Biography:
Dr. Colin Palmer is an Associate Professor of Theriogenology (Animal Reproduction) at the Western College of Veterinary Medicine. Originally from Nova Scotia, Dr. Palmer worked in mixed practices in Ontario and British Columbia and has owned/operated a practice in Saskatchewan. Dr. Palmer along with his wife Kim and children Lauren, Emily and Carter run a herd of purebred Red Angus cattle under the KC Cattle Co. name.

A Breeder's... Veterinary Perspective

Is Foot Measurement an Acceptable Method for Weighing Calves?

Purebred cattle breeders know that calf birth weights should be recorded within 24 hours of birth. The CalfscaleTM developed and patented in 1987 by Marshall Ruble, Beef Teaching Station Manager for Iowa State University represents a quick, easy, and inexpensive way to determine a calf's weight. By measuring the circumference of the calf's front foot at the coronary band (hoof-hair junction) it is possible to determine body weight based on a strong correlation between the hoof size of the calf and its weight. The tape is double-sided, one side for heifers, the other for bulls. Place it around the coronary band of a forelimb so that you are reading the appropriate side and pull it snug; an arrow points to the hoof circumference in centimetres and the corresponding weight in pounds. The tape can be easily folded and held in a pocket eliminating the need to transport scales to the pasture or paddock, or tote calves to the scale. Because it is made of vinyl, the tape is durable and washable which is especially good for those who forget to empty pockets on wash day.

Weigh scales are not without fault. Aside from being more expensive than the tape, spring scales are prone to rust or spring tension may vary over time. Electronic load cell-type, hydraulic and traditional balance beam scales all can become inaccurate. To maintain accuracy all scales should be checked periodically within weight ranges typically used. Calf birth weight can vary too – What if the calf is wet? What if it urinates? What about if it nurses? What about fluid loss simply from breathing? I have always assumed that natural fluid losses are probably compensated for when the calf nurses. In preparation for this article, I contacted the Canadian Angus Association, Canadian Hereford Association and the Canadian Limousin Associations to ask what their preferred method of determining calf birth is. All recommended the use of a weigh scale.

With a hunch that the heavier the calf the bigger the feet, the hoof circumference – body weight determination system was developed by first recording the hoof circumference and corresponding body weight of a group of calves as a single point on a graph. It was realized that not only were the hoof sizes for calves of given weight similar, but the relationship was also linear - heavier calves had bigger feet. Therefore, it was now possible to determine the approximate weight of a newborn calf by measuring its hoof. Like birth weights, weaning weight and yearling weights, hoof circumference and birth weight are positively correlated. The coefficient of correlation in this case, however, was very high at 0.84. A perfect relationship would have a coefficient of correlation of 1.0 which might occur if the weights of calves were recorded using two different weigh scales. Unfortunately, I was unable to determine the breed of cattle or the number of measurements that comprised the dataset used to develop the CalfscaleTM, but I am now aware that there is a tape available for dairy calves and one specifically for beef calves.

But is the CalfscaleTM ok to use instead of a scale? Last winter two of my colleagues, Drs. Joe Stookey and John Campbell, and I posed this same question. First we conducted a literature search to see if any other scientists had compared foot measurement at birth with conventional scales – we found 1 scientific study from Mississippi where four different methods for determining calf birth weight were compared on 587 calves of various beef breeds. Birth weights were recorded using a visual estimate; CalfscaleTM; a hanging spring scale and a small electronic digital scale. Birth weights collected using the spring scale and digital scale were the most accurate. Visual estimate and CalfscaleTM tended to underestimate high birth weights and the CalfscaleTM tended to overestimate low birth weights.[a]

We thought it would be fun to compare the CalfscaleTM with conventional weigh scales in our own area to see if our results were similar to others. Our dataset included 190 beef calves in three herds – my own Red Angus herd, our University of Saskatchewan Goodale Farm commercial Hereford herd and Joe's Speckle Park herd. Three new CalfscaleTM tapes were purchased and each herd utilized a different type of weigh scale. The scales varied from a digital livestock scale using load cell technology, to a spring scale with an easy-to-see digital readout, to a high quality bathroom scale placed on a level surface. In all 3 herds, the scales recorded heavier average calf weights than the tape. Overall, when the data were combined the average calf weight was a statistically significant 4.3 lbs heavier using the scale verses the tape (94 lbs vs. 89.7 lbs). Interestingly, our coefficient of correlation was identical to Marshall Ruble's at 0.84; however, we also noticed that as calf weight increased so did the difference between each of the measuring systems. In other words, the CalfscaleTM tended to underestimate high birth weights. The same finding reported in the Mississippi study.

So what can we can we conclude? The CalfscaleTM is indeed a simple and inexpensive way to determine the approximate weight of a calf and for commercial herds interested in recording birth weights or for determining birth to weaning gains it is a great tool. Personally, I found it tiresome throwing and sitting on calves verses walking them into a scale; but others might not mind. For purebred breeders submitting calf birth weight data to breed associations I believe we need to be as accurate as possible. Honest data submission for national cattle evaluations makes EPDs more reliable. The CalfscaleTM is arguably more objective than a best guess, but investing in a scale is better. Furthermore, the reality of purebred bull sales is that potential buyers are more likely to study actual birth weights rather than EPDs. A high birth weight can often greatly affect the price or salability of an individual animal. In the words of Anne Burgess, General Manager of the Canadian Limousin Association; there exists the 100-pound mental block – in many cases a bull with a birth weight over 100 lbs. will not sell. The reality is that there are many great calves with birth weights in the 90's and many more over 100, just look at our 94 lb. average. Let's be honest - lying about calf weights will always occur, but if you are serious about improving cattle performance through your breeding program then the recording accurate data is a must. Invest in a scale and share your records and knowledge with commercial producers.

a *Parish JA et al. Evaluation of four different methods of calf birth weight data collection. The Professional Animal Scientist 25 (2009):715-721.*