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Ranch Logistics and Rancher Perceptions of the BioPryn® Blood Test for Pregnancy Determination in Beef Cattle

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Abstract: Pregnancy determination of beef cows is critical information that assists ranchers in keep/cull decisions, which impact profit margins. The declining number of large animal veterinarians may make access to pregnancy determination services more difficult. BioPryn® blood testing is a new method that can be accomplished without the assistance of a veterinarian. Ranchers received two presentations on BioPryn® and instruction on the bleeding procedure, and a ranch-level demonstration was conducted. Ranchers were evaluated for logistics of the practice, perceptions, and potential adoption. Knowledge of the method increased significantly. Ranchers are beginning to seriously consider BioPryn® or are already adopting it.

Introduction

Pregnancy determination of beef cows is critical information that assists ranchers in keep/cull decisions. These decisions relate to the largest cost associated with maintaining a cow for a year, which is winter supplemental feeding (Garrard & Glaze, 2008). Local evaluations have shown average hay costs in Navarro County, Texas are $143 per cow per year. The declining number of large animal veterinarians (O'Rourke, 2003) may make access to pregnancy determination services more difficult. BioPryn® blood testing is a relatively new method of pregnancy determination that can be accomplished without the assistance of a veterinarian. BioPryn® is a Yes/No test that measures the presence of a Pregnancy-Specific Protein B (PSPB) in ruminant animals. PSPB is produced by the placenta of the growing fetus and is detectable in the blood stream. The test assesses the optical density of blood samples as measured by calibrated laboratory equipment. The test can be used as early as 90 days post calving and 30 days post breeding. The test has proven to be 99% accurate on open animals and 95% accurate on pregnant animals with confirmatory testing (Carpenter & Sprott, 2008).

Materials and Methods

Ranchers in Navarro County, Texas received two presentations on BioPryn® and instruction on the bleeding procedure, and a ranch-level demonstration was conducted. Ranchers were then evaluated for logistics of the practice, perceptions, and potential adoption. In the demonstration, 32 crossbred beef cows were hand palpated by a veterinarian and blood tested by the county Extension agent for comparison. At the time of pregnancy checking, the cows were expected to be 105 days to 196 days post breeding (average = 151 days). All cows were worked through a squeeze chute/head gate, and an assistant tailed the cows. Vacutainers and needles were used to collect 2cc of blood from the tail of each cow.

Results

Demonstration Results

Three open cows were determined by palpation versus one open cow by blood testing. However, all three cows called open by palpation had significantly lower Pregnancy-Specific Protein B (PSPB) values than bred cows (Open = 0.152 versus Pregnant = 0.702). Thus, the cows called open may have been extremely short bred and had not bred back in the set 91 day breeding season. The primary discrepancy was detection at early gestational stages. Early gestational stages are more difficult to detect by hand and hard to anticipate without good breeding herd management (Carpenter & Sprott, 2008). In this demonstration, these cows would result in profit loss as they were not breeding and calving every 365 days.

Ranch-Level Logistics

The following logistics have been identified by the county agent and ranchers who have adopted the BioPryn® blood testing method.

1. Blood sampling takes practice and some cows are easier to collect (due to vein collapse and disposition).

2. Other activities (tagging, administering injections, dehorning) may cause a cow to be difficult to sample.

3. Help for moving cattle, working the headgate, tailing cows and marking the samples is prudent.

4. Multiple needle holders are needed as they become hard to see through and are easily broken if dropped.

5. The jugular vein on the neck could be utilized with proper restraint in lieu of the tail.

6. A palpation cage is not required as samples were obtained from the side access of the squeeze chute.

7. If there is enough time to collect samples this method is very feasible. In the demonstration, 44 cows were actually processed but only samples from 32 cows were collected as we did not want to slow down the overall process (veterinarian, day-workers, etc).

8. This method may provide cost savings as ranchers reported veterinarian palpation costs to be approximately $7.00/hd versus $4.32/hd in this demonstration (savings of $2.68/hd).

Rancher Perceptions

Ten ranchers (representing 5,680 acres and 512 beef cows) ranked the advantages of the BioPryn® blood test method. Items were ranked from 1 to 6, with 1 being the most important and 6 the least important.

#1 – Early Detection is Desired (Average ranking = 1.6)

#2 – To Save Money Compared to the Costs of Hand Palpation (Average ranking = 2.6)

#3 – Reduced Stress on First Calf Heifers (Average ranking = 3.1)

#4 – It is Hard to Diagnose the Outward Signs of Pregnancy (Average ranking = 4.1)

#5 – Double Check Diagnosis on Purchased Cows (Average ranking = 4.3)

#6 – It is Difficult to Schedule/Locate a Large Animal Veterinarian (Average ranking = 5.0)

Change in Knowledge

- 2010 Lab Presentation and Blood Collection Training (11 participants)
  - Participants characterized their knowledge as 'Non-Existent' to 'Poor' before the training and as 'Good to Excellent' after the training.

- 2011 Demonstration Presentation (26 participants)
  - Participants were evaluated for change in knowledge using a retrospective post evaluation with the following Likert scale: 1=Poor, 2=Fair, 3=Good, 4=Excellent. Percent Change was calculated using the following formula: [(After-Before)/Before]*100
  - 99.4% knowledge increase of the BioPryn® blood test (1.68 BEFORE vs. 3.35 AFTER)

Adoption of the BioPryn® Blood Test

Prior to formal evaluation, five ranchers had already confirmed adoption of the practice, pregnancy checking 412 heifers/cows using BioPryn®. Formal program evaluation results indicated the following:

- 46.1% (12 of 26) **DO** pregnancy check cows on an annual basis. Similar reports were found in Illinois (< 50%) and Virginia (50%) (Hall, McKinnon, Greiner, & Whittier, 2004; Parrett, Faulkner, & Varner, 1988).

- 21.7% (5 of 23) reported '**YES**', they will adopt the BioPryn® blood test.

- 65.2% (15 of 23) reported '**MAYBE**', they might adopt the BioPryn® blood test.

Conclusion

The BioPryn® method is an alternative to palpation and may become more important as the number of large animal veterinarians continues to decline (two have recently retired in Navarro County, Texas and remain un-replaced). BioPryn® may also be a tool ranchers can adopt who had not been pregnancy checking at all. This method of pregnancy determination requires a certain amount of practice but is very feasible for cattle producers to adopt. Five ranchers indicated that the time and labor constraint of re-gathering and/or re-sorting due to waiting on laboratory results was the primary logistical challenge.

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