Report on the Deer Industry in Great Britain, 2002

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This report was prepared for the Department of the Environment, Food and Rural Affairs and the Food Standards Agency. It focuses on the size of the various elements of the industry, the trading practices, slaughtering practices, routes of supply of venison and other products into the human food chain and the disposal of fallen stock and by-products. The primary objective in undertaking the report was to provide background information that would assist the appropriate authorities in the establishment of a survey for transmissible spongiform encephalopathies in British deer. To this end, a number of specific recommendations are included.

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List of Recommendations

Free-living

Recommendation 1:

Select heads for sampling from chest-shot animals

Recommendation 2:

Transport heads to veterinary laboratories for sample collection

Recommendation 3

Use Game dealers' vehicles to transport these heads

Recommendation 4

Specifically recruit to the survey those estate managers and dealers who are currently raising standards of wild venison.

Recommendation 5:

Institute a tagging scheme to facilitate traceability

Recommendation 6

Target mature adults in the winter starvation/exposure cohort

Farmed Deer

Recommendation 7:

For "on-farm" slaughter on premises licensed to butcher deer, train staff to collect samples

Recommendation 8:

Develop technique for rostral approach to brainstem for "on-farm"

Recommendation 9:

Where possible, arrange for MHS staff to collect samples from abattoir killed and inspected deer.

Recommendation 10

Where recommendation 9 is impractical, transport heads from abattoir-killed deer and farmed game processing facilities to veterinary laboratories

Recommendation 11:

Collect brainstem, at veterinary laboratories, from all "fallen" farmed deer over 12 months of age

Recommendation 12:

Collect brainstem, at veterinary laboratories, from all culled wapiti

Park deer

Recommendation 13:

Transport heads from culled park deer to veterinary laboratories

Recommendation 14:

Use game dealers' vehicles to transport these heads

Recommendation 15:

Institute a carcase-tagging scheme as per free-living deer.

Zoo deer

Recommendation 16:

Transport all culled or fallen deer to veterinary laboratories for necropsy

Chapter

1

Introduction

This report draws together the somewhat fragmented and incomplete information that exists on the nature and size of the deer industry. It sets out published or otherwise reliable data, where this is available. In the absence of hard facts, “educated estimates" are based on the informed opinions of leaders within the industry.

Unsurprisingly, there is a degree of concern amongst some producers and dealers that a report of this kind will lead to the imposition of additional regulation and bureaucracy by the authorities in Whitehall or Brussels. This concern led to some cautiousness or reluctance to talk, when numbers and throughputs were being discussed. Commercial sensitivities compounded this problem. Nevertheless, the general openness and co-operation of people, on all sides of the industry, has been exceptional. The primary objective of the investigation was to provide sound, up-to-date information that would facilitate the design of a practical and achievable survey for evidence of spongiform encephalopathy in British deer. With

this in mind, the report includes recommendations on sampling points for the different categories of deer.

The deer/venison industry in Great Britain is made up of three main components:

- Wild (otherwise known as "free living") deer that live extensively and are harvested annually during prescribed seasons, laid down in statute. Free-living deer, which maraud enclosed agricultural or forestry land, may be shot out-with the normal "open" seasons for deer stalking. Wild deer are, for the most part, killed by shooting with a rifle bullet.

- Park deer are for all intents and purposes "wild" deer that live within the confines of deer parks. They are more closely managed than many of the truly free-living deer but are not subjected to normal husbandry practices, such as vaccinations or treatments for parasites, as might be expected on farms. Like wild deer, they are usually killed by shooting during the stalking seasons.

- Farm deer are domesticated animals that are reared and husbanded in controlled farming conditions. These deer are individually identified (by ear-tags) and form a small specialist area of livestock farming. Farmed deer are exempted from the close seasons. In practical terms this means that they may be killed at all

times of the year. They are slaughtered either on farm or in specially licensed abattoirs.

The structures of these three diverse sectors of the deer industry are outlined separately. The practices related to the slaughter of the deer and to the sale or distribution of venison, and other products that might enter the human food chain, are presented within the chapter on each sector.

Exposure to meat and bone meal (MBM) / concentrates

It is difficult to be confident that there are any populations of farmed or free-living deer that have not had some contact with MBM/concentrates. Exposure may have occurred:

1. Directly through feeding of deer on farms or estates
2. Through free-living deer entering agricultural land and consuming commercial concentrates supplied to cattle and sheep
3. Indirectly through movements of deer from one farm to another, or to open ranges or woodlands, or by movements between different populations of free-living deer.

Movements and contacts

For the purposes of establishing a strategy for a survey of spongiform encephalopathies in deer, it is important to consider the likelihood of contact between different populations of deer.

In the early days of deer farming there was considerable movement between the various categories of deer farms (breeders/hill farms/fattening units/exporters). These types of movement are much reduced in the mature system that currently exists.

Deer farms are securely fenced but break-outs happen occasionally, usually as a consequence of carelessness by farm staff or deliberate acts by anti-deer farming extremists. Most escapees are either recaptured or shot. Those that evade capture or death will make contact with free-living deer and provide a theoretical route for transmission of spongiform encephalopathy (SE). On rare occasions, wild red deer break into deer farms. This is usually related to the rut or to prolonged bad weather, damaged fences or heavy snowfalls making it easier for the deer to jump the perimeter fences.

Some farmed stags are sold, when they are three years or older, and transported to open ranges or woodland where they are released for sport for wealthy hunters who wish to shoot a stag with a large set of antlers. This practice creates a theoretical route for SE transmission from farmed to wild deer.

Some populations of wild red deer have different winter and summer ranges. As the seasons change, so the deer move to the feeding grounds and contact between different groups occurs as the herds form and disperse. Young stags and, to a lesser extent hinds, migrate to new areas and integrate with other herds. Red deer also use fields and pastures grazed by cattle and sheep.

Roe deer are steadily increasing their range and have, potentially, considerable contact with cattle. Roe graze around the margins of cattle and sheep pastures and can jump, freely, normal farm fences. Roe probably regularly eat concentrates supplied, in fields, to sheep and cattle.

Chapter

2

Free-living Deer

Background and populations

The principle species of free-living deer in Britain are red (*Cervus elaphus*), roe (*Capreolus capreolus),* fallow *(Dama dama),* sika *(Cervus nippon)* and muntjac *(Muntiacus sp.).* Estimation of population sizes and densities can be difficult, particularly for species inhabiting woodland (Mayle et al 1999). Different methods of compiling abundance estimates are used depending on the deer species under investigation and the type of habitat. General population estimation methods fall into three categories: -

Method	Example
• Direct methods	Open range counting Thermal imaging at night
• Indirect methods	Tracks or slot counts Faecal pellet counts
• Cull data	In woodland habitats a cull of 10-25% is usually required to keep the population stable

Distribution maps for the whole of GB have been prepared by the British Deer Society. (Appendix 1). Local density estimates are, in general, of

greatest value from a deer and habitat management perspective. Over all population numbers, however, may provide useful information for estimates of the sustainable annual cull and the quantity of venison that may be entering the human food chain.

Details of the sizes of the various parts of the industry are to some extent obscured by: -

- the genuine absence of information on the sizes of some deer populations
- the absence of a central authority in England or Wales (cf. Deer Commission for Scotland) charged with the duty of amassing cull and venison records from owners and dealers
- fragmentary records on deer culls from leased stalking in commercial woodlands

Red Deer

The majority of free-living red deer are found in Scotland. For many years they represented the largest population of free-living deer in Britain. However, this may no longer be the case as a consequence of recent increases in roe deer numbers throughout Great Britain. Current estimates suggest that there are 273,000 red deer on hill ground (open range) plus an additional 124,000 in woodland. These figures are based on the statutory cull returns (DCS, 2002), assuming that the annual cull

represents approximately 16-17% of the total population. In reality, the cull in many areas is probably less than 16%. This current estimate is somewhat higher than previous estimates and it will need to be verified in the coming years. Improvements in counting methods are providing better estimates of local deer densities and future annual counts should become progressively more reliable. Established populations of red deer are also present in the southwest of England, Cumbria and East Anglia. Smaller numbers of red deer are found in various woodlands in the east and south of England.

Roe Deer

Roe deer are widely distributed throughout Great Britain (Appendix 1) but are notoriously difficult to count. Population estimates, again based on the 2001/2002 statutory cull returns for Scotland, suggest a total of 173,000. However, the roe cull is probably significantly higher than that included in the returns and the actual population is almost certainly in excess of 200,000. The British Association for Shooting and Conservation estimated that the Scottish roe population could be as high as 400,000. English roe were estimated to number 150,000 in 1994 (JNCC) rising by 15% in the following 3 years to 172,500. Deer are increasing year by year and even a modest increase of 15% over the last 5 years brings the English roe deer estimate close to 200,000. Based on the estimated cull figures (with all the caveats that are attached to those) the roe population in England

maybe in the region of 227-228,000. Roe are increasing in Wales, also, but numbers remain modest.

Fallow Deer

Fallow deer are considerably more numerous in England than north of border with 1994 figures of 95,000 and 4,000 respectively (Harris et al, 1995). The rate of increase in fallow numbers in England is less dramatic than for some other species. Assuming a rise of around 10%, the current population in England and Wales may amount to 104,500. For 2002, the DCS estimate 6,000 fallow in Scotland, representing an upward revision of the 1994 figure by 50 per cent.

Sika Deer

The sika deer distribution is known to be rapidly expanding in recently established woodland. Estimates in 1994 gave sika populations of 2,500 in England and 12,000 in Scotland. These may now have risen to 3,300 and 26,000 respectively. However, there is much uncertainty over these figures and it has been suggested that up to 50,000 sika may be present in Scottish woodland and forest areas.

Muntjac

The review of British mammals in 1994 (Harris et al, 1995) estimated that the muntjac population stood at around 40,000 adults plus 12,000 juveniles. Since that time, Muntjac are known to have colonised new counties in England (BDS Appendix 1). Although no accurate figures are available for this small and secretive deer, it is believed that the population is increasing rapidly and might readily have reached 100,000 (N. Chapman pers. comm.).

Natural mortality/fallen stock

All deer that are not killed or captured by humans are considered to die naturally. The major causes of death include starvation, exposure, predation of young stock and disease.

