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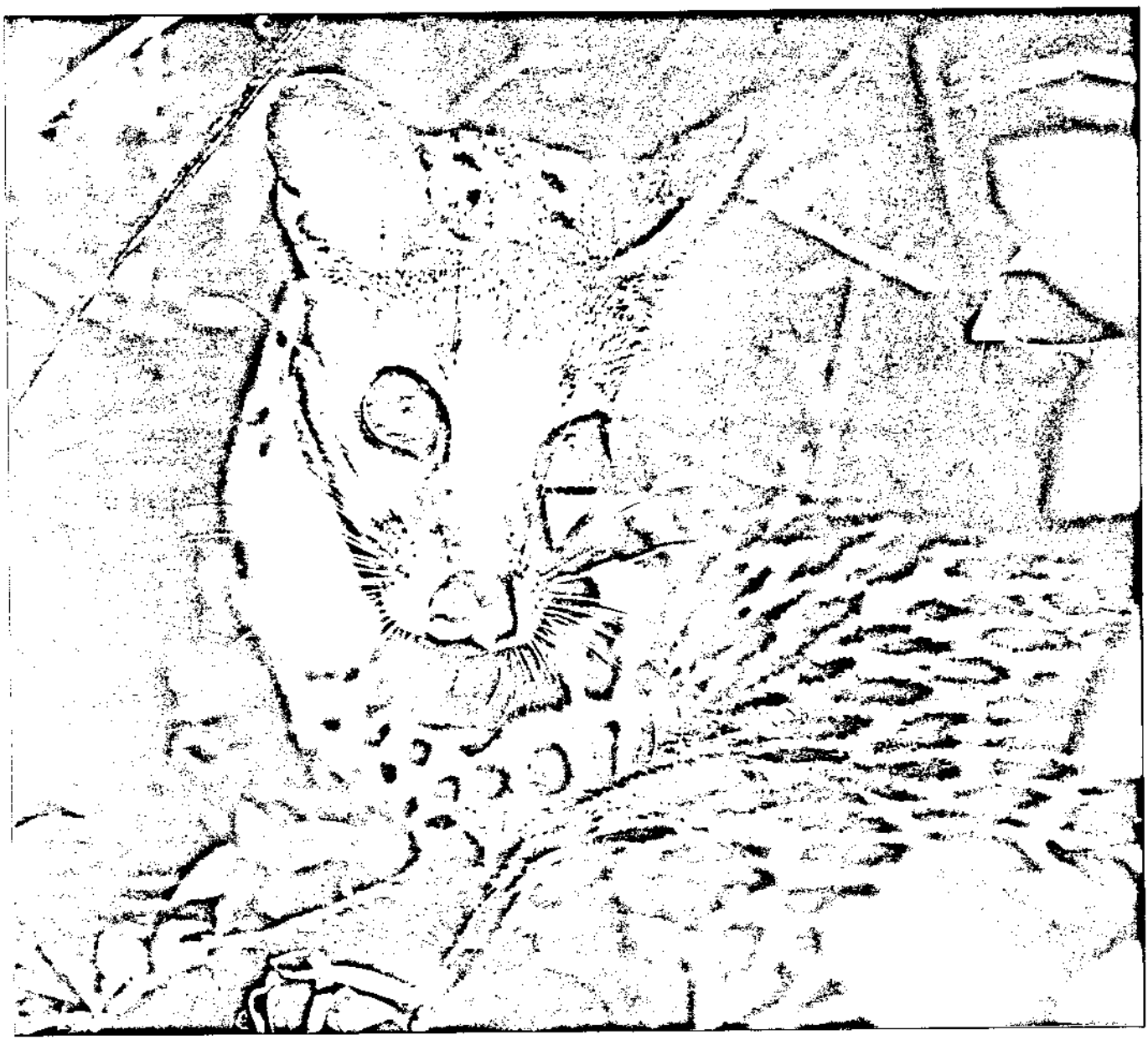
MUSTELID & VIVERRID CONSERVATION

The Newsletter of the IUCN/SSC
Mustelid & Viverrid Specialist Group

Number 3 October 1990



Crested genet *(Genetta cristata)*. First live specimen photographed. Photo by S. Heard.

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Mustelid & Viverrid Conservation

The Newsletter of the IUCN/SSC Mustelid & Viverrid Specialist Group

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We are particularly grateful to Walter Rasmussen for reading the manuscripts and improving the English style.

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The aim of this newsletter is to offer the members of the IUCN/SSC M&VSG, and those who are concerned with mustelids or/and viverrids, brief papers, news items, abstracts, and titles of recent literature. All readers are invited to send material to:

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Rediscovery of the crested genet

Shelagh HEARD and Harry VAN ROMPAEY

Introduction

In 1940 Hayman (in Sanderson) described a new form of genet as *Genetta servalina cristata*. The holotype (BMNH 39323) was collected in Okoiyong by I. T. Sanderson in 1933 during the Percy Sladen Expedition to the Mamfe Division of the then "British Cameroons". At the same time 13 other specimens of the same form were collected from Mamfe, Binjong, Bashauo, and Ululu, all localities between 150 and 900 m ASL (Fig. 1). The habitat was described as: "scrub, low tangled vegetation, and bare ground below trees in high deciduous forest, occasionally in secondary and mountain forest".

Hayman found that comparison of the above mentioned specimens with typical *servalina*, described from south of the Sanaga River (Cameroon) and from Zaire, showed that the form inhabiting the Mamfe and Oban regions was obviously racially distinct, and distinguishable by several characteristics:

"First, the ground-colour is much paler, varying from pale buff to pale ochreous, darkening on the shoulders and the middle line of the back to a rich ochreous. In consequence, the pattern of close-set black spots is bolder than in typical *servalina*. The fore and hind legs are much paler above, and the fore legs are boldly spotted far more than half their length from the shoulder. The whole under surface is pale, in striking contrast to that of *servalina*, the throat being light ashy-grey and the remainder of the under surface a drab mixture of buff and grey, paling again to ashy-grey in the genital region. On the back and neck, however, two features attract attention. One is a conspicuous black dorsal line, composed of hairs slightly longer than elsewhere on the back, commencing about 75 mm behind the shoulders and running to the root of the tail. The second is a well-marked crest on the neck composed of converging nuchal hairs immediately on either side of the median line of the neck. This crest includes the hairs forming the central inner pair of narrow stripes. It commences on the nape and disappears on the shoulders. The white and black tail-rings are well-marked, and the tail may end up in a white or a brown tip, or in a pale brown tip succeeding a dark brown ring".

