

# Ferrets (*Mustela putorius furo*)

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## 5.1 History and Context

### 5.1.1 Natural History

Ferrets (*Mustela putorius fero*) are members of the class Mammalia, order Carnivora, and family Mustelidae, which also includes mink and polecats. The ferret (Figure 5.1) is the result of humans crossbreeding two species of polecat. This makes it difficult to refer to their natural history, beyond considering information about polecats, feral ferrets, and polecat-ferret hybrids. The most probable ancestors of the ferret are the European polecat (*Mustela putorius putorius*) and the Steppe polecat (*Mustela eversmanni*) (Ashton et al. 1965; Tetley 1965; Fisher 2006; MacKay 2006). These are distributed across much of Europe and Central Asia, and both are designated as Least Concern by the International Union for Conservation of Nature (IUCN). The ferret has not been included in the IUCN Red List.

Feral ferrets and polecats live in wooded and semi-wooded areas near water sources (Duda 2003). They live in dens such as rabbit burrows, but spend a large proportion of their active time travelling and foraging across home ranges of up to 102 ha (Norbury et al. 1998; Fisher 2006). Mean home ranges of  $102 \pm 58$  ha are reported for males,



**Figure 5.1** Ferret with the 'mask' characteristic of polecats and sable or wild-type coloured pet ferrets.

whereas mean home ranges of  $76 \pm 48$  ha are reported for females (Norbury et al. 1998). Juvenile ferrets may disperse over distances up to 5 km (Caley and Morriss 2001). However, territoriality not only depends on gender and age, but also on environmental factors such as the abundance of prey in the area (Powell 1994). Polecats feed on a variety of vertebrate and invertebrate prey including rodents, small birds, reptiles, amphibians, spiders, beetles, slugs, snails, and earthworms (Bulloch and Tynes 2010).

(Feral) ferrets are solitary and territorial animals, except for breeding and before weaning. Their territories generally exclude other ferrets of the same sex (Powell 1979), whereas territories of opposite sexes may overlap extensively (Moors and Lavers 1981). Ferrets use anal gland secretions, faeces, and urine to obtain information on other individuals' identity, reproductive, and social status (Clapperton et al. 1988; Woodley and Baum 2003; Berzins and Helder 2008), and males use such olfactory cues to find mating partners (Baum 1976; Moors and Lavers 1981; Baum et al. 1983). The breeding season (in Europe) lasts from March to August, depending on daylight length (Fox et al. 2014). Ovulation is induced by the combination of vaginal stimulation and the hob gripping the jill's neck (Bibeau et al. 1991).

### 5.1.2 Domestic History

The ferret is a fully domestic species. Ferrets were first described before 1000 BCE in North Africa (Fisher 2006), and it is likely that ferret domestication started more than 2000 to 3000 years ago (Bulloch and Tynes 2010). Ferrets might have been kept initially to protect

**Table 5.1** Number of ferrets kept as pets or for hunting in different countries.

Country	Number of ferrets	Reference
United States	≈ 800 000	(Jurek 1998)
United Kingdom	>100 000	(Vinke and Schoemaker 2012)
Germany	115 000	(Vinke and Schoemaker 2012)
Italy	105 000	(Vinke and Schoemaker 2012)
France	300 000	(Vinke and Schoemaker 2012)

human food from rodents (Price 2002); they were also commonly used for hunting – ‘ferreting’ – rabbits, mice, and rats (Thompson 1951; MacKay 1995). More recently, ferrets have also been used for research, especially as a model for the human influenza virus (Brown 2007), and a small number are bred for their fur (Anonymous 2001).

Contemporary estimates of pet ferret numbers are scarce, and most figures include both pets and ferrets used for hunting (Table 5.1). Ferret breeding varies from small-scale ‘hobby-breeders’ up to international commercial farming enterprises (United States, Fisher 2006). Domestic breeding has not created particular breeds of ferrets, but there is a variety of colours, including sable, white (onyx-eyed and albino), black, butterscotch, cinnamon, champagne, chocolate, and chocolate, with various additional markings (American Ferret Association [AFA] 2014).

