency is required.

Records and Output

Careful consideration when choosing the type of record system for herd management is important. The value of good herd records and use of information has been stressed for herd health-management.[3 4 5 6 8 9] For today's producer and consulting veterinarian, collecting, organizing and analyzing data should become as much a part of beef production as nutrition and health, it is equally important from a business standpoint.

The amount and kind of information and the method of storage and retrieval will vary with the type of herd and management goals. The use of microcomputers and recent development of software provides an effective method of record keeping not available in the past. One of the benefits of computerized record systems is the ease of data manipulation and use once it is stored. Several important facts should be considered when developing a record system:

1. Will the information collected have purpose?
2. Will the data be objective, accurate and reflect the facts?
3. Will collection of the data be reasonably easy?
4. How will data be recorded and stored?
5. Can one stored data item be compared with another?
6. Is the system flexible?
7. Is it expandable?
8. Can the information be summarized rapidly and easily when needed?

9. How and when will the information be utilized?
10. Is the record system efficient from a time and economical point?

The final measure of productivity for the cow-calf herd is the number and weight of calves weaned per breeding animal unit maintained and the cost required to accomplish it. This determination requires the input from herd production records and those involved with accounting. This discussion will attempt to review some of the items necessary to define, evaluate and monitor losses from the production standpoint and formulate herd health-management decisions. Obviously, until the production and financial records are compared the job is not finished.

The majority of losses in herd productivity can be divided into three categories; (1) Reproductive Failure, (2) Calf Death Loss, (3) Reduced Calf Performance.

Reproductive Failure

Major factors contributing to low weaning rates in beef herds have been summarized in Table 1. Reproductive failure resulting in non-pregnant cows or those conceiving too late to calve in a limited calving period has been the major cause of reduction in the number of calves per cow unit each year.[11 12 13 14 15 18] Herds that have extended or continuous calving seasons also experience low reproductive rates.[16] Reports vary on the amount of loss by location and year, but generally range between 10% and 20%.[12 14 15 18] Variation in pregnancy rate can be monitored and correlated with year, age of dam, level of production and other factors (Table 2). Variation can be related to availabe forage, forage quality, supplemental feeding, bull selection, or calf performance as well as other management factors. In the herd in Table 2 only a slight depression in pregnancy rate occurred in rebreeding the first calf heifers and is a credit to the management. This is not a chance occurrence but rather some combination of nutritional supplementation, sorting, breeding yearling heifers earlier than cows and weaning the heifer's calves earlier. The cows from 3 through 9 years of age generally had the highest pregnancy rates and at 10 years the effect of age began to influence pregnancy rate once again. This information was collected from a herd that culled open cows following pregnancy examination. Different patterns in pregnancy rates would occur if cows were allowed to remain in the herd when non-pregnant. Dams that have been dry the previous year have advantages in rebreeding and calf performance when compared to those dams that raised a calf each year.

It is interesting to note the effect of short breeding seasons for yearling replacement heifers upon pregnancy rates[38]?:

Effect of Length of Breeding Season Upon Pregnancy Rate

Breeding Season	% Pregnant	Number	Years Data
25 days	65.8	333	2
30 days	82.0	162	1
62 days	90.4	2819	14

There are many advantages of short breeding and especially short calving seasons for heifers, however this data indicates that even when the majority of heifers are exhibiting estrus, extra potential replacements must be exposed at breeding if adequate numbers pregnant heifers are to be available. In this situation approximately one-third more heifers than actually needed would have to be exposed and then culled following pregnancy examination.

TABLE 1. Reported Losses in Potential Weaned Calf Crop and Resulting Weaning Rate[a].

Location, Length of Study (No. of Cows)	Pregnancy Failure %	Gestation Losses %	Calf Death Losses %	Calf Crop Weaned %
Montana 14 yr. (12,827)	17.4	2.3	9.3	71.0
Virginia 2 yr. (882)	12.0	3.5	10.5	71.5
Louisiana 2 yr. (462)	22.0	4.0	8.5	62.5
Nebraska 1 yr. (530)	7.0	3.0	13.0	77.0
Florida 22 yr. (13,885)	21.2	0.8	5.0	73.0
Wyoming 14 yr. (8,129)	10.7	1.8	8.4	78.9

[a] Adapted from References 12, 14, 15, and 18.