Deer usually seek out secluded places in which to die. Consequently, despite the considerable numbers of deer dying annually, surprisingly few are found. Post-mortem decomposition and scavenging by a variety of insects, mammals and birds successfully remove the majority of the muscle and internal organs. The skeleton, pieces of skin and small portions of ligamentous attachments may resist complete breakdown for many months or years. It is unlikely that samples suitable for the purposes of a spongiform encephalopathy survey could be obtained from the natural mortality cases.

No general rule can be applied to all species regarding the age distribution of natural mortality. The very young and the elderly may have a higher risk from disease. However, during severe winters all age classes may be decimated.

The free-living deer cull

"Close seasons" are those periods during the year when the shooting or hunting of deer is generally prohibited by law, although there are exemptions. These periods for female deer usually coincide with late stages of gestation (pregnancy), calving and lactation. There are some differences in the close seasons between Scotland and England/Wales (Table 1).

Table 1
Close Seasons for Deer

Species	Gender	England & Wales	Scotland
Red and sika & their hybrids	Stag Hind	1May – 31 July 1 March – 31 Oct	21 Oct – 30 June 16 Feb – 20 Oct
Fallow	Buck Doe	1 May – 31 July 1 March – 31 Oct	1 May – 31 July 16 Feb – 20 Oct
Roe	Buck Doe	1 Nov – 31 March 1 March – 31 Oct	21 Oct – 31 March 1 April – 20 Oct

The Deer Commission for Scotland collects cull data from all the major estates and woodlands. In 2001/2002 in excess of 100,000 were shot.

Table 2 presents this information broken down by species and type of habitat.

Table 2

Scottish Statutory Cull Returns 2001/2002

Species	Woodland	Open Range	Total
Red	**20,632**	**45,480**	**66,112**
Roe	**26,480**	**2,400**	**28,880**
Sika	**4,013**	**395**	**4,408**
Fallow	**971**	**194**	**1,165**
	52,096	**48,469**	**100,565**

These figures probably represent about 95% of the deer culled by, or under the guidance of, professional stalkers in Scotland. However, there are some doubts over the numbers of roe deer killed by recreational stalkers. Many of these roe deer may not be recorded. Additionally, a small number of red deer are culled (but not reported) by, for example, farmers killing deer on enclosed agricultural land

The situation in England is much less clear. The absence of any national authority responsible for the collection and collation of cull figures, and to act as a reference centre, makes estimating cull figures a very uncertain task. Rose (2001) states, "*The total number and species breakdown of the English annual deer culls is not known.*" The Forestry Commission

data is reliable and may be representative of all the large forestry and commercial woodlands. However, considering England and Wales in its entirety, the numbers of the various species culled may show a somewhat different pattern. For example, comparison of Forestry Commission figures with some game dealers' records highlights similarities and differences: -

Table 3

Proportion of cull by species in England and Wales

Species	FC figures	Game dealer sample
Roe	**59%**	**58%**
Fallow	**33%**	**23%**
Red	**5%**	**16%**
Sika	**3%**	**3%**

It should be recognised that there will be proportional differences in the deer being presented to game dealers in different parts of the country. The number of deer culled on Forestry Commission land in England and Wales during 2001/02 is set out in Table 4.

Rose (20001) considered that the quantity of English venison equates to "*at least 25% of the Scottish total*'. Using the information and assumptions presented in the following section "**Venison Trade**", and using the

Forestry Commission percentage by species (Table 3), the estimated annual cull of English and Welsh deer is set out in Table 5.

Table 4

Forest Enterprise English and Welsh Deer Cull 2001/2002

Species	England	Wales	Total
Red	350	0	350
Sika	233	0	233
Roe	4165	22	4187
Fallow	2040	293	2333
Muntjac	1249	0	1249
TOTAL	8037	315	8352

Table 5

Cull in England/Wales based on estimate of 1000 tonnes of venison

Species	Estimated cull
Roe	49,167
Fallow	13,750
Red	1,190
Sika	1,428

If it is accepted that 20% of all small deer and 8% (same as in Scotland) of the larger species carcases are kept for home consumption (Rose, 2001)

and do not enter the venison market, then the estimate of the English and Welsh deer cull can be increased to **78,327** (Table 6).

Table 6

Annual cull in England/Wales including home consumption

Species	Estimated cull including home consumption
Roe	**59,000**
Fallow	**16,500**
Red	**1,285**
Sika	**1,542**
Total of these four species	**78,327**

Estimates of the muntjac cull must be viewed with some caution since attitudes towards muntjac vary from a hard-line “shoot on sight” to active translocation of muntjac to new areas of the country. Nevertheless, expert opinion suggests that in the region of 20,000 muntjac may be culled annually (N. Chapman/H.Rose pers. comm.). This is substantially more than the 11,000 estimated by the British Association for Shooting and Conservation (BASC) in their survey in 1998 (see below).

Macdonald *et al* (2000), in their report to the Burns Inquiry, quote estimates taken from an unpublished survey (undertaken in 1998) of BASC membership. BASC claims 72% of all stalkers are members of the

association and the national totals are calculated by extrapolation. The BASC estimates vary in some respects from the figures presented in Table 6. These differences may be accounted for by changes in deer numbers or stalking practices between 1998 and 2002. The calculations based on the estimated 1000 tonnes of venison entering the retail trade indicate that the roe deer cull may have increased. There is a substantial difference in the estimate on fallow deer (BASC estimate - 27,500, Table 6 estimate – 16,500). This may suggest that more fallow deer are retained for home consumption than previously believed. However, the two estimates for total numbers of roe, fallow, red and sika being culled are remarkably similar – this report estimate = 78,327, the BASC estimate = 79,550.

Age assessments of deer

Deer managers have long recognised the need for, and usefulness of, methods for ageing live and dead deer. The first serious attempts to devise a suitable system were made by German biologists in the early 1930s. Since then considerable research has been conducted in Britain on red deer of known ages (Lowe 1967, Mitchell 1963, 1967).

Two methods are available. The first involves counting the cementum layers that form around the tooth roots and deep to the crowns of the molars. This is a fairly laborious and time consuming technique that is probably not suited for routine use on large numbers of heads during a

spongiform encephalopathy survey. The second method relies on tooth eruption, patterns of replacement of temporary teeth and wear on the cheek teeth. An illustrated chart "Teeth and age in Scottish Red Deer a practical guide to age assessment" produced by the Red Deer Commission (now known as the Deer Commission for Scotland) is a most helpful publication.

Comparisons between stags and hinds and between different populations show the methods to be remarkably consistent. Also, the features typifying each age class of Scottish red deer show great similarity to data from Germany. It appears that ageing based on tooth eruption and wear is a suitable method for most, if not all, red deer.

According to Whitehead (1993), the development of a full mouth in wapiti, sika and fallow follows a similar pattern to red deer. However, roe mature more quickly with all permanent teeth being present by 13 months. Wear patterns in roe are well described and, in general, they occur considerably earlier than in red. For example, similar degrees of wear are seen in a four-year-old roe and an eight-year-old red.

Age at culling

Examination of a meticulous data set (Goffin pers. comm.) of 2782 roe culled in four locations revealed that between 54-64% of culled roe deer are aged less than two years. Seventy three to 82% are less than three years of age. The over 5-year category accounts for only 4.5-9.3% of the

roe culled. Roe deer aged 7 or more (i.e. born before the 1996 ruminant protein ban) are estimated at 1.5-5.4% of the 2002/03 cull. The figures for 2003/04 should drop to approximately 0.5-3% for the "born before the 1996 ban" animals.

The situation with red deer is more complex. Habitats and shooting plans differ from one estate to another and these factors can greatly influence the age at which deer are culled. Generally, on open ranges, the heavier the culling pressure, the younger the average age is of culled animals. It has been estimated that 20% of hinds are less than one year and that the majority are culled hinds are less than 8 years. Stags on properties where mature stags are a valued part of the estate ethos may, on average, be around 7-8 years when culled. On other estates, the average age of the culled stags is likely to be closer to four years.

Woodland red and sika are shot when they are sighted and there is a much-reduced possibility of selecting the deer to be shot. Consequently, the ages of the culled woodland deer should mirror the population structure more closely than the culled open range deer. Red deer are one of the longer living deer, with an average life of 15-16 years. Individuals can survive into their 20s. Sika deer are also fairly long lived with the average life span recorded as 13-15 years. On this basis, it might be expected that culled woodland red and sika will have a higher average age

than the open range red deer. Similarly, free-living fallow might be expected to live to 13+ years if they survive the first year of life. Culled fallow might be expected to reflect the population structure but little information is available on their ages.

Shooting practices

The majority of deer are killed by a shot to the chest. In a successful shot, the bullet causes extensive damage to the heart or great vessels within the chest. Massive haemorrhage occurs into the chest cavity, the blood supply to the brain is greatly impaired and the deer quickly lapses into unconsciousness, followed by death.

The hunting rifle bullet damages the chest wall - both sides, if the bullet passes through the full depth of the chest. Game dealers prefer to receive deer that have been “head or neck shot”. These bodies show no damage to the thorax or shoulders and so trimming of the carcase is kept to a minimum. Unfortunately neck/head shots carry with them significant risks of creating welfare problems through wounding rather than causing rapid death. Consequently, most stalkers should be discouraged from using these shots. Even highly experienced stalkers should restrict their usage of head shots to very specific, favourable conditions. In terms of conducting a survey for spongiform encephalopathy, head and upper neck shots are undesirable inasmuch as they can seriously damage the brainstem. The brains from these animals may be unsuitable for collection

of samples for the diagnosis of BSE/CWD. In any survey, sample collection should be restricted to chest shot animals.

Handling of shot deer

Following shooting, it is normal practice for the animal to be “gralloched”. Basically, this process consists of removing the stomachs, spleen and intestines. If the hind is pregnant the uterus and foetus will also be removed at this time. Most stalkers will examine the gralloch and note any abnormalities.

Small deer may be carried or dragged to the nearest road. Larger deer are dragged down the hill or through the forest before being loaded on a suitable vehicle or garron (highland pony) for transport to the larder. The time taken for the body to arrive at the larder will depend on the distance to be covered, the terrain, the type of transport and the stalking plan for the day. A roe deer carcase may reach the vehicle within a short period of being shot but it may not be off-loaded at the larder until much later. A red deer shot on open range in the morning might not arrive at the larder until evening. On arrival at the larder, the deer is weighed and logged in the larder records. The body is hung up; the chest is opened; the liver, lungs and heart are removed and are then identified with the body. The head and lower limbs are removed and discarded.