## 5.2 Principles of Ferret Care

### 5.2.1 Diet

Ferrets are considered obligate carnivores, indicating that they need to be provided with food sources of animal origin to fulfil their nutrient requirements. The exact nutrient requirements for ferrets have not been well established, but some recommendations can be made (Table 5.2).

Insufficient protein or excessive carbohydrates may lead to health problems such as weight loss, poor coat condition, pancreatic endocrine disorders, insulinoma, and urinary calculi (Bell 1999). Conversely, feeding only muscle meat provides insufficient calcium and an overly low calcium-to-phosphorus ratio, leading to the ‘All Meat Syndrome’ (secondary nutritional hyperparathyroidism) in which loss of calcium in ferrets’ bones increases the risk of bone fractures (Kronfeld 1985). Intestinal fermentation is limited by the ferrets’ relatively simple intestinal flora and short colon (approximately 10 cm), so the digestion of fibre is minimal (Andrews and Ilman 1987; Brown 2004).

Excess energy can lead to obesity. It is therefore recommended to monitor the ferret’s body weight and body condition monthly. Weights between males and females differ greatly, with males usually weighing between 1200 and 2100 g and females weighing between 700 and 1200 g (Fox et al. 2014). Ferrets’ body weight may also vary 30–40% over the seasons because of increased deposition of fat during the autumn, which will decrease again the following spring (Moorman-Roest 1993). When food is ample and

**Table 5.2** Nutritional requirements of normal adult ferrets.

Nutrient	Amount required, adult
Protein	30–40%
Carbohydrate	20–30%
Fibre	<3%
Lipid	15–20%
	(25–30% for lactating females)
Calcium-to-phosphorus ratio	1.5:1

Source: Wolf and Hebeler (2001), Brown (2004), Banks et al. (2010), Fox et al. (2014).

All figures assume animals are of normal physiology, healthy, non-breeding, and non-working.



**Figure 5.2** Ferrets sharing a frozen (and thawed) whole pigeon (Source: courtesy Birgit van der Laan).

freely available, ferrets typically eat 9–10 meals per day (Kaufman 1980). Ferrets have a tendency to hide excess food, which – if involving fresh food – may decay if not found in time by the owners.

Ferrets' nutritional requirements can be provided either by a commercial, balanced ferret kibble, soft food diet, or by whole pre-killed prey animals. Whole prey additionally maintains dental health by cleaning the teeth without too much abrasion and provides a source of enrichment by making ferrets work for and spend more time to obtain and consume their food, as well as create opportunities for chewing (Figure 5.2). It does, however, also pose an increased risk for bacterial infections, such as salmonellosis or campylobacteriosis. In addition, owners may find it easier and less gruesome to feed a complete commercial diet. All ferrets should also be given adequate and variable food enrichments, such as food placed in safe toys.

Wild polecat juveniles have a sensitive period between 60 and 90 days of age for the imprinting for the scent of their prey (Apfelbach 1986). If a ferret does not learn the

smell of a prey species during this sensitive period, it is likely to refuse that food later in life. A similar process may explain why some individual ferrets have particular food preferences and why it may be difficult to convert to different types of food. Juveniles should therefore be offered a variety of foods during their first months of life to guarantee they will accept a broader range of foods later on in life (Fisher 2006).

Water intake is around 50 mL kg body weight per day (Kaufman 1980; Banks et al. 2010). Fresh water should be available at all times, especially when the ferret is fed dry kibble. This may be provided in either a bottle or a bowl, although ferrets often play with bowls and tip them over.

### 5.2.2 Environment

Guidelines for housing ferrets as animals used in research state that the minimum size is 4500 cm<sup>2</sup>, although for hobs a space of at least 6000 cm<sup>2</sup> is required (EU Commission 2007). However, ferrets are inquisitive, active animals, and should therefore be kept in as extensive areas as possible, and if caged, given daily opportunities of supervised time outside of the cage (Figure 5.3). Ferrets need at least 50 cm height to stand on their hind legs and scan the surroundings (Schoemaker and van Zeeland 2013). Moreover, because ferrets are renowned escape artists, every effort should be made to ensure their enclosure is escape proof.

