

Acknowledgment

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A CASE OF TWIN FOETUSES IN A SIKA HIND (*Cervus nippon*) FROM COUNTY WICKLOW, IRELAND

by T. CLINTON*, T.J. HAYDEN**, J.M. LYNCH and P. MURPHY

Mammal Research Group, Department of Zoology, University College, Dublin, Belfield, Dublin 4, Ireland.

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* Luggala Estate, Roundwood, County Wicklow, Ireland

** To whom correspondence should be addressed

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Introduction

AN EFFECT of age and body condition on fertility of deer is well documented (Clutton-Brock *et al.*, 1989; Albon *et al.*, 1986). The effects of these factors are more pronounced among the New World (Telemetacarpalian) deer which have the capacity to produce multiple offspring per litter (Sadler, 1987).

The Old World (Pleisometacarpalian) deer, which includes the gene *Cervus*, are considered to be mainly K-strategists in that the females have, in general, a low reproductive potential and thus normally produce a single offspring per breeding cycle (Harrington, 1985). We here report a case of twin foetuses in a sika (*Cervus nippon*) hind.

Sika deer were introduced to County

Wicklow in 1856 by Viscount Powerscourt, and by the 1940s were well established in the wild. Hybrids between red (*C. elaphus*) and sika had been produced as early as the 1870s in the Powerscourt Deer Park (Powerscourt, 1884), and it appears that some hybrids became established in the wild in the 1920s. Extensive introgression is believed to continue in the wild, and currently sika-like, red-like and sika/red hybrid deer are found throughout the Wicklow Mountains (Harrington, 1985).

Material and methods

The hind was shot on 26 January 1990 during a routine culling operation in the Glencree region of County Wicklow (53° 10' N; 06° 15' W). The carcass was subjected to routine inspection where biometric data was collected. The reproductive tract was examined and measured, and the ovaries examined histologically. The foetuses and their associated membranes were fixed in formalin. The age of the hind was determined by counting annuli in the cementum pad of the first molar (O'Donoghue, 1991). A series of measurements taken from the skull of the hind were compared with a database including similar measurements from red deer (Rhum, Scotland) and sika deer (Killarney National Park, Ireland) to determine if the hind fell within the range of



Principal Component Analysis has been used to analyse patterns of variation in mammals (Thorpe, 1976), and has been shown to be useful in examining red, sika and hybrid deer (Lowe and Gardiner, 1974, 1975; Ratcliffe *et al.*, 1991; Murphy, 1992).

Results

The uterus contained two normally-formed foetuses, one of either sex (Figure 1). For all measurements taken, both foetuses fell above the range of singleton foetuses at the same time of year. Reference to a generalised growth curve for foetuses from this area indicates a estimated conception date in mid-September, earlier than the median date of 3 October.

The male foetus was implanted in the left uterine horn through two major placentomes; the female on the right through four major placentomes. In singleton pregnancies, on average, eight (range 5-11) placentomes are present. The sexes of the foetuses excluded the possibility of monozygotic twins. In fact, three corpora lutea were present, two in the left ovary. Accessory corpora lutea are quite common in sika deer. For example, in a series of 29 hinds from Killarney (Co. Kerry, Ireland) with singleton pregnancies, 38% had accessory corpora lutea.

The hind was estimated to be eight years old and in excellent condition for the season. The kidney fat index (1100%) was well above the range (130-540%) found in 24 sika hinds culled in Wicklow during January 1989. The mean gralloched weight of sika hinds from Wicklow during January is 28.5 kg (sd = 3.86, n = 63; range 22.6-37.0). The hind weighed 38.2 kg gralloched and had a full weight of 44.1 kg. While this weight is not exceptional for sika hinds, it is more common for such weight to be recorded early in the winter. Skull (condylobasal) length is a good indicator of body size and is significantly correlated with both total body length ($r^2 = 0.75$) and shoulder height ($r^2 = 0.63$). The skull length of the hind (231mm) was normal compared to those of 62 hinds from Wicklow (226mm; sd = 6.80).

The hind was classified as a milk hind. The trimmed weight of the mammary glands was 100.1g. For yield hinds during the same month, the maximum gland weight was 90g. Furthermore, the size of teats was consistent with a recent lactation.

