Cervical AI techniques for fallow deer

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Introduction

Deposition of semen in the cervix of a fallow doe can be achieved without the need for anaesthesia. With the appropriate equipment (Figure 1) and adequate physical restraint of the doe, intracervical AI can be performed cheaply and rapidly. However, success of the technique, in terms of resultant pregnancy rate, can be variable, especially when using frozen-thawed semen. Correct procedure is essential to ensure appropriate placement of semen in the reproductive tract. However, once good procedure has been aquired by the inseminator, does can generally be inseminated at a rate of about one doe every 1-2 minutes, depending on the efficiency of the handling facilities.

Use of cervical AI

Intracervical AI is a cheaper option to laparoscopic intra-uterine AI, and is generally used for deposition of less valuable semen (i.e. < $70 straw) or for blanket insemination of large numbers of does with fresh semen from local bucks. The technique is certainly best suited to fresh semen, as spermatozoa that have not gone through the rigors of cryopreservation are generally more robust than frozen-thawed spermatozoa, and are better able to passage through the cervical lumen.

A likely scenario for the use of cervical techniques is when the farmer wishes to dramatically increase the number of progeny from one or more of his/her resident bucks. A single ejaculate may be collected in the morning, diluted out, loaded into the appropriate number of straws and inseminated intracervically within 12 hours of collection.

Oestrous synchronisation

As with any form of AI in fallow deer, oestrous synchronisation is an essential component of the intracervical programme. Our standard procedure involves the intravaginal placement of a single type-G CIDR device for 14 days. Treatment must be performed after the onset of natural rutting activity (mid-April) for an optimum oestrus/ovulatory response to CIDR device treatment. We also prefer to run the does with vasectomised bucks (1 buck: 50 does) during CIDR device insertion and for 10 days following device removal (recent evidence suggests the buck presence is not absolutely essential but we still prefer to use vasectomised buck to maximise chances of good conception rates).

Recent studies suggest that the optimal timing of intracervical AI of fallow deer does is about 12 hours before ovulation (Jabbour *et al.* 1991). Given that does show oestrus on average 48 hours after CIDR device removal, and ovulate 24 hours after oestrus (i.e. 72 hours post-device removal), the optimum timing of AI should therefore be **60 hours post-device removal**. This contrasts with intra-uterine techniques, whereby AI is performed 10-12 hours later.

Does should not be subjected to any stressful procedures in the interval between CIDR device removal and insemination. We prefer to yard the does for AI as little as 30

minutes prior to the start of inseminations. Any undue stress before AI can delay oestrus and ovulation, disrupting the temporal association between semen deposition and ovulation. This would serve to reduce fertilisation/conception rates.

Pregnant Mare Serum Gonadotrophin (PMSG), which is used in other species to aid synchronisation, **must not be used for synchronisation of fallow deer.** Fallow deer are very sensitive to PMSG and, even at low doses (< 100 I.U.) it has a tendency to dramatically reduce conception rates even though it may appear to improve synchrony.

Semen quality and concentration

Only good quality, robust semen should be used for intracervical AI in fallow deer. For use of fresh semen, we would recommend the deposition *of at least 25x10^6 (25 million) live spermatozoa* per doe. We have gone as low as 12.5x10^6 spermatozoa with good results, but this may be a little risky in an on-farm situation. A good ejaculate should provide between 40-80 inseminations at the recommended semen dosage. Should the ejaculate prove to be even better than expected, increasing the dosage of spermatozoa per inseminate would improve chances of high conception rates.

For use of frozen-thawed semen, we would recommend using only the most robust of semen (i.e. > 75% post-thaw motility, with > 40% motility after 3 hour incubation at 37°C) that has been processed to a concentration of no less than 50x10^6 (50 million) spermatozoa per straw/inseminate. In our experience, the best semen for intracervical usage following cryopreservation has been from F1 Mesopotamian x European hybrid bucks. Certaintly, this is the only cryopreserved semen sold by the Ruakura Artificial

Breeding Centre that is stated to be suitable for intracervical AI (loaded at $50x10^6$ sperm per straw).