Ferrets can be housed indoors and outdoors, as long as protection against the elements is provided. Ferrets' preferred ambient temperature is 15–21 °C and should never exceed 29 °C because ferrets cannot transpire (Bulloch and Tynes 2010). It is therefore advisable to prevent ferrets from being kept in direct sunlight, without presence of



**Figure 5.3** Ferrets exploring and using tubes and tunnels.





**Figure 5.4** Ferret hiding in a sleeping tent.

sufficient shade or shelter (Schoemaker and van Zeeland 2013). Although mustelids are often more active in the twilight or night, most pet ferrets adapt to the activity cycle of their pet owners.

Because of the sensitivity of the ferrets' respiratory tract, ferrets need adequate ventilation, and aquaria are not adequate as housing systems for ferrets. This also means sawdust and straw are not advised as bedding materials (Jenkins and Brown 1993). Ferrets mostly eliminate in one or two favourite areas and can often be easily trained to eliminate in one location by creating an elimination point at a place that the ferret has already chosen (Schilling 2000; Bulloch and Tynes 2010). Healthy ferrets sleep between 18 and 20 hours a day (Fisher 2006) and need safe sleeping places, such as hammocks and sleeping tents. Tubes and pipes also allow pet ferrets to hide, rest, and sleep in constructions similar to their natural den choices (Figure 5.4).

Ferrets are active and inquisitive animals, which need varied and complex environments (Bays et al. 2006). This allows them to express various motivations and seems to improve alertness, emotional stability, and cognition. Digging opportunities are highly valued by ferrets and should be provided in addition to tubes and tunnels. Insufficient environmental enrichment may lead to behaviours such as destruction and plant digging (Bulloch and Tynes 2010). Enriched environments are particularly important for juvenile ferrets, which should come into contact with many novel objects and confronted with many different kinds of environments and situations during their early life because this is an important part of proper socialisation.

Tubes can also provide opportunities for play. Ferrets are playful animals and play may help ferrets to develop motor, mental, and social skills and to fulfil some behavioural needs. Play can also be used in a therapeutic way to help ferrets overcome stressful incidents or situations. Providing more enrichment may encourage more play (Talbot et al. 2014). Many ferret toys are now commercially available. Ferrets may habituate to familiar toys, so novel toys should be provided frequently, or toys rotated regularly. Ferrets are good destructors and often explore new objects with their mouths (Moorman-Roest 1993). Toys must therefore be chosen carefully to avoid ingestion and

obstruction of the digestive tract. As many mustelids prefer the taste of rubber, soft rubber toys frequently lead to ingestion of rubber and gut obstruction and should be avoided. In general, hard, nondestructible toys should be chosen instead of toys with small parts (Bulloch and Tynes 2010).

### 5.2.3 Animal Company

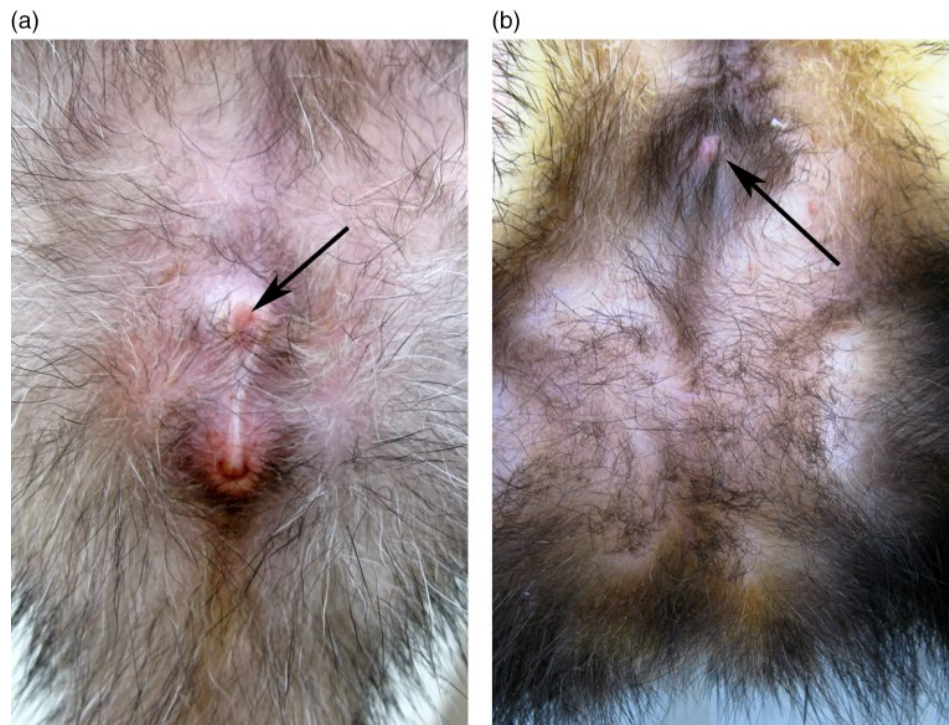
Pet ferrets may react aggressively to each other, and this can be the most frequently reported behavioural problem (Staton and Crowell-Davis 2003). Inappropriate company can also cause chronic stress, which may lead to stress-induced elimination (personal communication Roest 2011) and increased vulnerability to diseases and infections such as *Helicobacter* infection (Fox and Marini 2001; Banks et al. 2010). Large groups may also increase the risk of problems such as *Helicobacter* infections. However, pet ferrets commonly sleep together, play, and groom each other, suggesting that these ferrets can appreciate certain forms of social interaction.

