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The husbandry, welfare and health of captive African civets (Vivera civetica) in western Ethiopa

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Abstract

*A study was carried out during the period from September 2001 to August 2002 in Jimma zone, western Ethiopia to evaluate the husbandry and health of captive African civets (*Vivera civetica*). Wild civets were found in the wild in all 13 of the districts in the zone, although traditional civet-keeping was practiced in only five. Civet management practices were determined via the use of a questionnaire survey of 15 farms; containing a total of 107 civets. Health was assessed by routine clinical examination, and examination of faecal and blood smears of 55 civets selected at random. All civets were male and over one year of age, with a mean weight of 12.5 ± 0.79 kg. Fifteen percent were in poor body condition, and only 13% had a good body condition score. An average of 7.13 civets were kept on each farm. Farmers obtained wild civets by either trapping them themselves, purchasing them from dealers or a combination of both. The civets were housed separately in wooden cages, with an average size of 1.0 × 0.5 × 1.0 m (length × breadth × height) and kept in a communal thatched room. They were fed boiled meat, milk (fresh or powdered), eggs, butter, corn soup and fruit juice. Although an assessment of the behavioural parameters of welfare were outwith the scope of this study, trapping methods, adaptation processes, housing condition, restraint and the techniques for musk extraction from the anal glands were stressful and injurious, and have important welfare implications. Approximately 20 g of musk was expressed from a single civet every 9-15 days. The civets often sustained injuries while being restrained during musk harvesting; 14% had swelling and bruising, 6.5% fractures and 11.2% had eye lesions. Cestodes were the most prevalent gastrointestinal parasites, followed by ancylostomes, ascarides and* Tricuris *spp. Skin lesions were identified in 19.6% of civets examined and an assortment of fleas and ticks including* Haemophysalis leachi, Rhipicephalus *and* Amblyoma *spp were found on the body.* Trypanosoma congolense *and* Babesia felis *were identified in blood smears taken from four animals. This study shows there is an urgent need to invest in research into improving the welfare, husbandry and health of civets, as well as providing educational programmes for those who farm these animals.*

Keywords: *animal welfare, captive, civets, Ethiopia, health, husbandry*

Introduction

Civets are wild viverids of the tropics, found in India and Africa (Smithers 1983). The African civet (*Vivera civetica*) is the source of most of the musk for the World's perfume industry (Dorset & Dandelot 1970; Mason 1984). Ethiopia earns about one million USD each year from the export of civet musk (Fasil 1995). Over 90 per cent of the civet musk is produced in western Ethiopia (Fekadu 1995); most of which comes from captive animals (Ketema 1995). These animals remain in captivity for up to 15 years, producing musk every two weeks (Mohammed 1995). The African civet is the largest of the viverids, being the size of a medium-sized dog, with a male weighing up to 20 kg and having a body length of 65 - 90 cm. They are found in the south and south-western region of Ethiopia (Smithers 1983; Fasil 1995) and are nocturnal, solitary animals, mixing only for the purposes of mating (Kingdom 1977). Civets are omnivores, eating a variety of fruits, vegetables, insects, rodents, birds and carrion. Although the reproductive biology of civets has not been very well documented, breeding in the wild appears to have a seasonal component (Dorset & Dandelot 1970).

Mohammed (1995) and Pugh (1998) have described many of the difficulties associated with traditional civet management in Ethiopia; there are no published standard guidelines for the husbandry and welfare, or the common diseases and disorders of civets. The objectives of this study were to: 1) investigate the conditions under which captive civets are managed in western Ethiopia, and, 2) assess the body condition and disease status of civets in captivity.

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Table 1 Civet farm distribution in the 5 districts in Jimma zone.

Districts	Number of active farms	Number of closed farms	Number of civets in active farm	Average number of civets per farm
Gomma	6	3	40	6.67
Limu-Kossa	5	2	35	7.00
Limu-Seka	5	4	-	-
Sigmo	2	6	18	9.00
Kersa	2	7	14	7.00
Total	20	22	107*	7.13*

* Five farms in Limu-Seka that declined to cooperate were not included.

