

# *The reproductive cycle of* **FALLOW DOES**

Little research effort has previously gone into the annual reproductive cycle of female Fallow deer. The Ruakura data presented in this article by G.W. Asher of Ruakura Animal Research Station, provides useful background information for Fallow deer farmers and a base for future research on control of the breeding season.

## Puberty in does

There is no doubt that the majority of does ovulate and conceive for the first time at 16 months of age, although occasional doe fawns do so at five to six months of age. The threshold puberty weight has been variously assessed at 28 to 30 kg. However, most Fallow deer farms attain average weights in excess of 34 kg, placing most individuals above the threshold.

## Events leading up to first oestrus of the season

Fallow does come into breeding condition in autumn in response to shortening day length. Before the onset of first oestrus ("heat") a number of physiological events occur as seen by changes in progesterone (pregnancy hormone) secretion from the ovaries (Figure 1a). Most does have a series of "silent ovulations" (ovulations not preceded by

behavioural oestrus). These ovulations occur at 9 to 12 day intervals, a considerably shorter period than for a normal oestrous cycle (see later). At a certain point in the breeding season ovulation is accompanied by oestrus and the earlier silent ovulations have helped to synchronise this first oestrus.

## Onset and spread of first oestrus

First oestrus matings recorded on Ruakura during the 1983 and 1984 rut are shown in Figure 2. As mentioned in the previous article in this series, the spread of first oestrus corresponds to the frequency of buck "groaning" during the rut.

The onset of oestrus occurred between April 15 – 25 each year and there are indications that variation between Waikato farms, and between years, is small. The actual spread



▷ of first oestrus is only about two weeks, roughly corresponding to the interval length between successive silent ovolutions. Pubertal does (16 months) appear to be about seven to eight days later in oestrus than older does. This may account for the slightly later Ruakura rut in 1983, as most of the does were yearlings (Figure 2).

**Table 1: Oestrous cycle lengths for Fallow and Red deer**

| Cycle number | Fallow deer (NZ) |                          |                    | Red deer (UK) |                          |                    |
|--------------|------------------|--------------------------|--------------------|---------------|--------------------------|--------------------|
|              | No.              | Mean cycle length (days) | Standard deviation | No.           | Mean cycle length (days) | Standard deviation |
| 1            | 33               | 21.0                     | 0.64               | 29            | 17.8                     | 1.7                |
| 2            | 33               | 22.0                     | 0.66               | 21            | 18.2                     | 1.7                |
| 3            | 33               | 22.9                     | 0.97               | 14            | 18.8                     | 1.7                |
| 4            | 28               | 23.0                     | 1.11               | 7             | 19.1                     | 1.1                |
| 5            | 12               | 23.5                     | 1.45               | 4             | 18.3                     | —                  |
| 6            | 3                | 25.7                     | 1.53               | 2             | 19.0                     | —                  |
| Total        | 142              | 22.4                     | 1.30               | 77            | 18.3                     | 1.7                |

### Oestrous cycle length

In the absence of mating or conception does will continue to come into oestrus at regular intervals. This was monitored on Ruakura by running does continuously with a vasectomised buck fitted with a ram mating harness. The recorded oestrous cycle lengths for different cycles are presented in Table 1 along with similar data for Red deer.

While the oestrous cycle length of Fallow deer is about three days longer than that of Red deer, it is considerably less variable early in the breeding season. In both species, oestrous cycle length increases, and becomes more variable, as the breeding season progresses. Cycle length in Fallow deer does not appear to be related to doe age or liveweight.

### Duration of the potential breeding season

Does are "seasonally polyoestrous", which means they will only cycle at a certain time of the year. From the Ruakura study, does cycled from April to October (Figure 1b). The maximum number of oestrous cycles recorded within that period was six. However, there was a significant age effect upon the number of cycles with younger does having fewer oestrous cycles, and hence a shorter breeding season, than older does (Table 2).

### Conception

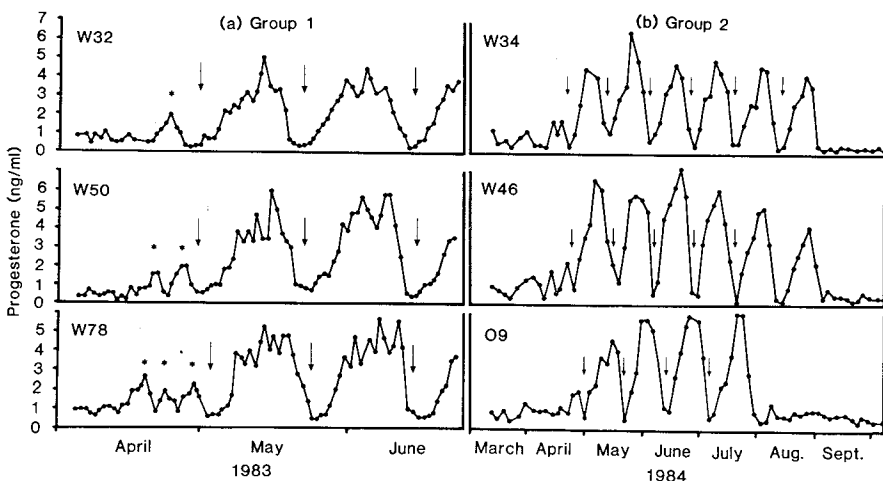
Continual cyclic activity in Fallow does is, in nature, a rare event. Conception at first oestrus is as high as 85 per cent, and 95 per cent by second oestrus. Only a few does conceive at subsequent oestrus. Pregnancy suppresses further cyclic activity.