TABLE 2. Summary of Variation in Herd Pregnancy Rates by Year and Dam Age[a].

	Age (yr.)	Low %	Mean %	High %	Number n
Year:	—	**80**	**89**	**94**	**17 yr.**
Dam Age:	1	66	87	98	2819[a]
	2	84	89	95	1991
	3	85	92	98	1623
	4	83	92	99	1297
	5	84	92	98	1053
	6	87	93	100	851
	7	72	93	98	645
	8	77	93	94	497
	9	81	92	96	372
	10	80	87	92	266
	11	76	89	100	198
	12	67	80	95	136
	13	60	82	100	66
	14	50	65	86	57
	15+	—	67	—	75

[a]From Reference 39
[b]Yearling heifers from breeding periods less than 60 days not included

Calf Death Loss

Calf mortality is responsible for a multi-million dollar reduction in potential income and is second in importance as a cause for reduced weaning rate.[14] Nearly three-fourths of all calf deaths occur during the perinatal period.[12 14 15 18] Other major causes of calf death are associated with calf scours, injuries, starvation, environmental exposure and respiratory infection (Table 3). This herd was unique in attempting to classify the cause of each death and still many of the deaths listed leave room for doubt in terms of the underlying etiology. The first step in reducing death loss is documenting, defining and recording the time of occurrence and cause of **all** deaths in a herd.[19 20 21] Many problems are not prevented or treated efficiently because it is difficult to recognize the underlying cause of the loss. Action is usually not taken by many producers until the situation is serious and by then significant losses have already occurred. Specimens intended to assist diagnosis are frequently received by laboratories in totally unsatisfactory condition. When working closely with a herd, the veterinarian performing a postmortem examination can make sound judgment decisions regarding laboratory work, the suitability of specimens, and insure their proper handling to improve diagnostic capabilities and save unjustified expense. Even when the immediate cause of death is known, a necropsy examination can provide additional important information. Congenital defects, injuries from improper calving assistance, predator loss of diseased calves, and other subclinical disease conditions not otherwise manifested, can often be determined. A close alliance with management objectives permits identifying and correcting many herd problems that generally go unrecognized and unattended.

TABLE 3. Causes of Calf Loss in a Beef[a] (8,129 Calvings, 1969-82).

Calves Dead At Birth (Delivered Dead)[b]				
Age of Dam (years)	2	3	4+	Total
Cause of Death				
Abortion	10	5	19	34
Premature	5	1	5	11
Stillbirth	12	11	28	51
Dystocia	46	14	27	87
Other	5	4	14	23
Total Calf Deaths	78	35	93	206
Percent Calf Loss	5.23	2.77	1.73	2.54
Calves Died After Live Birth To Branding[c]				
Age of Dam (years)	2	3	4+	Total
Abnormal	7	0	13	20
Abomasal Ulcer	4	3	13	20
Rt Heart Failure	3	0	2	5
Bloat	1	0	5	6
Diphtheria	2	0	0	2
Enterotoxemia	6	5	8	19
Scours (Navel III)	43	36	75	154
Pneumonia, etc.	9	2	12	23
Subtotal	75	46	128	249
Other Causes:				
Exposure	1	8	8	17
Injury	27	5	34	66
Weak	4	2	7	13
Premature	4	1	1	6
Lost	1	1	3	5
Malnutrition	1	0	2	3
Displaced Gut	1	2	3	6
Predator	2	2	0	4
Unknown	14	7	37	58
Subtotal	55	28	95	178
Total After Live Birth	130	74	223	427
Total Calvings	1490	1265	5374	8129
% Loss	8.72	5.85	4.15	5.25

[a] Reference 18.
[b] Calves dead before or during delivery.
[c] Includes calves with any evidence of life at birth.

