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EVALUATION OF ESTRU$ ALERT®, KAMAR®, AND FIL® TAILPAINT AS AIDS FOR DETECTION OF ESTRUS

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Summary

Three estrus-detection aids were evaluated in beef heifers after synchronization of estrus with a typical melengesterol acetate (MGA)/ prostaglandin $F_{2\alpha}$ (PGF) protocol. Devices were applied at the time of PGF administration. Application time was longest for Kamar® patches, intermediate for Estru$ Alert® patches and FiL® Tailpaint, and shortest for controls. The degree to which the detection aids were activated at first observed estrus was dependent on the time of day when first observed and the type of device. A greater proportion of Estru$ Alert® and FiL® Tailpaint devices were 75% to fully activated when first observation of estrus was in the morning, compared with first observations in the afternoon. Time of day did not influence degree of Kamar® patch activation. At breeding, more than 90% of Estru$ Alert® and Kamar® devices were fully activated, whereas more variation in degree of activation was present in heifers with FiL® Tailpaint. Use of detection aids did not increase estrous-detection rate or AI pregnancy rates, compared with those of controls when visual observation was intensive. Use of detection aids still requires observation at least twice per day to time inseminations, because the degree of color change/activation is not consistently an indicator of time since onset of estrus.

Introduction

For artificial insemination programs dependent on heat detection, accurate identification of females in estrus is critical to the success of the program. A variety of heat-detection aids have been available over the years, and newer ones have joined the market. Electronic aids are available, but cost and more application challenges make them less practical for use in synchronization systems.

Colorado State University research has shown pregnancy rates twice as high as a result of using heat detection for 2 hours in the morning and evening and one hour at noon in a synchronized group of cows, compared with use of heat detection for 30 minutes twice a day. Even with the increased observation time, it is impractical to observe animals around the clock, and the limits of daylight hours generally mean that animals will not be observed for a large portion of the day. Estimates indicate that 29% of females initiate estrus between midnight and 6 a.m. For situations in which the value of AI pregnancies is high, use of relatively inexpensive, easily applied aids may help detect animals that only exhibit estrus during the dark. A challenge with most detection aids is that there are some gray areas in reading the devices, especially as the intensity of visual observations decrease.

[1]Sincere appreciation is expressed to Losey Land and Cattle Co. for their participation in this study and to Stan Robb for dedication and attention to detail during many hours of heat detection.

The objective of the current study was to evaluate estrus-detection aids for ease and time of application, variation in degree of activation at estrus and breeding, and benefits to heat-detection rates and pregnancy rates.

Procedures

Estrus was synchronized in 398 Angus and Angus crossbred heifers by feeding 0.5 mg daily of melengesterol acetate (MGA) per heifer for 14 days, followed by prostaglandin $F_{2\alpha}$ (PGF; 25 mg, i.m.; ProstaMate®) 19 days later. At the time PGF was administered, heifers received a Kamar® heatmount detector (n=96), an Estru$ Alert® patch (n=105), or FiL® Tailpaint (n=104), all according to label directions, or received nothing (control; n=93). Two of four pens received PGF on each of two consecutive days. Each treatment was applied to groups of 9 to 16 heifers before switching to the next treatment. A starting and ending time was recorded for each treatment replicate. One person operated the hydraulic chute and administered PGF, one applied detection aids, and a third loaded the alley.

Estru$ Alert® is a self-adhesive patch similar to a lottery scratch card. As the animal is mounted during estrus, the scratch-off silver surface is gradually removed to reveal a florescent layer underneath. The Kamar® heatmount detector contains a built-in timer that releases a red coloring when activated (requires a 3-second mount, according to company literature). The cylinder containing the dye is covered with an outer plastic layer that appears red when fully activated. FiL® Tailpaint is applied to the tail head from a convenient plastic bottle whose lid is an application brush.

Detection of estrus occurred in a manner consistent with previous years in which no detection aids were used. From approximately 36 to 144 hours after PGF administration during daylight hours, heifers were observed for estrus at least 8 hours per day. Before and after that time period, less time was spent. When a heifer was first observed in standing estrus, the detection aid was scored from 0 to 4, based on color change from initial application; 0=unchanged, 1=25% color change, 2=50% color change, 3=75% color change, 4=total color change. A second score was taken at AI. An effort was made to note lost devices and interpret partial color changes. Attempts to do this were only moderately successful because control animals were in the same pens, and marks made to identify control animals did not all remain intact.

Results and Discussion

The average time to administer PGF was 44 ± 3 seconds per heifer and was least ($P<0.05$) for control heifers. Estru$ Alert® and FiL® Tailpaint both required 59 ± 3 seconds per heifer, which was less ($P<0.05$) than the 75 ± 3 seconds for Kamar® patches. Less time per animal ($P<0.05$) was required for treatments on Day 1 than on Day 2. This difference may relate to the size of the treatment replications each day, 15 to 16 for Day 1 and 9 to 10 for Day 2.

