

CHAPTER 3: BEHAVIOURAL PROFILES OF DOMESTIC ANIMALS

Before recommendations can be made about management of animals, design of facilities for holding, special operations (e.g. shearing, branding) and transport of animals, it is necessary to have an understanding of the animal's behaviour.

This chapter will look at the behavioural profiles of horses, sheep, cattle, goats, pigs, poultry and deer. The following aspects will be discussed in each species:

1. Vision and other special senses
2. Social organisation and dominance hierarchies
3. Sexual behaviour
4. Maternal-offspring behaviour
5. Abnormal behaviour

HORSES

VISION AND OTHER SPECIAL SENSES

Horses can see near objects clearly but also maintain distant watchfulness. They have panoramic vision of 330° to 350° and binocular vision of 60° to 70°. The blind zone accounts for a proportion of startle responses, including shying (Enzerink, 1998). The width of the blind zone is determined by the level at which the head is carried (Saslow, 1999). Horses also have night vision and are thought to see colours (Grzimek, 1952). In a variety of discrimination trials, yellow test colours were identified most easily, followed by greens, then blues, with reds the least easily identified. Colour vision studies are still the source of some debate because it has been suggested that horses may be better than humans at discriminating between shades of grey (Harman et al., 1999). Both cones and rods are present in the retina and there is clear functional duality of responses indicative of cones and rods (Smith and Goldman, 1999).

The horse's hearing is similar to humans but it has been suggested that they might hear a higher pitch than we do. The olfactory senses are well developed. Horses have a sense of taste that discriminates between safe and toxic plants with variable accuracy (Marinier and Alexander, 1991) and may be useful in detecting sources of trace elements (McGreevy et al., 2001a). Habituation by gradual exposure to increasingly concentrated solutions of innately aversive chemicals has been reported in horses as a means of modulating water intake in performance horses (Murphy et al., 1999).

Horses are very sensitive to tactile stimulation especially around the muzzle and ears, and it is important to be aware of this when handling them. In each horse, there are zones of cutaneous sensation that can be plotted according to their effectiveness in reducing heart rate during allogrooming (mutual grooming) (Feh & De Mazieres, 1993). The cutaneous sensitivity of horses is used to control horses by a process of negative re-

inforcement (McGreevy, 2001a). Positive reinforcement is rarely used in horse-riding (McGreevy, 2001b).

SOCIAL ORGANISATION, DOMINANCE AND LEADERSHIP

Studies done on groups of feral horses (Tyler, 1972; Feist and McCullough, 1976; Salter and Hudson, 1982) suggest that the social groups consist of:

1. harem groups, typically one male, a variable number of females and immatures;
2. bachelor groups composed of excess males.

Under this permanent harem-type of social organisation, females are in constant association with a male and so detection of heat is assured. It is the harem males who do all or most of the breeding.

In the feral state the stability of the harem group depends on:

1. the herding instinct of the stallion;
2. the strong social attachment between harem members;
3. rejection of intruders.

Dominance hierarchy. In any group of horses, feral or domesticated, a dominance hierarchy develops and, once it is established it remains stable. In feral groups the adult males tend to rank at the top, with dominance being expressed as threats to bite or kick, or actual biting and kicking. Tyler (1972) described kicking fights between strange mares.

Domesticated groups show expressions of dominance in competitive situations, e.g. for a restricted food source. The faeces of a subordinate are often topped by a more dominant individual. Feist and McCullough (1976) and Salter and Hudson (1982) found that dominant and subordinate males in harems and bachelor males all urinated on elimination products of other group members and both dominant and subordinate males in harems marked in the vicinity of their groups.

Haupt, Law and Martinisi (1978) studied dominance hierarchies in 11 herds of domestic horses ($n = 3-11$ horses) and found that in small herds linear hierarchies were formed but in large herds triangular relationships were observed. Bodyweight, but not age, appears to affect rank, and the daughters of a dominant mare were dominant within their own herds. Colts leave the natal band at between 0.7 and 3.9 years of age (Khalil and Murakami, 1999). Fillies leave when slightly older as they become sexually mature. While spring-born fillies tend to ovulate during the late spring when they are 12-15 months old, late-born fillies show surges of luteinising hormone and progesterone that allow some (but not all) of them to display oestrus and ovulate at younger ages (Wesson and Ginther, 1981). It is recognised that sneak matings occur regularly in free-ranging horse herds and that the biological fitness of harem mares is greater than that of mares that consort in multi-stallion groups (Linklater et al., 1999).

Leadership. This may be shown by the stallion in feral groups (Feist and McCullough, 1976) and often by the

dominant mare in domestic herds, although other mares sometimes lead (Tyler, 1972). It is important to note that the stallion may not always be the alpha member of his band (Keiper and Receveur 1992). Agonistic behaviour is also dependent on herd size since, in small groups, a linear dominance hierarchy is usual while triangular and more complicated relationships can develop in large herds (Estep et al., 1993). There are considerable data to suggest that isolation from the group can be aversive (Mal et al., 1991).

SEXUAL BEHAVIOUR

Horses are seasonally polyoestrous. Mares show a cyclical active oestrus (7.1 ± 4.2 days; Ginther, 1974) and quiescent dioestrus (16.3 ± 2.9 days; Ginther, 1974) throughout the breeding season (152 ± 50 days; Ginther, 1974). An unreceptive mare kicks, squeals and lays back her ears if the stallion approaches. Receptive mares indicate readiness for mounting by standing still, spreading hind legs, lifting tail to one side, lowering the pelvis and repeatedly exposing the pink tissue of the vulva ('winking'). Stallions are more responsive to olfactory stimuli from conspecifics than are mares and geldings (Marinier et al., 1988). Foreplay is important and the male will smell, nibble and lick the mare and exhibit flehmen (curling of the top lip to expose teeth). Following ejaculation the stallion may smell the mare's genital area and the ground, flehmen and urinate.

