

Early Fertility of Red Deer Hinds in New Zealand

FOR sporting purposes, more than 100 liberations of red deer (*Cervus elaphus* L.) were made in New Zealand during 1851-1923¹. Some of these deer were of mixed strains (including English, Scottish, and German) from several English parks². They were afforded partial or complete protection in most parts of the Dominion until 1930. Because of this, and because of the great abundance of browse in the previously unbrowsed indigenous forests and alpine grasslands, the several established herds increased and spread to the remaining suitable environments in both main islands with dramatic speed. The average rate of spread of the red deer and other species of introduced deer has recently been given by Caughley³. Control operations against the red deer and other species were initiated in 1930 and are continuing in economically important areas⁴. To-day the red deer occupy most of the suitable lowland and mountain forests and alpine grasslands from about latitude 37° S. to 47° S.—a very wide variety of deer habitat.

This communication reports for the first time, so far as is known, that red deer hinds in favourable areas in both the North and South Islands become fertile and breed one year earlier than their relatives in Europe and, in excellent range conditions, are capable of becoming fertile while still fawns.

Darling⁵ states that in the Scottish Highlands red deer hinds calve for the first time at 4 years and under favourable conditions may calve at 3 years of age, but adds that this is uncommon. Lowe⁶, working with red deer on the Island of Rhum, mentions that the majority of hinds do not breed until they are 3 years of age, thus calving at the age of 4 years. Harrison Matthews⁷, discussing the red deer in Scotland and England, agrees that it is rare for a hind to be served in her second year, most hinds coming into use for the first time at about 2 years and 3 months and dropping their first fawns at the end of their third year. In Yugoslavia, Valentincic⁸ found in a sample of yearling hinds from mixed oak and beech forest in the lowlands that about 30 per cent were pregnant, compared with none from the nutritionally poorer alpine region of Scots pine, beech and mountain pastures.

In New Zealand, hunters and wildlife biologists have for many years shot yearling hinds carrying embryos, which indicates that, where the food is relatively abundant in the indigenous *Nothofagus* and podocarp forests, red deer hinds have their first oestrus and are successfully served as yearlings of about 16 months and calve at about 24 months of age. The incidence of yearling pregnancies in the various deer herds is not known but in some it may well reach 80 per cent. The only reference to this common occurrence of fertility in yearling hinds—one year earlier than in Scotland and England and 2 years earlier than on Rhum—is a brief mention in a paper by Miers⁹ on *Cervus canadensis* in Fiordland National Park, New Zealand.

Ovaries from red deer fawns which have been feeding on high-protein lucerne and clover pastures bordering exotic and indigenous forests, preserved in 10 per cent formalin and sectioned for gross investigation after the method of Cheatum¹⁰, reveal that even at the age of 3-5 months there is considerable follicular activity in at least one of any given pair of ovaries.

Fig. 1, a low-power photomicrograph of a 20 μ m section of fawn ovary stained with hæmatoxylin-cosin, shows a number of developing follicles (in one the secondary oocyte can be seen) and one fully mature Graafian follicle 7 mm in diameter. This fawn, weighing 87 lb., was not more than 4 months old and could have been successfully served at her first oestrus in the course of the normal rutting season. If this particular fawn had been successfully served and had carried the foetus to full term, it would have calved at about 12 months of age.



Fig. 1. Low-power photomicrograph of a 20- μ m section of ovary from a red deer fawn, showing a number of developing follicles and one mature Graafian follicle shortly before the first oestrus

Stained sections of ovaries from fawns of other species of deer living in the forest/farm ecotone show that it is possible for fawns of the Javan rusa (*Rusa timorensis russa* Muller and Schlegel) and the Ceylon sambar (*Rusa unicolor unicolor* Kerr) to breed at about 6 months of age.

In contrast to these fawns from areas adjacent to rich pastures, red deer fawns from the indigenous *Nothofagus* and podocarp forests, which are nutritionally much poorer range, show very little follicular activity until about one year of age, suggesting that their first oestrus occurs at about 16 months. On even poorer range, where the forest has had most of the palatable species removed by browsing mammals, it is possible that the hinds do not breed until their third year as in Britain. At present it is not known what percentage of fawn hinds become fertile and breed in areas of rich food supplies, but further work should be able to demonstrate this for different regions of the main islands of New Zealand.

Although possibly not recorded before in red deer, early fertility of fawns is quite commonplace in parts of North America in the white-tailed deer (*Odocoileus virginianus*)¹⁰⁻¹², and has been recorded for the black-tailed deer (*Odocoileus hemionus columbianus*) on excellent range conditions by Cowan¹³. Cheatum has clearly demonstrated that in New York State the fertility of fawns is directly related to the nutritional quality of their range¹¹.

The breeding of fawns may be of some importance in New Zealand where the red deer has reached pest proportions in many regions. The possibility of fawns breeding and the common occurrence of yearling hinds breeding explains why the initial increase in the deer herds was so rapid. However, it also gives warning that, where deer numbers have been markedly reduced by hunting (in areas that are economically important from the hydro-electric and soil erosion points of view), they could again increase rapidly as the vegetation recovers.

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