In fact none of the genets of the *servalina* group (*servalina* ssp. and *victoriae*) show a well-marked dorsal line nor a nuchal crest as in *cristata*. Only Lönnberg (1917) referred to a dorsal line in E. Zaire specimens, which he called *intensa*, a form which Crawford-Cabral (1980-81) thought may be included in *G. servalina bettoni* of East Africa.

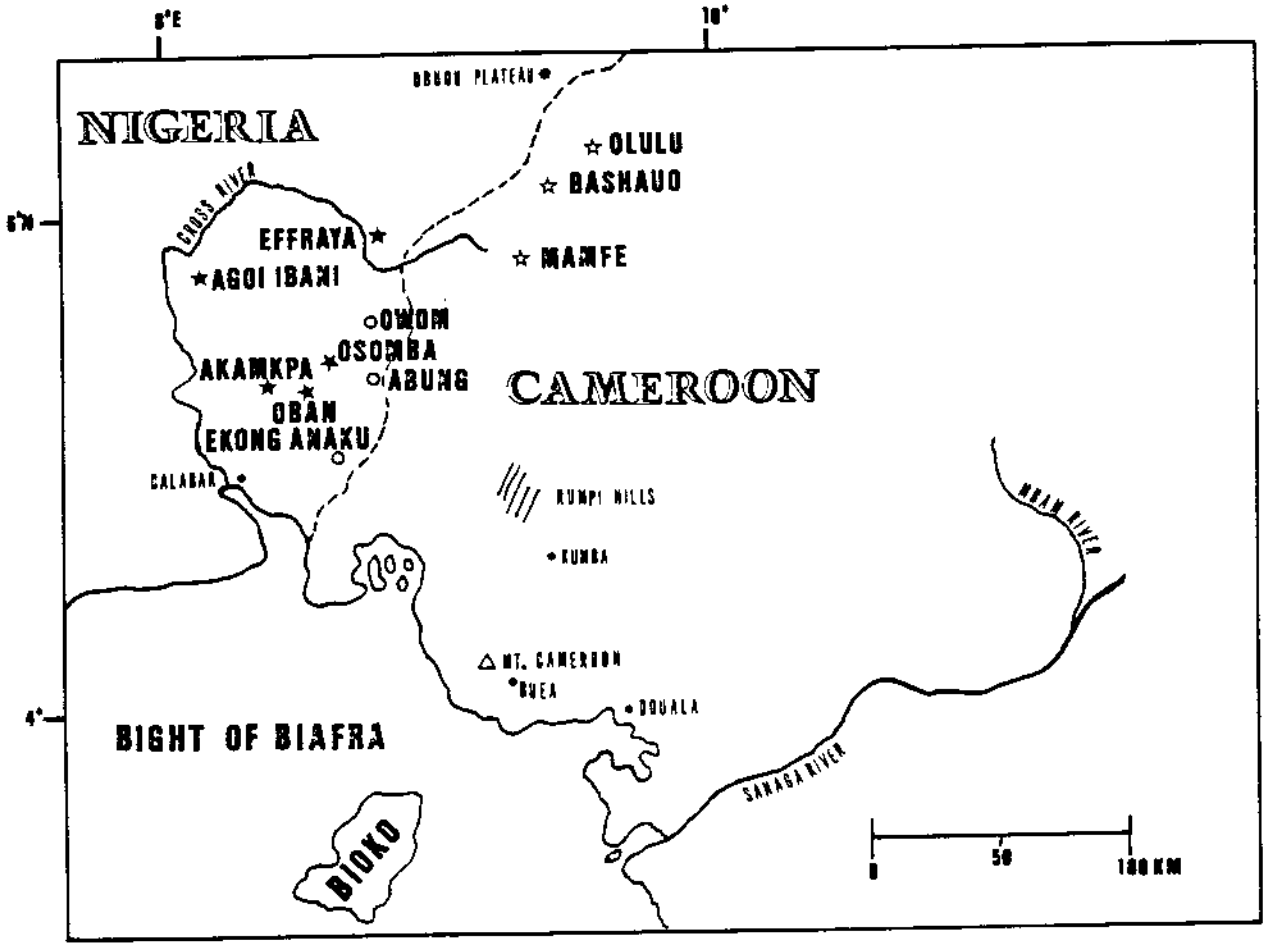

Fig. 1. Localities from where specimens of *G. cristata* were collected by Sanderson (1933): open star; specimens of *G. cristata* by Heard (1989): closed star; specimens of another form of genet by Heard (1990): open circle. Interrupted line shows border between Cameroon and Nigeria.

In external measurements *G. servalina bettoni* averages one- seventh smaller than *G. servalina servalina*, while the skull of *bettoni* is one-third less massive, which made Allen (1923) consider the possibility they may be specifically separable. Hayman found little difference in size between *servalina* and *cristata*.

Contrary to Rosevear (1974), Crawford-Cabral (1980-81) found *cristata* differing on a craniometrical basis from *servalina*, and also considered it a distinct species.

Is *cristata* a subspecies of *G. servalina* or a distinct species? Opinions differ: originally described as a subspecies by Hayman (in Sanderson, 1940) it still is considered as such by Coetzee (1977), Honacki *et al.* (1982), and Wozencraft (1989). On the other hand, Rosevear (1974), Crawford-Cabral (1980-81), and Corbet & Hill (1986) list it as a distinct species. Where systematists disagree as to whether a taxon should be recognized as a species or subspecies, the IUCN/SSC M&VSG has chosen to list it as a species. This approach has been adopted to ensure that no taxon is overlooked or neglected when conservation action is called for (Schreiber *et al.*, 1989).

Rediscovery of the Crested genet

The confusion regarding the nomenclature of *Genetta* in south-eastern Nigeria, and in particular the taxonomic relationship between *G. servalina* and *G. cristata*, has recently been brought to our attention again with the acquisition by one of us (Shelagh Heard) of two young genets in the Oban Hills area, Cross River State, Nigeria. In view of this and the IUCN/SSC M&VS Group's approach to systematics, it seemed a timely opportunity to consider *Genetta cristata* more closely.

In late August 1989, a male genet with eyes open but ears closed, believed to be about one week old, was brought by a farmer from the village of Oban (05°19'N, 08°34'E). The young animal had been found curled up asleep, at the edge of a farm where cassava and low scrub abutted into secondary forest. Again in mid-October of the same year, another male of approximately one week was brought to Oban, having been taken from its nest by a hunter in the Akampa area (05°13'N, 08°18'E).

Although both of these animals came from areas of degraded secondary forest near settlements, the original habitat of the Oban Hills area is tropical rain forest. This area of forest, east of the Cross River, forms the north-west rim of the Cameroon-Congo Coastal Strip which is part of the larger Lower Guinea Forest Block of Central Africa, and is in fact the largest of the few tracts of primary rain forest remaining in Nigeria. It is also the southern portion of the forest belt from which the genets described by Hayman above were collected.