Materials and methods

Study area

Jimma is located in western Ethiopia at an altitude ranging from 880 m to 3360 m above sea level. The climate is tropical and humid with bimodal heavy annual rainfall, ranging from 1200 - 2000 mm. The vegetation includes a mixed type natural forest, coffee and various annual crops. Farmers in the area practice mixed crop-livestock agriculture. Cultivated and wild coffee is the main cash crop of the area.

Animals

Although civets were found in the wild in all 13 of the districts in Jimma, civet-keeping was only practiced in five, namely: Sigmo, Gomma, Kersa, Limu-Kossa and Limu-Seka. At the start of the study, 20 civet farms were identified in 5 of the districts and the cooperation of the local farmers in the area was sought. Although, five farms in Lemu-Seka refused to reveal the number of civets in their possession, a total of 107 civets kept on the 15 farms from the remaining four districts were able to be used in this study. The length of captivity ranged from 6 months to 8 years.

Questionnaire survey

The study was carried out between September 2001 and August 2002. A questionnaire was given to all 15 of the civet farms to determine parameters such as ownership profile, stocking, housing, feeding, breeding, musk extraction, marketing of the product and health status of the animals.

Clinical examination

All animals were examined clinically by a veterinarian on two separate occasions in January and June 2002, and the findings recorded. Initially animals were observed in their cages and then during restraint by the owner while musk was being collected. In most instances, this was carried out on the pre-arranged dates of musk collection to avoid any additional disturbance. The coat, eyes, ears and body orifices were examined, and the trunk, and limbs were palpated in order to check for the presence of lesions including limb fractures. Body condition was assessed by palpation of the lumbar vertebrae and scored as follows: 1) Poor; prominent dorsal spinous and transverse processes. 2) Moderate; both processes could be palpated with moderate pressure. 3) Good; difficult to palpate both processes even with substantial pressure.

Faecal and blood samples

Fifty-five of the 107 animals were randomly selected for faecal and haematological sampling. Faecal samples were taken by gently inserting a small blunt curette in the rectum and were transported to the regional laboratory in 10% formaldehyde in screw-capped universal bottles. They were then examined using the sedimentation and flotation techniques described by Bowman (1990). Blood samples were taken with disposable blood lancets from the tip of the tail. Thick and thin blood smears were then prepared on clean, dry slides and allowed to dry before being fixed with methanol. Fixed thick and thin smears were stained with Giemsa for 45 minutes, and examined under a light microscope at × 100 magnification (Coles 1986).

Results

Distribution of the farms and owners' profile

In the 5 districts in which captive civets were kept, 20 active civet-keeping farms were identified and, in the 15 farms included in this study, there were a total of 107 civets. All were male and greater than one year of age; the average number of civets in each farm was 7.13 and no breeding took place on any of the farms. The distribution of the farms in the zone is shown in Table 1. Most of the civet farmers in Jimma zone had long experience of traditional family civet farming, ranging from 15 to 50 years.

Civet capture

The animals on the farms had been obtained directly by trapping, purchased from a dealer, or a combination of both (Table 2). The majority of the civets were purchased, though, and the involvement of individuals that specialised in trapping and selling civets was readily observable. Trapping was carried out using a woven trap made from the bark of a tree known locally as 'kerero'. This trap is known

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as 'debo' and is net-like. It is laid in the evening with a self-locking knot. The entangled civets would be examined by the trapper for sex, age and health, and transported for sale early at dawn. Another type of trap known as 'kiyo' was also occasionally deployed, but tends to cause more injury to the animal. Only males are kept, as they produce greater quantities as well as better quality musk than females. The females are released back into the wild once the tip of the phalanx of any one toe has been amputated, to enable identification if recaptured. Keeping females in the same colony was thought to severely affect the males' musk production, causing them to become disturbed and restless.