A number of the large estates have chilled larders and carcases can be cooled to 7°C. Generally, however, estate larders are not fitted with chilling equipment. Consequently, cooling of the majority of carcases is less controlled and can be considerably influenced by the prevailing ambient temperatures. During the stag cull in September, for example, carcase temperature may drop to only 12-15° C within 24 hours and may cool in an uneven manner as the larder heats up during the day and cools again at night. The length of time that the carcases remain in the larder often depends on the number of carcases to be collected and the distance from the game dealer's premises. Game dealers, who operate at the "top end" of the market (and who make the effort to obtain quality carcases through mutually agreed carcase handling protocols with the estate managers), collect carcases twice or three times per week and transport the bodies in appropriate vehicles. However, much poorer standards are also encountered where bodies hang in the larders for several days before being transported, piled one on another, in a dirty van.

Venison trade

Wild venison that is destined for the export market must meet the requirements of the Wild Game Meat (Hygiene and Inspection) Regulations 1995. For the domestic market, wild venison is covered by the Food Safety (General Food Hygiene) Regulations 1995.

In England and Wales two licences are required to trade in game including venison. The first is a local authority licence that will specify the business premises. The second is an excise licence that is available from the post office. It is a condition of the excise licence that the applicant is in possession of a council licence.

The legal requirements for venison dealing in Scotland are contained in the Deer (Scotland) Act 1996, sections 33-36. The Licensing of Venison Dealers (Prescribed Forms etc)(Scotland) Order 1984 details how venison dealers' records must be maintained. Appendix 2 contains a copy of the prescribed records sheet. Venison record returns submitted by the licensed venison dealers in Scotland are collated by the Deer Commission. There are some disparities between these figures and the cull data supplied by the estates. This is inevitable because of home consumption of venison and because of small numbers of deer from other sources being sold to venison dealers. Table 7 gives a summary of the venison records for Scotland for 2001/2002.

Table 7

Summary of Scottish Venison Dealers Records 2001/2002

Species	Venison record returns
Red	58,649
Roe	24,726
Sika	3,420
Fallow	803
Total	87,598

Game dealer records indicate that the average weights for the different species are: -

- Roe – 12kg
- Sika – 21kg.
- Fallow - 24kg,
- Red – 42kg

Using these figures, it is calculated that the weight of Scottish venison produced in 2001/2002 was 2,850 tonnes. If the cull figures (Table 2) are taken as a more accurate figure for the deer entering the food chain then the weight of Scottish venison rises to 3,240 tonnes. Rose (2001) suggests that 8% of the larger deer cull and 20% of the roe cull are kept for home consumption. Adding this to the previous figure brings the total of Scottish wild venison to over 3,500 tonnes.

As noted in the previous section, the cull figures for England are very uncertain and the calculations are based on assumptions. However, for the purpose of this report, a figure of 1000 tonnes of English venison is considered to be traded.

There is a limited market for roe venison in Britain. This stems from a mixture of economic and culinary factors, lack of discrimination by the public on differences between the types of venison, cost and unsuitability of the size of roe venison cuts for the British catering trade. It is estimated that 99% of roe venison is exported – mainly to continental Europe where the market is prepared to pay double the price for roe venison.

Although there is a healthy demand for red deer haunches and saddles in Britain, 50-70% of the red venison is exported to Europe. As a consequence of the restricted "open" season for shooting red deer, there is a glut of red deer carcases from September to December. Facilities in Britain are insufficient to handle this volume in such a short period. Consequently, large numbers of skin-on carcases are exported to the Continent. Opinions vary over the proportion of "front end of the carcase" venison that is exported and processed abroad. Some game dealers believe that virtually all of it is exported whilst others claim that a market is developing in Britain and that an increasing quantity is processed in Britain.

Within Britain, venison is sold to the wholesale catering trade and to the public through local butchers licensed to handle game/venison. The first quality assurance scheme for wild venison is developing. Named "Scottish Quality Wild Venison" (SQWV), it is a joint venture involving Forest Enterprise, the Association of Deer Management Groups, the Scottish Game Dealers and Processors and the Scottish Gamekeepers Association. The SQWV standards apply to stalking, carcase handling and processing and embrace: -

- Deer management and control
- Stalking proficiency
- Larder management
- Carcase inspection
- Processing – transport, dressing, cutting, packaging, labelling.
- Product specification
- Hygiene specification
- Traceability

Considerable numbers (hundreds, certainly – thousands, probably) of poached or otherwise illegally obtained deer, e.g. road kills (there are an estimated 40,000 RTAs involving deer annually), are believed to enter the food chain annually. Many of these animals are, apparently, transported from Scotland to England or Wales. It is an open question whether a tagging scheme (as suggested in Chapter 8) would affect this trade unless

it was strenuously enforced. A limited trade in deer carcases occurs in the opposite direction because of differences between Scottish and English legislation. In England although some animals can be legally killed out of season, the sale of venison from these animals is prohibited except between dealers. The venison can, however, be sold in Scotland. It is easy to appreciate the opportunities for exploiting these differences. In practice, any illegal trade is probably limited since large scale out-of-season shooting is usually carried out by those holding Game Dealer Licences.

Waste disposal

The Animal By-Products Order 1999 requires that animal carcases are disposed of by one of several methods including rendering, incineration, dispatch to knackers' yards or, in very limited circumstances, burial or burning. The large game dealers and processors dispose of un-saleable material in sealed skips that are up-lifted by licensed carriers. This material is taken for rendering. However, deer larder operators may not fully appreciate that different rules apply to larders considered to be "wild game processing facilities" and deer larders that act as "collection centres". "Wild game processing centres" are facilities where the carcases are removed from the skin and where some butchering may take place. "Collection centres" are larders that eviscerated the bodies and then store them in the skin before transport to the game dealer. The latter type of larder is exempted under the legislation and is permitted to bury carcases

in such a manner that ensures that carnivores cannot gain access, that there is no environmental contamination and that there is no disease risk. The wild game processing centres may bury carcases only where DEFRA is convinced that there is no alternative outlet.

Considering the poor quality of some of the premises used by some of the smaller game dealers, and the apparent laxity of application of basic hygiene standards within these premises and the vehicles that deliver the carcases, it seems likely that disposal procedures may also be less than adequate in some instances.

Chapter

3

Farmed Deer

Background

Deer farming was established in Britain in 1970s and expanded rapidly into the 1980s. Initially much of the farming was focused on breeding but gradually a commercial farmed venison trade developed. Several species of deer have been farmed with red deer proving to be the most popular. Although fallow are farmed in substantial numbers in New Zealand and the continent they are less commonly found on British deer farms. A small number of farms have populations of sika, wapiti (*Cervus canadensis)* and Pere David's deer (*Elaphurus davidianus*). The wapiti all appear to have been imported into European zoos, from Yellowstone National Park, USA, before the Second World War. Selected wapiti were subsequently introduced to a small number of farms in Britain in the late 1970s.

Traditionally, the deer farming industry was stratified into hill, upland and low ground pastures (Hamilton 1994). The hill farms were concerned with the production of weaned calves to supply to upland and low ground farms. The upland farms bred stags for hill farms and sold breeding stock and store calves to lowland farms. However, this structure has been

modified over the years and now approximately 60-70% of farms are considered to be breeder/finishers. It is estimated that only 20% of farms concentrate solely on breeding. Lowland farms have the full range of activities ranging from supplying breeding stock, importing and exporting deer and producing prime venison.

Population figures

The 1998 agricultural census indicated that there were 285 farms (240 in England & Wales and 45 in Scotland) holding 30,424 deer; of which, 8,379 animals were slaughtered (Appendix 3). The 2000 census gives a higher deer count of 33,848. Current figures indicate that there are 363 deer farms in Great Britain (England 263, Scotland 67, Wales 33). The British Deer Farmers' Association (BDFA), which represents about 60-70% of the deer farmers, estimates that red deer account for about 90% of the total numbers. Production figures are commercially sensitive and there is a lack of a specific mechanism for data collection on small farms. However, the BDFA estimates that approximately 9,000 animals will go for slaughter in 2002. The code of practice and the Quality Assured Prime Venison scheme stipulate the maximum age for slaughter is 27 months of age. In practice, many farmed deer being reared for venison are slaughtered when they are 10-15 months of age. Others are killed between 18-27 months of age. However, the 27-month rule is not always respected. In some instances, hinds of up to 60 months are entering the prime venison market.

Older culled hinds may enter the food chain as processing grade meat for sausages and other products. These hinds range in age from 4-14 years, the majority being between 8-10 years. Most of these hinds will be slaughtered between October (post-weaning) and turnout in April or May. Most stags are slaughtered or sold by three years of age.

Slaughter

Slaughter of deer may occur "on-farm" under the Farmed Game Meat Regulations. Where on-farm slaughter is carried out the farm must be licensed as a Farmed Game Handling Facility. If the deer are eviscerated on the farm then the premises are required to be licensed as a Farmed Game Processing Facility. Deer farmers who wish to butcher venison in the same premises need ensure that the facility is also licensed as a red meat cutting plant. The Fresh Meat (Hygiene & Inspections) Regulations 1995 are applicable, equally, to deer killed on-farm or in the abattoir. These rules cover ante-mortem inspection, handling of carcases in controlled premises and meat inspection by qualified meat inspectors.

There is a considerable variation in the practices of different farms. Some slaughter on-farm and send away for evisceration and butchering. Others send to the abattoir for evisceration before butchering the carcases on farm. Yet others have the deer killed, eviscerated and butchered elsewhere.

On-farm" slaughtered deer may be shot in the head in the field using a .270 rifle bullet. Others are restrained, either in a crush or in a small pen and stunned with a captive bolt humane killer. Alternatively, the deer can be transported to abattoirs licensed to slaughter deer. The deer in abattoirs are stunned by captive bolt applied to the forehead. Currently, three abattoirs account for the bulk of the abattoir-slaughtered deer in Britain. These are located in South Lanarkshire, South Yorkshire and Staffordshire. The number of abattoirs being used for deer varies from time to time and it is usual to have a greater number of abattoirs licensed to handle deer that the number that are actually killing deer. Unsurprisingly, there is considerable "commercial confidentiality" and the throughputs of the individual abattoirs were not available for this report. Farmed deer are exempted from the "close" season restriction and, as a consequence, can be killed at all times of the year.