After consulting the literature in an attempt to identify the young genets, the most fitting description was that given by Rosevear (1974) for *Genetta cristata*. From the outset the young genets were striking in their markings and very similar to each other; the pelage was an even greyish-buff with rows of longitudinally arranged black spots, a black mid-dorsal stripe running from between the shoulders to the base of the tail, and the tail bearing nine black (the first incomplete ring being at the juncture of tail and body) and eight white concisely marked rings (Fig. 2). Over the past nine months the pelage colour of both animals has changed and though there are some differences between the two, they are obviously the same species.

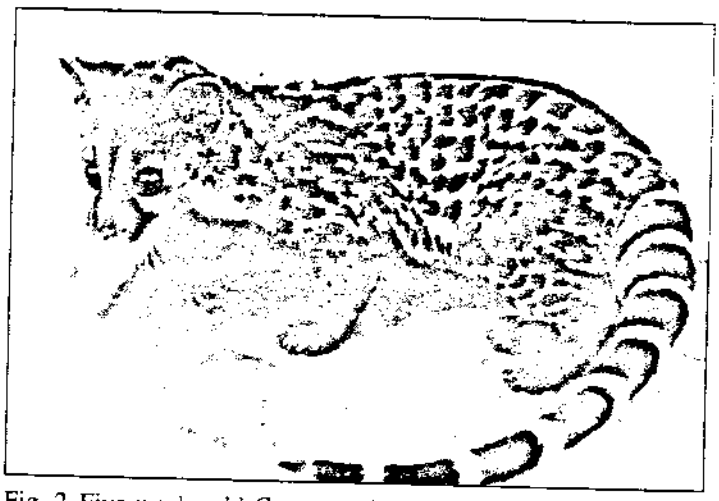

Fig. 2. Five weeks-old *Genetta cristata*. Photo: S. Heard.

From approximately one month of age, the original genet began to acquire a distinct ochreous tone to his forehead, and the ground pelage began to change from grey to oatmeal-beige, acquiring a "warmer" tone. While the ground pelage of the second genet became more oatmeal coloured after a few months, it was only at about six months of age that the reddish tones became obvious, and he remains slightly greyer and darker than the other, but again, the impression is of a pale, oatmeal coloured pelage.

Although the genets may not have fully acquired the coloration of their adult pelage (being ten and eight months respectively), their markings and certain other characteristics are the same as other adult *cristata* skins which have been collected from the area. The most striking of these are the bold spot pattern, the mid-dorsal stripe, and the spinal crest. These characteristics also help to distinguish it from another local form of genet, which appears to be sympatric with *cristata* and probably equally common. The following is a more detailed description of the two captive *cristata*, which may in future serve as a basis for comparison with the other form, whose identity at present remains unclear.

In agreement with Hayman's description, the ground-colour of the animals is pale, being oatmeal on the dorsal pelage and particularly light on the throat, changing to greyish-oatmeal on the ventral pelage. The forehead and top of the head have an ochreous cast, like some tips of the hairs of the black spots and ground-colour on the dorsal pelage near the mid-dorsal line.

The belly is greyish-oatmeal, with irregular, small elongated spots which in some places merge together. The ventral pelage between the hind legs is distinctly ash-grey, without spots, paling to a very light grey in the immediate genital region. The hair covering the scrotum is, in stark contrast, dark brown. The inner hind legs are dark grey and unspotted, and as in Rosevear's (1974)

description of *G. cristata*, "carry a distinct pale, greyish patch over the metatarsal region above" (see Fig. 4), the hairs of which are actually black but with a tip of white, giving the appearance of grey. The forelegs are pale on the innermost side with some scattered small spots, dark grey on the upper outer portions with small round spots, and become blacker towards the toes.

The black spots on the dorsal pelage are large, well separated and regularly spaced, and run in fairly distinct longitudinal lines. In the two captive animals, these rows number about six when counted down the side of the body from the mid-dorsal stripe, with the top three rows adjacent to the mid-dorsal stripe being the most uniform. The spots become smaller and more randomly spaced towards the ventral pelage, while the chest has only a few small, random spots, as does the throat.

The mid-dorsal stripe is indeed conspicuous in *G. cristata*, where it runs from just behind the shoulders to the base of the tail (Fig. 3). It is particularly distinct as it forms an erectile spinal crest when the animal is excited. When in this state, the coat becomes slightly puffed out, the tail becomes noticeably thicker, and the crest immediately raises to form an upright, spiky ridge (Fig. 4). In addition, there is a much thinner nuchal crest along the median line of the neck, composed of short hairs which run in the opposite direction to the surrounding hairs. Although the nuchal crest is not very pronounced, it is still apparent when the animal is in a relaxed state.

There does not seem to be any consistency regarding the number of tail rings in *G. cristata*, although the two captive specimens do have the same number, colour and pattern of rings. However, in three other *cristata* skins which have been observed, the number of tail rings has varied between eight and ten dark rings. The two captive animals both have grey tail tips, a colour very distinct from the rings. This colour has not been seen in any of the other *cristata* skins, all of which end in either a light or dark tip, the same colour as the rings. However, a description of tail tip colour for identification is probably unreliable as it was discovered whilst recently skinning a genet that it was impossible to get the extreme tip of tail. This may be one reason why there is no apparent consistency in the colour of tail tips reported.
In general, *cristata* has much wider dark rings in proportion to the light rings (dark rings are approximately three times as wide as the light ones in the captive animals). Again, however, there appears to be a great deal of variability which makes it very difficult to use tail colour and pattern as distinguishing characteristics.

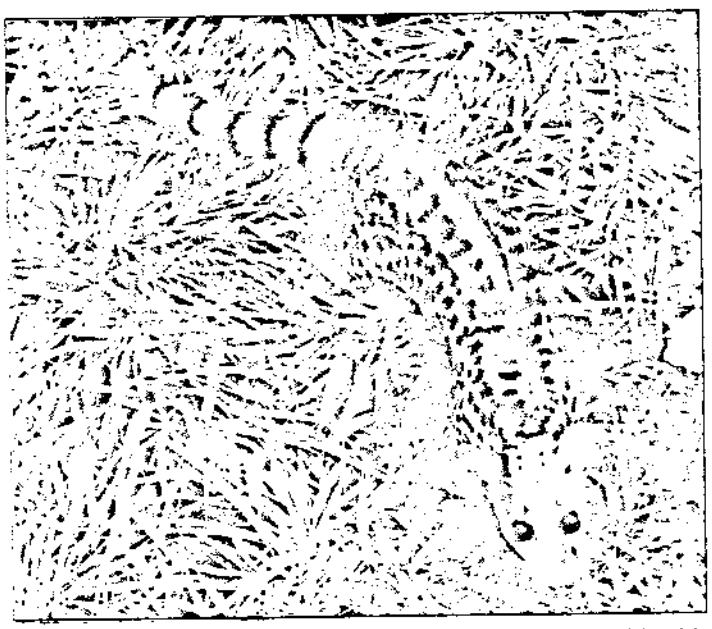

Fig. 3. Nine months-old*Genetta cristata* showing the bold mid-dorsal line. Photo: S. Heard.

