Abdominal ultrasonography in Red deer

Clive Bingham

Introduction

Ultrasound pregnancy testing of red deer using a rectal probe was first investigated in 1988 (Bingham et. al. 1988). This and subsequent work (Revol et. al., 1990) confirmed that the pregnancy status of red deer could be determined with a very high degree of accuracy (>98%) between 30-130 days of pregnancy.

In practice this does not always appear to be achieved. There have been a number of anecdotal reports of pregnant deer being sent to the works, after being scanned as dry. This could occur due to the following reasons:

1. Farmers dates are incorrect or inaccurate (ie. Stags taken out later or stags got back in after being taken out).

2. Vets scanning outside the 30-130 day range.

3. Poor equipment (rectal probe not able to be advanced far enough into rectum).

4. Not identifying the non-pregnant uterus.

5. Inexperienced operators (not enough training).

Because of these potential errors and the subsequent threat to the reputation of the technique, if these continue, I decided to look for a alternative and possibly more fool-proof method of pregnancy testing deer than by early rectal ultrasonography.

Scanning method and materials

My criteria for the alternative method were:

1. Simple to perform
2. Not require any restraint device (97% of our deer clients do not have crushes or races)
3. Be able to scan deer over a greater period of gestation with a very high degree of accuracy
4. Be safe for handlers and machine
5. Less invasive than rectal scanning

6. Use scanning equipment already available within a mixed practice; ie, able to be used on different species

The method chosen was an abdominal scanning technique having been employed successfully on fallow deer after 50 days of gestation (Mulley et al 1987). Some abdominal scanning of red deer was already being employed in very late pregnancy in Red deer by some operators in New Zealand.

To scan the deer, 3-4 hinds are run into a small room. Each hind is minimally restrained by holding onto its head (as for TB testing), with its back end directed towards the machine and operator. The operator advances his/her hand underneath the hinds abdomen while standing in front of the hind's lback eg with their weight leaning against the deer. The hair of the ventral abdomen is combed forward with the fingers until a bare patch is found. This is found in front of the udder just cranial or between the front two front teats. The other hand holding the lubricated probe is then placed on this point and a thorough scan of the abdomen in made.

Good tissue penetration is required for this technique to be performed in early pregnancy, therefore a 3.5 megahertz sector scanner was selected. This type of probe is commonly used for sheep scanning.

One mob of deer was scanned in 1995 in late pregnancy (October) with a 5 MHz probe. In 1996 nine mobs were scanned using the 3.5 MgHz probe attached to an Aloka 500 machine.

Results

1995

83 hinds were scanned on 9 October 1995. Eighteen non-pregnant hinds were identified. All were checked through the deer slaughter premise (DSP) and all were confirmed to be dry.

1996

A start time of 2 months in calf was arbitrarily selected to be earliest time pregnancy was likely to be diagnosed by this scanning technique. Scanning began in July and all drys that were detected and sent to the DSP were checked for pregnancy. If pregnant animals were present then a Crown Rump (CR) length was taken to assist determination of a more appropriate starting date for scanning or to identify were possible errors where occurring. Results are presented in Table 1.

Table 1. Description of deer scanned, and scanning results

No. of deer	Class of stock	No. dry at scanning	No. culled	No. pregnant at DSP	Age of foetus
8	poss dry	3	3	0	-
94	1st calvers	7	7	0	-
51	prev drys	2	2	0	-
47	1st calvers	7	7	0	-
41	selected	5	5	0	-
79	whole herd	5	4	0	-
45	whole herd	5	2	0	-
50	1st calvers and selected	7	7	1	89 days
98	1st calvers	32	32	1	67 days
513		73	69	2	

Specificity of technique

The specificity is the likelihood of the animals that are scanned dry in fact being dry, which in this case is:

$$67/69 = 97\%$$

The sensitivity of the test can not be determined at this stage but given the fact that pregnancy is only confirmed once placentomes or a part of the foetus is detected, the sensitivity is likely to be just as high, if not higher than the specificity.

Starting date for scanning

The two hinds which were diagnosed pregnant at the works both had foetuses under 3 months of age. This points towards a starting time for scanning of 3 months after the stag has been removed from the hinds. This was subsequently confirmed by one hind, which was scanned in calf at a stage I regarded as being the earliest I could detect pregnancy with this technique. This hind was slaughtered and a foetal crown-rump length of 460mm was recorded. This would equate to a foetal age of just over 90 days.

Conclusions

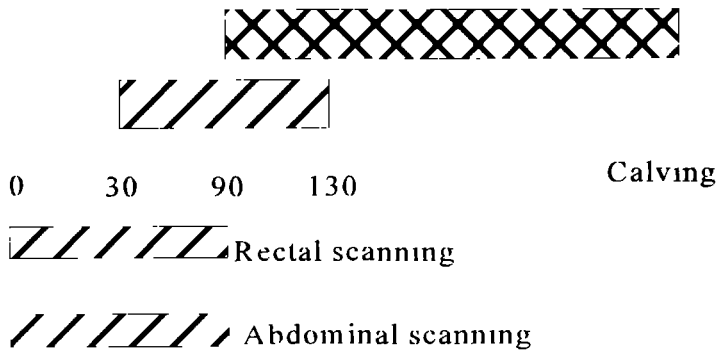
The abdominal scanning technique is a very accurate method for pregnancy testing Red deer (specificity=97%). It is easy to perform, requiring no restraint devices and it is noninvasive.

The time during pregnancy which the deer can be scanned is much greater than that allowed for rectal scanning. This permits the technique to be used in those herds where the calving span is likely to be spread out, without fear of missing those early calves which have descended deep into the abdomen. It also allows the farmer more scope to use the technique in response to sudden market changes.

Abdominal scanning reduces the problem associated with inaccurate mating dates, although it does not totally eliminate them. Therefore farmers still need to be informed where mistakes are likely to be made. The dry uterus cannot be detected by this technique due to the lack of tissue penetration therefore eliminating the need to look for it. This means inexperienced operators are less liable to make mistakes.

I do not believe the abdominal scanning technique supersedes the rectal technique, but simply gives us another option that we can use to satisfy our clients needs. Where crushes and races are available and stock management is good (ie. accurate mating dates and compact calving pattern) then rectal scanning can be used in early pregnancy, with confidence, provided the non-pregnant uterus is identified. Where no restraint devices are available or where deer are likely to be more than 130 days pregnant the rectal technique should not be used and the abdominal technique adopted. In some situations deer may be scanned with both techniques to further reduce the risk of error.

Schematic representation for the timing of rectal and abdominal scanning of red deer



References

Mulley RC, English AW,Rowlinson RJ & Chappel RS (1987) Australian Veterinary Journal **64**,257

Bingham CM,Wilson PR & Davies AS (1988) Proceedings of the deer course for veterinarians Number 5 New Zealand Veterinary Association Deer Branch p41

Revol B & Wilson PR (1990). Rectal ultrasonographic pregnancy diagnosis and foetal ageing of Red deer, Massey University