Copulation is first achieved at about 15 months to three years, although interest is shown by young males by pelvic oscillations and erection of the penis, at as young as three months. Comparisons of semen characteristics and stallion behaviour during semen collection using a dummy and an oestrous mare have shown that, while the dummy is a safer technique, it produces semen with reduced motility. Despite having a higher concentration of spermatozoa, it also has a lower total sperm count (Silva et al., 1999). It is estimated that up to 50 per cent of geldings show stallion-like behaviour to mares McDonnell (2000a). Stabling stallions together, away from the mares, in a stallion barn has the potential to impose some characteristics of the bachelor group on some occupants of the barn, including reduced spermatogenesis (McDonnell, 2000b). Masturbation is part of the normal ethogram of male horses (McDonnell et al., 1991).

MATERNAL-OFFSPRING BEHAVIOUR

Gestation period is about $340 + 5$ days. There is a tendency for foaling to occur in feral horses in the early morning hours (Tyler, 1972) with the mare lying down. Stabled Thoroughbred horses tend to foal at night and towards dawn, but this might be due to human disturbance during the day (Rossdale and Short, 1967). After birth, the mare remains lying down and if the foal moves within reach she will nuzzle it. Once she stands up the mare nuzzles and vigorously licks the foal. This is the start of a bond forming. The mare-foal bond seems to grow at the expense of the bond the mare has with her herd affiliates (Estep et al., 1993). The mare stands in a suitable position so the foal will locate the teats and suckle. The behaviour of the mare is, to some extent, predicted by the behaviour of her foal, e.g. if the foal is

lying down, the mare is more likely to remain close by (Weeks et al., 2000). Some mares may resist suckling and in extreme cases the foal is kicked and bitten. The mare keeps the foal away from direct contact with herd members or intruders by calling it to her side and often by herding it away. The mare keeps the foal with her for many days until it gradually begins to socialise with other horses. However, the mare-foal relationship with nursing may continue for up to two years (Tyler, 1972).

Arabian mares seem to be more predisposed to rejection of foals than Thoroughbreds, with the presence of one of two related sires being statistically higher in the pedigrees of rejecting versus non-rejecting mares (Juarbe-Diaz et al., 1998). Fostering is difficult and the mare probably recognises her foal by smell, visual and auditory cues. When attempting to foster a foal, it is advisable to mask an introduced foal's odour by smearing it with the prospective surrogate dam's own milk and applying her own faeces to the tail and head of the foal. It also helps to apply vaporous ointments to the nostrils of nurse mares prior to the removal of their own foals (Kelly, 1999). It has been reported (Tyler, 1972) that a mare accepted an orphaned foal draped in the skin of the mare's dead three-year-old filly. Mares accept foals within 1 to 12 hours of an introduction but it is not advisable to leave the pair unsupervised until they have been together for three days (Kelly, 1999). Coprophagy (eating faeces) is normal in foals and commonly occurs at 4-6 weeks of age, possibly as a means of learning preferred forage types (Crowell-Davis, & Caudle, 1989).

ABNORMAL BEHAVIOURS

Housed animals sometimes exhibit behaviour patterns that are rarely seen in extensively managed horses. Stereotypic behaviours are characterised by being repetitive, relatively invariant and apparently functionless (Mason, 1991). They include frequent urination, weaving (where a horse rocks to and fro), and crib-biting (where a horse grasps some fixed object with its incisor teeth and swallows air). Owen (1982) gives a full description of crib-biting and wind sucking, and points out that it occurs worldwide in domestic horses and ponies, but does not occur in feral horses and ponies. These behaviours may be due to boredom associated with lack of exercise and it is suggested they may be learned behaviours. Once they have become established, stereotypic behaviours may become emancipated from their initiating causes, i.e., they are not easily removed from the animal's behavioural repertoire by rectifying the factors that contributed to their emergence (McGreevy and Nicol, 1998).

Data from 4,468 UK Thoroughbred horses in training showed the total prevalence of all three of the most common stereotypies (crib-biting/wind-sucking, weaving and box-walking) to be 10.8 per cent, similar to the prevalence of lameness (McGreevy, 1997). Wind-sucking (where the horse swallows air without the aid of a fixed object), licking walls, gnawing woodwork, and pressing the head against a fixed object are other abnormal behaviours that indicate some changes in the physiological or psychological condition of the horse. These behaviours can sometimes be eliminated by giv-

ing the horse more outdoor exercise or by introducing a companion animal, e.g. a donkey or a goat. A study in dressage and eventing horses demonstrated that the amount of time spent in the stable correlated with the likelihood of stereotypies being reported (McGreevy et al., 1995). Management factors that might frustrate motivation in the horse and may contribute to the emergence of stereotypies, e.g., concentrated feeds at weaning can increase the risk of crib-biting by a factor of four (Nicol, 1999). Stereotypic behaviours are unwelcome because they can result in weight loss, because affected horses rest less and eat less than normal horses (McGreevy et al., 2001b).

Abnormal sexual behaviour is also sometimes seen. The stallion may fail to obtain an erection, have incomplete intromission or lack of pelvic thrusts, may dismount at the onset of ejaculation or fail to ejaculate. These abnormalities may be associated with several factors, lack of libido, association of copulation with pain or previous injury, or injuries received during breeding (Pickett, Squires and Voss, 1981).

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