Observed behaviour

Genets in this area, unlike reports from elsewhere, do not live in close contact to people or their villages. Perhaps due in part to heavy hunting pressure, these forest genets are extremely shy animals. Hunters are usually the only people who report sighting them live, but they are unable to offer much insight into the habits or behaviour of genets as they immediately shoot them rather than observe them.

The two *G. cristata* described here, although captive, have not been confined to a cage, thus they have developed hunting skills and what might be termed other "normal" behaviour. They are agile climbers, spending the majority of their time in high places. While they are presently still crepuscular, most of the day is spent resting (but often not sleeping) in a few favourite places, usually sprawled out but sometimes curled up. Around dusk they arouse and become quite excitable and highly playful, particularly with each other, during which time they chase, leap, tumble and roll over each other. They are extremely fast and nimble animals, easily pursuing and pouncing on small insects, frogs and lizards, the latter of which are a favourite prey.

The two animals are very attached to each other, grooming each other, and sleeping, exploring and hunting together, which begs the question of whether or not they are social or solitary by nature. They toilet in one place, and it appears that the older genet may scent mark whilst urinating, slowly moving his pelvis from side to side during this time. They also roll and rub themselves, for the length of their bodies, in smells or substances to which they are attracted.

They are quiet animals and do not vocalise often. Although the tone and pitch of their calls is quite different to each other, they both have at least three easily recognisable vocalisations in addition to a purr and a growl: a long meow, a short squeak, and what is best des-cribed as a combination short sneeze/cough/grunt, which they greet each other with after being apart, and which they sometimes use to maintain contact when not in sight of each other.

Importance of the conservation of the Nigerian forests

Fascinating animals as they are, it remains a mystery just what the taxonomic relationship between the different forms or species of genet found in the area is. With the forests of south-eastern Nigeria and those adjacent in Cameroon reputed to be the

Fig. 4. Nine months-old*Genetta cristata* showing the erected spinal crest as well as part of the thinner nuchal crest and the puffed out coat and tail. Note also the grey patch over the metatarsal region on the hind legs. Photo: S. Heard.

most biologically diverse of any in Africa, and believed to have a very high degree of endemism, it is possible that there are even more complications for *Genetta* taxonomy in the form of as yet undiscovered and undescribed subspecies.

Unfortunately, Cross River State is typical of most rain forest areas throughout the world in that its forests are being rapidly converted to farmland and wasteland. To compound the problem of loss of habitat which forest species are facing, none escape the extremely high hunting pressure which exists in the southeast of Nigeria. There are already several endangered and threatened species in the country; at present *Genetta* species are lumped together and none are thought to be endangered nor given a special protection status. On a positive note though, a rain forest National Park in excess of 4000 square kilometres is currently being planned; when eventually established this will protect indefinitely rain forest habitat, however it is likely to take some time before proposed wildlife laws are adequately enforced and hunting is brought under control.

Finally, although *cristata* is just one more piece in the whole confused puzzle of *Genetta* taxonomy in Africa, it does seem important that the questions surrounding it are addressed in the light of the above threats. Should *Genetta cristata* turn out to be a distinct species, with limited and decreasing distribution, it would obviously be a higher priority for protection. In order to find answers to some of these questions more attention needs to be focussed upon not only its taxonomy, but its ecology and behaviour as well, so that conservation of these truly beautiful animals may be ensured.

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The European mink in France: past and present

Alain-Jacques BRAUN

Although already mentioned since at least the 16th century in Germany, our rarest mustelid, the European mink (*Mustela lutreola*) was only "discovered" in France in 1839 by Sélys-Longchamps. He stated that it was present in the Atlantic region without giving further details. Apparently, our native mink was commonly confused with the polecat (*M. putorius*), and this until the early 20th century. In fact, hunters and trappers used names such as "putois d'eau" or "putois de rivière" (water or river polecat), believing that the European mink was just a variety of the polecat, especially adapted to semi-aquatic life. French naturalists such as Pucheran (1861), Lataste (1884), Trouessart (1884), Gadeau de Kerville (1887), Anfrie (1896), Lapouge (1896), and Raspail (1896) began to study the European mink's distribution and status. According to these authors the species had a relatively wide range (Fig. 1) but some information is doubtful as no specimens were collected.

The scientific interest in *M. lutreola* faded away for a period of over 60 years until the works of van Bree & Saint-Girons (1966) and Chanudet & Saint-Girons (1981) which updated the distribution and taxonomic data (Fig. 2).

Two subspecies, *M. l. biedermanni* and *M. l. aremorica*, were described by Matschie (1912) as occurring in France, but Ellerman & Morrison-Scott (1966) made the latter synonymous with the former, and Youngman (1982) also recognised only *M. l. biedermanni*. Following studies on *M. vison* in Brittany, the author started a survey in 1985 of which part of the results was published in "An Action Plan for the Conservation of Mustelids and Viverrids" (Schreiber *et al.*, 1989). From all the data gathered it appears that the range of *M. lutreola* has become somewhat reduced in size during the last 60 years (Fig. 2.). Unfortunately the distribution map may not reflect the reality as data on population density and breeding success are lacking.

Analysis of some causes of decline

In the past (prior to 1970), the major causes were trapping and shooting although figures on these activities are scarce.

Lapouge (1896) stated that a fur-dealer in Rennes (Isles-et-Vilaine, Brittany) prepared over a hundred mink's pelts each winter. The same author wrote previously that the European mink was common in the districts of Rennes, Redon, and Vitré in Brittany. In Côtes-du-Nord, in the same province, a trapper captured over 2,000 European minks between 1930 and 1970. According to this source, the species was quite common, especially in the period 1930-1950, and was found in the same habitats as the otter: small rivers, ponds, and marshy areas (Quémener, pers. comm.). Mink-hunting, which lasted in Brittany until the 1960's, was largely done with the help of dogs and principally as a "by-product" of otter-hunting. All informants stressed the fact that otters and minks were using the same biotopes, sharing a common feature: a very dense riparian vegetal cover. They also noted a sharp decline in the number of captures during the late 1950's and early 1960's. This could be correlated to the increased use of agricultural pesticides, the extension of draining schemes, and river improvement works.

