

It has now become customary for most deer farmers in New Zealand to mate their hinds with a single sire in mobs of 20 to 40 hinds. This practice has evolved from evidence turned up by research, particularly at Invermay, and practical experience of many deer farmers in the early years.

In the following article on the subject, Geoff Moore of Invermay Agricultural Research Centre (Otago, NZ), and Andy Bray of Winchmore Irrigation Research Station (Canterbury, NZ) bring together some of the evidence from Britain and New Zealand as to the pattern of behaviour of stags during mating which gives support to the theory of single-sire mating with hind herds of 50 members.

Single-sire mating makes sense

MATING ACTIVITY in wild Red deer is concentrated in a short autumn rut. It has been described for the population of the Isle of Rhum by a number of leading British scientists, including Lincoln, Youngson, Short, Guinness, Clutton-Brock and Gibson.

They report that on the Isle of Rhum, off the coast of Scotland, bachelor groups, in which stags spend most of the year, break up as individual stags move away to areas occupied by hinds. Each stag tends to return to the same general area each year. Since hinds tend to remain faithful to particular home ranges, a stag could be expected to encounter many of the same hinds in successive years.

On reaching the rutting ground each stag competes for hinds and attempts to herd hinds into groups, to which he tries to add more hinds, and from which he tries to prevent hinds escaping, while excluding other stags. Unsuccessful stags roam the periphery of these harems, occasionally challenging harem holders or disrupting the harem while the holder's attention is elsewhere.

The success of a stag in forming and maintaining a harem, and the size of his harem, are related to his dominance rank and the number of hinds in his rutting area. Dominance is associated with age (stags are most successful between seven and 10 years of age), body weight, antler size and complexity, and roaring ability.

Stags with high dominance rankings tend to be the first to form harems at the start of the rut, and to hold the biggest harems over the peak mating period. Those stags (particularly the younger), that continue rutting after the more dominant ones have exhausted themselves, gain access to hinds towards the end of the rut after the majority have conceived. Thus rut dominance is believed to be the key behavioural determinant in reproductive success.



Photo: Andy Bray

Yearling stag sniffing hinds.

Older stags, though physically able, have been observed to show little mating activity.

Some three-quarters of the stags present on Rhum in one period of observation were not observed in the company of hinds, indicating the low success rate of the majority of stags. The few successful individuals were estimated to have sired six to 12 calves in a season.

On the rutting grounds in the Rhum studies the hind-to-stag ratio was 1-2 : 1. In the early years of farming Red deer in Scotland and New Zealand there were five to 15 hinds for every stag in a herd. More recent information from experiments at Glensaugh shows that fertility in small mobs of hinds was similar when one or two stags were present, and that a group of three stags could produce satisfactory calving rates in mobs of 60 hinds. One stag sired 28 calves in a season when joined with 30 hinds, but conception rates were low in other single-sire mobs containing fewer hinds.

New Zealand experience

The New Zealand experience has also been that single sires are effective; one

stag is known to have sired 73 calves when joined with 83 hinds. Two stags in multiple-sire herds in the same study are estimated to have sired similar numbers. All stags in these studies were three years or older when joined, and were selected for, among other things, large body size.

These findings, and the subsequent experience of deer farmers, indicate that well-grown mature stags are capable of mating many more hinds than was originally thought to be the case; there is now ample practical evidence for this and the principle is being generally adopted on farms here. Observation of multiple-sire herds on New Zealand farms has shown that, when in large paddocks, with cover provided by bush or broken terrain, the hind herd is split into harems, much as would be expected in the wild. When isolation is not so readily obtained, as in small flat paddocks without cover, the maintenance of a harem can be difficult for a stag when faced with competition from a number of other stags.

MATING MANAGEMENT

In one case study at Dunrobin (Southland, NZ) even the dominant stag was not able to prevent disruption of his harem. The number of rival stags may have been no more than he could have expected in the wild, but they were all confined in close proximity to him, and to a larger number of hinds than would normally aggregate in the wild during the rut.

High-ranking stags tended to occupy central positions in the hind group, and low-ranking stags were most often found on the periphery, but were not denied access to hinds.

Reduction of the number of stags present in small paddocks will result in the formation of harems. In one case at Papamoa (Canterbury, NZ) the highest-ranking stag held most of the hinds, the second-ranking stag held a smaller share, and four lower-ranking stags sat in the corner.

