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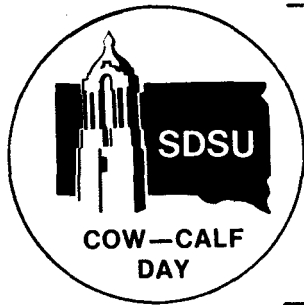
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Calculating Optimum Daily Gain for Wintering Replacement Beef Heifers

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Summary

A computer program has been developed to help producers compute the average daily gain needed for yearling heifers to achieve a desirable weight at puberty. It was assumed that 90% of the heifers in a breed group would be cycling when they average .6 of their expected mature weight. Users have the option of changing the .6 if they so desire.

Introduction

Research has demonstrated that weight of the yearling heifer is an important factor affecting puberty and initiation of the reproductive cycle. Work at several institutions including South Dakota State has demonstrated that rate of gain from weaning to start of the breeding season influences the proportion of heifers that settle. The objective of this project was to provide the producer with an easy way of calculating this desired rate of growth.

Procedure

Some recommendations for developing replacement heifer calves are based solely on daily rate of gain that should be achieved. This overlooks the year to year variation in initial weight that normally occurs. This computer program was developed utilizing average weight of heifers at the start of the feeding program, date of initiation of feeding and date of start of the breeding program. It was assumed 90% of the heifers in a breed group would be cycling when they reached .6 of their expected mature weight. Producers using the program have the option of changing the .6 if they have information relative to the actual percentage for their cattle. Using this information and estimated mature weights for the breeds involved, the computer calculates desired end weight and daily rate of gain required to achieve it.

Using the Program

All animals which will reach approximately the same mature weight should be fed together as a group. One daily rate of gain is computed for each group. Generally, groups will be split along breed lines with heavier breeds fed together and lighter breeds fed together. However, if there are different mature sizes represented within a breed type, it is important to place them according to size not breed. Place each heifer in the group which best fits her size potential. The program allows up to six different breeds per feed group and a crossbred heifer is considered as one breed.

The program contains the estimated mature weights of 12 breeds (table 1) and will compute this value for crosses of these breeds. The producer may use these program features or opt to use his own mature weight values.

Consider the following example: A producer wants to know the average daily gain needed for a herd of 60 heifers. Three breed types are represented. These include 25 Simmentals, 15 Charolais and 20 Angus x Hereford crossbred heifers. He estimates the two straightbred groups will have approximately the same mature weight and places them in one feed group and puts the crossbreds in another group. Average starting weights (weaning weights in this case) are 450 pounds for the purebred group and 425 pounds for the cross. The starting date for the postweaning feeding is October 26 with the breeding season to begin the following June 1.

The cross can consist of only two or three breeds. The producer will need to know the number of crossbred heifers, the number of breeds involved and the percent of each breed in the cross. The program uses a weighted ratio of the component breeds and a heterosis factor to calculate one mature weight for the cross. In the example, two breeds were involved, Angus and Hereford, making up 75% and 25% of the cross, respectively. The total for any cross must be 100%. If a cross has more than three breeds, use the three breeds with highest percentages and make them total 100%.

A data input form (table 2) is given at the start of the program. This enables the producer to have all needed data in front of him as the program is running. The sample data are shown in table 2.

The producer may use breeds which are not in the program, but he must then supply all pertinent weight data for that breed when the program asks for it. The program results for the example given in table 3 include breeds and numbers involved, breed percentages, starting weights and calculated puberty weights for each group along with the computed average daily gain. Group I of the example needs an average daily gain of 1.46 pounds to reach its average expected puberty weight of 769 pounds. The crossbred heifers in group II need to gain 1.05 pounds per day to reach 654 pounds, the cross' expected weight at puberty.

TABLE 1. BREEDS AND THEIR ESTIMATED MATURE WEIGHTS

Breed	Code	Mature wt (lb)	Breed	Code	Mature wt (lb)
Angus	Ang	1050	Shorthorn	Sho	1100
Charolais	Cha	1250	Simmental	Sim	1300
Hereford	Her	1125	Swiss	Swi	1250
Holstein	Hol	1300	Chianina	Chi	1400
Jersey	Jer	900	Maine Anjou	MAJ	1400
Limousin	Lim	1160	Gelbvieh	Gel	1160
Red Polled	Pol	1050			

TABLE 2. INPUT FORM CONTAINING EXAMPLE DATA

GROUP 1

TOTAL NUMBER OF HEIFERS IN GROUP 1 40.

STARTING DATE 10/26/79 . START OF BREEDING (DATE) 6/1/80 .

BREED	NUMBER	% OF BREED	STARTING WT	MATURE WT
<u>Simmental</u>	<u>25</u>	<u>100</u>	<u>450</u>	<u>—</u>
<u>Charolais</u>	<u>15</u>	<u>100</u>	<u>450</u>	<u>—</u>
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GROUP 2

TOTAL NUMBER OF HEIFERS IN GROUP 2 20 .

STARTING DATE 10/26/79 . START OF BREEDING (DATE) 6/1/80 .

BREED	NUMBER	% OF BREED	STARTING WT	MATURE WT
<u>Cross</u>	<u>20</u>		<u>425</u>	<u>—</u>
<u>(Angus</u>	<u>-</u>	<u>75%</u>	-----	-----
<u>Hereford</u>	<u>-</u>	<u>25%</u>	-----	-----
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TABLE 3. EXAMPLE PROGRAM RESULTS

Group	Breed	No.	%	Start- ing weight	Weight at puberty	Avg daily gain
I	Sim	25	100	450	780	
	Cha	15	100	450	750	
Group I Total		40		450	769	1.46
II	Cross	20		425	654	
	Ang		75			
	Her		25			
Group II Total		20		425	654	1.05