Venison

Venison from farmed deer is usually of high quality, more expensive than free-living venison and sold into a niche market that is prepared to pay a premium for the guaranteed quality. Haunches and saddles are considered the prime cuts, with sausages and pies being amongst the most common venison products. Farm gate sales and farmers' markets are important outlets for venison from deer slaughtered on-farm. There is a strong demand from the catering trade for British farmed venison. The "Supermarket" trade is also increasing. Consequently, there are no

significant export sales of farmed venison although a limited quantity goes to Holland and Belgium.

Fallen/casualty animals

The fate of fallen stock is of interest in the context of this report. Management practices and husbandry of farmed deer have developed progressively since the 1970s and, in general, farmed deer represent a remarkably healthy population. Inevitably, some deaths occur and these animals are usually buried on the farm rather than transported to knackers' yards or hunt kennels. No figures are available for casualty or fallen farmed stock but deer farmers estimate that less the 1% will die or require casualty slaughter. Based on the current Census data of approximately 34,000 deer on farms, casualty/fallen stock are likely to amount to 300, or less, per annum. Arrangements could be made to submit all of these animals to the veterinary laboratories.

Chapter

4

Park Deer

Deer parks have been existence in England since at least the time of the Norman Conquest in 1066 (Whitehead, 1993). A detailed history of deer parks is provided by Hingston (1988). The number of parks has decreased substantially since their heyday towards the end of the 19th Century and only about 150 remain. The great majority of these are in England with only five in Wales and 10 in Scotland. In addition to those deer that live in what are considered true deer parks, there are numerous small collections of "ornamental" deer that exist in the grounds of large properties for aesthetic reasons. These latter collections are, in general, not managed in any substantive manner (although they maybe subjected to culling from time to time) and are not included in the assessment given in this report.

Fallow and red deer were the most commonly maintained herds whilst small numbers of exotic species, Pere David (*Elaphurus davidianus)*, Axis (*Axis axis*), rusa (*Cervus timorensis*), muntjac (*Muntiacus* sp.), water deer (*Hydropotes inermis*) and swamp deer (*Cervus duvauceli*) were introduced

and survived. Attempts to establish feral populations of black-tailed or mule deer (*Odocoileus hemionus*) failed. White-tailed deer (*Odocoileus virginianus*) flourished for many years at Woburn Abbey Park but ultimately died out (Whitehead, 1993).

Deer that are enclosed in Great Britain but not registered as a farm herd with the Department for the Environment, Food and Rural Affairs (DEFRA) are classified as "wild". They are subject to all the legislation (with minor exceptions) applicable to un-enclosed deer. In particular, venison from park herds may only be sold to a licensed game dealer in England and Wales or a licensed venison dealer in Scotland, unless the deer manager or the estate is suitably licensed.

The estimate for the park deer cull is presented in Table 8. Further details are given in Appendix 4. The number of deer parks and collections changes from year to year so the attached data can only be considered as a snapshot in time.

Table 8

Park Deer cull estimates 2001/2002

Species	England	Scotland	Wales	Total
Red	**1929**	**242**	**105**	**2276**
Fallow	**5266**	**77**	**250**	**5501**
Sika	**336**		**Nil**	**336**
Total	**7531**	**319**	**355**	**8205**

In Appendix 4, where the populations are known to exist, but numbers are not currently available, the species of deer is given in the spreadsheet. Where cull data was not readily available an estimate has been made based on 30% of the latest known herd size. This calculation is liable to result in an underestimate because most parks operate with a high percentage of females and have a high fecundity rate.

The disposal of carcases occurs through various routes. If the deer manager of a park is a registered game dealer, direct sale to the public may take place. These parks may also have contracts to supply carcases or venison to particular caterers. Additional carcases are sold to other registered game dealers.

Chapter 5

Zoological or other captive collections

Early in the BSE epidemic it became apparent that cases were occurring in zoological collections. The affected species were Ankole cattle, Bison, eland, Arabian and scimitar horned oryx, gemsbok, kudu and nyala. Antelopes appear to be particularly susceptible to infection and succumb at a relatively early age. No cases were found in deer although similar concentrates were being fed.

The Federation of Zoological Gardens of Great Britain and Ireland compiles, annually, an inventory of mammals held by members and some non-member zoos. These surveys are voluntary and the data they contain reflects the unevenness in response rate from member zoos from year to year. Table 9 sets out the species of deer held and the numbers of each type of deer as recorded for 2000 with specific information from the 2001 survey added to reflect, more accurately, the current position. The largest collections consist of Axis (200+), Fallow (670+), Red (500+), Sika ($\cong$ 300), Pere David (500+), Chinese Water (400+) and Muntjac (300+).

Table 9

Deer species and numbers in Zoos, 2000

Species	Male	Female	Gender Not stated	Total
Axis	44	76	122	242
Fallow	194	461	19	674
Philippine spotted	2	2	0	4
Hog	27	21	49	97
Swamp	23	68	73	164
Red [1, 2]	181	327	13	521
Eld's	5	12	1	18
Sika	104	159	35	298
Rusa	1	7	0	8
Vietnamese sika	2	5	0	7
Sambar	0	0	41	41
Pere David	178	325	15	518
Chinese Water [3]	76	76	259	411
Muntjac	140	144	16	304
Reindeer	6	20	0	26

1 - Includes 9 Canadian elk. 2 - Includes 69 recorded in 2001 at one park that did not submit figures in 2000
3 – 2001 figures

Over the period 1995 – 2002 two deer were examined, under the arrangements for surveillance of exotic species, for the presence of

spongiform encephalopathy. An axis deer was submitted in 1998 and a red deer in 2000. Both proved negative.

Fallen stock

Moderate numbers of deer die, each year, in zoological collections. For example, the Inventory for 2000 records that 155 deer, out of a total of approximately 3300, died. This suggests that 4.5-5% of deer could be categorised as fallen stock. The majority of these deaths probably occurred in very young animals but further investigation of the age groups involved might be useful.

Chapter

6

Deer Co-products

The main co-products from deer are antler velvet, tails, sinews and pizzles (penis).

Of these, antler velvet is the most valuable. Deer antlers are cast and re-grown every year. Growth commences as light levels increase in the spring and the growing antler is covered by a highly vascular, sensitive covering named "velvet". Deer velvet is greatly prized for oriental medicines but harvesting of antlers in velvet from live animals in Britain is prevented by the Welfare of Livestock (Deer) Order 1980. During the first part of the open season for red stags in Scotland, the antlers are in velvet and these antlers may be collected from culled stags. Stags shot out of season, under permit, in spring and early summer will also be in velvet. No records are available for the weight of antlers-in-velvet that is collected. However, considering the limited number of stags that are killed whilst in velvet, the trade from Britain is insignificant compared to major exporters such as New Zealand. The main outlet for antlers is Hong Kong and Korea. Sika antlers are also sought after for the oriental medicine trade but there appears to be little interest in fallow antlers.

Tails and pizzles are routinely collected when red deer are processed. Traditionally, these were considered as perks for the stalkers and were collected in the larders. The tails and pizzles were frozen and sold to traders who exported them in bulk to Hong Kong. Recent changes to the rules governing the export of co-products stipulate that the tails and pizzles, etc., for export, must originate in a body that has been inspected and passed as suitable for human consumption. Consequently any tails removed at the larder, before the veterinary inspection, are unsuitable for export. The large game dealers will take over the tail and pizzle trade and will, undoubtedly, negotiate contracts with the exporters.

Sinews are used in oriental medicines but there is little interest in collecting them in Britain. The sinews in question are the flexor tendons located on the posterior surface of the lower parts of the limbs. The effort in collecting suitable specimens, blunting of the knives, subsequent handling and low value are given as reasons for the general lack of interest in this aspect of the co-products market.

Chapter

7

Comments

Spongiform encephalopathy in British deer?

To date, no evidence of Chronic Wasting Disease (CWD) or other spongiform encephalopathies has been found in deer in Britain and Europe. It could be argued that, as far as the wild populations are concerned, the failure to detect disease may be a reflection of inadequate surveillance. With regard to the farmed, park deer and other captive collections, the limited sizes of these populations might make it difficult to detect a disease that occurs at low prevalence.

Risks from feeding and movements

Before the introduction of the ruminant protein feeding ban, deer in Britain were exposed to concentrates containing bovine and ovine material. The degree of exposure is difficult to calculate at this late stage but it is clear that potentially contaminated concentrates were fed to farmed, captive and free-living deer. For example, a questionnaire survey of supplementary feeding practice of free-living deer in winter in Scotland in 1995, suggested that up to 50% of properties fed deer and, of these, 17% fed concentrated food and feed blocks, and 29% provided hay/silage, feed blocks and concentrates/roots (Trenkel,

1998). However, it is not known if deer are susceptible to oral challenge by the BSE agent. They may, indeed, be refractory to this infection or the infective dose may be at a level rarely, if ever, reached under normal feeding practices. If infection were established in deer during the 1980s and early 1990s (and if horizontal or vertical transmission occurs in deer) then, considering the large numbers of deer movements that have occurred between farms, between zoological collections and under natural conditions in the wild, it is theoretically possible that the agent could be widely distributed. On this latter basis, alone, it could be argued that a survey should be conducted.

Susceptible species

CWD was first described in captive mule deer (*Odocoileus hemionus)* in North America in1967. At that time the cause was unknown. Captive Rocky Mountain elk (*Cervus canadensis nelsoni)* were subsequently found to be infected. CWD was recognised in free-living elk in 1981 and in free-living mule deer and white tailed deer (*Odocoileus virginianus*) during the following decade. It is possible that this disease could have been present in the wild populations for twenty years or more before its first detection (Williams and Miller, 2002). Currently, the natural host range of this condition is restricted to these three species of deer. The mode of transmission is unknown but it is clearly not related to consumption of ruminant meat and bone meal. CWD is currently considered to be the sole

example of a naturally occurring spongiform encephalopathy of deer species.

