DEER

Deer farming is a growing industry in Australia with demands for antler velvet and venison. Several useful books on the topic are available (Anderson 1978; Yerex, 1979, 1982) and much of the information in this section comes from them.

TERMINOLOGY

Male	stag, buck
Female	hind, doe
Young	fawn, calf
Pubertal female	jinnock
Young male with spike-like antlers in advance of a later full head	spiker
Castrated stag	havier
Naturally polled stag	hummel

(extra information Haigh & Hudson, 1993).

SOCIAL ORGANISATION, DOMINANCE HIERARCHIES AND LEADERSHIP

In general, dominance orders are linear, but during rutting, triangular relationships are common among males (Lincoln et al., 1970). There seems to be a stable relationship between age and social rank, but this may change during the antler growth period. The most dominant animal does not necessarily have the largest antlers.

It is important to understand herd behaviour when deer are farmed. They tend to maintain a loose grouping when tamed, all rising together, moving to the grazing area, all grazing and then all returning to their favourite spot. Deer walk the fenceline and this can open up the ground and make it prone to erosion. This can be overcome by proper placement of fences in areas less likely to be eroded. It is possible that pacing the fenceline indicates stress (Hodgett et al., 1998).

Deer shelter from cold winds, so windbreaks can be provided. Shade and shelter may assist with thermoregulation (Pollard and Littlejohn, 1999).

Wild hinds tend to live in ranges overlapping those of their mothers, while stags disperse from their dam's range at about 2–4 years of age to associate loosely with other stags (Clutton-Brock et al., 1982).

Leadership is usually undertaken by the lead hind, helped by a second female, who assumes a rear-guard position during group movement. It is important when trying to drive a herd that the lead hind is moving in the right direction.

Even under intensive farming conditions, fallow deer may tend to maintain the sexual segregation typical of this species in the wild, especially during the birthing season (Mattiello et al., 1997).

Mature bucks spend most of their time alone or in bachelor groups until rutting, when they become intolerant of each other and move to rutting areas to collect and defend groups of adult hinds (Pépin et al., 2001).

Deer become aggressive to each other during yard confinement, with more aggression being observed in spring. (Pollard and Littlejohn, 1996). Confinement of established social groups may be stressful, particularly to low-ranking individuals (Pollard and Littlejohn, 1999).

Mixing of unfamiliar groups of deer should be avoided. (Pollard and Littlejohn, 1999). Stress manifests in conflict or disturbed behaviour (Wiepkema, 1990).

Reduction in space allowance as a consequence of higher stocking density results in changes in stress levels, particularly in subordinate hinds, which are more sensitive than dominant animals. At high stocking densities, more agonistic behaviour occurs with bites and pushes occurring twice as often as those in lower stocking densities. Fence pacing increases and head movements are more frequent, suggesting a greater motivation to escape. Grazing patterns are modified, with meals being more frequent and synchronisation of grazing with other hinds decreasing. This is more important for the subordinate hinds in the group and leads to breaks in feeding and lower growth rates (Blanc and Theriez, 1998).

Mixed-sex groups of fallow deer occur more frequently when population density increases (Mattiello et al., 1997).

High female densities have a deleterious effect on male forage habitat and nutritional condition. Males require a higher minimum standing crop of grass/forage than females to obtain efficient forage intake. As standing crops are very low after females have grazed, males are unable to obtain sufficient forage intake and must move to areas of lower forage quality but higher biomass (Conradt et al., 1999).

Adult male fallow deer prefer to feed on hay and show higher preference than females for corn and bran meal, while females, depending on lactational status, prefer pasture. In an intensive farming system, males will become more active when supplemented feed is supplied (Mattiello et al., 1997).

Grazing occurs at dawn, declines throughout the day and then increases strongly at dusk. In poor weather, grazing is reduced and sitting periods are increased at feeding times. Pacing along fence-lines increases in poor weather, possibly reflecting motivation to find shelter, which suggests that protection from rain, as well as windbreaks, affect the welfare of the animals. The uses of shade and shelter are important, not only in wet weather conditions but may also assist in thermoregulation of the animals even in temperate conditions, enhancing welfare and possibly productivity (Pollard and Littlejohn, 1999).

Providing cover in a paddock reduces social interactions by up to about 60%, aggression by up to 17%, and reactivity by 50% (Whittington and Chamove, 1995).

