

Technical Bulletin #3

Diagnosing Empty using ReproScan Ultrasound Equipment

Ultrasound is being used to diagnose empty in North American dairy cows at 26 days. The presence of fluid in one or both uterine horns and a CL (corpus luteum) is used to diagnose pregnancy. These pregnancies are always rechecked at the next herd visit. The lack of a CL and no fluid or a very small amount of fluid is used to diagnose empty or as they say in North America, “open”. These empty cows are then enrolled in a hormone program to synchronize them for their next breeding. These hormone injection programs usually involve prostaglandin so accurate diagnosis of empty is imperative. No veterinarian would consider using their palpation skills to assess the pregnancy status of cows at 26 days post breeding.

“Arm in cow” ultrasound has allowed these experienced veterinarians to diagnose empty at 26 days post breeding. The detailed examine required for these 26 day pregnancy checks may not be practical in most Australian herds. None the less, the principle that ultrasound can detect pregnancies and empty uteri more accurately than palpation remains the same. Yet, there is controversy surrounding the use of ultrasound to diagnose empty accurately. Why is this?

Firstly, there are many different types of cattle ultrasound units on the market. All have different specifications and attributes that affect their ability to find and correctly identify the empty uterus. Sector scanners with 1 to 4 revolving crystals provide a large field of view but tend to have lower resolution which makes accurate detection of the empty uterus difficult. Almost 100% of veterinarians that use a sector scanner, palpate the empties to be sure that a pregnancy has not been missed. Individuals including contractors with minimal training who use sector scanners and who have poor palpation skills may be misdiagnosing the pregnancy status of the cows that they examine. Traditional linear rectal probes with 80 to 128 crystals firing at 5.0 to 6.5 MHz provide sufficient resolution to identify the empty uterus. This type of ultrasound equipment is used extensively by veterinarians in N. America and Western Europe. These veterinarians take the probe into the cow’s rectum by hand in order to examine the uterus carefully for pregnancy or “empty” starting at 26 to 32 days post breeding. The date for first examination after breeding will vary with the experience of the veterinarian, the resolution of the particular ultrasound unit and the management plans of the dairy or beef farm. Using a 5.0 to 6.5 MHz linear rectal probe on an extension arm presents several challenges. The area scanned by these probes is approximately 5.5 cm x 8 cm depending on the ultrasound unit and the settings used. It can be difficult to accurately scan over the entire uterus with this size of scan area while using an extension arm. Another concern with linear rectal probes is the flat contact surface with the cow’s rectum. This flat surface area makes it more difficult to get 100% contact with the rectum while doing a thorough “ovary to ovary” examination of the uterus. Fecal material may stick to the probe face and cause a temporary dropout of the image.

The ReproScan 4.0 MHz convex rectal probe addresses these issues. The increased scan area is approximately 3 to 5 times the scan area of a linear rectal probe. The curved contact surface of the probe allows for improved and safer contact with the rectum. These two features allow for a quicker and more complete “ovary to ovary” 180° examination of the uterus in empty cows and heifers. The resolution of the ReproScan 4.0 MHz probe is sufficient and the scan area large enough that multiple cross sections and/or longitudinal sections of the empty uterus can often be seen in one field of view. By

rotating the extension arm in the rectum in a precise manner, a complete examination of the uterus is often possible.

All of the above discussion relies on cattle veterinarians have a thorough understanding of the types of ultrasound equipment that are available to them. They need to understand the type of ultrasound scanning that their client require and then match ultrasound equipment to the services that they wish to provide. There are several skills that the veterinarian will need to develop to provide accurate extension arm scanning services for their clients:

1. Proper manipulation of the extension arm. This will develop with practice. Training programs are available to assist with development of these skills.
2. Recognition of the empty uterus on the ultrasound screen or goggles.
3. Quick arm in cow manipulation of the uterus and rescanning technique.
4. Aging of foetues based on measurements and/or visual recognition of stage of foetal development.
5. Recognition of manure consistency and its affect on the image quality.
6. Recognition of the limitations to aging pregnancies over 4 months and the method to scan these cows and age advanced pregnancies as accurately as possible.
7. Safety of the various extension arms in the rectum of the cow.
8. Biosecurity, safe handling and maintenance of the ultrasound equipment.
9. Develop of a backup plan (which is usually palpation) for correctly diagnosing cattle pregnancy status if the uterus is not visualized. This may occur in the following situations:
 - Freemartins and hypoplasia of the uterus in heifers
 - Anestrous, poor body conditioned cows with small uteri with little or no echogenicity
 - Very dry manure

ReproScan is committed to providing the best cattle scanning solutions for veterinarians in Australia. It is important to recognize that veterinarians around the world are using veterinary ultrasound equipment as a more precise way to diagnose the empty uterus rather than palpation. ReproScan ultrasound equipment makes the accurate diagnosis of “empty” with extension arm ultrasound possible and practical in most cattle scanning situations.

Case Study:

A cattle scanner is called to a farm in New Zealand to re-examine dairy cows that had been called “empty” by a team of three young veterinarians from a local veterinary clinic. Out of the group of 92 cows that had been previously called “empty”, 28 were pregnant. These 28 foetuses were aged in 5 day increments by the cattle scanner and the foetal ages ranged from 35 to 75 days. The team of veterinarians had scanned the entire dairy herd of 900 cows 28 days previously. The results showed that 16 pregnancies that would have been 35 to 47 days pregnant at the time of first scanning had been misdiagnosed as “empty”.

What went wrong? The team of three veterinarians had 2 different types of scanners and the third veterinarian was gloved up to palpate any cows that the scanning veterinarians did not find a pregnancy in. The team of veterinarians had been requested to find all pregnancies over 35 days by the farmer. As it turned out on the second ultrasound examination, the palpating veterinarian’s skills were not as good

as he thought he was and some pregnancies were missed. The scanning veterinarians were not as good as they should have been as some 35 to 47 day pregnancies were missed.

What is the solution to prevent this from happening again? Veterinarians should receive training specific to the ultrasound units that they are using. If a clear examination of the pregnant or empty uterus is not obtained quickly, the uterus should be manually manipulated and repositioned to one side of the pelvis canal and then re-examined with by extension arm ultrasound. A thorough examine of both uterine horns can usually be obtained by this method. If there are still questionable cows, the probe can be removed from the extension arm and a careful “arm in cow” examination can be performed.



Cross sections of the open uterus.

ReproScan 4.0 MHz convex rectal probe.

A thorough 180° sweep over the uterus should be made before calling this cow “empty”.

This technical bulletin was prepared by Andrew Bronson D.V.M. Please address all inquires and comments to Andrew Bronson by email: abronson@repro-scan.com.

Additional information is available on the ReproScan website: www.repro-scan.com

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