Targeted surveillance

Red deer are relatively closely related to Rocky Mountain elk and, of the British deer, red deer may be viewed as the species with the greatest potential to develop a spongiform encephalopathy. Targeted surveillance of "high risk groups" for spongiform encephalopathy should include aged red deer, and those showing loss of condition or overt neurological disturbance. In late winter/early spring, loss of condition and death from exposure is not uncommon in open range deer. Starvation combined with wet and windy weather is often the cause of this late winter mortality but it might be reassuring to examine mature animals in this cohort of deer, to rule out spongiform encephalopathy as a predisposing cause.

A small number of wapiti (North American elk) and some wapiti/red deer hybrids are present on British deer farms. The wapiti introduced to the deer farms came from zoological collections in Britain and Europe before the BSE crisis. The antecedents of these wapiti are believed to have been imported from North America before the Second World War.

Sample quality

It will be important, in the context of the design of any potential survey, to recognise that the quality of sample available from wild deer may be less than ideal. The delays in delivering the deer to the larders combined with

the additional time elapsing before the heads are uplifted and before they arrive at the veterinary laboratories, will result in various degrees of autolysis. With good co-operation of the estate managers, stalkers and game dealers, the problem can be minimised and totally unsuitable heads, for example, can be rejected at the larder end of the process. Nevertheless, it is probable that routine haematoxylin and eosin stained sections of brainstems from animals shot during the summer and autumn will show moderate to marked autolytic changes. Consequently, immunohistochemistry is likely to have a pivotal role in the diagnostic procedures.

Other sources of samples

Deer are the focus of veterinary attention or investigation for various reasons. Examples are diagnostic sampling of farmed deer and surveillance for tuberculosis in wildlife. These activities may provide opportunities for the collection of additional samples that could enhance any proposed spongiform encephalopathy survey. Initial interrogation of the "Farmfile" and VIDA databases in VLA indicate that approximately 500 deer carcases are submitted to the Agency annually. Further samples may be retrieved from archives held in research institutes such as the Moredun Research Institute, VLA, and the Zoological Society of London.

Chapter
8

Recommendations on sampling points

The three categories of deer – free-living, farmed and park – need to be considered separately when the practicalities of sample collection are being studied. Although the structure of any potential survey has not yet been finalised it might be assumed that, for consistency, similar samples will be collected from all deer included in the survey.

Free-living

Recommendation 1:

Select heads for sampling from chest-shot animals

Recommendation 2:

Transport heads to veterinary laboratories for sample collection

Recommendation 3

Use Game dealers' vehicles to transport these heads

Recommendation 4

Specifically recruit to the survey those estate managers and dealers who are currently raising standards of wild venison.

Recommendation 5:

Institute a tagging scheme to facilitate traceability

Recommendation 6

Target mature adults in the winter starvation/exposure cohort

It is standard practice, now, for deer shot in woodland or open hill to be gralloched (i.e. to have the stomachs and intestines removed on the hill) but for the body to be delivered to the estate larder with the head on. Once in the larder, the head and lower limbs are removed and these items are normally placed in a disposal pit. This pit is covered over at the end of the season and a new pit is dug the following year.

Under these circumstances there are two principal options for sampling brainstem and tonsil:

- The stalker or other designated person in the larder can be taught to remove the correct samples
- The head is transported to a veterinary diagnostic laboratory for sample collection

The first of these options is open to many practical difficulties such as achieving agreement with estates that their staff will undertake this task, agreeing a fee for this process, arranging training sessions for staff in remote locations and lack of supervision of the sampling process during the busy stalking season.

The second option is more practical inasmuch as game dealers' vehicles collect deer carcases regularly. Transporting heads in the same vehicles should not pose a problem and these heads can be delivered to the

closest appropriate veterinary laboratory. Using game dealers' vehicles should prove to be cost effective when compared to arranging other delivery services.

Advice and instructions will need to be given to estates on which heads to avoid submitting. For example, in animals shot in the upper neck (or in the back of the head) the brain stem is unlikely to be suitable for laboratory examination.

In the initial phase, facilitation of any proposed survey would be assisted by the recruitment of those estate and forest managers who are currently concerned with raising standards of presentation of wild venison

For traceability purposes it may be felt necessary to introduce a tagging system for carcasses, plucks (lungs, liver & heart) and heads. The Forestry Commission already tag their carcasses and plucks and an extension of this scheme is desirable. Problems can be anticipated in persuading some of the smaller operators to participate in routine tagging.

The winter starvation/exposure cohort of red deer, although not showing the characteristic signs of CWD, may be worthy of special attention. Consideration could be given to shooting affected animals, in late winter and early spring, under the terms of "action intended to prevent suffering" in the Deer (Scotland) Act 1996.

Farmed Deer

Recommendation 7:

For "on-farm" slaughter on premises licensed to butcher deer, train staff to collect samples

Recommendation 8:

Develop technique for rostral approach to brainstem for "on-farm"

Recommendation 9:

Where possible, arrange for MHS staff to collect samples from abattoir killed and inspected deer.

Recommendation 10

Where recommendation 9 is impractical, transport heads from abattoir-killed deer and farmed game processing facilities to veterinary laboratories

Recommendation 11:

Collect brainstem, at veterinary laboratories, from all "fallen" farmed deer over 12 months of age

Recommendation 12:

Collect brainstem, at veterinary laboratories, from all culled wapiti

On those farms that are licensed to butcher deer, the staff who handle these carcases would be in an ideal position to collect the samples required. However, training in sample collection would need to be given. This could be arranged at veterinary laboratories or at demonstrations on selected farms. Although the standard practice for obex collection in cattle and sheep has been via the "foramen magnum procedure", a different

approach might be more acceptable on deer farms. It might be helpful if a method were developed whereby the head is sawn through, vertically, posterior to the angle of the jaw and the brainstem sample collected following removal of the posterior part of the brain from inside the skull (rostral approach technique). This is suggested because the staff on deer farms are confident and familiar with the use of the saw. Additionally, the complications related to the development of new tools for removal of the brainstems (from different species and ages of deer) through the foramen magnum are avoided. Deer shot in the head with a high velocity bullet are likely to sustain some damage to the brainstem. A pragmatic approach may need to be adopted whereby damaged, incomplete samples may need to be accepted. A fee might need to be offered to deer farmers as an incentive to collect quality frozen and fixed samples.

Abattoir slaughtered deer would fall into a similar category as abattoir killed cattle and objections to brain sampling within the confines of the abattoir could arise. If not, meat inspectors could collect samples as for farm shot deer. In the case of local difficulties, the heads from these animals could be transported to veterinary laboratories for sampling.

Fallen stock could be considered as a group deserving particular attention. CWD appears to have an incubation period of around 15-18 months. Consequently, routine post-mortem examination, at a diagnostic

laboratory, of all fallen stock over 12 months of age might be a worthwhile study.

Similarly, examination of all brainstems from all farmed wapiti (whether culled or fallen stock) may provide confidence that spongiform encephalopathy is absent from this group of breeding animals that may be distantly related to the diseased wapiti in Canada and USA.

Park deer

Recommendation 13:

Transport heads from culled park deer to veterinary laboratories

Recommendation 14:

Use game dealers' vehicles to transport these heads

Recommendation 15:

Institute a carcase-tagging scheme as per free-living deer.

For the most part, the circumstances in Parks more closely resemble those surrounding wild deer than the farmed deer scenario. Collection of heads by game dealers and delivery to veterinary laboratories would seem the best option.

The occasional park (with contracts to supply fallow venison to specific catering establishments or organizations) is licensed to butcher deer.

Arrangements could be made to have these people trained in sample collection (see Farmed deer).

Zoo deer

Recommendation 15:

Transport all culled or fallen deer to veterinary laboratories for necropsy

Deer in zoos were, almost certainly, exposed to MBM/concentrates and this category of deer might be considered for "targeted surveillance". If the co-operation of the large zoological gardens can gained, then it would be instructive to examine all culled deer over 12 months of age.