The first day devices were applied, heifers were held in an alley way after being treated and before returning to their pens. In this situation, some tail paint did not have sufficient time to dry before being subjected to rubbing chins from heifers turning around in close quarters. The second day more room was given to the heifers when they left the chute, and this problem was prevented.

Three Estru$ Alert® patches and one Kamar® patch were lost within 24 hours of application. Two additional Kamar® patches and one Estru$ Alert® patch were missing, and four Kamar® patches were broken open (pressure-sensitive device gone) on heifers that had not been observed in estrus by 7 days after administrations of PGF. At the time devices

were applied, heifers were shedding, and notes were made of individuals with hair condition that might contribute to loss. None of these animals lost devices. A light mist present at the end of the second day of application did not seem to affect device retention. One heifer with an activated Kamar® patch was observed positioning herself so that she could rub the top of the patch under the top cable over the feed bunks. Heifers were in a feedlot setting, with no trees or branches near the pens.

The distribution of device scores when the heifers were first observed in standing estrus is shown in Table 1. Observers failed to record a score for 13.3% (31/233) of heifers. For Estru$ Alert® and FiL® Tailpaint, there was a larger proportion of scores of 3 or 4 at first observed estrus when estrus was in the morning rather than the afternoon. The proportion of heifers with Kamar® patches that scored 3 or 4 was similar, regardless of time of day detected. This likely reflects differences in the amount of activity it takes for full activation and the amount of activity that occurred before daylight in the morning. When standing estrus was observed in the afternoon, more Kamar® devices were fully activated at first observation than were FiL® Tailpaint applications. This likely reflects a more rapid change in color with one or two good mounts with a Kamar® patch.

Distribution of device scores at breeding (Table 2) were similar for Kamar® and Estru$ Alert® devices, with a majority fully activated. A greater percentage of heifers with FiL® Tailpaint had scores of 0 or 1 at breeding, compared with Estru$ Alert® and Kamar® devices. Of the 15 heifers that had a score of 1 at breeding, 11 of 15 (73%) were pregnant to AI. More experience with the amount of FiL® Tailpaint to apply would likely result in more consistent product removal. In addition, problems due to early paint loss in the alley on the day of application and the fact that untreated controls were in the same pens and lost their distinguishing mark, limit the reliability of our evaluation of the FiL® Tailpaint. Cost of FiL® Tailpaint is $0.15-0.20 per animal, compared with roughly $0.90 to $1.10 per animal for Estru$ Alert® or Kamar® devices.

Estrous response from PGF administration through 144 hours after PGF was 86.0%, 86.7%, 86.4,% and 85.6% for control, Estru$ Alert®, Kamar®, and FiL® Tailpaint groups, respectively, and did not differ among treatments. AI pregnancy rates during the same time period did not differ and were 60.0%, 57.1%, 64.6%, and 67.3%, respectively.

The FiL® Tailpaint and Estru$ Alert® patches were also used on a group of cows being fed MGA on pasture during late May and early June. Although there were some trees and brush in the pasture that could contribute to false readings, the fly season probably had the biggest impact on the effectiveness of the devices in these settings. The Estru$ Alert® patches were in a location on the cow's back where they could easily be brushed by the cow's tail swatting flies. A company representative later indicated that we should have positioned the devices closer to the tail during fly season to reduce this problem. The FiL® Tailpaint was a water-based version, and water solubility, particularly after wading into the pond for a drink, may have contributed to the rapid loss of tail paint that occurred in this setting. The oil-based version of the product likely would have been more appropriate in this setting. As used, neither device was very helpful over an extended period in a pasture setting.

Although the directions for the Kamar® patch indicate that a partial color change should be interpreted as positive, the manager at this commercial operation only inseminated one heifer in this category. In this instance, secondary evidence of mounting activity from an irritated hip brand was convincing. If an Estru$ Alert® patch is scraped accidentally by a hard object, a single mark is observed. Chances of an accident totally polishing off

the Estru$ Alert® patch are slim, making it much easier to identify a false positive. A fully activated Estru$ Alert® is very easy to see, and can aid the sorting process.

