Intensive husbandry of fallow deer

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Introduction

The European fallow deer (*Dama dama dama*) is one of the most widely distributed of the temperate cervid species. Although originating in the Mediterranean region, through man's influence the species is now found in discrete wild or captive populations between latitudes 25° - 60° N and S. There has been a close association between man and fallow deer for several millenia, but within the last 200 years fallow deer have been distributed widely for sport hunting and aesthetic appeal. The move into intensive husbandry of fallow deer in pastoral habitats represents a relatively new association between man and beast, and follows recent world trends away from agricultural production of more traditional mammalian species (eg. sheep, cattle) and into production of high-valued commodities of venison and velvet antler. In this paper I will discuss the modern concepts of fallow deer farming that have been developed within the last 10 to 15 years, highlighting aspects of production and management unique to this species.

Genotypes

The majority (>95%) of farmed fallow deer are of the European subspecies. However, in recent years there has been considerable interest in interbreeding European fallow deer with the rare Mesopotamian subspecies (*Dama dama mesopotamica*) to produce hybrids that are characterised by faster growth rates, larger mature body weight and earlier birth season. The Mesopotamian fallow deer, which is of Middle Eastern origin, is classified by the IUCN as highly endangered, and less than 10 purebred individuals (based largely in New Zealand) have contributed to hybridisation programmes in New Zealand, Australia, USA, Canada and, to a limited extent, the UK. Much of this has been achieved through the use of artificial insemination.

Fallow deer are closely related to the *Cervus* genus (red deer, sika deer, etc), and were originally placed in the same genus. In several ways, however, fallow deer can be distinguished from members of *Cervus*. The most obvious difference is that mature male fallow deer have palmated antlers. Furthermore, as distinct from *Cervus*, they have no neck mane and no upper canine teeth. They do, however, have a similar karyotype to red deer (ie. 2n = 68). There have been no verified accounts of hybridisation between fallow deer and any other cervid species (one reference to a hybrid between fallow deer and chital deer is highly suspect). However, the two subspecies, European and Mesopotamian fallow deer, can hybridise freely and produce fully fertile offspring.

Adult European fallow deer have peak annual liveweights of 100 to 110 kg for bucks and 45 to 60 kg for does, and stand about 90 cm high at the shoulder. The subspecies has a long tail (33 cm) and the male has a prominent larynx (Adam's apple). The wildtype pelage colour is light brown with a black dorsal line and white belly. Spotting is discernible in adults, particularly in summer. However, there are probably more pelage colour variations in European fallow deer than in any other mammal leading a wild existence. These colours include melanistic (black or brown), menil and white. The typical antlers of mature bucks are palmated at the top. Both the brow tines and trez tines are well developed and widely spaced from each other. The bez tine is normally absent and a number of snags or spellers are present along the rear edge of the palmation.

The Mesopotamian subspecies is larger than the European fallow deer, with peak annual liveweights of 130 to 160 kg for bucks and 70 to 85 kg for does. The antlers are of a rather different pattern, with very short brow tines and long trez tines sprouting close to the brow. Where this tine emerges from the main beam, the antlers show distinct palmation. However,

palmation towards the top of the antler is not as marked as for European fallow deer. All Mesopotamian fallow deer exhibit the same pelage pattern, which is similar to the wildtype European fallow deer pattern but with more pronounced spotting in summer.

Species Characteristics

During the short history of deer farming in New Zealand and Australia, a period of perhaps 20 years, there has been considerable, often acrimonious, debate about the relative merits and demerits of the various species; particularly red deer (*Cervus elaphus*) and fallow deer. While it is not my desire to reopen old wounds, it is important to recognise that species differences do exist, and these must be considered in relation to species-specific husbandry practices. As this Congress focuses largely on red deer/wapiti farming, it is perhaps relevant to compare the fallow deer with its larger cousin in order to understand its unique husbandry requirements.

Environmental tolerances

Both fallow deer and red deer are tolerant of a wide range of environmental conditions within temperate zones. In general, however, fallow deer appear to be less tolerant of extreme cold (ie. northern limit in North America and Europe is approximately 50 to 52° N) and more tolerant of extreme heat and aridity (eg. Texas, USA and inland regions of Australia). Within most temperate pastoral regions these extremes are not relevant.