Pollution

Recent data concerning rivers frequented by *M. lutreola* are lacking. Mercury was found in three rivers in Morbihan,

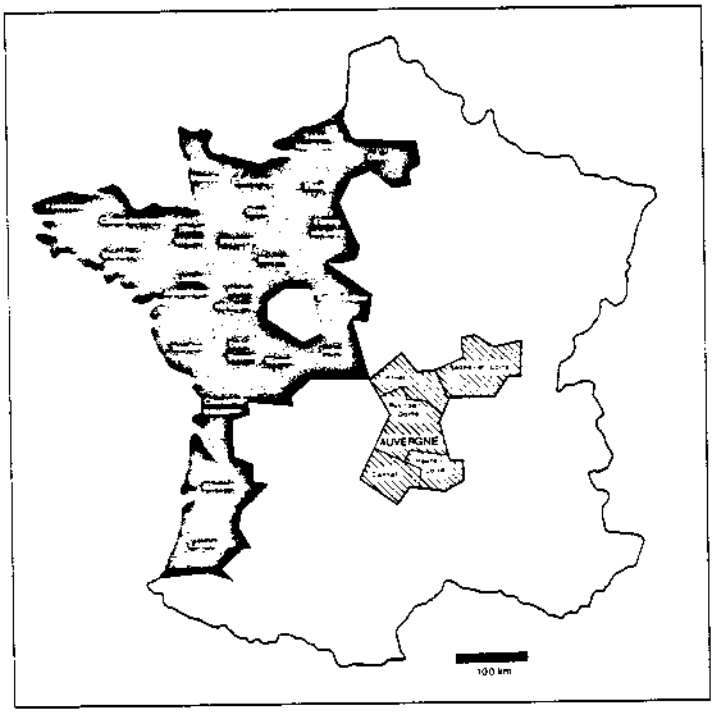

Fig. 1. Past distribution (until the early 1900's) of the European mink (*M. lutreola*) in France. Hatched parts indicate non-documented/non-authenticated regions. Maps after van Bree & Saint-Girons (1966) and Chanudet & Saint-Girons (1981).

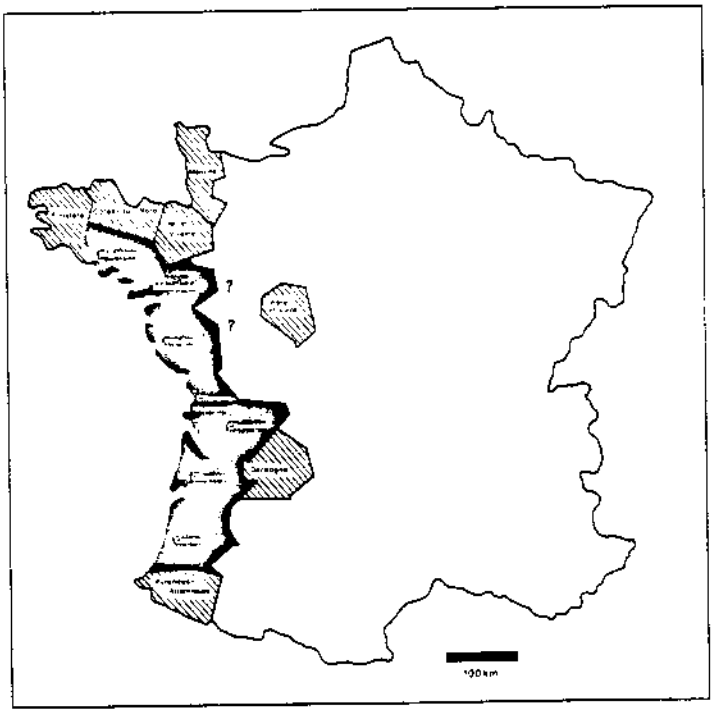

Fig. 2. Present distribution of the European mink (*Mustela lutreola*) in France. Hatched parts indicate regions where the mink is very scarce. Question-mark: possibly present but not authenticated.

Brittany, where the species was reported recently (Delattre, pers. comm.). Further research is needed.

Draining of wetlands for agricultural purposes

Draining of wetlands could be the most important threat. Mermet (1984) stated that there are between 3 and 10 million hectares which may be subject to drainage in the future and, within this total, there are probably around 600,000 ha of wetlands at risk. A study showed that about 40% of the coastal wetlands in Brittany have been lost over the last 20 years and 67% of the remaining area has been adversely affected by drainage or other activities. This obviously has some negative impact on wildlife. For example, the otter disappeared in the Redon area (Brittany) after 10,000 ha of wetlands were drained during the 1960's (Braun, 1986). Effects on *M. lutreola* are not known but we can suppose that drainage contributed (and still does) to reduce the species range.

River improvement

Too frequently, river improvement means disguised destruction of the river's ecological balance (canalization, reprofiling, removal of vegetation cover, etc.). Improvement works have affected, since 1980, more than 2000 km of rivers annually (Mermet, 1984). Their negative impact on otter populations has been proved, but nothing is known of the effect on *M. lutreola*.

Accidental trapping

Nowadays, in spite of legal protection, the European mink has to face new threats in addition to those mentioned above. The colonisation of European mink biotopes by exotic mammals, *Myocastor coypus*, *Ondatra zibethicus*, and *Mustela vison*, has led to more intensive eradication campaigns (pest control), by means of trapping and, in the case of *Myocastor*, poisoning. In Brittany, Braun (1987) estimated that between 1,000 and 1,500 American minks are killed annually as well as over 10,000 coypus and muskrats. In consequence, accidental captures of protected species such as the otter or European mink have increased during the past 10 years (Braun in Schreiber *et al.*, 1989; Braun, 1988 and unpubl.).

Jaw-type traps (steelgin traps) are used in France although legally the dents on the jaws should be removed. As this type of trap is not selective and causes injuries, it should be therefore totally banned. It must be pointed out that many trappers in Brittany are still using traps with dents, which are illegal and highly lethal. Moreover they are not checked at required times (daily) as required by trapping laws (Braun, 1988). Law enforcement in this matter is almost nihil, principally due to the small number of Game Officers, and sometimes also to laxity.

Road traffic mortality

This seems an important cause of mortality (12 recorded cases in Brittany from 1930 to 1986). Minks are often crossing roads near bridges instead of using the river passing under the road. Otters behave in a similar way. In Brittany, 45.5% of the otters found dead were killed by cars (Braun, 1987, 1988 and unpubl.). Some technical measures such as building a dry ledge (out of the water) under bridges which would allow the passage of minks and/or otters, should be taken urgently (Braun, 1987).

