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# MANAGEMENT NOTES

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## Freeze vs. Fire Branding as Methods of Beef Cattle Identification<sup>1,2</sup>

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### Highlight

Over a three-week period in April 1969, 200 Hereford females, ranging in age from 15 months to 10 years, were branded with their individual herd numbers on each side of the rib cage just behind the shoulder with either freeze or fire brands. The brands were evaluated for legibility on January 14, 1970, using the following scoring system: 1 = no visible numbers; 2 = visible numbers, but illegible; 3 = incomplete numbers, but able to understand after study; 4 = easily recognizable numbers, but with breaks or unbranded areas; 5 = instantly recognizable, complete unbroken numbers. Variation among brand scores was partitioned into age of cow, side of cow, type of brand and the two-way interactions between these three effects. Type of brand was the only significant source of variation influencing the brand scores, and the fire brands (4.35) were more legible than the freeze brands (3.75). However, it should be stressed that neither type of brand was legible at the time of evaluation without first clipping the brands.

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Finding a satisfactory method of identifying beef cattle has been a problem confronting producers for years and is a must for the producer who maintains and utilizes records on his cattle. Various methods of identification such as neck chains, ear tags and fire branding all have their advantages and disadvantages. However, to be reliable, any method of beef cattle identification should be permanent and legible at all times. Most neck chains and ear tags are legible but are far from being permanent. Neck chains often require adjustment and are subject to wear and eventual loss, while many types of ear tags are rather easily lost, especially when used on bulls. Fire branding serves as a permanent method of identification, but fire brands are not always legible on certain types of cattle, especially those which tend to have long hair growth during the fall and winter. To alleviate this problem, many producers resort to clipping of fire brands to increase their legibility during the winter. However, this can be a rather tedious and time consuming chore where large numbers of cattle are involved. To alleviate some of the problems often encountered with the use of either fire branding, neck chains or ear tags, freeze branding was developed with the idea that this method would provide a more reliable method of identifying cattle. This method has gained rather

widespread attention in recent years, and a limited amount of research work has been conducted with freeze branding but in most cases results are based on a limited number of animals.

The purpose of this study was to compare freeze branding with fire branding as methods of beef cattle identification when the comparison was made on a rather large number of breeding females.

### Materials and Methods

Over a three-week period in April 1969, 200 Hereford females, ranging in age from 15 months to 10 years, were branded with their individual herd numbers on each side of the rib cage just behind the shoulder with either freeze or fire brands. This particular site was chosen since the branding was done just prior to the beginning of a 75-day breeding season, and it was reasoned that if the brands were placed on the rib cage rather than the rump, there would be less sloughing of skin from the branded area, due to mounting by bulls and other cows as the cows came into heat. Also, branding on the rib cage just behind the shoulder provided more surface area on which to apply the large branding irons used for this study and, also, provides a quick way of locating a particular cow at feeding time during the winter (critical time for accurate animal identification in the herd in which study was conducted). As silage is fed during the winter, the cows will line up at the silage trough and drop their heads to eat; consequently, the brands are easy to detect by merely walking in front of the cows on the opposite side of the silage trough.

For this study, side of cow served as the experimental unit rather than each individual cow *per se*. To determine which side of each cow would be fire branded and which side would be freeze branded, the experiment was designed as a  $2 \times 2$  factorial arrangement of treatments in a randomized complete block design where type of brand (freeze vs. fire) and side of cow (left vs. right) served as the two factors and age of cow served as blocks. Side of cow was determined when standing behind rather than in front of the cow. The 200 Hereford cows were randomly allotted to the four treatments on a within age of dam basis. Allotting of cows to the four treatments permitted each cow to be either fire or freeze branded on either the right or left side. In addition, once a cow was branded according to her allotment in the factorial arrangement of treatments, the cow also was branded on the opposite side with the other type of brand. Thus, the individual herd number of each cow, which consisted of from two to four digits, was fire branded on one side of the cow and freeze branded on the other side. Variation among brand scores was partitioned into age of cow, side of cow, type

of brand and the two-way interactions between these three effects.

Five-inch copper-tipped irons were used for the fire branding and five-inch copper freeze branding irons were used for the freeze branding. The fire brands were heated using a butane branding iron heater and the freeze brands were chilled in dry ice and 95% ethyl alcohol 45 to 60 minutes before being used. Prior to freeze or fire branding, hair on the rib cage just behind the shoulder was clipped and excess "scurf" removed from the clipped area with a stiff brush. For the side of each cow that was freeze branded, the clipped area was wetted with a sponge dipped in 95% ethyl alcohol, and the freeze brands were applied immediately for a duration of 50 to 55 seconds. This time interval was chosen with the idea that if the freeze brands did not result in a regrowth of white hair, the brands would appear as legible scars in a manner similar to what occurs for fire branding.

