AGBU ANIMAL GENETICS AND BREEDING UNIT
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Technical Information Note I/1997

Structural soundness of replacement heifers in seedstock herds

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Maintaining or improving structural soundness is an important decision to both seedstock and commercial cattle producers. The productive life of cows and bulls is vital to overall herd profitability. Feet and leg structure are major components of structural soundness of an animal. This Technote reports on results from a recent study in several Angus seedstock herds regarding the use of feet and leg scores (measured on replacement heifers) to predict subsequent herd-life.

The Research Project

Feet and leg structure were scored on almost 3000 replacement heifers in 20 stud Angus herds over 3 to 4 years. Scores were taken by 2 trained technicians specifically employed for the project (AGBU Validation Project funded by MRC). This part of the project was undertaken to establish if any relationship exited in seedstock herds between feet and leg scores and subsequent herd-life of the heifer. The Angus Society inventory was used to determine for each heifer whether she was still active in the herd after a given time. Standard statistical procedures were used to identify factors that affected herd-life of a heifer.

Scoring feet and leg structure

The feet and leg structure of each heifer were scored on a 1-9 scale. A feet score of 9 described the perfect foot while a 1 represented a foot that would render the animal a cripple. A leg score of 9 represented the ideal leg structure. A l score described a leg with very poor angularity (either too straight or too bent). Earlier examination of the data reported the majority of the animals scored between 6-8 for feet and I~(J structure. Also the heritability of leg and feet scores estimated from this data were low to moderate (15-20%) indicating a small but significant genetic basis for observed difference.

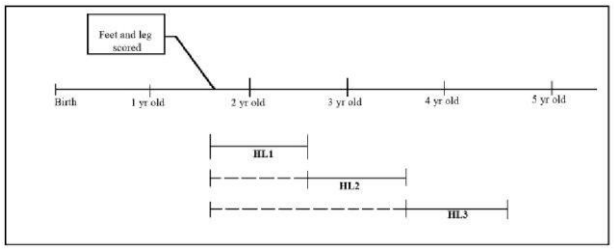
Defining herd-life traits

The first trait considered was whether or not the heifer was still active in the herd approximately one year after feet and leg scores were recorded and is referred to as herd-life to one year (HL1). If the heifer calved in the herd and/or the heifer was mated as a 2 year old then she was deemed to be active. However if the heifer was culled or transferred at the time of scoring or some time before she was about 32 months then she was deemed as not active (see Figure l).

The second trait was simply an extension of the first. If the heifer was active for HL1 it was then determined if she was still active in the herd 12 months later (HL2). Therefore any heifer culled or sold would be scored as inactive for HL2. Whereas she was considered still active in the herd if she calved as a 3 year old and/or had a mating record in the herd.

The final trait was then a further extension of HL2. If the heifer was active at HL2 it was then determined if she was active or not in the herd in the next 12 month period (HL3).

Figure 1: Defining herd-life traits



Results

Factors affecting herd-life:

HL1

About 35% of potential replacement heifers, scored at about 18 months of age, had left the herds within the first year. Large differences existed between studs and reflect differences in management and selection decisions regarding the amount of culling. Differences also existed from year to year within a herd, and possibly reflect yearly differences in the supply and requirements of replacements. Heifers that were heavier (and older) at the time of measurement had a higher chance of remaining in the herd. For example, a 400 kg heifer (at 19 months of age) had a 18% higher chance of remaining in the herd compared to a 350 kg heifer (15 months old). Interestingly there was an additional effect, on top of the age and weight, in that heifers from young dams were less likely to be in the herd after 12 months than from older dams. Our model only explained 26% of the variation. No affect of feet and leg structure on HL1 was observed.

HL2

Given that a heifer lasted in the herd for the first 12 months the percentage of those remaining after a further 12 months was 83% with 17% being removed. Once again large herd and year differences occurred. Also heifers that were heavier at yearling time were still slightly more likely to be in the herd after 2 years. The results also showed that leg scores significantly affected heifer survival to HL2 in some herds. For this analysis leg scores were grouped as either 'good' (scores 7, 8, 9) or 'bad' (score 6 or less). For example, results from one herd showed heifers with 'good' leg structure were 27% more likely to be in the herd at HL2 than those with 'bad' legs. In other herds no differences were observed. For example, in one herd 34 heifers out of 42 with 'bad' legs were still in the herd at HL2. The same percentage of heifers with 'good' legs also survived. However our model only explained 17% of the variation. No age of dam effect was detected suggesting that if a heifer got through the first year her mother's age was then irrelevant or forgotten.

HL3

Given that a heifer lasted in the herd for the first 24 months the percentage of those remaining a further 12 months was 78% with 22% being removed. As before, large herd and year differences were observed and these were the only effects identified as affecting HL3. However our model only explained 18% of the variation in HL3.

What does it mean?

Large numbers of replacement heifers are removed from seedstock herds after only a short time. Differences existed between herds in the severity of the removal. Leg structure was used as a selection/culling criterion in some herds, particularly in first calf heifers (HL2).

Heavier heifers had a greater chance of remaining in the herd. This is likely to be related to fertility, ie heavier heifers are more likely to get pregnant. Also this effect reflects likely selection for increased growth in these seedstock herds.

Obviously many culling/sales decisions are being made in these herds. However structural soundness was not a significant reason for culling of young heifers. This may be due, in part, to the fact that most of the animals at the time of measurement had acceptable structure. This allowed other traits to be considered in the selection process. Further, the data could not establish any relationship between bad structure and natural failure.

It may be possible that the herds are in fact placing more emphasis on structure at later ages than was detected, but it was not related to the scores taken at yearling. That is, an animal may break down in later life, but as a yearling had adequate structure. Better use of disposal codes and codes that allow for culling on structural soundness to be recorded could identify the extent of this problem in older cows. It should be noted that the first group of heifers measured in this project were from the 1989 drop with the majority of the data from 90-91 drop heifers. Therefore these animals are still only young cows and may not be old enough for differences in longevity to be determined yet. However of the total heifers measured at yearling only 51% remained after 3 years which is a substantial reduction.

This research suggests that feet and leg structure of young heifers is generally not related to the herd-life of cows up to 5 years of age. Perhaps in these years selection pressure is being placed on fertility and performance in the seedstock herds used in this study. Further research would be required to determine the relationship between structural soundness and longevity of cows in herds managed under commercial conditions.

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