Interspecific competition

a. with *Lutra lutra:* While Heptner & Naumov (1974) reported that the otter greatly affects the European mink so that in areas where the otter increases, European mink populations decrease, no evidence of such an impact has been found in western Europe. This should be the focus for further research. In spite of our lack of knowledge, we may assume that there is some kind of competition in many areas of western France where the two species are sympatric, as food resources have been locally greatly depleted due to poor river management such as overfishing (especially of eels, one of the main components of the otter's diet) or water pollution.

b. with *Mustela vison:* According to Heptner & Naumov (1974), American mink is outcompeting European mink while more recent studies (Tumanov & Zverev, 1986) tend to prove that this is not the case. Schreiber *et al.* (1989) noted that the latter authors based their study on questionnaires obtained from hunters and wondered if the species were correctly identified. *M. vison* is largely restricted to Brittany where the greatest number of mink farms is located (the majority of them in Morbihan). Escapes from these farms have occurred since the 1960's and still go on (Braun, 1985). During the 1987 hurricane, about 12,000 minks escaped from one farm in Morbihan.

Competition between the two species is likely to occur as *M. vison* has virtually colonized the whole territory of Morbihan (excepting the islands), and is occupying all suitable biotopes from lowland rivers (eutrophic), oligotrophic streams, and marshes to coastal wetlands and seashores. The situation seems to be critical because of the sheer number of American minks compared to the highly fragmented and small population of European minks. Competition is bound to be in terms of exploitation of the same food resources and, most likely, also for territorial space. Moreover, due to its great ecological adaptability, the American mink will probably invade, in the near future, most of the remaining range of *M. lutreola*, spreading east- and southwards from Brittany, with perhaps the exception of the southernmost parts (Landes-Pyrénées region), where climatical conditions may act as a barrier. This expansion pattern has already been observed in northern Europe (Scandinavia, Finland, USSR, Great Britain).

The proliferation of *M. vison* with all its consequences will not be stopped by predator control schemes, especially when mink fur farms, in their majority, do not meet the official standards set for building safe, escape-proof enclosures, and therefore allow a perpetual flow of "immigrants" which continuously reinforces the local populations. Due to pressure from hunters, sport fishermen, and conservationists, some steps towards a more strict respect of construction standards have been made recently but these efforts should be extended to all mink farms in France.

According to a hypothesis formulated by Prof. Ternovsky (cited by Maran, 1988), who is breeding regularly *M. lutreola* and *M. vison*, males of *M. vison* can copulate earlier with female *M. lutreola* than can males of *M. lutreola*. Fertilisation does occur but the embryo is always resorbed before birth, so that every year some European mink females are unable to breed with their own

species partners. This would eventually result in the slow extinction of *M. lutreola*. If this is proved to be true, the future of our native mink is indeed in jeopardy and conservation measures would appear totally useless.

c. with *Mustela putorius:* According to a former mink\otter trapper from central Brittany (Lefranc, pers. comm.), European minks were rarely captured in areas where polecats were numerous (period 1940's-1950's). No other informants reported this fact. In many parts of Brittany, *M. putorius* seem to have declined sharply during the last 30 years (Braun, unpubl.). This aspect of interspecific competition should be studied in the future.

Identification problems

Among many hunters and trappers whom we contacted, confusion between *M. vison* and *M. lutreola* was frequent. Since the two species are now sympatric in several regions, the problem of correct identification has become very acute and the assessment of the present occurrence of European mink very difficult and complex. This problem has recently been reviewed by Linn & Birks (1989).

It is still commonly stated that *M. lutreola* can easily be identified in the field by the presence of a large white perilabial patch while white fur is never found on the upper lip of *M. vison*. Recent investigations in Great Britain (Linn & Birks, 1981; Birks & Linn, 1982) have shown that quite a large number of American minks (16.8% of 83 specimens) do have some white spots on their upper lip, varying in shape and size (Fig. 3). In 1989 they examined 35 *M. vison* skins from the British Museum's collection and originating from Great Britain, and they found that 16 of them (45.7%) showed some white on their upper lip.

In contrast to these results, out of a sample of 42 American minks, captured in a single area in Brittany, only one specimen (2.3%) showed a small white spot of about one cm^2 (Braun, unpubl.). In Estonia, Maran (pers. comm.) never found any American mink with white fur on its upper lip. As shown in van Bree & Saint-Girons (1966), some European minks can have quite small patches of white fur on their upper lip. We may conclude that both species can share very similar facial characteristics and that field observations must be substantiated by other evidence, that is: close examination of dead or live specimens which allows the taking of skeletal measurements (skull, tail vertebrae) and the observation of dental characteristics (Youngman, 1982).

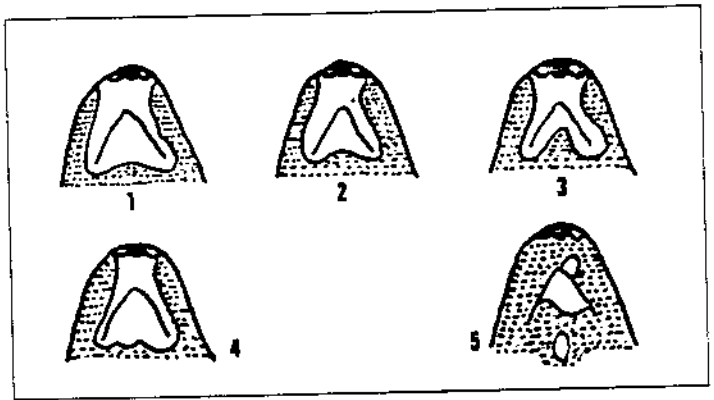

Fig. 3. Diagrammatic sketches of the white pattern of four European minks (road kills) from Brittany (1 to 4) and one atypical American mink from the same region (5). 1: from Callac, Côtes-du-Nord; 2 and 3: from Noyalo, Morbihan; 4: from Bubry, Morbihan; 5: from St-Avé, Morbihan.

In order to differentiate between the two species and to confirm the actual occurrence of *M. lutreola*, in particular in regions where it is sympatric with *M. vison*, it would be necessary to plan large trapping schemes (using only selective traps: cage traps) all over its supposed range, and also checking as many as possible American minks (in Brittany).

T. Maran (pers. comm.), who is breeding *M. lutreola* and *M. vison* at Tallinn Zoo, Estonia, noted that vocalizations may help differentiate the two species. For example, when expressing fear, *M. lutreola* emits a series of short screams while in *M. vison* it is a long whine. This may prove hardly helpful in field conditions as our own experience has shown that both species were usually silent.