SEXUAL BEHAVIOUR

Red deer are seasonal-breeding mammals with reproduction time regulated by photoperiod. Stags are usually silent except when alarmed, but during the rut they produce repeated lion-like vocalisations (Pépin et al., 2001). Other male sexual behaviour includes chasing and mounting a hind in oestrus (Jaczewski, 1989).

Fights occur among males and it is the dominant stag who mates. Male mating success is positively related to dominance and body size (Clutton-Brock et al., 1998). The stag's neck hair grows long, the neck enlarges and he rolls in the mud and thrashes his antlers against trees or posts to display his dominance.

During the rut, males of high rank use low-risk behaviours towards smaller, low-ranked bucks, but when dealing with bucks of similar rank, they use higher-risk techniques, such as antler contact and kicking (Mattiangeli, Mattiello and Verga, 1999).

In domestic herds mating management is important, and there are several different strategies:

1. One stag put with a group of up to 50 hinds. The group of males is first allowed to sort out the dominant stag and this is the one put in with the hinds.
2. The herd sire can be selected by the deer farmer on the basis of bodyweight and head (i.e., antlers).
3 The dominant stag can be introduced into the group of hinds as well as two or three younger males, who keep the dominant male on his toes.

During the rut, stags may express visual and aggressive displays that serve to intimidate, or prompt assessable responses from competing challengers (McComb, 1991). There is a danger of overextending a stag, especially in smaller paddocks (e.g., 10 hectares) where he can defend his hinds against all comers.

In selecting mating areas, females avoid isolated small meadows within scrub areas, preferring larger meadows where a number of sexually active males may be found (Carranza and Valencia, 1998).

Female deer suffer less sexual harassment when in larger groups. When other groups surround their group, they have a greater chance of mating with highly competitive males, promoting male–male competition before accepting a mate (Carranza and Valencia, 1998). Roaring by red deer stags advances oestrus in hinds (McComb, 1987).

Stags may remain within 5 metres of hinds for up to 10 hours post-copulation, chasing away any males that approach (Endo, Doi, Shiraki, 1997).

MATERNAL–OFFSPRING BEHAVIOUR

Gestation is about 233 days and the female is first mated at about 15–16 months (i.e. at about 65 kg). Hinds with fawns have a strong preference for an area far from road disturbances (Mattiello et al., 1997). In the first week of life, fawns lie hidden in the grass, except when being fed. In the second week, the animals become more active, investigating, and tasting possible food resources, including soil, grass, seeds and water, without swallowing. The animals start to graze at 20 days and begin ruminating one week later (Birgersson et al., 1998).

Going into the paddock after the fawns are born is a risky business because they may lie hidden anywhere. They remain in their hiding place until disturbed and then they bolt and often smash into or through the first fence they reach. Gloves should be worn when fawns are picked up for weighing and tagging, as a hind will strike a fawn that has been handled without gloves.

Hinds quite commonly steal fawns and some cases of 'twins' are thought to be due to this.

Mismothering and allosuckling occur in deer where female nurses may take care of calves that are not their own. These calves may occasionally be adopted by a nursing mother (Vankova et al., 2001).

Occasionally, fawns will suckle from a hind that is not their mother (allosuckling). This allows fawns of hinds with lower milk production to have higher growth rates, thus increasing group size. This increase in group size may decrease the risk of predation of the hind's own offspring by creating a dilution effect (Ekvall, 1998).

Male fawns receive more milk than females. This maternal investment bias towards males results in males attaining a large body size. In artificial suckling systems, male fawns were more likely to empty the bottle without interruption, suck harder and be more motivated to obtain milk (Birgersson et al., 1998).

Confinement of fawns indoors and the presence of a hind improved weight gain in the period following weaning, and reduced the weaning stress and fear responses in fawns, especially if the hinds were familiar with humans, e.g., hand-reared hinds (Pollard et al., 1992).

Farmed red deer are normally weaned at 3–4 months of age, whereas wild members of the species are normally suckled for 7–8 months and continue to associate with their dam after weaning (Pollard et al., 1992).

Weaning over a period of 10 days (interval weaning) appears to be less stressful than abrupt weaning and could therefore reduce susceptibility to stress-related diseases such as pneumonia and digestive upsets (Church and Hudson, 1999). Other common reactions include long periods spent pacing fence lines and loudly expressing their distress. This behaviour was not evident in animals weaned over a longer period. Heart rate and neutrophil/lymphocyte levels were also significantly higher in abruptly weaned animals, indicating elevated stress levels (Church and Hudson, 1999).