Table 1. Distribution of Device Scores at First Observed Standing Estrus when Estrus was First Observed in the Morning or Afternoon and Early Evening

		Device Score				
Item	No.	0	1	2	3	4
Detected before noon		---------- % (number) ----------				
Estru$ Alert®	45	2 (1)	16 (7)	7 (3)	20 (9)	56 (25)
Kamar®	46	17 (8)	13 (6)	7 (3)	4 (2)	59 (27)
FiL® Tailpaint	43	0 (0)	12 (5)	49 (21)	28 (12)	12 (5)
Detected afternoon and evening						
Estru$ Alert®	36	6 (2)	47 (17)	22 (8)	11 (4)	14 (5)
Kamar®	28	25 (7)	25 (7)	4 (1)	0	46 (13)
FiL® Tailpaint	35	3 (1)	37 (13)	46 (16)	6 (2)	9 (3)

Table 2. Distribution of Device Scores at AI

		Device Score				
Device	No.	0	1	2	3	4
		---------- % (number) ----------				
Estru$ Alert®	88	1 (1)	0	1 (1)	6 (5)	92 (81)
Kamar®	81	5 (4)	0	1 (1)	2 (2)	92 (74)
FiL® Tailpaint	92	1 (1)	16 (15)	33 (30)	28 (26)	22 (20)

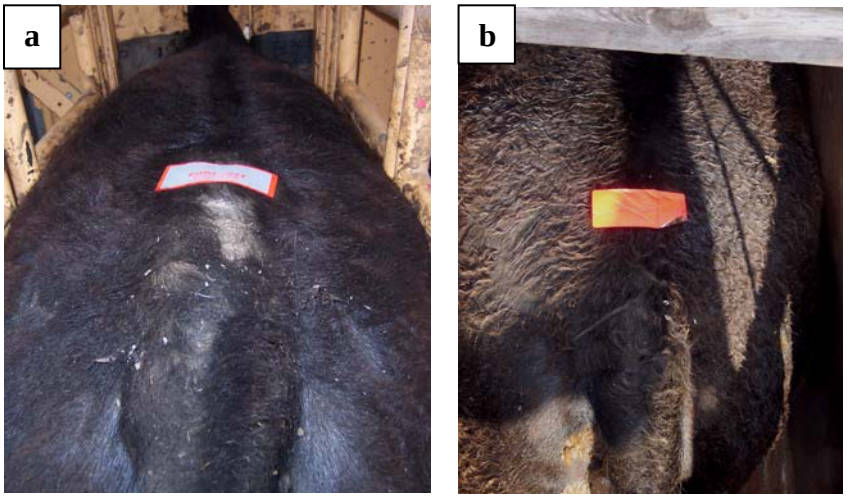

Figure 1. Estru$ Alert® Patch at Application (a) and AI (b; device score 4).

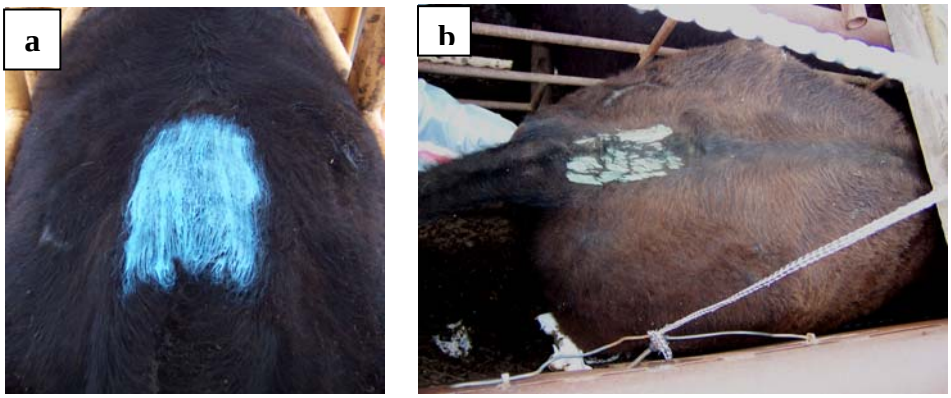

Figure 2. FiL® Tailpaint at Time of Application (a) and at AI (b; device score 1).

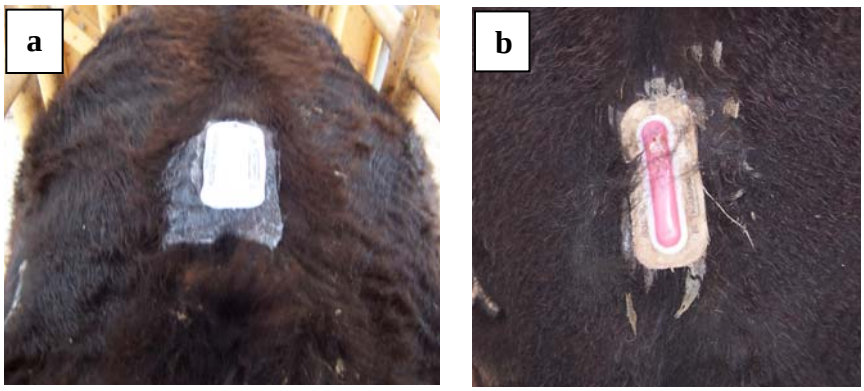

Figure 3. Kamar Heatmount Detector at Application (a) and at AI (b; device score 4).