Insemination technique

(1) **Doe restraint:** Does must be securely restrained for intracervical AI - failure to do so could lead to injuries to both the doe and the inseminator. It is preferable that the inseminator be able to access the does genital region directly from behind. This greatly facilititates visualisation of the *os cervix* and passage of the pipette tip into the cervical lumen. We have worked on a number of farms where the crush/cradle is able to be manouvered to suit the inseminator, thus alleviating the need of the inseminator to contort his/her body in order to place the speculum and to see the *os cervix*. Most commonly, the crush/cradle containing the restrained doe can be pivoted towards the inseminator for direct genital access. The use of chemical restraint (i.e. sedation, anaesthesia) should be avoided for intracervical techniques.

(2) **Visualisation of the os cervix:** The *os cervix* is located visually with the aid of a lighted speculum (Figure 1). The speculum is inserted gently into the vagina following liberal application of obstetric lube gel, and the *os cervix* identified. The insemination pipette is passed through the speculum and the tip of the pipette is weaved gently into the first 0.5-1.0 cm of the cervical lumen. Semen is deposited in this region - attempts to penetrate deeper into the cervix may cause minor haemorrhaging into the cervical lumen, to the detriment of sperm viability.

Following semen deposition, the pipette and speculum are withdrawn, and the doe returned to pasture.

Post-insemination management

Does should be returned to their base paddock as soon as insemination is completed. Do not induce any additional stresses over the next 2-3 days. Replacement of the vasectomised buck with the fertile "chaser" bucks normally occurs 8-10 days after AI, at a buck: doe ratio of between 1:10 to 1:20.

As with all forms of AI in this species, ultrasonographic pregnancy diagnosis is normally performed between 40 and 50 days from AI.

References

Jabbour, H.N., Veldhuizen, F.A., Green, G., Langridge, M. and Asher, G.W. (1991) Fertility of fallow deer (*Dama dama*) does following synchronisation of oestrus with CIDR devices or prostaglandin. *Proceedings New Zealand Society of Animal Production* 51: 147-151.

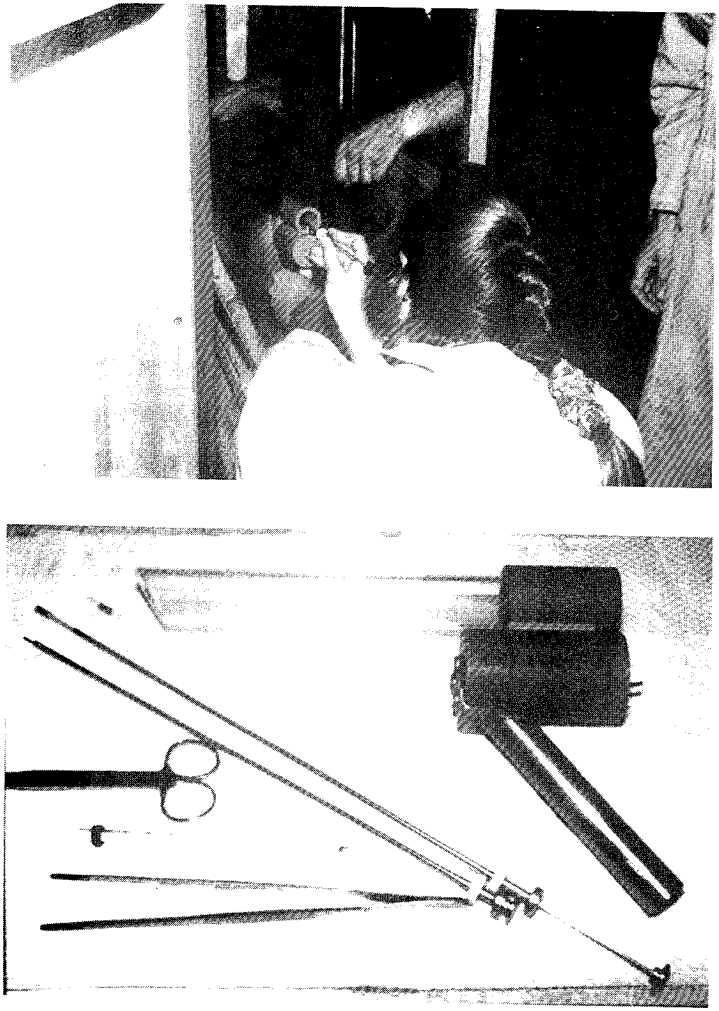

Figure 1: Speculum and pipette for intravcervical AI of fallow deer (available from the Ruakura Engineering Development Group, Ruakura Agricultural Centre, Hamilton, NZ).