MUSTERING

It is best not to move the herd when fawning. At other times, in small areas, they can be set moving towards a gate if the farmer can walk around them. Deer are very curious and will move from one paddock to another to look at something they have never encountered before.

Quiet dogs are used by some farmers and others use a farm bike. Yarding is better done in the evening as deer are much quieter as it gets dark. In fact, deer tend to exhibit fewer fear behaviours in dim light (Pollard and Littlejohn, 1994), so mustering late in the evening may be advantageous.

Care must be taken not to alarm groups of deer as they may take flight, but this depends on the level of familiarity with the immediate environment and their habituation to human presence (Recarte et al., 1998). Females looking after young are more likely to take flight than males or mixed groups (Recarte et al., 1998).

If deer do break a fence it is best to leave them until the next day and they will probably be back in the original paddock—it seems they have a strong site-attachment bond.

When deer must be yarded for long periods, they should be kept in familiar groups of the same sex and of similar body size (AACSCAW, 1991).

Movement through races may be facilitated by widening the race to about 1.5 m and allowing the deer to move through two or three abreast (Grigor et al., 1997). Such movement may be enhanced if the handler moves behind the group (Jago et al., 1993).

Following short-term stressful procedures (e.g., mustering), animals will reduce their lying time and increase moving activity when returned to their paddock (Diverio et al., 1993).

Handling practices prior to velvet harvesting are more stressful than the harvesting itself (Mathews and Cook, 1991).

TRANSPORT

Before transport, deer should be able to move freely in and out of the race for a couple of weeks before they need to be loaded. Then they are put into darkened yards prior to loading as this keeps them settled.

The attitude of the farmer to his deer is very important. He must be conscious of their 'feelings' or 'temperament', yet not interfere with them more than necessary. He must also be firm and in control of them. Deer become very tame if the farmer moves freely among them and this makes them much easier to manage.

In deer farming the human–animal bond plays a crucial part in the success of the venture.

Neuroleptics can be used to sedate wild deer, to reduce the stress of translocation. Transport injuries are reduced and the animals adapt more readily. Tranquillised animals were able to maintain normal behavioural patterns while under stress, and were easier to approach and handle. However, there are some side-effects, including hypersensitivity, restlessness and anxiety (Diverio et al., 1993).

Within travelling groups of deer, the larger animals initiated the most agonistic behaviour and targeted this towards smaller animals, hence deer should be transported with animals of similar size (Jago et al., 1997).

Deer can be loaded more easily if the loading raceway is wide enough to allow them to move as a group, since deer rarely move in single file, but narrow enough to prevent them from turning around (Grigor, Goddard, Littlewood and Deakin, 1998a).

The Model code of practice (AACSCAW, 1991) also suggests that there should be sufficient space allowed so that the deer can lie down during the journey.

Both confinement in the truck and the vehicular motion are stressful for deer, which is shown by increases in heart rate, alert behaviour, plasma cortisol levels, plasma creatine levels and a decrease in rumination (Grigor et al., 1998b).

Significant stressors during transportation include removal from the home environment, loading, unloading, confinement, mixing with unfamiliar individuals, food and water deprivation, temperature extremes and vibrations (Grigor et al., 1998b).

In a study conducted by Grigor et al. (1998b), heart rate was significantly increased during loading and during the initial stages of the journey but it decreased as time went on, suggesting that the deer became accustomed to the movement in the transporter.

It has also been suggested that, during transportation, deer should be positioned closer to the front of the transport crate, where the vehicular movement is reduced (Waas et al., 1997).

Confinement of males during transport might lead to aggressive behaviour, especially when space allowances are greater (Jago et al., 1993), so higher stocking densities have some merit, especially for short journeys.

In low stocking densities, deer tend to align themselves parallel to and facing the direction of travel, avoiding diagonal orientations. In higher densities, the animals are prevented from standing in their preferred orientations, with slight avoidance of the right-front and left-rear diagonal orientation. Higher stocking densities prevent loss of balance with the deer often in contact with other animals, which gives a greater amount of support and prevents impacts and injury. However, in higher densities, the animals are prevented from lying down as other animals stand on them. So it is recommended that densities should be decreased on long journeys to allow for lying down (Jago et al., 1997).

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