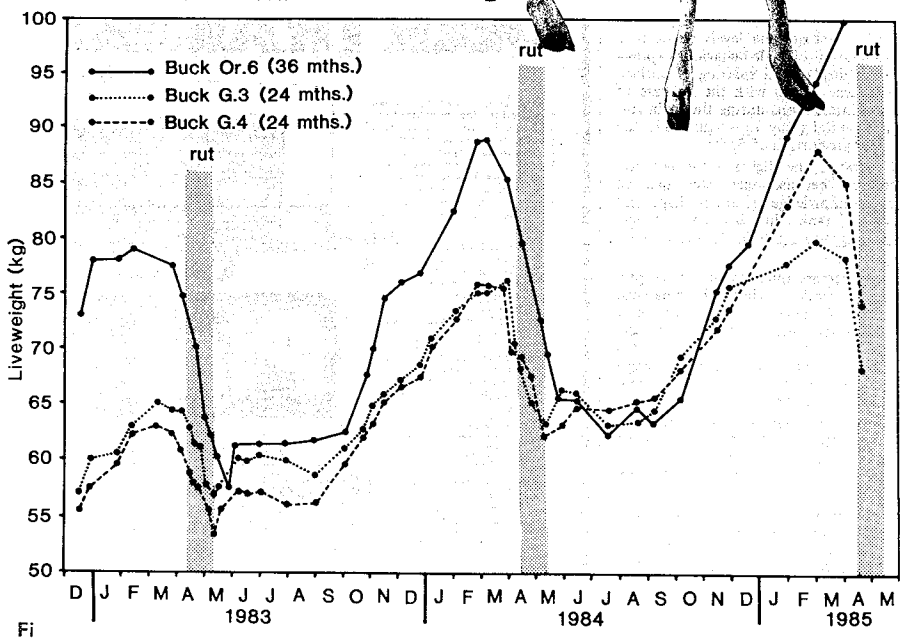
THE FALLOW DEER RUT

The roar of Red stags during the breeding season is a familiar sound to all deer farmers. By comparison, 'groaning' of Fallow bucks is less conspicuous, but their rut is no less remarkable in its intensity. In fact in the available reports, the Fallow deer rut is generally defined in terms of readily seen sexual behaviour of the bucks, with little consideration given to oestrus (heat) of the does. In this article, the first in a series on Fallow deer farming, G.W. Asher and R. Kilgour, Ruakura, outline the major events and responses of both sexes during the breeding season. Most of the information is based on observations of the Fallow deer at Ruakura.

Right: *Polled sire buck (G4) during the 1983 rut. The ram mating harness proved successful for detecting oestrus does.*

Below: *The liveweight profile of Ruakura bucks used as sires in 1983 and 1984.*



1985

▷ **The buck:** The annual liveweight cycle of mature bucks (Figure 1) is closely related to the annual sexual cycle. Rapid weight gains during late spring, summer and early autumn (October-March) are mainly due to accumulation of subcutaneous and depot (e.g. around kidneys) fat. Utilisation of this fat starts two to three weeks before the rut, (late March) and liveweight plummets from then until the end of the rut in May. There is some recovery after the rut, but essentially bucks remain in poor condition, in terms of body fat, until October.

As can be seen from Figure 1, rutting bucks can lose up to 25 per cent of their peak March liveweight by the end of May. This is due to a decline in grazing activity and increases in vigorous, energy consuming activities brought on by hormonal changes (e.g. testosterone). Figure 2 summarises some of these activity changes for the three bucks (Figure 1) used as sires at Ruakura in 1983. The male 'groanings' were recorded independently as they occurred during all other activities (even grazing!). These results are superimposed with the number of does observed mated on each day.

Assuming these profiles are typical of rutting bucks, then clearly, the proportion of time spent feeding decreases from early April and reaches lowest levels during the onset of groaning activity. In addition, the amount of time spent walking (or other energy consuming activities such as running, fighting, pawing ground, etc) increases from early April and peaks during the groaning period.

The figure also shows that buck vocalisation corresponds exactly to the spread of doe oestrus, as the frequency of groaning closely matches the frequency of matings. Clearly, groaning activity is an excellent signal of the true rut for both sexes. This contrasts with Red deer, where stags start roaring well before hinds show oestrus. There is, however, a pre-rut period, requiring considerable energy outlay, when Fallow bucks establish their territories ('stands'), patrol boundaries (or fences), develop 'scrapes', chase does and display to other bucks.

