ARTIFICIAL INSEMINATION OF DEER: CERVICAL AND LAPAROSCOPIC TECHNIQUES

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When contemplating methods of insemination of deer there is currently only one viable option - laparoscopic. After three years of field trials with cervical AI we are no further ahead in terms of results than when we started. We have, however, learned a great deal in the interim and are determined to undertake further research to attempt to improve current results.

1. Cervical Insemination

Some of the difficulties experienced to date evolve from an inability to detect oestrus. We are therefore faced with "fixed-time" insemination which has not proved optimal in other species either. We have learned over the years that the depth of penetration through the cervix has a strong influence on success. We are achieving only complete cervical penetration in approximately 25% of deer.

We have incorporated the use of GnRH and Prostaglandin along with various administration times of PMSG into our synchronisation routine. Success rates range between 0-50% conception. This field work has incorporated some 2000 inseminations with our best efforts reaching 40% for some small groups but proving unrepeatable in subsequent years.

Future work will concentrate on oestrus detection and semen dose rates along with some timing options. Basic programming to date has included 12 day synchronisation with CIDR's, PMSG at withdrawal or 24 hours before withdrawal, and insemination 48 hours after CIDR withdrawal. Some earlier work incorporated double insemination at 48 and 60 hours. Results from double inseminations proved similar to those for single inseminations and are therefore not commercially acceptable.

We have found a definite disadvantage in other species when inseminating intracervically at the oestrus immediately after CIDR withdrawal. Inseminating at the next natural heat has enhanced results by 15-20%. I would expect a similar increase with deer if oestrus detection was practical. We believe the major problem in this area revolves around sperm transport difficulties. The presence of males during synchronisation may also play an important role in ovulation rates. To date we have recommended that teasers are included in the programme but I would expect that very few breeders have teasers available and this issue also requires clarification.

2. Laparoscopic Insemination

To date we have inseminated approximately 2800 hinds laparoscopically. Results range from 25% to 75% using frozen semen and 40% to 75% using fresh semen. Many factors

1. Effectiveness of synchronisation.
2. Hind management and facilities.
3. Semen handling
4. Insemination procedure.

2.1 Synchrony

In the main CIDR's have been used to establish synchronisation. The programme has included 12 day placement, administration of PMSG at CIDR withdrawal or 24 hours before, and insemination at 54-56 hours after CIDR withdrawal. Earlier work involved the use of either one or two CIDR's and in some cases replacement of CIDR's at day 9. There appears to be no significant difference between these regimes in our experience. A single goat CIDR appears satisfactory.

It has been suggested previously that hinds have the ability to "remove" CIDR's once inserted. I would suggest that loss of CIDR's is due in the majority of cases to incorrect placement; the CIDR must be placed over the pubis into the anterior vagina to ensure retention. The use of goat or sheep applicators is not recommended. Most operators have fashioned their own applicators to ensure correct placement of CIDR's. Adequate lubricant must be used and the tail of the CIDR must be well inside the vulva. Don't cut the tail off as it may cause discomfort and irritation. In large programmes withdrawal of CIDR's should be staggered with a maximum of 30 per hour being removed. Hinds should then be inseminated in the same sequence as withdrawal. The administration of PMSG does not appear to be so important in terms of timing.

2.2 Hind Management

The standard of preparation and condition of hinds is vital to the success of an AI programme. Hinds need to be in good fit condition and not over-fat, but the most important factor is to ensure hinds are on a rising plane of nutrition from well before insemination day. Our recommendation is to wean calves at the same time as CIDR insertion (or before). Provided adequate feed is supplied a natural increase in body weight will occur to coincide with weaning. This however only gives a 14 day "flushing" effect, which may be adequate. Quality of feed is just as important as quantity.

Since hinds will be handled on many occasions during the programme, good facilities and management will be reflected in results.

2.3 Semen Handling

Semen which takes hours to process and freeze can be destroyed in a matter of seconds by poor handling. We recommend thawing at 35°C for a minimum of 30 seconds. Good semen thaw units are available and should be used. Damage to sperm cells can be avoided by ensuring that the thawing apparatus and all equipment used is maintained at the same temperature. The transfer of semen from the warm thaw unit to a cold syringe and then to a warm recipient causes cell damage and a general lowering of results.

Protection of the tip of the pistolette before insemination should also be ensured as inseminating directly into the horn of the uterus does not provide the natural filter that the cervix natural service does. Blood at the site of insemination should also be avoided.

2.4 Insemination Procedure

Good facilities are vital to a smooth insemination programme. Sheds should be inspected before insemination day. Power, water and a concrete area must be available. A well lighted concrete area with suitable pens for anaesthetic and recovery purposes will ensure a good flow of animals and people during the day. Hinds should be held off feed and water for a minimum of 6 hours before insemination.

We have been using a "Rompun"/"Fentaz" mixture for anaesthetizing the deer, this combination is reversed after insemination. A minimum of noise and activity around the anaesthetized hinds will assist with response. We normally drug groups of 4-6 hinds at a time and two "feeder" pens for this purpose will maintain continuity. Hinds should be left a minimum of time between drug administration and insemination because bladders tend to dilate while anaesthetized, and this interferes with the ease of laparoscopy.

After insemination, hinds are placed in a clean yard, treated with drug reversal agents and antibiotic, and allowed to wander outside onto clean pasture once recovered.

During insemination we have observed the tone and colour of the uterus to gain some indication of the synchrony and timing influence. Generally turgid, firm horns indicate a positive response to synchronisation and induction of oestrus. If the horns are pale and slack we have recommended to the breeder not to use valuable semen in these hinds, as that indicates failure to come into oestrus.

3. Summary

Cervical insemination has not yet yielded acceptable results.
Results will improve for all types of AI if better heat detection methods are developed.
Management and facilities contribute to good results.
Frozen semen must be thawed and handled correctly.

4. Acknowledgement

It would be incomplete to discuss deer AI without reference to the co-operation and financial contribution that has been made by the breeders involved over the past three seasons, namely, the members of the Monarch Group and Graham Carr N.Z. Ltd and Proutings Mesopotamia Ltd., especially when considering the cervical programmes which were of little advantage to those involved.

The many hours of planning and recording contributed by Noel Beatson is also acknowledged. His vast knowledge of deer has contributed in no small way to the success of laparoscopic AI.