**Table 2:**

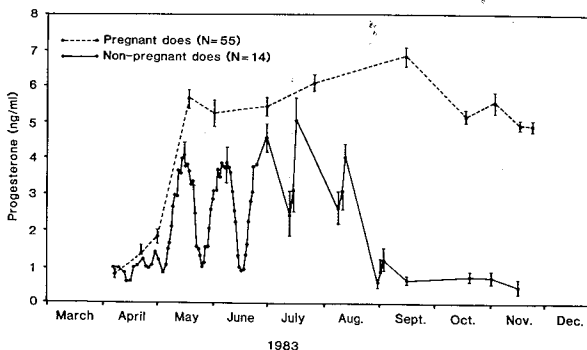
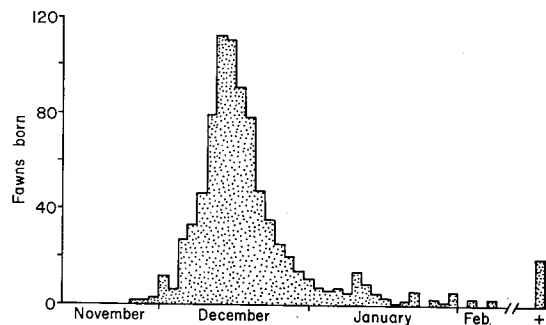
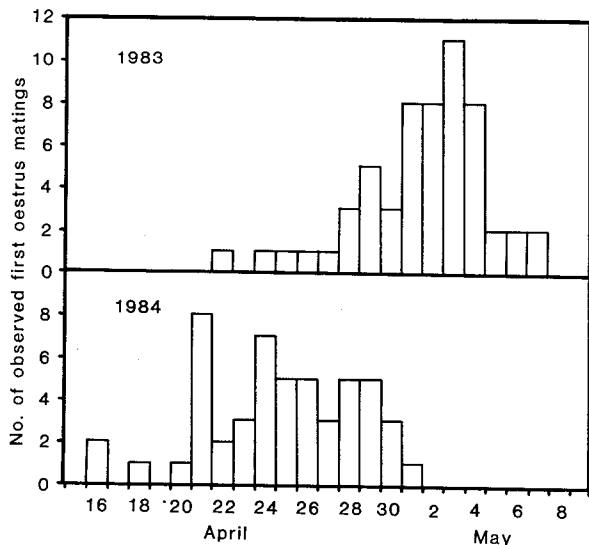
| Doe age (mths) | No. of does | Mean no. of cycles | Standard deviation | Mean date of first oestrus (SD) | Mean date of last oestrus (SD) |
|----------------|-------------|--------------------|--------------------|---------------------------------|--------------------------------|
| 16             | 9           | 3.56               | 0.53               | 2 May (2.8)                     | 20 July (12.4)                 |
| 28             | 17          | 4.24               | 0.56               | 27 April (4.5)                  | 30 July (12.5)                 |
| 40+            | 7           | 5.43               | 0.54               | 24 April (3.3)                  | 25 August (15.1)               |

### Pregnancy and gestation

The ovaries of pregnant does maintain a relatively high, constant output of progesterone. Non-pregnant, cycling does show regular 21 to 22 day pulses of progesterone until oestrous cycles terminate between July and October (Figure 3).



# ANIMAL BEHAVIOUR



Between mid-October and mid-November, there is a significant difference in progesterone levels between pregnant and non-pregnant does. This may allow for a valid late-term pregnancy determination by veterinarians, as it only requires a single blood sample. However, diagnoses earlier in the year would require serial blood samples in order to detect non-pregnant, cycling does.

The gestation length (mating-fawning interval) of Fallow does is 234.2 ( $\pm 2.7$  SD) days, based on 88 observations of mating and fawning on Ruakura. Gestation length appears to be unaffected by year, doe age, sire, fawn sex and fawn birth weight.

### The fawning season

The birth dates of all Fallow fawns born on four Waikato/Bay of Plenty farms between 1980 and 1984 are shown in Figure 4. The data are pooled by farm and year without any correction for median birth dates.

The high synchrony of first oestrus among Ruakura Fallow deer seems to be reflected in the synchrony of the fawning season on other farms. Of interest is a discernible second peak in birth dates that roughly corresponds to an oestrous cycle length (21 to 22 days) from the main peak, suggesting births resulting from second oestrus conceptions in a small proportion of does. Occasional births as late as March probably result from conception at later cycles, but only account for 2 to 3 per cent of births.

### Summary

- Doe puberty at 28 to 30 kg (16 months),
- "Silent ovulations" precede, and help synchronise, first oestrus,
- Pubertal does are about seven to eight days later in oestrus than mature does,
- Oestrous cycle length is 21 to 22 days,
- Non-pregnant does can cycle up to six times between April and October,
- Conception of first oestrus is about 85 per cent, and 95 per cent by second oestrus,
- Gestation length is 234.2 $\pm$ 2.7 days,
- Fawning starts in early December and the tight fawning pattern reflects the high synchrony of first oestrus.

**References:** Guinness, F., Lincoln, G.A. and Short, R.V. (1971). The reproductive cycle of the female Red deer. *Cervus elaphus* L.J. *Reprod. Fert.* 27: 427 - 438.