Conservation of the European mink in France

Although protected since 1977 in France, the European mink has not benefited from any national conservation plan as has been the case of the otter. A meeting, under the auspices of the French Ministry of Environment was held in February 1990 (reported in Mustelid & Viverrid Conservation No.2, April 1990). In a first step it was decided to update data concerning the species distribution, using stricter criteria. The second step will be the preparation of a National Conservation Action Plan before the end of 1990. All the participants agreed that the major problem to be tackled in the near future is the unselective trapping and that legal action should be taken urgently to ban the use of steel-jaw traps. A second meeting was held 23 May 1990 (see below).

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Le Marh, 56370 Le Tour-du-Parc, France

Second meeting on the European mink in France 23 may 1990

Except for the absence of P. Migot, the meeting was attended by the participants of the first meeting, held 23 February, 1990 (see Newsletter No 2).

M.-C. Saint-Girons is in possession of the results of a study, comparing the morphology of three European mink populations, resp. in Charente, Bretagne, and the Landes. She also stated that the part of the "Encyclopedia of Carnivores of France", dedicated to the European mink will be published soon.

At the next meeting it is expected that the "Secrétariat Faune Flore" (S.F.F.) will furnish the results of the distribution of the mink for every municipality. Only data from 1970 on will be taken into account. A distribution map of the European mink in France is being prepared by H. Maurin.

The EEC is ready to help with a European Mink Programme, and funds from the French "Ministère de l'Environnement" should be available in 1991. Specific field work could be carried out in southwest France and the establishment of a captive group either in Mulhouse or in Nancy is planned. The captive group could also become the breeding group. Genetic tests could be carried out in Brest and the Natural History Mueseum of Nantes has agreed to collect the material.

On the occurrence of the Honey-badger (*Mellivora Capensis*) and the viverrids in the Ivory Coast

Bernd HOPPE-DOMINIK

Introduction

More than 90% of the rain forests in the Ivory Coast has fallen victim to logging and shifting cultivation. Even the remaining forest fragments, totalling three million hectares, are threatened (FAO/BANQUE MONDIALE, 1988). Following forestry roads, squatters continue to enter the classified forest reserves. There is only one virgin tract of rain forest left, the Tai National Park (3000 km^2), which is classified as a "World Heritage Site" and a "Biosphere Reserve". Well-organized gangs of poachers kill any game they can reach in this area. In addition, natural habitats in the Ivory Coast are affected by widespread soil erosion, and climate changes with more irregular rain fall and severe droughts in between. Bush fires penetrate into the rain forests, formerly supposed to be "inflammable".

We conducted a study on the status of larger mammals to assess their status, and to gain basic data for conservation strategies. From 1986 to 1989 we concentrated on pigmy hippopotamus, forest antelopes, forest elephants, and chimpanzees. At the suggestion of and with the support from Roland Wirth and the "Zoological Society for the Conservation of Species and Populations" we included viverrids in our programme, particularly the Liberian mongoose. This species was discovered in Liberia in 1957 only and it remains one of the most elusive viverrids, with hardly any information available on any of its biological aspects (Taylor, 1988). The IUCN Mustelid & Viverrid Specialist Group included it in its highest category of species threatened with extinction (Schreiber *et al.*, 1989).

Survey Methods

From September 1986 to December 1988 we systematically interviewed villagers throughout the Ivory Coast. We usually approached the village chiefs or their assistants, who subsequently assembled the village inhabitants. The exact aims of the interview were not explained to assure objectivity of response. People were shown illustrations of 75 larger mammals. Specifically, they were asked about the honey-badger, civet, palm civet, slender mongoose, marsh mongoose, cusimanse, and Liberian mongoose. In addition, we interviewed 37 scientists, hunters or conservation/forestry officials to confirm the data received. Searches

Table1: Occurrence of *Mellivora capensis* and Viverridae in protected areas in Ivory Coast.

Species	Areas									
	I.R. Nimba (1)	N.P. Peko (2)	N.P. Tai (3)	N.P. Azagny (4)	N.P. Banco (5)	N.P. Comoë (6)	N.P. Marahoue (7)	N.P. Sangbé (8)	Lamto (9)	Toumoudi (10)
Mellivora capensis		+(c)	?(d)			++(e)		+(g)	?(h)	
Civettictis civetta	+(a)	+(c)	++(d)	+(e)	+(c)	+(e)	+(f)	+(g)	++(h)	++(i)
Genetta thierryi						?(c)				
Genetta johnstoni	+(a)		?(d)							
Genetta pardina	+(a)		?(d)	+(e)		++(e)		+(g)	+(h)	+(i)
Genetta sp.		+(c)			+(c)					
Poiana richardsoni			?(d)					+(g)	?(h)	
Nandinia binotata	+(a)	+(c)	+(d)	?(e)	?(c)		++(f)	+(g)	++(h)	++(i)
Herpestes ichneumon			?(d)			+(e)	+(f)	+(g)		(+)(i)
Herpestes sanguineus		+(c)	?(d)			+(e)	+(f)	++(g)	++(h)	(+)(i)
Mungos mungo						+(e)				
Mungos gambianus						+(e)		+(g)	+(h)	(+)(i)
Crossarchus obscurus		+(c)	+(d)		+(c)	++(e)	+(f)	++(g)	++(h)	+(i)
Liberiictis kuhni			?(d)							
Ichneumia albicauda						++(e)		+(g)	+(h)	
Atilax paludinosus			+(d)	+(e)		+(e)		+(g)	+(h)	+(i)

++ = common
\+ = record available
(+) = rare
? = doubtful

N.P. = National Park
I.R. = International Reserve

(a) = Lamotte (1942)
(b) = Lamotte & Tranier (1983)
(c) = this study
(d) = Roth & Merz (1986)
(e) = Roth *et al.* (1979)
(f) = Hoppe-Dominik (1989)
(g) = Winner (1983)
(h) = Bourlière *et al.* (1974)
(i) = Hoppe-Dominik (in prep.)