Analysis of 19 skull measurements taken from the hind revealed that the animal falls well within the range of variation of sika deer from Killarney (a population for which no sika x red hybridisation has been reported) and Wicklow. Figure 2 shows that the hind was located among the cluster of sika deer which are well separated from red deer. Gross examination of the carcass and pelage similarly shows no "red" characteristics. Thus, there was no evidence that the hind was a hybrid.

Discussion

In deer which normally bear single offspring and for which ample data exists, the incidence of twinning is less than 0.1% (Ruppell, 1997). Ruppell states that "sika

C. nippon subspecies may twin more frequently than 5%", though he provides no citations. Donne (1924) claimed that twin embryos are common in sika deer from New Zealand, although Kiddie (1962) refuted this, stating that he had examined around 500 tracts and has found no twin foetuses. Davidson (cited in Kiddie, 1962) stated that although she knew of red deer twins, she had never encountered them in sika.

We have been able to locate only four published reports of twinning in sika: one of twin foetuses in a wild population of Manchurian sika (*C. n. manchuricus*) in Russia (Bromley, 1952), three occurrences of twin embryos in New Zealand (Davidson, 1990) and one of a live birth of twins in a Vietnamese sika (*C. n. pseudaxis*) in Berlin Zoo (cited in Sadlier, 1987). The zoo birth represents a twinning rate of 0.012%. A survey of Formosan sika (*C. n. taiouanus*) on 38 deer farms in Taiwan revealed a twinning rate of 0.14% (Shih *et al.*, 1985). In red deer, twin foetuses are rare, occurring less than 0.2% in Scotland (Mitchell, 1973), but more frequently in European populations (Kronig and Vorreyer, 1957). Examination of records of over 1,000 live births of Japanese sika (*C. n. nippon*) in five captive herds in this country revealed no incidence of twinning (Harrington, pers. comm.). Since 1980, we have examined 593 reproductive tracts of pregnant Japanese sika from two populations in Ireland, and this is the first case of twinning. The incidence of twinning is thus 0.0017%.

In ungulates, twinning rate is affected by genetic background (sheep; Piper *et al.*, 1982), nutrition (roe deer; Chapman and Chapman, 1971) and age (white-tailed deer; Sadlier, 1987). Clutton-Brock and Albon (1989) suggest that twinning in red deer "may be more frequent [in commercial forests] than on the open hill". Larger than normal litters may be due to exceptional ovulation rates triggered by a high nutritional plane, which allows a species to increase fecundity given a beneficial environmental change. Indeed, the higher rate of twinning in captive populations may indicate a similar effect.

Of course, it is impossible to determine the factor(s) that induced twinning in this hind. It is worth noting that the kidney fat index of this animal was the highest recorded in this general area at that time of year. It is of further interest that in summer 1989, a hind occupying the same range as the present hind was regularly seen with two equal-sized calves at foot. It is impossible to know if the 1989 and 1990 observations relate to the same, or genetically related animals.

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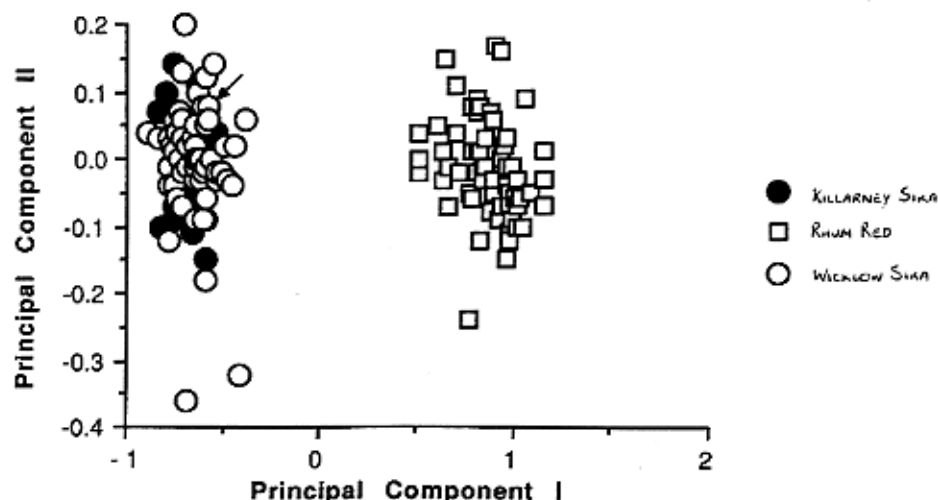