Trapped males would be held in a sack known locally as a 'kesha' for transportation. Newly introduced civets showed signs of distress as evidenced by restlessness and attempts to escape, as well as not eating or drinking for 2-3 days. The price of an individual animal, which ranges from 12-24 USD, is dependent on a number of factors that include: age, maturity, bodyweight and anal gland size. Payment of the agreed price is not completed until after a period of 7-10 days has elapsed, to ensure that the civet survives and is suitable.

Housing

In captivity, the civets were kept in separate cages within a communal, thatched building. Cages were made from wooden slats and were without bedding. The average size of the cage was 1.0 × 0.5 × 0.5 m (length × breadth × height) which was sufficient to accommodate the animal. Cages were well ventilated, and faeces and urine readily passed through the slatted floor; any that adhered to the cages was removed every four days. Farmers considered a clean cage to be very important in the production of good quality musk. Most owners protected the cats from insects with a pesticide spray or by using tobacco smoke.

Feeding

In the wild, civets are omnivores eating a wide range of foodstuffs. High energy and protein feeds are traditionally considered good for quality musk production, although there is no scientific information to substantiate this claim. Civet captors often fed animals on: boiled meat, milk, eggs, butter, corn soup, fruits and fruit juice. Sometimes, in the event of a food shortage, milk powder and wheat flour were used as emergency replacements during the musk harvest. However, some farmers were not able to afford these protein and energy rich feeds and corn soup was frequently used due to its relatively cheaper price. Water was provided *ad libitum*, and its intake was said to be higher when civets were fed on meat. No mineral was provided for the civets, as it was believed to cause alopecia.

Breeding

Until now, farmers have not attempted breeding civets in captivity. They estimate that gestation in the wild is approximately three months, and the number of kittens born ranges from 3 to 5. Most civets reach sexual maturity at 6 months of age and this is when they are believed to start producing musk.

Table 2 Methods of obtaining civets for farm stocking and replacement.

Method	Number of farms	Number of civets	Percentage
Trapping	1	6	5.61
Purchasing	8	59	55.14
Trapping and purchasing	6	42	39.25
TOTAL	**15**	**107**	**100**

Civet musk production

To extract musk from the anal glands, each civet was restrained in lateral recumbency with great difficulty, indeed it would often take three people to perform this task. One held the tail and the hind limbs, the second restrained the head and neck against the cage floor with a stick and the third extracted the musk by expressing the contents of the anal gland with a spoon made from cow horn. The musk was then transferred to a goblet also made from cow horn, which was sealed with a tight-fitting lid, and stored. Once the musk had been completely expressed, the gland was treated with a mixture of musk, butter and wax. This would usually be massaged over the gland's surface, although it was accepted practice by some to introduce a small amount into the gland itself. The logic being that this was thought to keep the gland moist, thereby inducing further production during the following harvest. Musk was extracted every 9-15 days at sunset, prior to feeding. The average volume of musk obtained at each collection was 20 g (range 10-25 g).

Musk marketing

Musk production was sometimes the primary source of income for the farms, or it was secondary, to mainly crop production. It is extremely labour-intensive and the income received from musk production fluctuates considerably. A kilogram of musk was sold for about 120 USD to dealers, however the same quantity would then be sold on for about 600 USD when exported. During the previous 5 years, 52% of farmers had gone out of business as a direct result of the increased feed costs, and low demand for musk.

Health

A total of 107 animals were examined. The mean body condition score was 1.97 ± 0.54; 17 (15.9%), 76 (71%), and 14 (13.1%) were scored as 1, 2 and 3, respectively. The mean bodyweight of the 25 animals weighed was 12.5 ± 0.79 kg. 21 (19.6%) had skin lesions, 12 (11.2%) had eye lesions, 15 (14%) showed evidence of swellings and bruises, 7 (6.5%) had fractures involving limb bones and 5 (4.7%) showed signs of diarrhoea.