Difficult births are responsible for approximately two-thirds of the total calf death loss and previous studies indicate that the majority of calf losses could have been prevented with proper management.[12 14 15 18 19] The likelihood of a calf dying that is born during a difficult birth is four times greater than a calf born without calving difficulty.[14] There is delayed breeding and a lower conception rate in dams that suffered dystocia.[23 24] A high percentage of stillbirth results from prolonged labor.[25] Dystocia, when improperly handled predisposes the calf to injury and other losses such as scours, starvation and exposure.[18 25 26 27] Cows and calves surviving severe dystocia frequently have decreased performance. Therefore, the successful delivery of a calf should be measured by performance of the cow-calf pair at weaning, not by whether the calf is alive following birth.

Table 4 contains summary information on performance and calving ease for comparing relationships among birth weight, weaning weight, and calving difficulty. The information taken on first calf heifers substantiates relationships of pelvic area and birth weight to calving ease scores. Birth weight increased and/or pelvic area ratios decreased in

TABLE 4. Calving Ease vs Other Production Measurements[a].

Calving Ease Score[b]	(n)	Pelvic Area Ratio[c]	Birth Weight (lb)	Weaning Weight (lb)	Weaning Weight Ratio
1	162	102.7	62.7	398.2	99.6
2	85	100.4	68.0	414.1	101.1
3	45	96.6	71.8	408.1	97.6
4	10	91.8	69.0	427.0	97.9
5	8	98.1	76.8	411.9	95.6

[a] From Reference 39
[b] 1= unassisted, 2=easy hand assist, 3=hard hand assist, 4=calf puller,, 5=cesarean
[c] Pelvic Area Ratio is calculated as follows:

$$\frac{\text{Individuals pelvic area (cm}^2\text{)}}{\text{Average Pelvic Area of Group (cm}^2\text{)}} \times 100$$

relation to higher calving difficulty scores as expected. The mortality in this group of heifers, however, from birth to weaning was less than 2 percent which is far below average. One important question arises from this information related to this herd's productivity. Since the death loss was not greatly effected by calving difficulty, is it likely that some increase in calf birth weight could be tolerated in order to further improve weaning weights? How much emphasis can be placed upon selection of bulls for light birth weights to reduce calving difficulty without significantly affecting weaning weights? Data was summarized from another herd in a manner that helps answer this question somewhat (Table 5). This summary indicates approximately a 20 pound loss in weaning weight for each 10 pound drop in birth weight of the calf.

TABLE 5. Calf Birth Weight vs Performance to Weaning[a].

Birth Wt. Av/Range (lb)	No. of Calves (n)	Age of Dam (yr)	Age of Calves (days)	Average Gain (lb/da)	Weaning Weight (lb)	Weaning Weight Ratio
64.4/60-69	173	5.7	206	1.88	451	97
74.2/70-79	278	5.9	207	1.92	472	100
83.1/80-89	136	6.1	207	1.99	495	104
92.8/90-99	55	6.4	208	2.03	514	106

[a] From Reference 39

The magnitude of calving losses in the past due to dystocia, has led many producers away from their initial goal of efficient production. This has taken place partly because of the use of sires of large breeds in crossbreeding programs to improve growth, followed by selection of sires with small birth weights to avoid dystocia. Birthweight is not only related to dystocia but also has a moderate to high correlation with growth traits. Reducing dystocia by direct selection of low birth weights can decrease calf performance.[30] Prevention of an unreasonable frequency of severe dystocia is vital, but sire selection for calving ease must be widely balanced with calf performance following birth. The statement "dead calves do not gain well" provides a strong argument for selecting light birth weight sires, but poor performing live calves are not a desirable substitute for good calving management if increased production efficiency is the goal.

Information collected from one aspect of production can be related to other items of importance. For example, data collected from the herd of two year old heifers and their calves discussed in Table 4 were summarized to compare calving ease parameters with total plasma protein by refractometry (an assessment of passive immunity). The calves experiencing calving difficulty averaged 5.87 grams of plasma protein per 100 ml while the unassisted calves averaged 6.34 grams. Although this represents a relatively large difference, it is not known whether it is due to the stress of dystocia, calving assistance, force feeding colostrum or differences in the dams colostrum and milk production. In this case the proper assistance of calves during birth had no effect upon death loss or no measureable effect upon performance measured by weaning weight. Obtaining colostrum from the dam and administering it by stomach tube to the calf following every assisted delivery apparently provided adequate early passive immunity even though plasma protein levels were lower than those in calves not experiencing dystocia.