Ferrets can therefore best be kept in groups of up to four animals, although solitary housing or housing in larger groups may be possible, dependent on the preference of the individual ferret and the compatibility of the individuals. The success of matching highly depends on the animals' genetic predispositions, life history, familiarity, season, sexes, and neutering status (Staton and Crowell-Davis 2003). Ferrets may particularly reject new arrivals, so pairs or groups should be carefully introduced and kept stable. Groups should be given ample resources that are sufficiently spread out, so they are hard to monopolise.

Male and female ferrets are considerably different in their appearance, therefore making it easy to sex them. Hobs are usually bigger and broader than jills. Moreover, in jills, the vaginal opening and the anus are close together, whereas in hobs, a penile bone and testicles can easily be seen or felt. The genital opening and anus also lie further apart in the male, a feature which makes it easy to distinguish sexes even in juvenile ferrets (Figure 5.5) (MacKay 1995, 2006).

The bonding between mother and offspring is particularly important for the development of normal behaviour. Within the first weeks of life, their mother may help young ferrets learn many skills, elimination places, food preferences, and the limits of play and aggression. Similarly, young ferrets' socialisation phase is highly important for the development of normal social behaviour and interactions with other ferrets as well as acclimatisation to their future environment. Although the time of the socialisation period in ferrets has not been determined, it is assumed to be between 4 and 10 weeks, as suggested for polecats (Fisher 2006). Isolating pups during the first month of life may alter their later social interactions, sexual behaviour, learning abilities, drug tolerance, activity level, and body size (Einon 1996). Moreover, both socialisation deficiencies and early weaning may result in fear and fear-related aggression later in life. During their first months, ferrets should therefore be confronted with a variety of trustworthy ferrets and weaning should occur no earlier than around 8 weeks of age.

Ferrets may tolerate other species such as dogs or cats (Figure 5.6). Because of their motivation to hunt, they should not be kept with pet species that are their natural prey such as rabbits and rodents. If a juvenile ferret is to be expected to live in a household with other species, daily contact with these species should also be included in the socialisation programme.



**Figure 5.5** Determination of the gender in ferrets: (a) The urethral opening (arrow) in jills is located close to the anus. (b) In hobs, the penile opening (arrow) is much further located from the anus. In addition the penile bone and testicles, in intact hobs, can easily be palpated.



**Figure 5.6** This ferret and cat (*Felis sylvestris catus*) live together in a household and enjoying rough play with each other.



### 5.2.4 Human Interaction

Ferrets may be fearful of humans, which can manifest as avoidance or aggression. Handling a fearful ferret can be difficult, poses a risk of injuries, and may result in owners relinquishing or even euthanizing their ferret. Inadequate exposure during the socialisation period is considered one of the main reasons for aggression towards humans (MacKay 1995; Fisher 2006). Aggression may also be learned, for example, when previous handling was unpleasant or when previous defensive behaviour had a positive outcome such as the removal of the threatening stimulus (i.e. the human or handling). Juvenile pet ferrets should be handled by familiar and unknown people daily from 28 days of age onwards (MacKay 2006), ensuring that this handling is positive and rewarding for the ferret.