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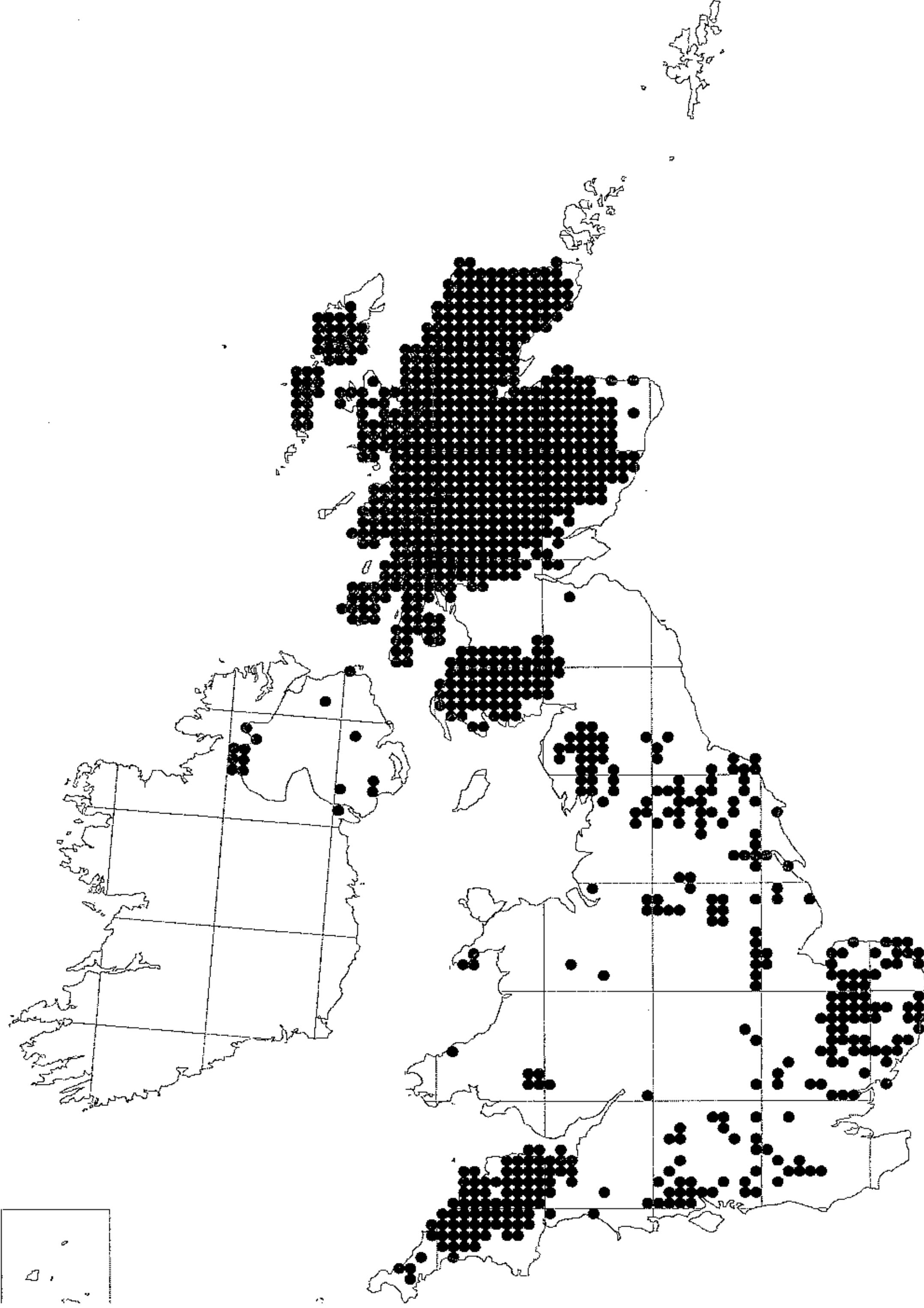
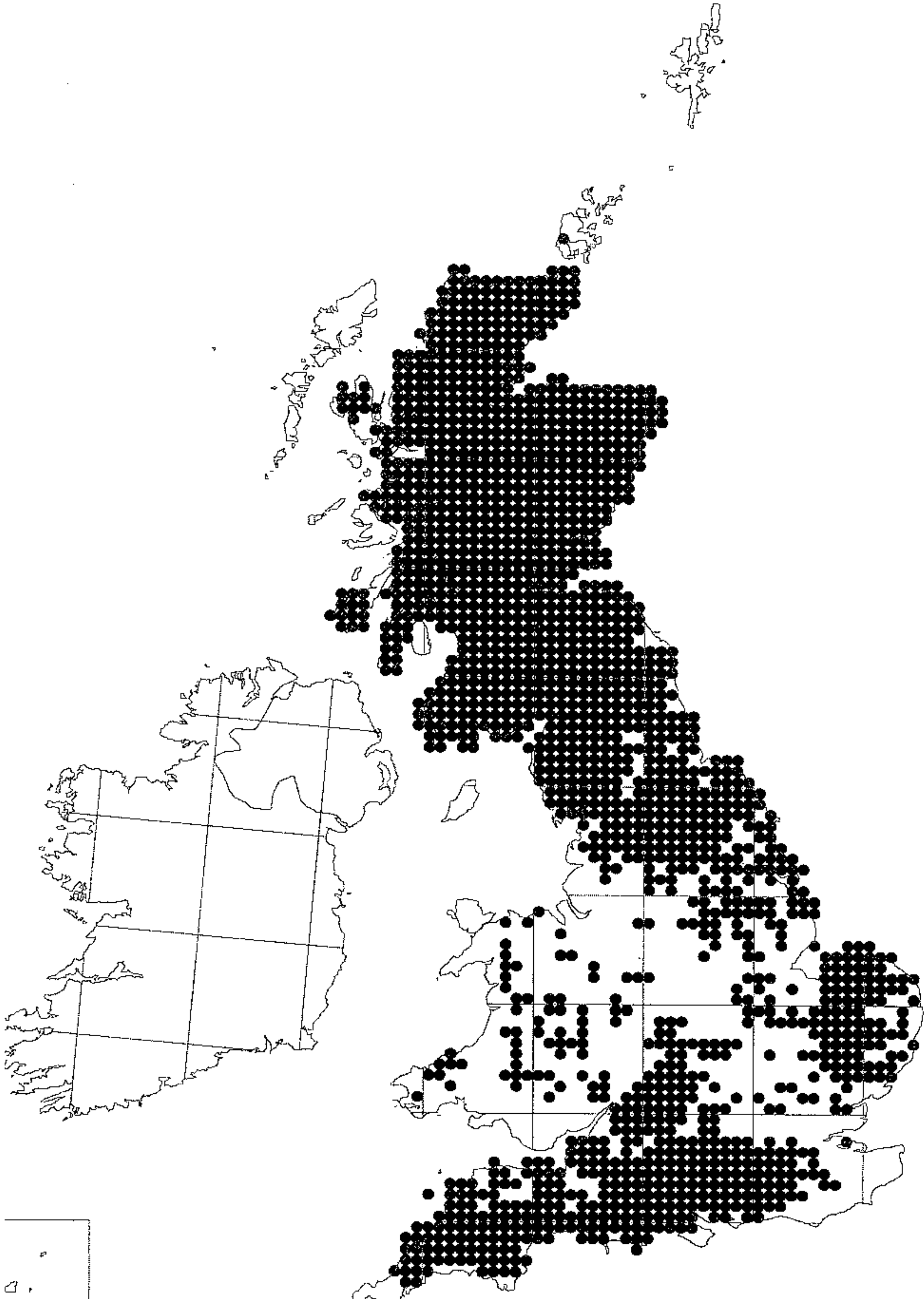
- British Deer Society
- Deer Commission for Scotland
- Deer Initiative
- Defence Deer Management
- Forestry Commission
- National Game Dealers Association
- National Gamekeepers Organisation
- Scottish Food Quality Certification Ltd.
- Scottish Game Dealers and Processors Association

APPENDIX 1

Cervus elaphus



Capreolus capreolus



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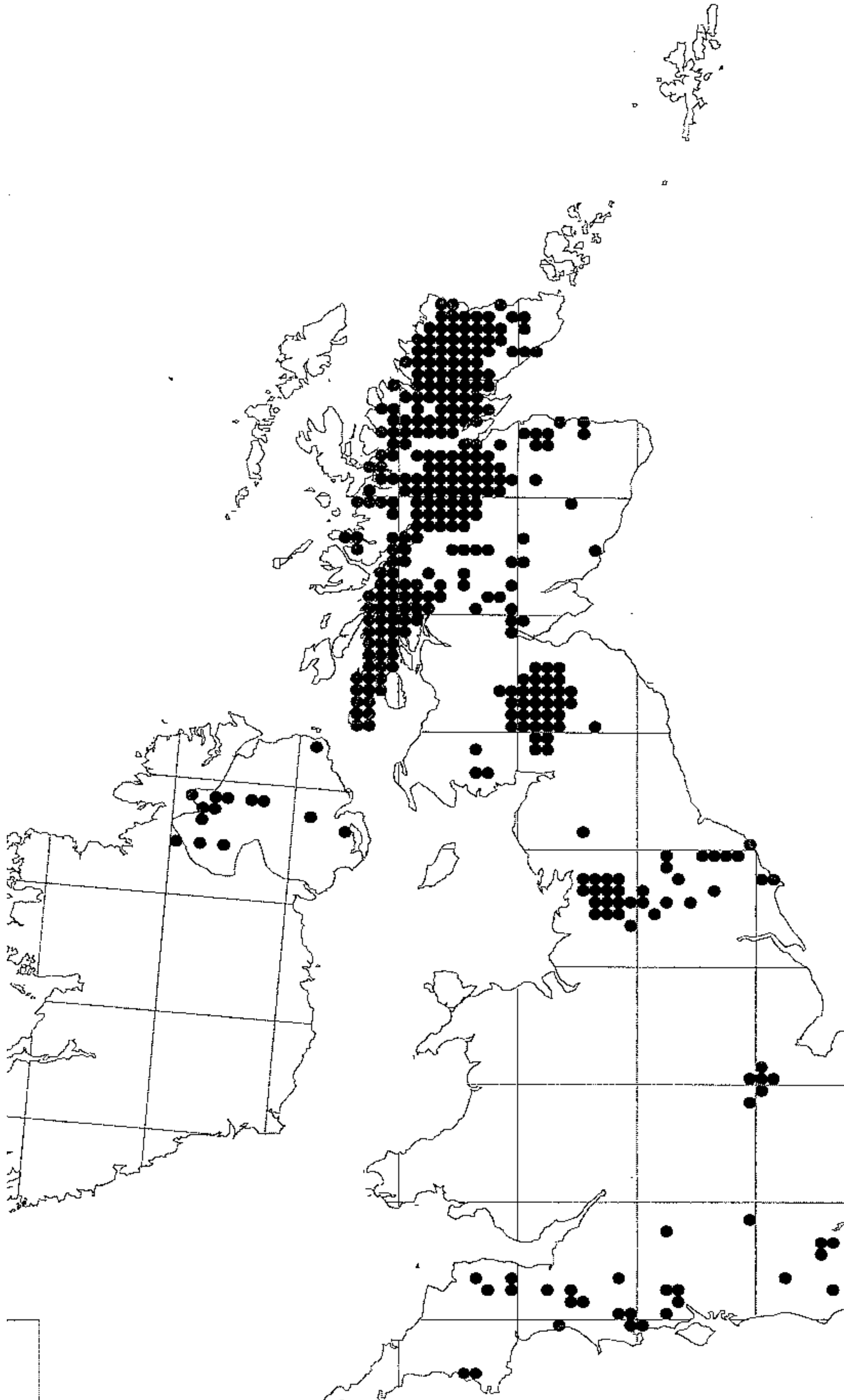