Of the 55 civets examined for internal parasites, 32 (58.2%) were infected by one or more gastrointestinal parasites, while 8 (14.6%) were found to harbour different external parasites.

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Table 3 Parasites recovered from the faecal and blood examinations of 55 civets.

Parasites	Number (percent) of civets affected
GIT parasites	
Cestodes	23 (41.82)
Ancylostomes	18 (32.73)
Ascarids	13 (23.64)
Tricuris spp	11 (20.00)
External parasites	
Ctenocephalides spp	7 (12.73)
Haemophysalis leachi	6 (10.91)
Rhipicephalus spp	4 (7.27)
Amblyoma spp	2 (3.64)
Haemoparasites	
Trypanosoma congolense	3 (5.45)
Babesia felis	1 (1.82)

Four (7.3%) civets were tested positive for the haemoparasites *Trypanosoma congelense* and *Babesia felis*. The different parasites recovered, and percentages of civets affected are summarised in Table 3.

Discussion

In Ethiopia the practice of keeping civets in captivity to extract and sell musk has been a tradition for many centuries.

In general, the traditional methods of civet husbandry have serious welfare implications. Trapping methods, adaptation to captivity, housing, physical restraint and musk extraction are all often extremely painful and/or stressful to the animals. There has been no advice or technical input to improve the health, welfare and productivity of these animals. The skills and experience of civet musk production have been passed on from generation to generation within closely related family groups. Knowledge had been acquired largely through an apprenticeship system, and has often been at the mercy of sociological, cultural and spiritual influences.

In the wild, civets are omnivorous. Civet owners were aware that by providing high quality feed, considerable quantities of good quality musk can be produced. However, the farmers were unable to afford to keep their stock on such diets and, as a result, animals were often found to be in a poor body condition; 15.4% were in poor condition, with only 13.1% considered to be in a good bodily condition. Previous reports (Pugh 1998; Fasil 1995; Fekadu 1995; Ketema 1995) also revealed this, and it has contributed to 50% of farmers giving up musk production as has the fact that market demand and the price of civet musk fluctuates rapidly.

The reproductive biology, general behaviour, feed requirements, and diseases of the civet have not been studied in great detail. As a result the practice of keeping civets in captivity has remained primitive in comparison to other forms of livestock production (Pugh 1998; Fasil 1995; Fekadu 1995).

Detailed clinical examination was frequently problematic due to difficulties with restraint, and the importance of keeping unnecessary restraint to a bare minimum. Thus it was frequently impossible to assess the precise nature of the lesions diagnosed, hence their division into the broad categories listed. Ideally, any animals with observed lesions should have been sedated, or even anaesthetised, to enable a detailed examination to be made. Funding for the purchase of suitable pharmacological agents was not available. Civets in captivity suffer from a variety of diseases and stressful situations eg feed shortage and adverse climatic conditions (cold and heat) all of which will probably affect the quality and quantity of musk obtained (Pugh 1998). Since the length of captivity ranged from 6 months to 8 years detrimental conditions such as parasitic burden, dislocations, fractures and wounds could have been acquired while the civets were captive or wild. Tapeworm, ascarid, ancylostome and *Trichuris* infections were diagnosed using coprological methods. In addition, trypanosomiosis and babesiosis were confirmed using blood smears. Feseha (personal communication 2003) diagnosed *Babesia felis* in one farm where many civets had died from the disease. It is highly likely that ticks of *Haemophysalis leachi* and *Rhipicephalus* spp found on the civets could transmit *Babesia felis*. Civet keepers often used local, indigenous knowledge to treat infirm animals with herbal medicines. This study indicates that inadequate diet, poor housing, parasitic disease, insufficient restraint and musk extraction facilities and low market demand make up a portion of the constraints on civet musk production.

It is clear further research is required. This should include a general assessment of nutritional requirements, specific welfare parameters, parasitic burdens, longevity and mortality rates

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