A good way to pick up ferrets is by placing one hand around the thorax and supporting the hind legs with the other hand (Figure 5.7). If their hind legs are held too firmly, ferrets may struggle. Scruffing of the loose skin at the back of the neck may be necessary for restraining uncooperative ferrets (Schoemaker and van Zeeland 2013).

### 5.2.5 Health

Ferrets can suffer from several diseases, including many infectious agents (Table 5.3). Influenza is a common primary cause for respiratory disease in ferrets. Humans can infect ferrets and vice versa (Orcutt and Malakoff 2009). People with minor symptoms or risk of influenza should therefore not come close to ferrets or should wear a face-mask. Many of the symptoms are similar to those of canine distemper but less severe. It is usually self-limiting and not fatal (Bell 1995), and the fever has usually gone down before the animal is presented to the veterinary surgeon. In comparison, canine distemper virus can be fatal.

Most ferrets carry *Helicobacter mustelae* bacteria within their gastrointestinal system. Previous studies have shown more than 80% of ferrets older than 1 year of



**Figure 5.7** Ferret being picked up by the handler placing one hand around the thorax and supporting the hind legs with the other hand.

**Table 5.3** Selected health problems in domestic ferret.

Condition			Possible welfare effects
Infectious or Parasitic diseases	Viral	Influenza <sup>a</sup>	Dyspnoea; fever; conjunctivitis; anorexia
		Rabies <sup>a</sup> (V)	Hypersensitivity; anorexia; behavioural changes; incoordination; paralysis; seizures
		Canine Distemper (paramyxovirus) (V)	Conjunctivitis; fever; severe dyspnoea; skin disease (hard pad); neurological signs
		Rotavirus	Severe diarrhoea; dehydration; emaciation
		Coronavirus	Systemic disease in rare cases (coronavirus)
		Aleutian disease (parvovirus)	Lethargy; anorexia; fever; hind leg weakness; emaciation; kidney failure
	Bacterial	<i>Helicobacter mustelae</i>	Stomach ulcers; nausea; anorexia; vomiting; lethargy; diarrhoea; melena; muscle wasting; abdominal pain
		Salmonella <sup>a</sup> or Campylobacter <sup>a</sup>	(Bloody) diarrhoea; vomiting; dehydration; emaciation
	Protozoal	Giardia	Intermittent diarrhoea; weight loss
		Coccidiosis Cryptosporidiosis	Diarrhoea at young age; dehydration; anal prolapse
	External parasites	Ear mites	Intense pruritus
		Fleas	Mild to intense pruritus
Metabolic or Hormonal problems	Persistent oestrus (jill)		Severe bone marrow suppression; immunosuppression; bleeding; anaemia
	Hyperadrenocorticism		Alopecia; pruritus; dysuria in hobs
	Insulinoma		Lethargy; hind leg weakness; nausea; coma
Cardiac disease	Dilated cardiomyopathy		Lethargy; exercise intolerance; anorexia; respiratory distress; liver failure; hind leg weakness
	Leaking heart valves		Often asymptomatic
Kidney disease	Chronic nephritis		Coughing; difficulty breathing
			Increased urination; dehydration; emaciation; nausea; vomiting; anaemia

(Continued)