Unknown Fetal Loss

A more difficult category of loss to define occurs between the time of examination for pregnancy and birth. This fetal death loss, during the later two-thirds of gestation is due to the combination of observed abortions and undefined losses that are usually detected when pregnant cows fail to give birth by the end of calving season.

The number of unknown losses from one herd over several years has been summarized (Table 6). This category (cows diagnosed pregnant that failed to calve) is an important statistic that is easily overlooked. It may be related to incorrect pregnancy diagnosis, recording errors, undocumented abortions, fetal mummification, and other miscellaneous causes. Examination of all cows failing to calve during the calving season should be a standard procedure in order to correctly document losses and determine the cause as often as possible.

TABLE 6. Unknown Fetal Loss[a] (Diagnosed Pregnant—Never Calved.)

Year	Loss/No. Cows	(%)
73-74	9 / 633	1.42
74-75	8 / 598	1.34
75-76	6 / 499	1.20
76-77	3 / 575	0.52
77-78	3 / 570	0.53
78-79	3 / 572	0.53
79-80	16 / 603	2.65
80-81	11 / 584	1.88
81-82	9 / 622	1.45
Average	7.6 / 584	1.29

[a] From Reference 39

Improving Calf Performance

Certain segments of the production cycle can be changed to improve calf performance and increase weaning weights. Most of those discussed above are related in one way or another to this end. One of the more significant of these is to add to the number of calves born early in the calving season.[29] Recommendations have been made under limited breeding seasons of approximately 60 days to strive for 75% of the cowherd to calve in the first 21 days.[13] The advantage of this can be seen in Table 7 where the information from Table 4 is sorted by birth date of calves. Calves born in the first 15 days of the projected calving period were heavier at

TABLE 7. Date of Birth in the Calving Season vs Actual Weaning Weight Measurements[a].

Period of Birth[b] (days)	No. of Birth Calves (n)	Weight (lb)	Weaning Weight (lb)	Weaning Weight Difference
Early	24	59.2	411.0	—11
1-15	171	68.0	422.8	0
16-30	101	64.3	387.7	—35
31-46	27	66.7	379.3	—43
47-62	8	65.5	336.9	—86

[a] From Reference 39

[b] Based upon projected calving period divided into 15 day intervals.

weaning (unless somewhat premature) than those born later. The calving pattern can provide valuable information concerning reproductive efficiency, disease, nutrition and projected production information. Selection for cows calving early in the calving season in herds with limited calving seasons has clear economic significance and is favorably related to reproductive efficiency.[28]

The calving pattern can also be utilized to project bull requirements and aid in breeding season management. Bull management utilizing the breeding soundness parameters of percent normal cells and scrotal circumference combined with herd information on dominance, libido and serving ability collected and recorded from previous breeding periods can improve reproductive efficiency.[31 32 33 34 35 36 37]

As discussed previously, spending time to manage the calving season is one of the better areas for profitable return on time invested. Designing calving programs to detect problems early and provide professional supervision and assistance when needed can greatly improve the number of live, healthy calves and their performance.

Other methods involving the use of records to improve calf performance include the selection of outstanding herd bulls and replacement heifers, evaluating the benefits of growth promoting implants, supplemental nutrition for calves, various weaning practices and proper preventive health practices. Insidious production losses due to disease and environmental stress that are overlooked under conventional management can be greatly reduced. The importance of recorded data to define each area of production that can be improved, monitor individual animal performance, evaluate selection, management and preventive health procedures cannot be over-emphasized. The following is a direct quote from a recent article by Dr. Thomas E. Stein.[38]

> **"The most important tool, the thing that makes a health management approach work and be effective, is a record system. It is the hub of logical foundation of a professional approach because your objectives can always be evaluated in terms of results."**

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Questions & Answers:

Question: What is your method of operation?

