

Foetal Age Determination Using Portable Cattle Ultrasound Equipment

Determination of foetal age has been a challenge to palpators and ultrasonographers since these skills were first developed. We have all heard the stories of legendary palpators who could instantly tell when a cow was going to calve. Few of us have ever come close to achieving this legendary status. In order to provide accurate breeding and thereby calving date information, many modern day cattle ultrasonographers have developed proficient methods for the determination of foetal age. These methods include:

1. Examination foetal and uterine development to estimate foetal age based on the stage of development of the foetus and/or uterine/placentome development.
2. Freeze on a foetal structure and measure with electronic calipers. Calculate age from this measurement and relevant tables.
3. Estimate a measurement of a foetal structure using the ultrasound's scale or grid marks. Use this measurement to calculate age of foetus from tables or memory.

1. Examination of the foetal / uterine development to estimate the foetal age is a technique that can be provide accurate information quickly and easily. The principles are very similar to palpation in that the ultrasonographer must be familiar with the development of the foetus and the uterus during the stages of pregnancy being examined. Examination from 4 to 16 weeks of gestation is generally considered the range with the greatest accuracy. The foetus is often out of reach in the abdomen beyond 16 weeks. Age of foetus is usually determined by size of cotyledons at this stage and beyond which is much less accurate than examination of all or part of the foetus. The Repro-Scan technology with its convex rectal probe provides a larger field of view than many other ultrasound units. The larger field of view allows for more of the foetus to be viewed at once and thereby increasing speed and accuracy when using this aging technique. The Repro-Scan technology works very well with its extension arm which allows for the rapid, safe and much easier determination of foetal characteristics. Ideally, the ultrasonographer will have access to artificial breeding dates and/or bull exposure dates when learning this technique. Studying development charts and images is another method for learning to recognize the stages of foetal development. See the other side of this bulletin.

2. Freeze on a foetal structure and measure with electronic calipers is a technique that has been used by many researchers and veterinary ultrasonographers. This is the most accurate method of foetal age determination. It is primarily performed with "arm in cow" 5.0 to 6.5 linear rectal probes and ultrasound units such as the Aloka 500. Usually, an external freeze button is pushed by the ultrasonographer and a technician does the measurement on the main ultrasound unit. Considerable skill is required to learn to freeze on the foetus in order to get a representative measurement of the crown rump length or head diameter. These are the two most common measurements used.

3. Estimate a measurement of a foetal structure using the ultrasound units scale or grid marks works with many ultrasound units that have a scale on the side of the image. Some ultrasound units have a grid imbedded in the image or a grid can be added to the surface of the monitor as in the case of Repro-Scan. This method is a good way to learn foetal aging but is too slow for many scanning situations. Placing the credit card sized image of the 5.0 to 6.5 MHz probe when using an extension arm correctly over the fetus can be quite challenging.

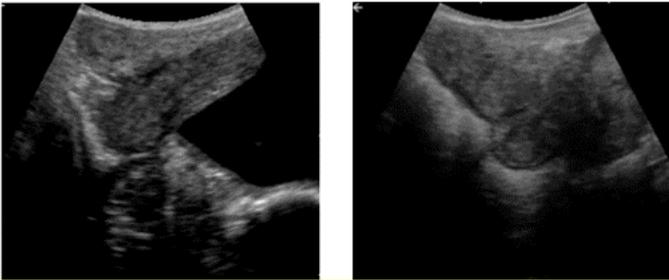
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Regardless of the method used, the determination of age of the foetus in order to predict calving date will continue to be a challenging part of cattle ultrasonography. Variations in length of gestation, variations in foetal development and errors in record keeping are all part of this challenge. Repro-Scan technology and access to training courses, still and video images and experience all help cattle ultrasonographers meet this challenge.

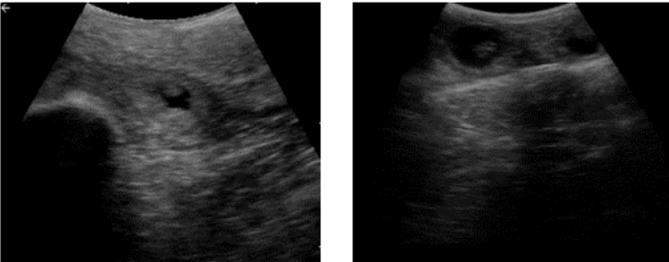
Please review the images and chart on the next page. Live video clips of these and other images are available at www.repro-scan.com website and at www.youtube.com/user/ReproScanCows. We plan to provide more images in the future which will help make learning this foetal aging technique easier to learn. We hope that other ultrasound trainers will embrace this technique and make training and training materials readily available.