**Table 5.3** (Continued)

Condition		Possible welfare effects
Gastrointestinal disease	Dental disease or tartar	Pain; reduced food intake; hunger
	Foreign body ingestion or hair ball	Abdominal pain; vomiting; gut perforation; shock
	Immune-mediated inflammatory bowel disease	Abdominal pain; loss of appetite; nausea; vomiting; diarrhoea; emaciation
Reproductive disease	Inflamed anal gland	Faecal straining; irritation; pain
Neoplastic	Dystocia (especially in low litter size [ $<3$ pups])	Abdominal pain; potential rupture of uterus
	Lymphoma	Loss of appetite; weight loss; organ failure
	Basal cell tumour	Benign skin tumour; ulceration
	Mast cell tumour	Benign skin tumour; itchiness
	Apocrine gland neoplasia	Locally invasive skin tumour; difficulty urinating
	Sebaceous epithelioma	Benign skin tumour
	Splenomegaly	Usually no welfare effects; lethargy
Traumatic	Bite wounds	Pain; irritation; infection; abscesses
Toxic	Incorrect vaccination	Delayed hypersensitivity reaction; high fever; anorexia; emaciation; muscle inflammation
	Rodenticide	Bleeding; blood loss
	Paracetamol or acetaminophen	Liver destruction

<sup>a</sup>zoonotic.

V = vaccine available to prevent the disease.

age to be carriers of the bacterium. Ferrets are thought to become infected at an early age and remain so until they are treated (Fox and Marini 2001; Morrissey 2004). *H. mustelae* has been associated with painful stomach ulcers, which frequently occur after stressful situations (Banks et al. 2010; Fox and Marini 2001). However, given the prevalence of carriers, confirmation of a causal relationship between ulcers and presence of *H. mustelae* infection is very difficult (Solnick and Schauer 2001).

Once ferrets get older, a variety of different diseases may be seen, including cardiac disease, renal disease, and neoplasia. Ferrets may get small tumours in the pancreas that produce an excess of insulin (so-called insulinomas), causing low blood glucose and resultant hind leg weakness. Checking the blood glucose on a regular basis may

help in early recognition of the disease and allow for treatment (Schoemaker 2009). Other types of neoplasia that are common in ferrets include adrenal gland tumours, lymphoma, and skin neoplasia. Dental disease is relatively common and the oral cavity should be checked yearly.

Ferrets should be physically examined by a veterinary surgeon on at least an annual basis. Checking the teeth and blood glucose regularly may help in early recognition of diseases and allow for treatment (Schoemaker 2009). All ferrets should be vaccinated against distemper and against rabies in countries where it is prevalent. Veterinary surgeons should take care to use the correct vaccine because the administration of a vaccine cultured on a ferret cell line or containing wrong type of adjuvant can lead to a hypersensitivity reaction. Ferrets should also be treated regularly with antiparasitic drugs such as selamectin or fipronil. Ferrets may need regular grooming of their nails and hair, which can be done by their owners (Figure 5.8). Ferrets should preferably not be imported from other countries because this poses a risk of introducing new diseases. In addition, owners are recommended to take suitable safety measures when introducing a new animal into a group (e.g. keeping the new animal isolated from the others during a quarantine period of approximately 2 weeks) to prevent the spread of infectious diseases.

Jills need external stimulation to ovulate (Bibeau et al. 1991), otherwise oestrus persists for 6 months. During this period, elevated hormone concentrations can lead to lethally reduced levels of many blood cell types (Martin 1986). This may reduce immune function, bleeding, anaemia, and potentially death. Jills can also suffer from difficulty giving birth, especially for small litters of less than three pups. To prevent persistent oestrus and pregnancy, jills should be neutered before their first breeding season.



**Figure 5.8** Nail-clipping a ferret while the ferret eats some of their favourite liquid or solid food placed on their belly by the owner.



**Figure 5.9** A jill being given a slow release implant containing deslorelin, while distracted with food.

Neutering may also reduce the incidence of repetitive behaviour in males and female (Talbot et al. 2014), perhaps by decreasing a frustrated motivation to roam. It furthermore reduces the distinct smell and fighting in males. However, in both sexes, neutering can be linked to the occurrence of hyperadrenocorticism, perhaps because of increased plasma concentrations of luteinizing hormone (Schoemaker et al. 2000, 2002), leading to severe alopecia, pruritus, and urinary blockage. For some people, this combination of risks has become a reason to consider ferrets as being unsuitable as pets. However, an alternative to neutering may be the use of a gonadotropin-releasing hormone (deslorelin) implant to reduce plasma concentrations of luteinizing hormone (Prohaczik et al. 2010; Figure 5.9).