Recently, fallow deer from New Zealand have been exported *en masse* to the tropics (eg. Malaysia). It will be interesting to see whether this species can adapt to hot, humid environments characterised by low fluctuations in annual photoperiod. As photoperiodic changes in temperate regions synchronise seasonal breeding patterns in this species, it is conceivable that reproductive patterns will be affected in equatoral zones.

Social considerations

Both fallow deer and red deer are highly gregarious species. However, the influence of herd/mob size is perhaps more pertinent for management systems of fallow deer. In particular, large groups often adapt faster to management practices and recover more rapidly from stressful situations than do small mobs of less than 10 individuals. It is particularly noticeable that isolated individuals can rapidly attain a state of panic under stress; whereas this is seldom seen in large mobs, which appear more controlled in the face of the same stimulus. This phenomenon has important management implications (eg. releasing stressed deer from the yards is often better performed with groups rather than individuals).

The desirability of larger mob sizes sometimes conflicts with other management considerations - (eg. providing adequate "space" for parturient does to allow unimpaired mother/fawn bonding). Furthermore, mature fallow bucks tend to lose their gregarious nature during the breeding season, during which time attempts to run high-density bachelor groups can often lead to excessive mortality from aggressive interactions.

Female red deer show distinct hierarchal patterns that often lead to displays of dominance and subservience. This, however, is seldom apparent in mobs of fallow does, and it is rare to find a severely beaten subservant individual. The same cannot be said of mobs of fallow bucks during the breeding season, in which delicate hierarchal balances are easily perturbed by imposition of stressful management techniques. Most fallow deer farmers agree that a "hands-off" approach to bucks (ie. minimal yarding) is wise during the breeding season (March to September).

Nutritional and pasture management

Because of similar seasonal patterns of growth and reproduction, the seasonal feed requirements of red deer and fallow deer are essentially similar (on a body weight basis). There are a number of pertinent points related to species differences:

- Fallow deer appear to be more inclined towards pasture grazing, tending to be less selective of pasture species in their diet. This, however, does not imply that all weed species will be controlled by grazing with fallow deer (eg. ragwort and inkweed are completely rejected).
- Smaller body and mouth size of fallow deer possibly mitigate against efficient utilization of rank pastures - the aim being to maintain swards acceptable to sheep rather than cattle.
- While it is common practice to restrict feed intake of red deer hinds in the third trimester of pregnancy to reduce fatness and the incidence of dystocia, this appears unwarranted and counter-productive for fallow deer. The practice seems to lead to reduced fawn birthweights and increased perinatal mortality due to non-viability. Furthermore, the incidence of dystocia is generally low in fallow deer irrespective of level of pasture feeding (luxury feeding of

concentrates, eg. maize, in spring and summer has been known to lead to obesity and dystocia).

- Unlike red deer, fallow deer do not "wallow" in mud, thus reducing potential pasture damage and removing any need for standing water (as opposed to reticulated drinking water).
- Fallow deer are perhaps more suited to fragile soil/pasture systems than red deer because a reduced tendancy to induce erosion. This may simply be a function of smaller body size.

Reproductive seasonality

The rut and subsequent fawning season of fallow deer tend to occur 2 to 3 weeks later than for red deer (ie. April/May and December /January respectively). While overall seasonal management is similar for the two species, farmers need to be cognisant of the actual timing of these events. The slightly delayed fawning pattern in summer coincides with rapid deterioration of pasture quality in many northern regions of New Zealand. Management requirements mainly focus on maintaining pasture quality for lactating does.

Animal health

There are considerable species differences with respect to disease susceptibility/resistance; leading to species-specific management strategies. Some diseases are common to both species; including bovine tuberculosis and clostridial diseases; that require similar management inputs (eg. Tb testing, clostridium vaccination). The following diseases are of particular relevance to fallow deer farming:

