TIME COURSE OF OOCYTE MATURATION, FERTILISATION AND SPERM TRANSPORT EVENTS IN RED DEER (*Cervus elaphus*).

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An increase in deer farming and captive propagation of endangered species have stimulated interest in applying artificial breeding techniques to deer. However, there is no basic information on gamete/embryonic physiology for any deer species. This study determined timing of oocyte maturation, fertilisation, sperm transport and motility events in red deer (*Cervus elaphus*).

Time to peak LH (PLH) from CIDR device withdrawal was determined in synchronised (12 d CIDR + 200iu PMSG) mature red hinds (N=26). Time to oestrous onset (OO) from device withdrawal was recorded. Reproductive tracts were surgically exteriorised at various times after estimated PLH (range 0-36 h). Preovulatory follicles were aspirated, and ampullary (A) and isthmic (I) regions of oviducts were flushed separately. Recovered follicular and ovulated ova were fixed and stained with 1% lacmoid. Sperm motility was recorded on video.

Mean±s e.m for OO and actual PLH following device withdrawal were 39±1 h and 37±1 h, respectively. Ovarian morphology, ovum recovery and sperm recovery data are presented below:

Actual PLH (h)	No.	Ovarian morphology (n)	Ovum recovery (n)	Sperm recovery
0-6	3	7-8mm F	GV (2)	I (non-motile)
7-12	3	5-7mm F	M1 (1)	I (non-motile)
13-18	7	10mm F	GV (1), M1 (1), M2 (1)	I (non-motile, FP, CM), A (FP)
19-24	5	7-10mm F (2)	M2 (3)	I (FP, CM)
		OV (3)	A (1)	A (FP)
25-30	5	7mm F (1)	2PN (3)	I (CM)
		OV (4)	A (1) I (2)	A (FP, CM, HA)
31-36	3	OV (3)	1PN (1), 2PN (1)	I (CM, HA)
			A (1) I (1)	A (CM, HA)

F=follicles, OV=ovulations, GV=germinal vesicle, M1=metaphase 1, M2=metaphase 2, FP=forward progressive, CM=circular motion, HA=hyperactivated

The majority of oocytes had meiotically matured (M2) by 24 h post-PLH (range 16.5-25.5 h). Mean time from PLH to ovulation was 20±1.5 h, with the earliest ovulation at 18.5 h. Fertilisation was first observed in an ovum recovered from the ampulla at 27.5 h post-PLH. All ovulated ova had lost their cumulus oophorus by the time of recovery. Sperm had reached the oviduct as early as 8 h after OO, but were all non-motile. Forward progressive motility was first observed in the isthmus 8.5 h after OO. Two other types of sperm motility were also observed: circular motion (CM) and hyperactivation (HA,"figure-8" motility pattern). One hind exhibited all three types of sperm motility at 28.5 h post-OO. After 31 h post-OO (and post-PLH) no FP sperm motility pattern was observed in any hind.

These data demonstrate that, in general, gamete maturation and transport in female red deer reproductive tract follows similar patterns to those of other ruminant species, in that: meiotic maturation is complete by 24 h after PLH; ovulated oocytes rapidly lose their cellular vestments; fertilisation appears to occur shortly after ovulation; a rapid transport phase of non-viable sperm is followed by establishment of a population in the isthmus; hyperactivated sperm move from an isthmic reservoir to the ampulla.