There is no need to remove ferrets' anal glands (Table 5.4). In fact, the typical odour in ferrets is caused by secretion of the sebaceous glands and *not* by the anal glands. It is therefore unnecessary as well as painful and can potentially impact on ferrets' social interactions or the smell of their home area. The removal of the anal glands should only be performed in case of a medical need.

### 5.2.6 Euthanasia

Before euthanasia, ferrets should be sedated, followed by the injection of an overdose of any of the available euthanasia solutions, such as those containing pentobarbitone or a mixture of embutramide, mebezonium iodide, and tetracaine hydrochloride (e.g. T61). The solution can be administered into the cephalic vein, saphenous vein, cranial vena cava, or abdomen. The last route may be as effective and less stressful for the ferret but takes longer to take effect (Table 5.5).



**Table 5.4** Nontherapeutic elective surgical procedures performed on ferrets.

Procedure	Reasons and benefits for the animal	Reasons and benefits for owners (or other humans)	Perioperative welfare risks	Welfare risks due to the behaviours prevented
Castration	Facilitates social housing; may reduce sexual frustration	Possible reduced odour; may increase sociability towards humans	Pain; Risk of hyperadrenocorticism	Precludes opportunity to mate and exhibit natural courtship and sexual behaviour
Spaying	Prevents persistent oestrus and associated pancytopenia; avoids pregnancy	May increase sociability towards humans		

**Table 5.5** Methods of euthanasia for ferrets kept as companion animals.

Method	Restraint required	Welfare benefits	Welfare risks
Sedation or anaesthesia followed by intravenous, intracardiac, or intrathoracic injection of barbiturate or other euthanasia solution*	Restraint or handling for administration of sedation or anaesthesia	Sedation or anaesthesia prevents adverse reaction to euthanasia solution	Possible pain at injection site if sedation or anaesthesia is inadequate
Sedation or anaesthesia followed by intra-abdominal injection of barbiturate or other euthanasia solution*		May be less stressful	Generally takes longer time before death ensues Risk of pain on injection

Source: AVMA (2013).

\* It is important to ensure that the animal is sedated or anaesthetised sufficiently by checking muscle tone and reflexes, including response to a painful stimulus (e.g. pinching of the toes), especially when administering the euthanasia solution via the intrathoracic, intracardiac, or intra-abdominal route. For these routes, a deep plane of anaesthesia, with loss of muscle tone and lack of response to a painful stimulus, is required.

## 5.3 Signs of Ferret Welfare

### 5.3.1 Pathophysiological Signs

Alongside basic measures (Table 5.6), signs of stomach ulcers such as nausea, vomiting, and dark faeces may indicate stress, for example associated with dietary changes, overcrowding, or the addition of a new animal in the group (Fox and Marini 2001; Banks et al. 2010). Alopecia (Figure 5.10) can be connected to several health problems including persistent oestrus, hyperadrenocorticism, allergic skin diseases, and parasites (Bowen and Heath 2005; Chitty 2009). Uncomfortable ferrets may also salivate, shiver, squint, and have more frequent, often shallow, respirations, and a pounding heartbeat. Weight loss may also indicate pain, starvation, dental disease, or other problems.

### 5.3.2 Behavioural Signs

Ferrets in pain are often lethargic, immobile, and anorexic, although some ferrets may become more anxious and restless (Fisher 2006). Other signs of discomfort or pain include trembling, collapse, crying, whimpering, not assuming their normal sleeping position or not grooming (Brown 2004; Johnson-Delaney 2009). Spasmodic teeth grinding may also indicate pain, with ferrets holding the head down and rhythmically moving the facial muscles back and forth and wriggling the ears (Fisher 2006). As abdominal pain is frequently associated with *H. mustelae* and stomach ulcers, signs of abdominal pain may be indicators of previous or continued stress. Abdominal pain may

**Table 5.6** Basic measures and clinical standards of ferrets (*Mustela putorius*).

Parameter	Normal measures	
Life expectancy	up to 14 years, average 5–8 years	
Common weight range	Males: 1–2 kg	Females: 600–950 g
Body temperature	37.8–40.0 °C	
Respiratory frequency	33–36 breaths/min	
Heart rate	180–250 beats/min	
Pubescence	Males: 6–8 months	Females: 6–8 months
Blood volume	40 (female)–60 mL (5–7% of body mass)	
Haematocrit	36–55	

Source: Quesenberry and Orcutt (2012) and Fox et al. (2014).