All those herds with five or fewer stags had only one harem over the main period of mating, and only the dominant stag herded and mated hinds. That is to say only one of the stags was an effective sire while the remainder played no active role in breeding. In fact, the supernumerary stags were not necessary at all, as shown by high conception rates in hind mobs joined with only one stag.

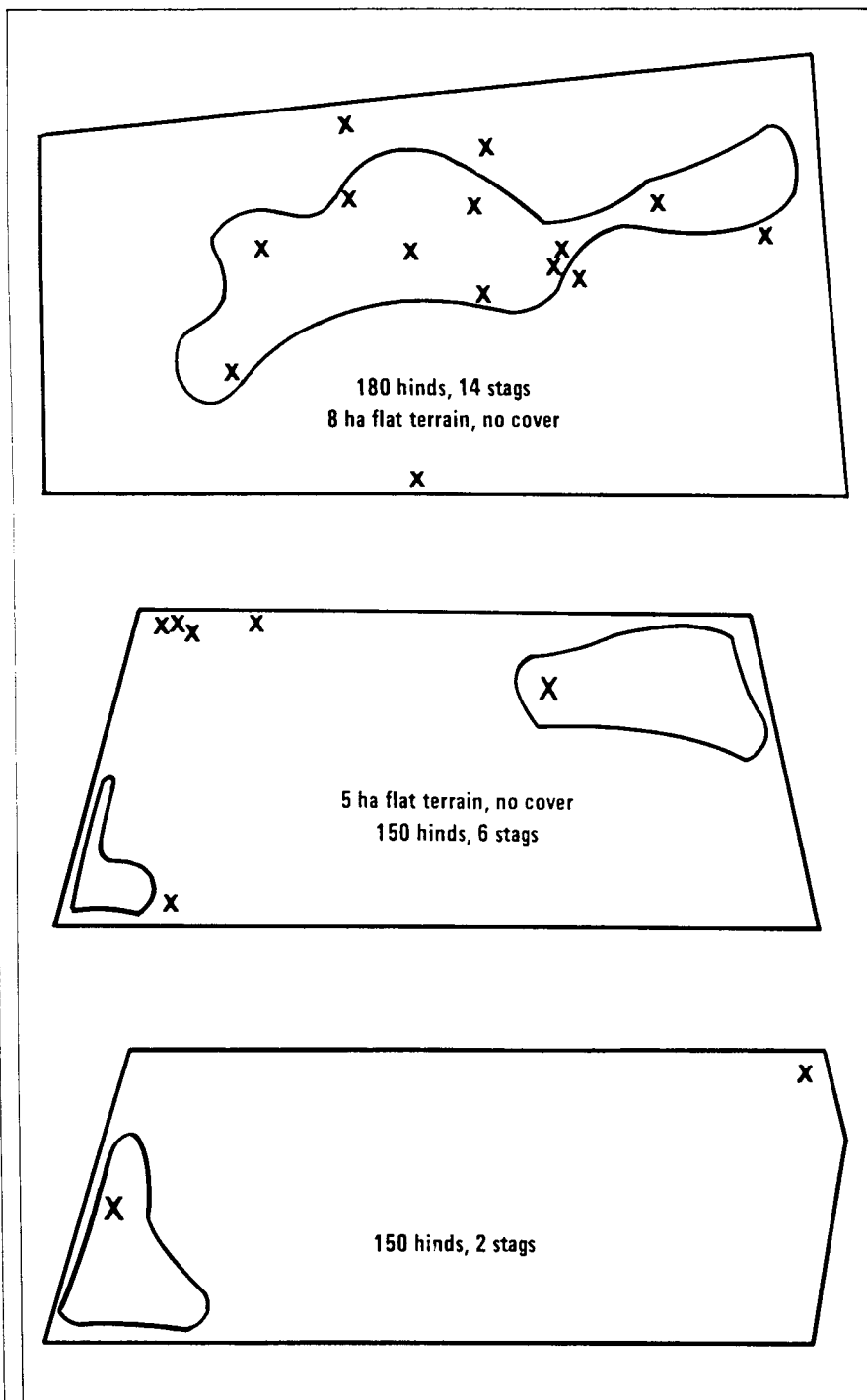
It was apparent therefore that in paddocks of less than 10 ha, the dominant stag was more able to exert his influence over mating activity when fewer stags were present.