Generally, one person did all the fire branding and one person did all the freeze branding. This provided for some partial confounding between personnel and type of brand; however, this procedure was deemed necessary, since the person doing the fire branding had previously had experience only with fire branding the person doing the freeze branding had previously had experience only with freeze branding.

The brands were evaluated first for legibility on January 14, 1970, just prior to the beginning of the 1970 calving season. This time was selected for evaluation since the need for accurate parental identification in the herd in which the study was conducted is greatest during the calving season. The following scoring system was used to evaluate the brands:

Score	Interpretation
1	No visible numbers.
2	Visible numbers, but illegible.
3	Incomplete numbers, but able to understand after study.
4	Easily recognizable numbers but with breaks or unbranded areas.
5	Instantly recognizable, complete unbroken numbers.

Due to long hair growth covering the brands at time of evaluation, neither freeze nor fire brands were legible so both sides of each cow were clipped prior to evaluation of the brands (Fig. 1). The brands were evaluated by one person immediately after the sides were clipped at a distance of 6 to 8 feet as each cow stood in a squeeze chute. Also, the brands were evaluated by another person from horseback three weeks later as the cows grazed on pasture. An average of the two scores was taken as the score for each brand. In the case where a cow's number consisted of two or more digits, all

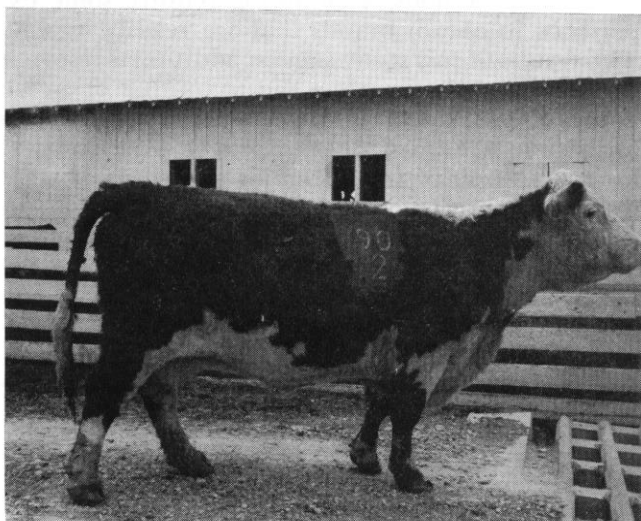
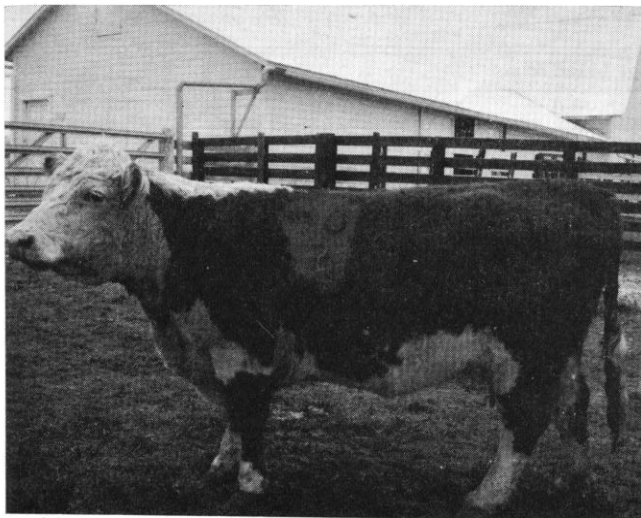


FIG. 1. Fire (upper photo) and freeze (lower photo) brands of cow number 90/2.

digits were evaluated together for legibility. For instance, if one or more of the digits of a four digit number were incomplete, but the other digits were legible, the entire brand was scored 3. This method of scoring was used since all digits of a number need to be legible for the branding procedure to be successful as a permanent method of identification.

### Results and Discussion

The average brand score for the 200 Hereford cows was 4.1, with an overall standard deviation of 0.9. This average score indicates that most of the brands were easily recognizable but also suggests that several of the brands had some breaks or unbranded areas. The distribution of average brand scores by type of brand is shown in Table 1.

Type of brand was a significant source of variation; whereas, age of cow and side of cow were

both nonsignificant sources of variation influencing the brand scores. Also, the age  $\times$  side, age  $\times$  brand and side  $\times$  brand interactions were nonsignificant.