**Figure 5.10** Alopecia, a potential sign of persistent oestrus or hyperadrenocorticism.

be indicated by a hunched posture, walking with an arched back or stilted gait. An arched back combined with raised hair on the tail (‘bottle brush tail’) may suggest fear or excitement (Fisher 2006). These postures are different from the normal posture which ferrets have during walking.

Signs of discomfort or pain also include crying and whimpering. Ferrets in fear, frustration, or pain may also squeal and scream (Fisher 2006). Continuous screaming can also be an indication of being alert to a serious danger, where the animal is excited or fearful and prepared to become aggressive. A barking-like sound can also be a sign of excitement or fear. Hissing can indicate fear, but it is sometimes difficult to interpret because it can also be heard during play patterns, particularly in situations of play escalation. A ‘dook’ or ‘chuckling’ noise may indicate excitement, for example, during play (Schilling 2000; Bulloch and Tynes 2010). Indeed, as ferrets are a very playful species, the observation of play patterns can be a useful indicator to assess a ferret’s welfare

status because play may not occur under severe stress. A normally playful ferret that suddenly stops to play might be unwell, in pain, or stressed. Ferrets in a good health and well-being, may dance, jerk, gallop, play fight with a partner, manipulate objects, and chase artificial prey (e.g. Poole 1978; Fisher 2006; Bulloch and Tynes 2010).

In mink, pacing along the side of the cage and scratching at the cage walls may be signs of stress (Heller 1991), frustration (Mason 1991), lack of enrichment (Hansen 1989; Mason et al. 2001; Poessel et al. 2011), or other problems (Hansen 1993; Mason 1993), and similar behaviour might indicate stress in ferrets (Talbot et al. 2014). Urinating outside the litter box, wiping the preputial sebaceous gland over surfaces, dragging the peri-anal sebaceous gland over surfaces, and defecating on objects (Fisher 2006) may all be considered as normal behaviours, quite probably related to ferrets' territorial natures (Fisher 2006). However, stress-induced elimination problems may be increased within instable social structures in multiferret households as a result of territoriality and social stress or individuals monopolising elimination places.

## **5.4 Worldwide Action Plan for Improving Ferret Welfare**

Owners should be made more aware of ferrets' strong motivations for exploration, foraging, activity, play, and resting and of their natural social responses, especially those relating to aggression and territoriality. Owners need to know how to manage resources, carefully match company, avoid too many animals and respect some ferrets' preferences for solitary lives. Owners should be encouraged to fulfil ferrets' behavioural priorities by providing adequate and variable food enrichments, interesting toys, and comfortable hiding and resting places to prevent behaviours that are problematic for those owners. Encouraging more widespread feeding of whole prey animals should also be recommended to prevent dietary deficiencies and potentially decrease the occurrence of insulin-producing tumours. Owners should also be encouraged to present their ferrets for yearly veterinary check-ups, preventive health care, and vaccination against canine distemper. Knowledge of ferret medicine is increasing among veterinarians, thereby ensuring that ferrets may be provided with the best care possible.

Breeders and owners obtaining young ferrets should be encouraged to ensure they get adequate positive experiences in early life, particularly socialisation, to ensure they live with minimal stress as pets in human surroundings, who can easily be handled and can also live in good company with other ferrets. All breeders need to implement validated protocols inside and outside the ferrets' living environment with many stimuli and in many contexts, and these should be followed up by the new owner. Both breeders and owners have a responsibility to ensure that the latter are sufficiently knowledgeable and committed to look after each ferret forever. Information on the reasons for relinquishment is scarce, but a reasonable estimate is that 1–2% of the ferret population might be relinquished.

The historical need to neuter and the consequent risk of hyperadrenocorticism may be avoided with the development of hormone implants. Removing anal glands (for nonmedical reasons) is illegal in many countries in Europe, but it is still common practice in the United States to remove the anal glands prior to selling a young ferret (Table 5.4). Finally, all ferrets should be microchipped and registered so they can be identified and returned to their owner if they escape.

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