Pregnancy diagnosis in feral camels

Australia is home to a vast resource of feral camels. Camel producers may seek to determine the pregnancy status of captured camels to increase flock sizes quickly and provide information to assist in management decisions. This fact sheet describes a simple and reliable method of pregnancy diagnosis using a single blood progesterone measurement. The method was developed and validated from the AgriFutures Australia research project *Determining the pregnancy status of feral camels*.

Feral camels can be dangerous to handle, and the rectal palpation and ultrasonography methods traditionally used to determine pregnancy are more difficult to perform, particularly if safe handling facilities are unavailable.

Reporductive biology

Female camels are induced ovulators (like cats) and ovulate in response to mating. Progesterone is produced by the corpus luteum in the camel's ovary and is essential to maintain pregnancy. In mated camels that do not conceive, serum progesterone is briefly elevated (>1 ng/mL) for 2-4 days. In contrast, mated camels that become pregnant have elevated levels of progesterone throughout the entire 13-month gestation. This means that a single measurement of serum or plasma progesterone is highly indicative for pregnancy at almost any stage of gestation.

Blood sampling

Blood samples can be easily collected from the jugular or the facial vein. Camels usually have an easily accessed and large superficial dilation of the jugular vein high up on the lateral neck. Vacuum tubes, either LiHep or plain tubes (10 mL) are ideal. Each camel will need a temporary or permanent form of identification so the blood test results can later be correctly assigned. Blood samples must be centrifuged (e.g. 10 minutes at 4200g) to separate the plasma or serum.

Progesterone measurement

The concentration of progesterone in serum or plasma sample can be measured using various immunoassay techniques. The method validated for camel serum during the project was on a miniVIDAS (Biomerieux, Australia) analyser. The miniVIDAS analyser is capable of running 12 progesterone assays simultaneously with highly accurate and repeatable results within 45 minutes. Analysis of replicates revealed only 3-12% coefficient of variation for physiological ranges, a sensitivity of >0.25 ng/mL and excellent correlation between camel and human serum. Progesterone was found to be very stable in camel serum and even samples stored at room temperature for 3 days measured the same as when freshly collected. If whole blood is to be stored for several days, refrigeration and serum/plasma separation is recommended to minimise haemolysis. Other laboratory methods of measuring progesterone may also be satisfactory for diagnosis of pregnancy. Camel serum reference samples are available to assist laboratories wishing to validate their own systems.

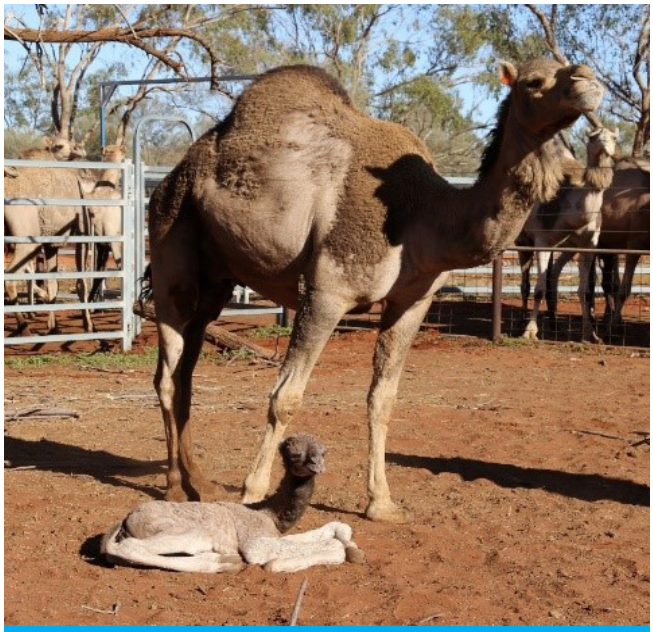

Figure 1: New born camel calf

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Cut off values for pregnancy

The minimum serum progesterone concentration consistent with pregnancy was 2.00 ng/mL, with an average of 10 ng/mL (n=150), using the miniVIDAS analyser. Other test methods may yield slightly different quantitative results, but high progesterone is almost exclusively found in pregnant camels. Very early pregnant camels (<3 weeks) may have notably higher levels of progesterone (10-40 ng/mL) although stage of gestation cannot reliably be determined from a single progesterone measurement. Non-pregnant camels typically have serum progesterone concentration of <1.5 ng/mL with an average of 0.65 ng/mL (n=66).

Practical tips

To pregnancy test a large group (e.g. 250 head) in a day, two testers are required; a blood sampler and analyser operator. Camel identification is critical as unlike manual pregnancy testing results are not given crush side; spray mark or ear tags are suitable. A dust free area away from the camel yards where the analyser can be run in controlled environmental conditions is necessary for field use. Reagent strips used in the miniVIDAS should be stored refrigerated but are unaffected by short term exposure (1-3 days) to typical room temperatures.

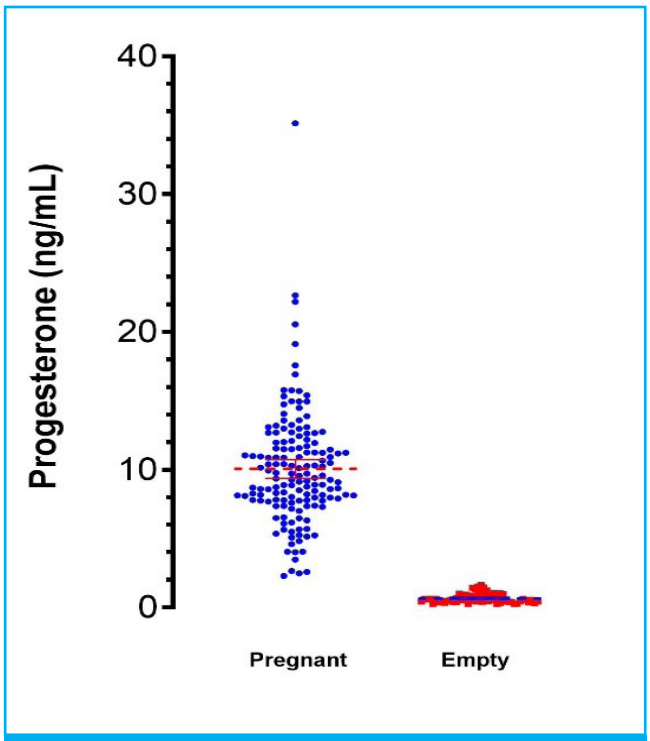

Figure 2: Serum progesterone concentrations measured by miniVIDAS in pregnant (n=150) and empty camels (n=66)

Conclusion

Measurement of progesterone in serum or plasma is a safe and accurate method of diagnosing pregnancy in feral camels.

Contact

Dr Andrew Padula
BVSc(Hons) PhD MACVSc DipECAR
Consultant, Padula Serums
mail@andrewpadula.net

Dr Margie Bale
BVSc MRCVS
Consultant, MB Vet Consulting
mbale@mbvetconsulting.com

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agrifutures.com.au/emerging-indutries

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