Email comments and suggestions to Andrew Bronson D.V.M., Technical Services Veterinarian, Repro-Scan: abronson@repro-scan.com

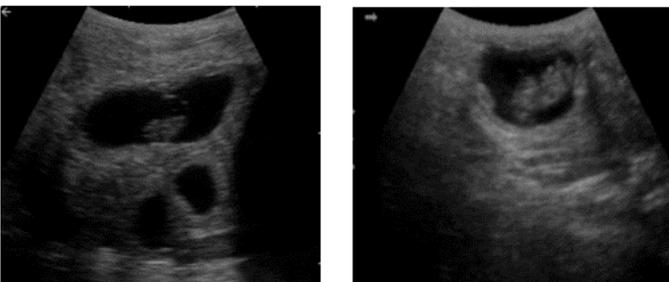
Foetal Age Determination Using **repro✓scan**® and Stage of Foetal Development



Empty Uteruses above. Multiple cross-sections are seen.

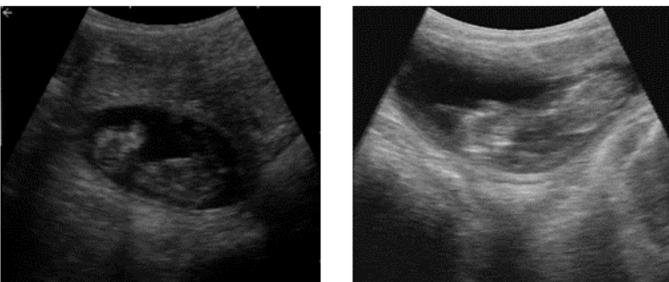


4 to 5 weeks. Multiple fluid filled cross-sections. The foetus may be seen.



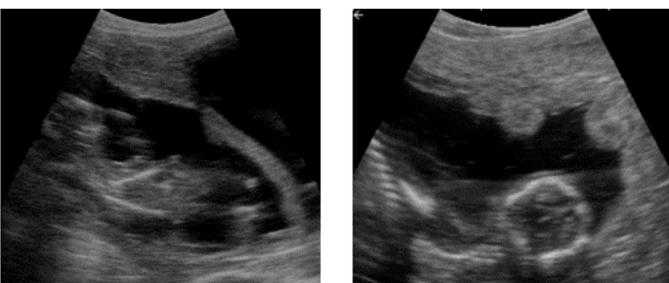
6 weeks

7 weeks



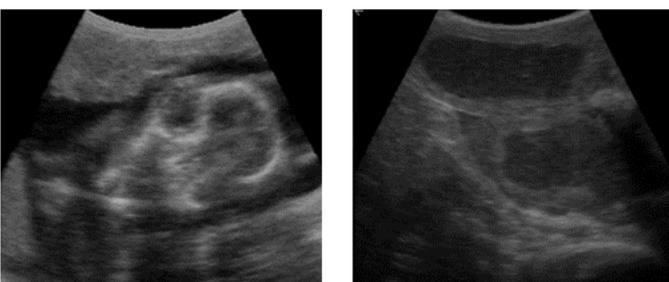
8 weeks

10 weeks



12 weeks

14 weeks



16 weeks

Pyometra

The empty uterus can be accurately determined with RePro-Scan's 4.0 MHz convex rectal probe while in the extension arm. The ultrasonographer must ensure that the 180 degree "sweep" over uterus has been complete. Ovaries may be seen. If a good "sweep" is not visualized, reaching in to reposition the cervix and then re-scanning is a useful technique.

4 to 5 week foetuses are not always detected. Diagnosis is often made on detection of multiple fluid filled cross-section of the uterus. Rechecking is recommended as early embryonic losses are more common at this stage.

At 6 to 7 weeks the head and early limb development becomes more visible. Text books will state that this development occurs sooner. On a practical level, head and limb visibility occurs at the 6 week stage when scanning conditions are good (moist manure) later with dry manure.

8 week — foetuses show a distinct head shape.
 9 week — distinct ossification of the head and ribs
 10 week — ribs are distinct, length of foetus is 10 cm and may fill the upper 1/3 of the scan area. The curvature of the probe is 6 cm. This is a good reference.

11 to 17 weeks — foetus becomes larger and fills field of view at 12 weeks and then becomes larger than scan area. Learn the relative sizes and development of organs and limbs.

Uterine Pathology may be present. An example is this pyometra.

The RePro-Scan 4.0 MHz Convex Rectal Probe has a 3 to 5 times larger scanning area than a traditional linear probe.

4.0 MHz Convex Rectal Probe

6.5 MHz Linear Rectal Probe