Means for type of brand indicated the fire brands (4.35) were more legible than the freeze brands (3.75). The distribution of brand scores presented in Table 1 shows that 168(84%) of the fire brands were scored 4 or greater; whereas, only 106(53%) of the freeze brands were scored 4 or greater. Table 1 also shows that 32(16%) of the fire brands received a score of 3.5 or less which suggests that these brands were not very legible. In most cases, the numbers six and nine were responsible for the poor legibility of these fire brands. The same branding iron was used for both of these numbers and if the iron was overheated at the time of application, some blotching of these two numbers usually occurred. Since the lower part of the number six usually blotched as compared to the upper part of the number nine, no real problem was encountered in distinguishing between these two numbers. However, in certain cases, it was difficult to distinguish between a blotched six or nine and a blotched zero.

At the time the brands were evaluated, the presence of white hair on the freeze brands was slight, although most of the freeze brands did have some white hair growth present around the periphery of each number. In fact, the legible freeze brands were similar in appearance to the legible fire brands, except the presence of scar tissue was not as evident on the freeze brands as on the fire brands. No certain number tended to be responsible for the poor legibility of the freeze brands as was the case for the fire brands.

The literature contains no direct comparison between freeze and fire branding as methods of beef cattle identification; however, several workers have published information describing various freeze branding procedures (Farrell et al., 1966; Brown and Williams, 1968; Hooven, 1968; Schalles et al., 1968; Kambitsch et al., 1969; Ely and Launchbaugh, 1969; Farrell et al., 1969). After comparing dry ice plus ethyl alcohol and liquid nitrogen as refrigerants to chill steel, aluminum and copper irons for freeze branding of 60 adult Hereford cows, Farrell et al. (1966) concluded that freeze branding can be successfully accomplished on adult cows by a 30-second application of a chilled copper iron to the clipped skin wetted with alcohol using either refrigerant.

It is well to emphasize that the present study was conducted using Hereford females that tend to have long hair growth during the fall and winter, and the results obtained probably are not applicable to other breeds such as the Angus or to "slick-haired" females of the Hereford breed. As previously stated, the results suggest that the fire

**Table 1. Distribution of brand scores by type of brand.**

Type of brand	Average brand score <sup>a</sup>								
	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Fire									
No.	0	0	2	3	8	19	33	66	69
Percent	0.0	0.0	1.0	1.5	4.0	9.5	16.5	33.0	34.5
Freeze									
No.	2	6	12	16	25	33	36	25	45
Percent	1.0	3.0	6.0	8.0	12.5	16.5	18.0	12.5	22.5
Total									
No.	2	6	14	19	33	52	69	91	114
Percent	0.5	1.5	3.5	4.8	8.3	13.0	17.3	22.8	28.5

<sup>a</sup> Average of two personnel doing scoring.

brands were more legible than the freeze brands. However, it should be stressed that neither type of brand was legible at the time of evaluation without first clipping the brands. Hence, regardless of which method of branding works best under a given situation, it appears that both types of brands still have to be clipped during the winter to provide for prompt, accurate identification of the type of cows used for the present study. This clipping may not be necessary where cows are branded that have a relatively short hair coat during the fall and winter. Also, when used for identification of Angus cows, it is conceivable that freeze brands would require no clipping since the white hairs of the freeze brands should show up better than on Hereford cows.

When successful, freeze branding can be a very satisfactory method of beef cattle identification; however, freeze branding of a large number of cattle can be a tedious and time consuming process especially when the brands are applied for a 50- to 55-second duration as they were in the present study. To reduce the time required to freeze brand each animal, Ely and Launchbaugh (1969) used a multiple iron holder to freeze brand 300 Hereford steers. Time required to apply three number brands was reduced from 150 seconds when irons were applied individually to 40 seconds when the multiple iron holder was used. Of the 300 steers freeze branded, 231(77%) had legible brands eight months after branding, 30(10%) had brands marginal in legibility and 39(13%) had brands that could not be readily identified.

In contrast to the time required for freeze branding, fire branding can be done relatively fast; how-

ever, both methods of branding require some experience to obtain brands that are readily legible. The results of this study suggest additional research work is needed to perfect the technique of freeze branding beef cattle. It appears that additional information is needed on the proper time interval for application of freeze brands as well as at what time of the year would best results be obtained with freeze branding. Also, it is possible that more favorable results could be obtained by placing the freeze brands at different locations on the body. Hooven (1968) freeze branded 10 dairy heifers ranging in age from 3 to 15 months and noted differences in response between anatomical sites of the same animal.

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