- Facial eczema is caused by the ingestion of toxic spores of the pasture fungus *Pithemyces chartarum* during high humidity periods in late summer and autumn. Fallow deer are clearly very susceptible to the hepatotoxic effects of the toxic compound, sporadesmin. Acute liver insult with sporadesmin leads to clinical disease characterised by severe photosensitivity that often proves fatal. Chronic ingestion of spores is associated with ill-thrift and poor reproductive performance arising from liver injury. In northern regions of New Zealand, where facial eczema is particularly prevalent in certain years, acute disease outbreaks have decimated some herds, while chronic liver injury has reduced the longevity of many other animals. The problem is often related to poor pasture management over summer, whereby accumulation of pasture dead-matter provides an ideal medium for growth of the fungus. Preventative management involves spraying of pastures with an approved fungicide during critical periods, and prevention of dead-matter accumulation in pastures. Preventative management is also relevant to red deer, but this species appears less susceptible to toxic effects of sporadesmin.
- Numerous fallow deer herds in New Zealand, Australia and North America have been subject to high fawn mortality due to infection with the bacterium *Fusobacterium necrophorum*. Characteristically, fawns of between 3 to 8 weeks of age exhibit either grossly swollen tongues/jaws or generalised abdominal abscesses. It is believed that the bacteria often gain entry through wounds in the mouth, with infection often occurring close to the entry point. Entry may also occur through the navel. Recently, it has become common practice on fallow deer farms to vaccinate breeding does against *Fusobacterium* prior to fawning. However, the common source of the vaccine has quit production, leaving many farmers contemplating fawn losses in the future. The economic severity of the disease in fallow deer is only just being realized, with up to 30% of fawns dying on some properties prior to the implimentation of vaccination programmes.
- Leptospirosis, a bacterial disease, has been implicated in the widespread occurrence of late-term abortions in farmed fallow deer in New Zealand in the early 1980's. Production losses have been severe on some farms, with up to 10% of does aborting annually. The implementation of widespread vaccination since the mid 1980's has seen the problem largely dissappear.
- Lungworm (*Dictyocaulus viviparus*) infections occur throughout the world and appear to be associated with intensive farming practices involving high stock densities. Both fallow deer and red deer are susceptible to lungworm infection, particularly in the first year of life. Routine drenching of young deer with broad spectrum benzimidazoles or Ivermectin is a sound preventative measure when incorporated into a good management system utilizing rotational grazing practices.
- Malignant catarrhal fever (MCF) and Yersiniosis are important diseases of red deer, but are of little consequence to fallow deer. Management strategies for this species generally ignore these two diseases.

Handling systems

Probably the most significant difference between the farming of fallow deer and red deer lies in handling during yarding. Indeed, it was not so long ago that many people believed that fallow deer were impossible to yard, and that all management was delivered by dart-gun. These people often failed to appreciate that the reactionary, and apparently volitile, nature of the species could be used to the advantage of the farmer. The important features of fallow deer handling relate to the use of light control, enclosed tunnel systems and mechanical restraint mechanisms. Whereas red deer are often man-handled due to their generally quiet disposition, fallow deer are generally handled "remotely", with 90% of the physical work being done by the animal. Gone are the days when handlers lose blood, sweat and teeth by physically capturing fallow deer in open pens. The important features of fallow deer yards are as follows:

- Entry races and corrals are of solid construction, at least 2.5 metres high and incorporate "blind corners" leading into the main yard complex (this facilitates animal flow in the desired direction).
- Large holding pens are designed to facilitate mob splitting "from a distance" - small mobs of 10 to 20 animals are generally preferred within the main yard complex.
- Fallow deer are temporarily subdued by reduced lighting and will tend to move from areas of low light intensity to well lighted areas. Most yards incorporate at least one pen that affords complete light control. This pen generally leads to an enclosed tunnel or even directly to a crush/cradle.
- Fallow deer readily move through narrow tunnels when prompted - thus they are able to be coaxed into the crush/cradle. It is important that the tunnel system is narrow enough to prevent animals from continually turning around. The height of the tunnel is also important; seldom more than 1.0 metre high. Tunnel length can vary from 1.0 metre to 5 to 6 metres.
- Mechanical restraint mechanisms (eg. crushes, cradles and bails) are almost a mandatory requirement of fallow deer yards. Many types are available and most work well. The species is of small body size (40 to 100 kg) and, relative to some tropical species, are not particularly powerful. Restraint can be applied without necessarily resorting to complex pneumatic or hydraulic mechanisms.
- Many yard designs often ignore drafting facilities. These are sometimes best placed after the crush/cradle, and operate by means of drafting doors leading to separate pens/raceways/tunnels.

Summary

Intensive husbandry of fallow deer in the pastoral environment has come a long way in the last 10 to 15 years. Much of the recent developments relate to improvements and innovations in the design and function of handling systems, which have largely come about from farmer ingenuity and acute observation of animal behaviour. The onus is still on the farmer to further observe fallow deer on the farm in order to tune better husbandry practices, being forever cognisant of animal welfare, stress and production performance.