Answer: The way we approach it in our practice is that we do an initial evaluation which takes into account the production goals for that operation, the facilities, the people, and the type of cattle they want to handle, and from that standpoint we project a time, which is how we do our fees, that we expect to spend at that particular operation. In my practice we are generally looking at being on the yard once every week or once every two weeks for a half a day, which is four and a half to five hours. It will vary. In the fall we may be on particular yards eight hours weekly. Our fees reflect that indirectly.

Second Answer: That's probably a good question. The answer depends greatly, as Dr. Jordan says, on the degree of expertise of the managers, per se, and the people who are there. We've got yards, "30,000 head yards" that require as little as 5 or 6 hours a month to those that require 5 or 6 hours weekly. On those that require a lot of time, and I hesitate to give you the amount, we try to charge by an hourly basis. We have certain clients that when you tell them what you're going to charge them per hour they call the abbulance right away and bring the defibrillators out after they do recover well enough to answer the phone! But I feel that if we can do that, and I'm expanding a little bit on your question, that the manager and/or the people in charge get essentially what they pay for. There's not any real question about whether or not, well, you only spent two hours with me the other day, or they don't ever remember the days you spent twelve hours. It's always, well, you were only here for 30 minutes. You flew over real low and looked at the cattle and were gone and sent me a bill. So what we tend to do as much as possible on those that require a lot of time, until we know how much time it's going to take, we charge an hourly rate and handle it that way and spend whatever time is necessary.

Question: How much time?

Answer: I would say you need at least five hours per month. We have yards that require more than that. Some of them want more and they are willing to pay. But to satisfy ourselves we want at least five hours a month. We want weekly yard sheets, weekly death loss recapped, and input as far as closeouts, and maintain an open phone line at all times. That generally is included within the fee structure that we discuss with them.

Question: Do you know of any cow-calf programs?

Answer: Dr. Deyhle, On the cow-calf end of it there are somewhere in the neighborhood of ten different programs that I'm aware of. They run basically from spread-sheet applications, which I think are minimal charges like $15 that handle some what I would consider minor considerations for cow-calf operators, up to about the most expensive one I've heard of was about somewhere in the neighborhood of $3500 which they included the hardware for you and they wouldn't give a price on the software in addition. The package we have is $350. It will be available through Texas Agricultural Extension Service. Oklahoma has a program and I think there are several other places that have them. In addition to the direct cow-calf programs, I will mention that through the Agriculture Extension Service at A&M there are probably somewhere in the neighborhood of 50 software programs that do a lot of the things that the speakers have discussed here today, in addition to a lot of accounting and other packages that are available. Most of them have spreadsheet templates to put on lotus or SuperCalc for accounting and pickup truck analysis, whether you ought to buy or sell this year on your truck, how much it costs you to run up and down the road every day with your pickup and trailer, and a lot of other little things like that.

Question: Could you discuss software packages?

Answer: Well I don't know a lot about different software packages other than the ones I've got and the ones that I have are ones that I read about or somebody talked me into or whatever. But the feedlot projection model that I used occupied 12,000 bytes or 12K in this little computer over here which has a total capacity of 32K. And that particular program is available from Agriware. Steve True and Chet Fields wrote that program and it's $150. Also you saw some of the word processing that that thing will do There is a ROM chip, or a read only memory chip that plugs into the bottom of the computer called a super ROM, made by a group called Portable Computer Support Group on Harry Hines Blvd., in Dallas, TX. They produce an ROM chip that costs $199 or $200 that does all my word processing, it has a telecommunications interface. The word processing deal is pretty neat in that it will format all the letters before you write them. You punch a button and it shows you on the screen what they look like and in the finished phase from page to page, etc., whereby you can read it and see how it's going to look on paper before you actually turn the printer on. It also has a fairly descriptive spreadsheet analysis in it called Lucid. I really honestly have not spent the time or the effort to learn how to use it. I'm aware of what spreadsheet programs do and I have not dedicated my life to computers. I realize there are those in the world who have and I haven't taken the time or the effort to learn to use that thing. I understand, based on what they tell me that it is basically the equivalent of Lotus 1-2-3, which is phenomenal considering the small size and portability of the unit involved.