The doe: The spread of first oestrus among does within a group defines the main rut in female terms. There are, however, physiological changes occurring before first oestrus. Most does appear to go through a series of 'silent ovulations' (ovulations not preceded by oestrus) before first overt oestrus. These ovulations, detected by investigating hormone (progesterone) profiles and laparoscopic examination of the ovaries, do not manifest themselves outwardly (hence the term 'silent ovulations'). They do, however, result in a series of short-lived ovarian events which help synchronise first oestrus over a two week period.

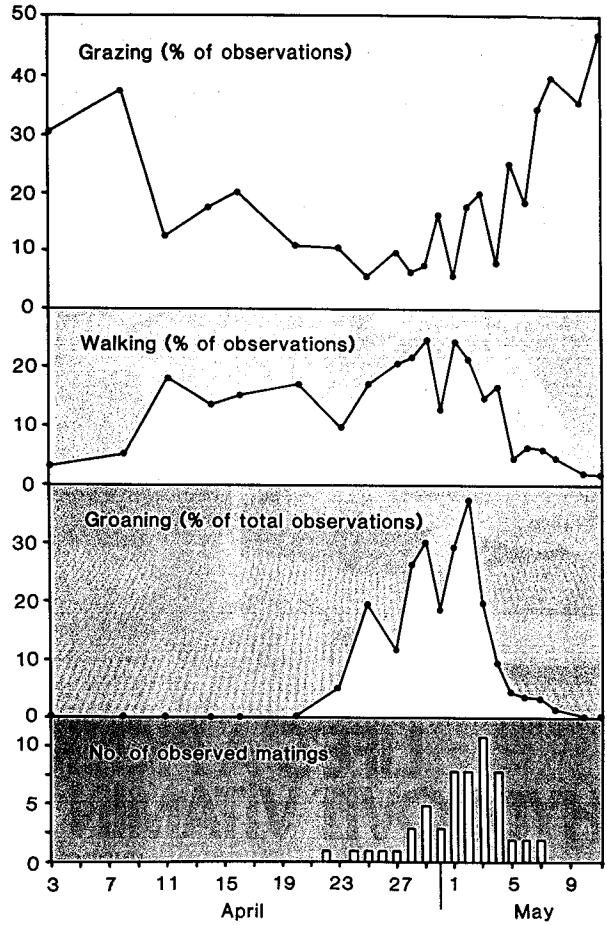
There appears to be little variation between years in the onset and duration of oestrus activity (mid-April to early May) although yearling does (16 months of age) are, on average, seven to eight days later than older does.

There is no data to show if there is a latitudinal difference in the timing of oestrus activity.

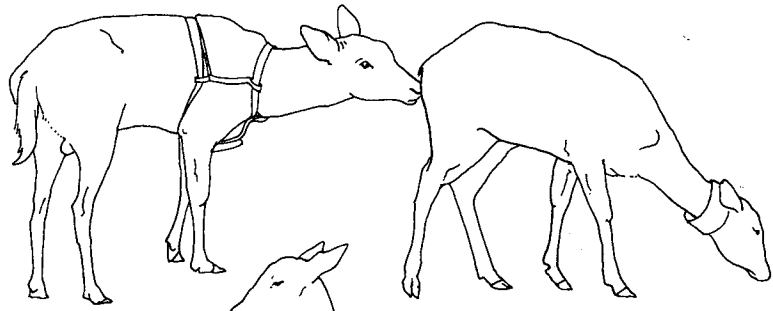
The events leading up to mating fall into three general phases:

Phase 1: Pre-oestrus agitation. Does coming into oestrus cease grazing, dissociate from the herd, and become restless. They frequently run along fencelines bleating intermittently and ▷

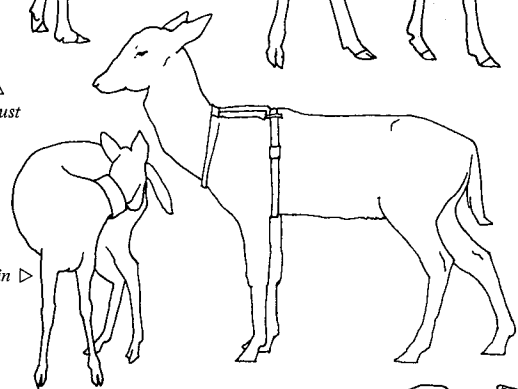
Fig 2.