Figure 2: Separation (on basis of the first two principal components of 19 cranial measurements) of

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MAR LODGE DEVELOPMENT

THE NATIONAL Trust for Scotland is prepared to invest £500,000 in Mar Lodge estate if it is saved for conservation. The Trust, which had previously offered only verbal support, held talks recently with the consortium bidding to buy the 77,000-acre Deeside property. Its director, Lesley Borley, had confirmed that the money would be made available if an acceptable management plan were put in place to safeguard the natural heritage of the land, its Victorian mansion-house, and the interests of the local community.

The funding was originally offered to boost the proposal before the National Heritage Memorial Fund, but the consortium advised that talks with the Government-funded body were too advanced to rejig the official application. The consortium – the RSPB, the WWFN and the Chris Brasher Trust – has asked the NHMF to provide half the purchase price, which could be as high as £10 million. The Trust's money will be a major boost to the management budget if the American-owned estate is bought by the consortium.

Mr Borley said: "The consortium preferred not to disturb their proposal to the NHMF and we agreed we would meet again. We, like lots of bodies, believe there must be a solution". He added that the Trust was particularly interested in the rôle of the mansion house, which is being restored after a major fire earlier this year. Its value was too high for casual use, and it was not ideal as a visitor centre, hostel or private home. He suggested it should be used in some way for environmental purposes or study, and said the Trust could act as a catalyst. "We have a lot of contacts who might be interested in that building."

The Trust was also concerned that the management plan, which has not been finalised, would reflect the historic use of Mar Lodge as a Highland sporting estate and would be at least partly based on red deer management and stalking. "We want it to sustain people and it is people in the countryside we are all supposed to be concerned about."

[*The Scotsman*, 28.12.91]

HUNTING SEASONS IN CZECHOSLOVAKIA

Roe:	16 May to 30 September
Mouflon:	1 August to 31 December
Red deer:	1 August to 15 January
Fallow deer:	1 September to 31 December
Sika:	1 August to 31 December
Whitetail deer:	1 August to 31 December

[From *Wild und Hund*, 2.12.90

LYME DISEASE VACCINE FOR DOGS IN USA

WHILE THE world waits for a vaccine that protects humans from the devastating effects of Lyme disease, the first major technological breakthrough in the prevention of Lyme disease – a vaccine for dogs – is gaining acceptance from vets.

In the first six months since the vaccine's introduction vets have ordered nearly one million doses.

William Ryan, doctor of veterinary medicine at Fort Dodge Laboratories where the vaccine was invented, told *North American Hunter* that new research suggests that dogs can be infected by other dogs that carry Lyme disease. "At Fort Dodge Laboratories we've shown that the disease can be communicated from one dog to another through faeces or licking," said Ryan.

When detected early, Lyme disease can be treated. However, it is difficult to diagnose. The treatment can be long and expensive.

While the disease has been most heavily concentrated in the northeast and upper Midwest of the United States, cases have been reported in 44 states, with incidence in humans tripling since 1984, according to the Center for Disease Control. Researchers estimate the incidence in domestic animals such as dogs may be as high as six to ten times that found in humans.

Meanwhile, the search for a human vaccine continues. Wyeth-Ayerst Research in Radnor, Pennsylvania has entered into an agreement to develop a human Lyme disease vaccine under exclusive patent rights obtained from the University of Minnesota. However it is not known when this will be available.

[*North American Hunter*, May/June 1991]

VENISON TESTING IN SWITZERLAND

THE SWISS Veterinary Office has recommended only random sampling of imported venison to measure bequerel levels resulting from the Chernobyl accident because these have now considerably fallen. In the venison season of 1990 only 11 of 370 samples exceeded the permitted level compared with 61 from 428 in 1986. The rejected carcasses were returned to the exporter.

[From *Wild und Hund*, 10.2.91
Kindly translated by P.L. Davenport]

DEER ON ROAD

A FORD Fiesta flipped on to its roof when the driver swerved to avoid a deer on the coast road at Swyre yesterday evening.

The driver was taken by ambulance for a check-up at Weymouth and District Hospital.