These results need to be tempered with one note of caution. Some stags, in herds with five or less stags, were able to monopolise more hinds than they could mate efficiently. One particular stag controlled 196 hinds during the peak of the rut, while two subordinates took no part in breeding.

This stag, like three others observed, was seen to retain rank and control of hinds after he had become sexually exhausted. Prolonged courtship sequences, and very high mount-to-service ratios, were recorded. The affected stags were not supplanted from their dominant position by other stags present, nor by fresh stags introduced into the mating mob. The only sure way to overcome the problem was to remove the affected stag.

The harem size of these stags that lost their potency was 77, 109, 183 and 196, but five other stags with harems of 83 to 108 hinds did not exhibit the same behavioural signs and calving patterns of their herds did not indicate any depression in fertility.

On the matter of poor fertility in stags,



In their studies of mating behaviour the New Zealand researchers recorded the stag-hind situation under different conditions. Diagrams 1 to 3 show the situation that pertained in the studies on open flat country.

personal observations and reports from farmers indicate that some older stags which appeared physically able, and even some which maintained high ranking in multiple-sire herds, showed little mating activity.

As a result of these studies, and similar findings in other herds, our current recommendations to deer farmers are based on the assumption that the majority of stags should be able to mate 50 hinds a season and thus maximise genetic gain while

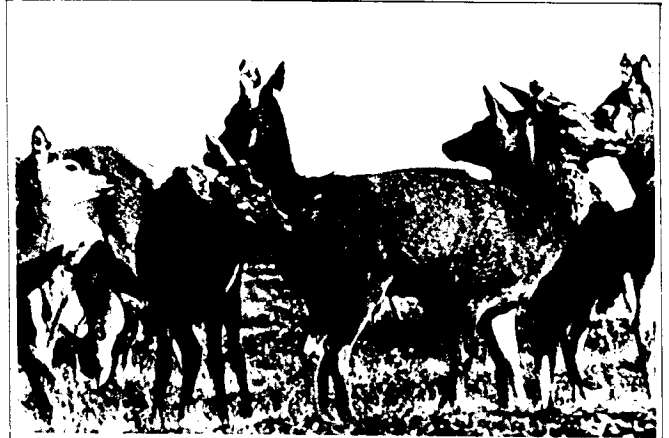
minimising the risk of poor fertility. It is recommended that farmers select young well-grown stags and join them, as single sires, with up to 50 hinds, for the early and main part of the rut. At the end of this period they should withdraw the stag and put in a fresh one. If it is not possible to split the hind herd into mobs of 50 or less, then many stags should be joined, sufficient to prevent formation of harems of more than 50 hinds.

This series of photos, taken by MAF researcher Andy Bray clearly shows the pattern of mating behaviour in Red deer. It also demonstrates that while a sexually-exhausted stag might have the will, he may not have the way . . . with obvious implications for subsequent calving percentages.

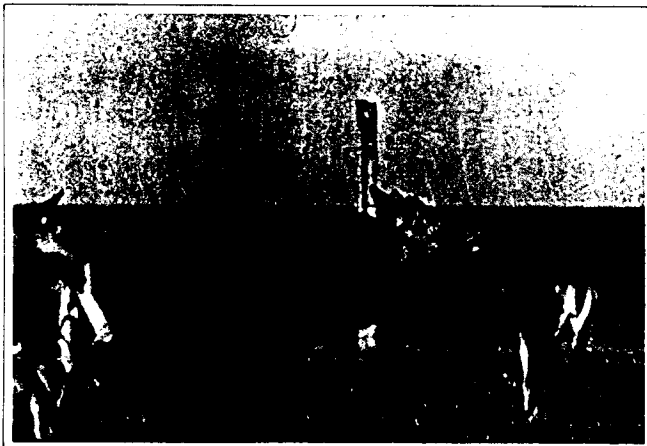
Mating - doing the job properly



A stag on Papamoa herding hinds in late April.



A spiker stag sniffs a yearling hind - Papamoa, May.



A stag exhibiting "flehmen" after sniffing a hind.



The ejaculatory thrust. Note the forelegs firmly gripping the hind quarters of the hind and the fact that the hind legs have completely left the ground.



Two instances of attempted mating by a sexually exhausted stag - head down, forelegs splayed and hind feet firmly on the ground.