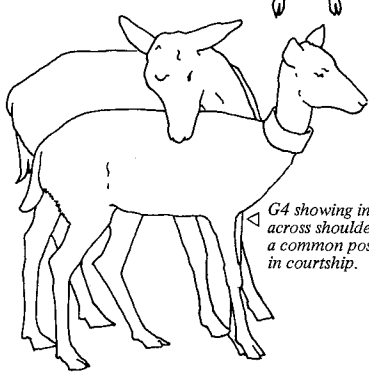
Changes in buck grazing and walking activity and the frequencies of "groaning" and mating observations during the 1983 rut.



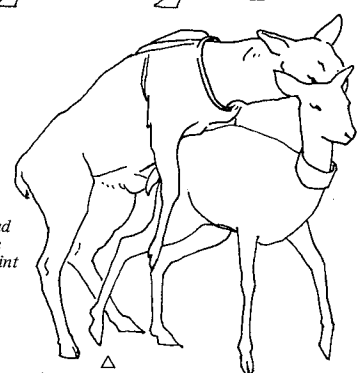
G4 showing interest in a doe just before the rut started.



Oestrus doe self-grooming in front of G4.



G4 showing interest using head across shoulder contact; quite a common position at this point in courtship.



The mount.

may even tentatively rear up on their hind legs in a feeble attempt to clear the fence. They are generally aggressive towards other does during this period which lasts up to five to six hours. The buck responds by groaning repeatedly and attempting to herd the does back towards the rest of the doe group.

Phase 2: Standing oestrus and courtship. After the period of agitation, does will finally allow the buck to come close – it appears that it is the doe that determines whether or not contact will continue and courtship proceed.

Characteristic signs of a doe in oestrus include frequently licking of the vulva and rubbing of the chin over the back and flanks. Both partners will begin social grooming and the buck will also lick the vulva, face, ears and shoulders of the doe. The flehmen (lip curl) response of the buck is common after vulval licking.

During courtship the buck frequently bunts the doe, followed by mounting maybe 10 to 20 times before successful mating.

The doe occasionally walks away, stops and grooms herself. This often leads to a 'goose-stepping' walk by the buck, involving stiff exaggerated steps made with the head held high.

▷ **Phase 3: Mating.** Copulation takes very little time, usually about one second. The buck mounts, penetrates, makes a pronounced rapid thrust, with the hind legs leaving the ground. The doe is usually propelled forward by the impetus of the thrust.

After copulation, the doe generally stands in a hunched position with frequent licking of the vulva and complete termination of oestrus behaviour. Only occasionally will does be mated twice at the same oestrus (observed twice during 40 observations). In the absence of copulation, oestrus behaviour will persist for more than eight hours. If mating does not occur or the buck is infertile, the doe will come into heat again 21 days later.

Buck/doe ratios during the rut. Two factors limit the number of does a buck is capable of servicing; the long courtship period and sexual exhaustion due to the intensity of rutting activities. With the natural sychrony of oestrus in large groups of does, there is a possiblity that at certain times during the rut more does are simultaneously in oestrus than the buck can adequately service.

Observations at Ruakura also suggest that young bucks (16 and 27 months old) may become exhausted early in the rut if they are run with large numbers of does. On the basis of limited data, the following sire/doe ratios are provided as a guide:

Age of sire	Number of does
16 months	10-15
27 months	15-20
39+ months	30-35

When using young bucks it is important to keep older, larger bucks well away to prevent dominance suppression of rutting activity. Likewise, bucks of similar age and size may spend more time fighting than mating if forced into close proximity.

In multi-sire situations, it would be preferable to use large paddocks with numerous geographical features (hills, trees, etc) so that individual bucks can establish non-overlapping territories.

In single-sire situations, the presence of a fence between bucks will *not* necessarily prevent fighting. Separation of mating groups by at least one paddock width or a race-way forming a 'no-mans land' will reduce fighting and, therefore reduce buck exhaustion. If a single-sire practice is adopted, it is preferable to change sires after the first oestrus cycle (once 'groaning' activity ceases about May 5 to 10) in case of buck infertility, and allow cycling does a second chance.

Summary

- 'Groaning' activity of rutting bucks corresponds to the spread of first oestrus in the doe group.
- Rutting bucks can lose up to 25 per cent of peak annual liveweight over the rut, with very little recovery until after winter.
- First oestrus of does is naturally synchronised within a two week period between mid-April and early May.
- Pubertal does (16 months) tend to be seven to eight days later in oestrus than older does.
- Pre-oestrus behaviour of does involves fence walking and aggression towards other does.
- Oestrus is characterised by close association with the buck and frequent self-grooming.
- Limit the number of does per sire depending on sire age.