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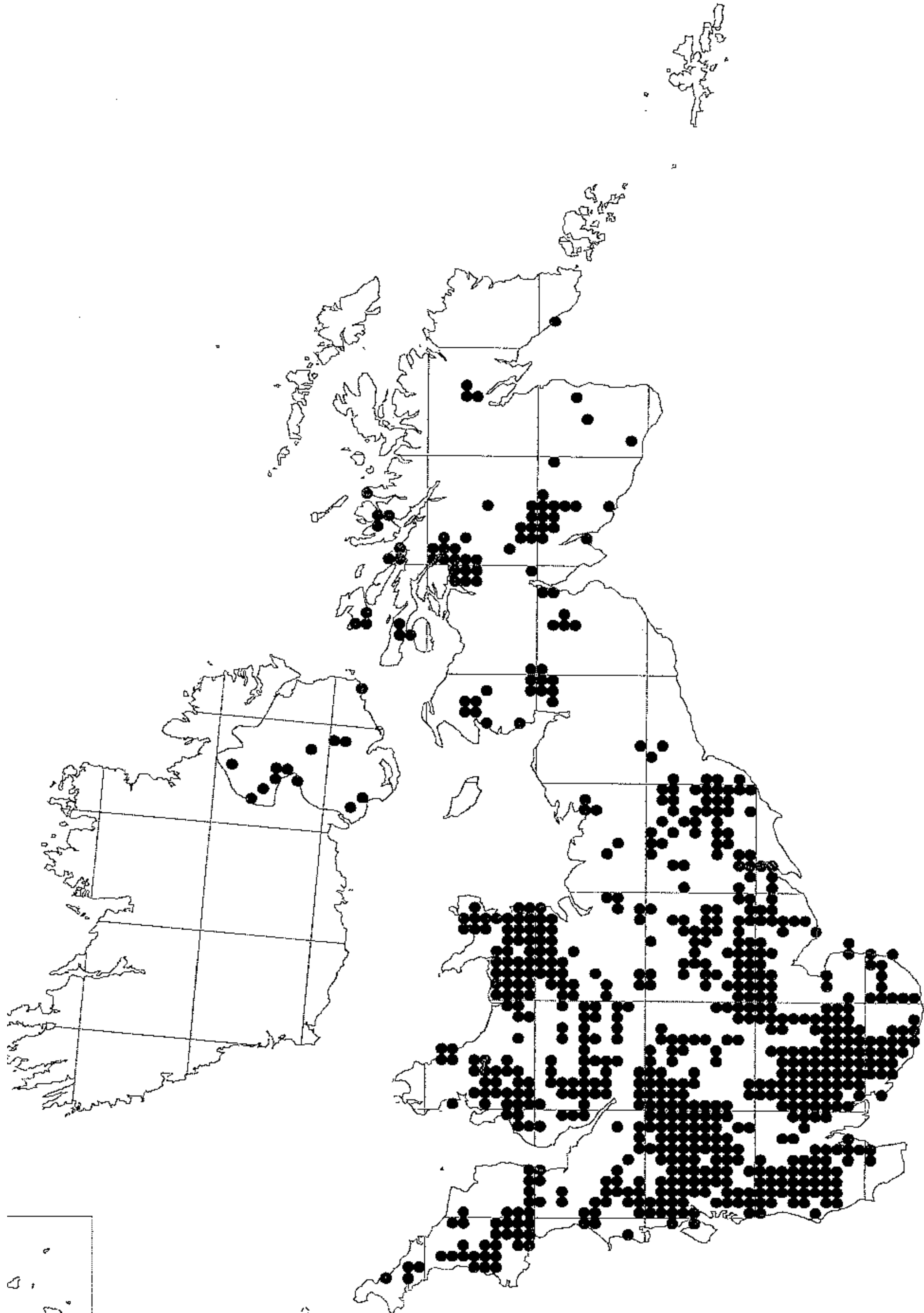

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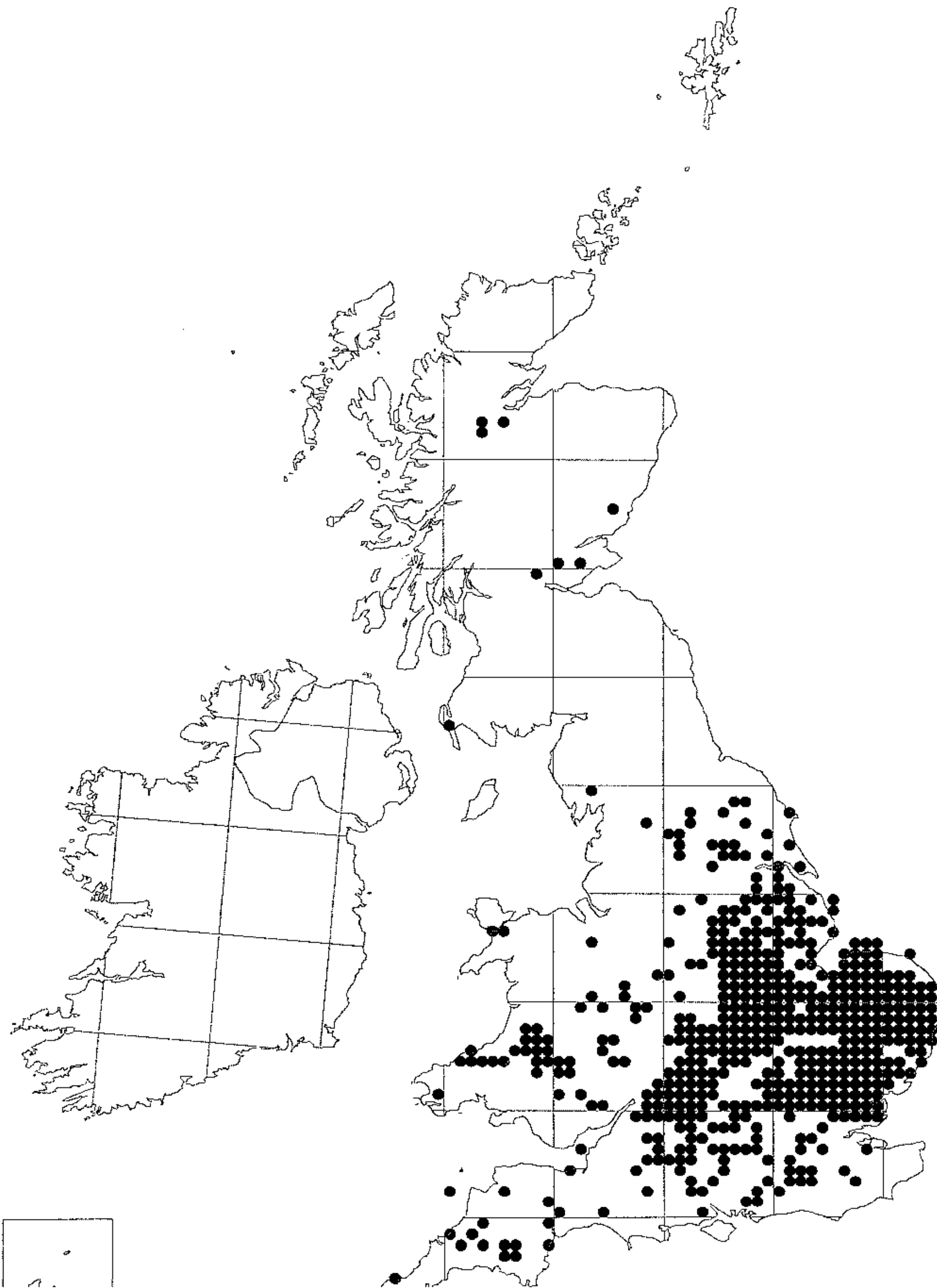
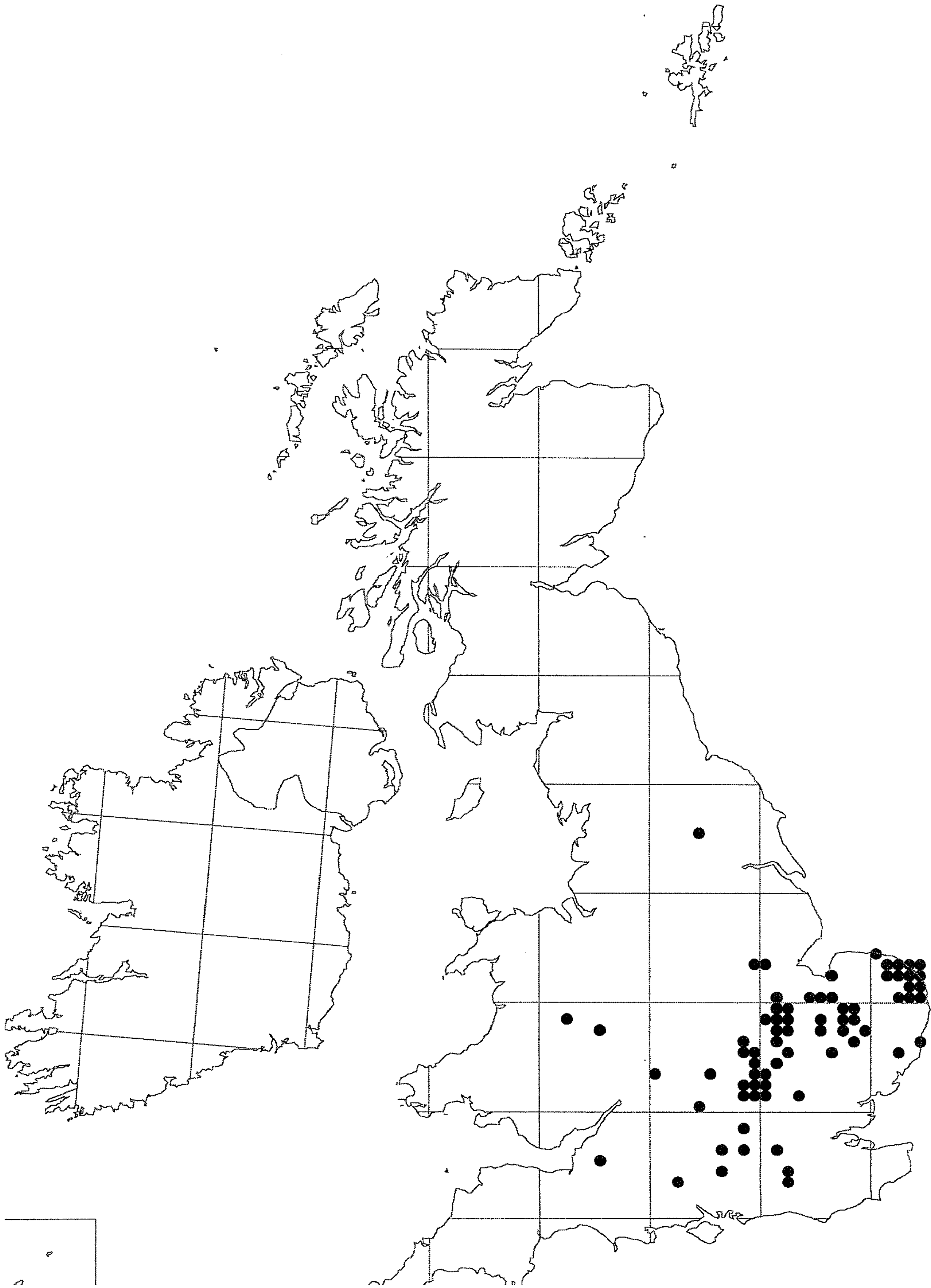


Hydropotes inermis



APPENDIX 2

SCHEDULE

FORM OF RECORDS OF PURCHASES AND RECEIPTS OF VENISON TO BE KEPT BY LICENSED VENISON DEALERS

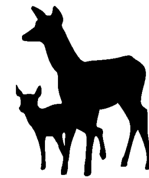
Date of purchase or receipt*	Species	Place where deer killed, eg name of estate, agricultural holding, or forest	Name and address of seller, or in the case of receipt the source from which the venison was received[x]	Registration number of vehicle delivering venison	Particulars of carcases purchased or received			Particulars of parts of carcases purchased or received		
					Male	Female	Total	Number (or parts)	Description (or parts)	Weight
					No. Weight	No. Weight	No. Weight			

*Where the venison comes from deer killed by the dealer (including his employee or agent), enter date of killing.

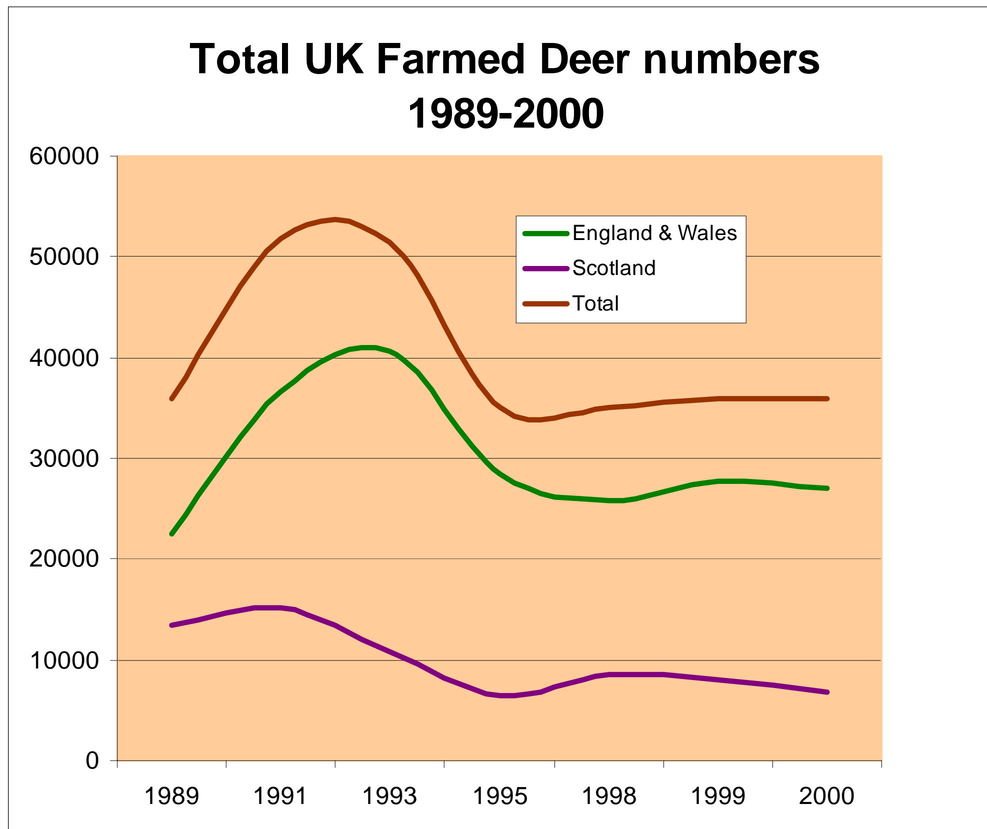
[x]Where the venison comes from deer killed by the dealer (including his employee or agent), enter 'killed by dealer'.

APPENDIX 3

BRITISH DEER FARMERS ASSOCIATION



FARMED DEER STATISTICS



1997-1998	England & Wales	Scotland	N.Ireland	Total
TOTAL FARMED DEER	**24,070**	**7,227**	**1,051**	**32,348**
Hinds(does) to the stag(buck) - yearlings	1,795	744		
Ditto - other	10,512	2628		
TOTAL BREEDING FEMALES	**12,307** (51.1%)	**3,372** (46.6%)	**525 (est)**	**16,204**
TOTAL BREEDING MALES	**866** (3.6%)	**244** (3.4%)	**37 (est)**	**1,147**
Sold for fattening during the year - males	1063	1,121		
Sold for fattening during the year - females	673	485		
TOTAL STORES SOLD	**1,736** (7.2%)	**1,606** (22.2%)		
Slaughtered for venison - males	3868	1,102		
Slaughtered for venison - females	2776	633		
TOTAL SOLD FOR SLAUGHTER	**6,644** (27.6%)	**1,735**(24.0%)	**273 (est)**	**8,652**
NO. OF DEER FARMS	**240**	**45**	**26**	**311**

Farmed deer only, not park, all species — % is that categories % of total

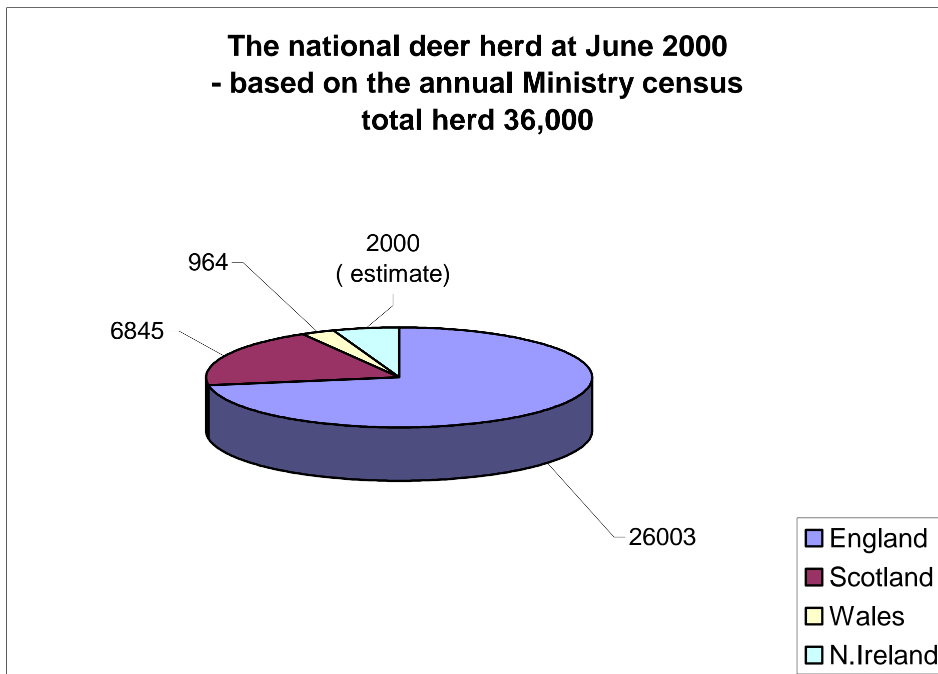
England & Wales 77% Red 22% Fallow 1% Other

Source: MAFF Deer census April 1998, Scottish Deer census Nov 1997, DANI Agric census 1998 (DANI - only total available, category totals are estimates based on %)

Farmed Deer figures, as recorded in Agricultural census'

Year		Total deer	No farms	No Hinds	Slaughter No
	England & Wales	22447	133	11888	n/a
	Scotland	13453	n/a	n/a	n/a
1989	**Total**	**35900**			
	England & Wales	36544	228	19145	5128
	Scotland	15252	n/a	n/a	n/a
1991	**Total**	**51796**			
	England & Wales	40616	227	20707	8983
	Scotland	10854	88	6535	2089
1993	**Total**	**51470**	**315**	**27242**	**11072**
	England & Wales	28500	186	12433	8756
	Scotland	6454	59	3201	2535
1995	**Total**	**34954**	**245**	**15634**	**11291**
	England & Wales	24070	240	12307	6644
	Scotland	6354	45	3372	1735
1998	**Total**	**30424**	**285**	**15679**	**8379**
	England & Wales	27003	n/a	n/a	n/a
	Scotland	6845	67	n/a	n/a
2000	**Total**	**33848**			

source: MAFF & Scottish Office Agricultural Census



APPENDIX 4

Estimate of Deer Park Culls for Great Britain, October 2002

Prepared by Peter Watson,
The Deer Initiative

Country	County/Unitary Authority	Red cull	Fallow cull	Sika cull
England	Avon	4	10	
England	Bedfordshire	55	30	
England	Berkshire	162	115	
England	Buckinghamshire	0	12	3
England	Cambridgeshire	?	?	
England	Cheshire	170	410	
England	Cornwall	0	60	
England	Cumbria	50	111	
England	Derbyshire	62	234	
England	Devon	40	155	
England	Dorset	100	220	20
England	Durham	25	65	
England	Essex	8	54	8
England	Gloucestershire	200	152	
England	Greater London	160	386	
England	Greater Manchester	0	100	
England	Hampshire	0	27	
England	Herefordshire	115	105	
England	Kent	0	235	75
England	Lancashire	12	0	
England	Leicestershire	125	155	
England	Lincolnshire	0	207	
England	Norfolk	140	660	40
England	Northamptonshire	0	8	
England	Northumberland	0	30	
England	Nottinghamshire	28	105	
England	Oxfordshire	0	210	50
England	Shropshire	0	192	
England	Somerset	0	156	
England	Staffordshire	5	87	
England	Suffolk	78	137	10
England	Surrey	0	20	
England	Sussex	60	488	90
England	Warwickshire	10	40	
England	Wiltshire	70	50	
England	Worcestershire	150	165	20
England	Yorkshire	100	80	20
England	**Total**	**1929**	**5271**	**336**

Scotland	Central	188	37	
Scotland	Dumfries & Galloway	30	0	
Scotland	Lothian	10	20	
Scotland	Strathclyde	14	10	
Scotland	**Total**	**242**	**67**	
Wales	Dyfed	0	35	
Wales	Powys	105	215	
Wales	**Total**	**105**	**250**	
GB	**Total**	**2276**	**5588**	**336**