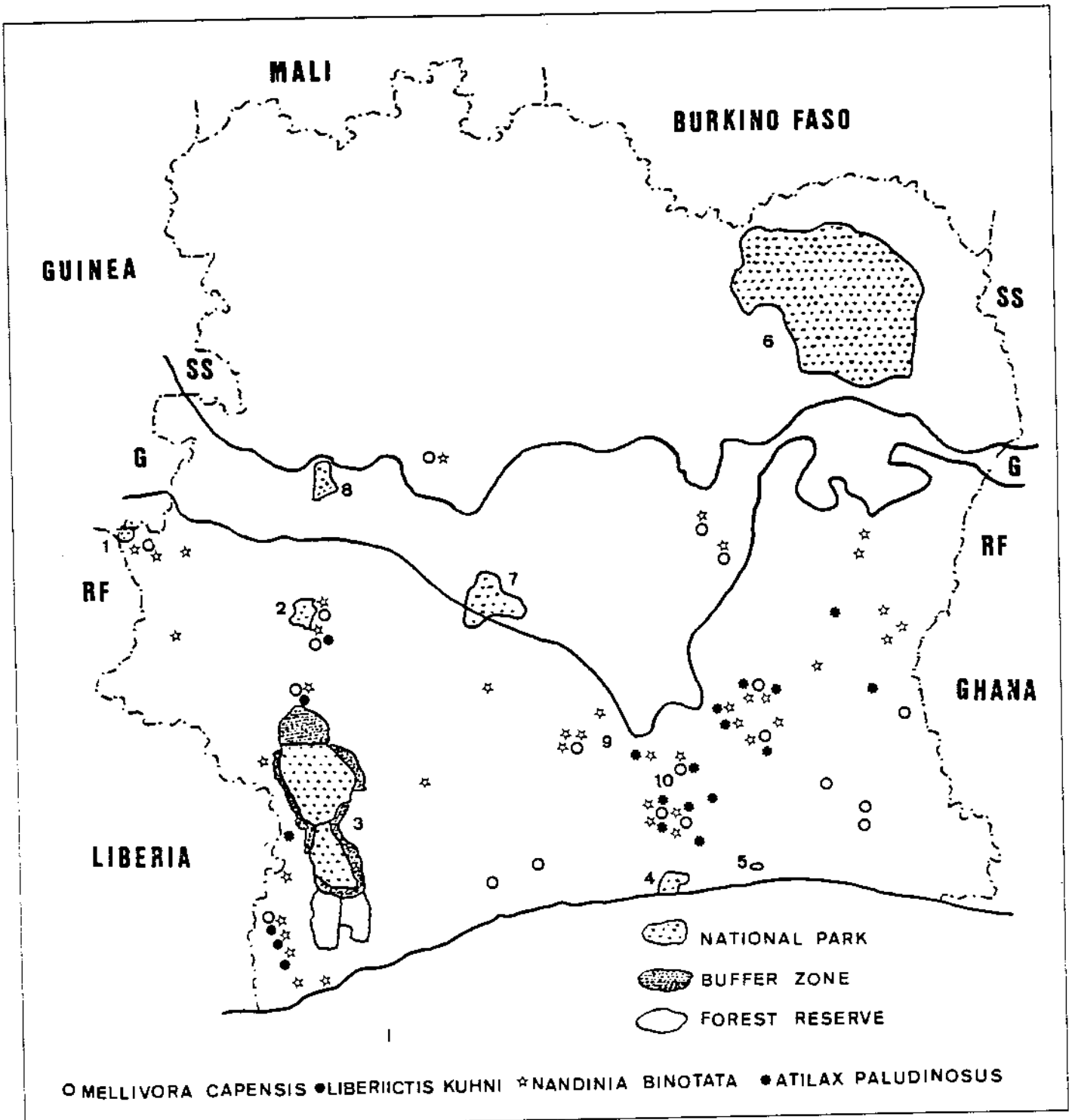

Fig. 1. Records of the honey-badger, Liberian mongoose, two-spotted palm civet, and marsh mongoose in Ivory Coast. The numbers designate the National Parks and other localities, and are explained in the table.

for marks or footprints of easily identifiable species, such as chimpanzee, elephant, pygmy hippo, bufallo, and bongo complemented the interviews.

Results

From the interviews alone no population estimates of the different species could be drawn, but comparing the data gave some evidence of the relative abundance of the various species.

From 131 interviews we concluded that genets (*Genetta sp.*) and civets occur in the surroundings of respectively 87% and 86% of all the villages. Slender mongooses (77%) and cusimanses (76%) are also widespread. Among the less common species were

the two-spotted palm civet (18%), the honey-badger (14%), the marsh mongoose (12%), and the Liberian mongoose (4%). Fig. 1. shows the distribution of the rarer species. The occurrence of all the recorded species is given in Tab. 1.

We concluded from an analysis of poaching incidences in the SW Ivory Coast that viverrids represented only 1.4% of all poached game. During the dry season of 1989 only 1.2% (64 animals) of all bush meat marketed at Toumodi consisted of viverrids (Total number of animals counted: 5,659. Fig. 1., No. 10). Prominent among these were the pardine genet (35%), followed by the civet (24%), the two-spotted palm civet (22%), the cusimanse (8%), while the marsh mongoose, the slender mongoose, the ichneumon, and the Gambian mongoose each represented less than 1%. Genets were predominantly hunted in the dry season (38 out of 56), and two-spotted palm civets in the rainy season (24 out of 29).

Occurrence, biology, and status of the recorded species

Honey-badger (*Mellivora capensis*)

The honey-badger is not confined to open savannahs, but also occurs throughout the rain forest zone, and there are confirmed records for Tai National Park. It is unknown whether its occurrence in the humid zone is due to the opening up of the rain forest by man, or if it is autochthonous. Agricultural development in the northern part of the Ivory Coast decreases suitable habitat, but we do not know to what extent this species may be threatened.

African civet (*Civettictis civetta*)

The African civet is quite able to adapt to changing habitat conditions and can be encountered throughout the Ivory Coast. It lives in closed forests, plantations, even close to human settlements, and can be spotted with relative ease (due to its use of characteristic defecation sites) on not-too-frequently used roads. In the rain forest and Guinean zones the species is abundant, but it is rare in the Sudan savannahs.

Fig. 2. Rare photograph of a Haussa genet (*Genetta thierryi*) in the flesh. The colour photograph shows the pale colour, the brown spots in longitudinal rows, and the typical reddish-brown colour dorsally on the first five of the dark tail-rings.

Haussa genet (*Genetta thierryi*)

The Haussa genet (Fig. 2) is widespread in the West African savannah zone in suitable dry habitats interspersed with bush and woodland. Its occurrence in Comoë National Park can be assumed, but its status is unknown.

Johnston's genet (*Genetta johnstoni*)

The natural history of this forest species is almost completely unknown. Single records are available from the I. R. Mont Nimba in the Ivory Coast, and from Liberia. We can assume its occurrence in Tai National Park, but know nothing on its status.

Genetta poensis

A forest species, its exact distribution, habitat requirements, and status are essentially unknown (Fig. 3). This form may also be a subspecies of *Genetta pardina*.

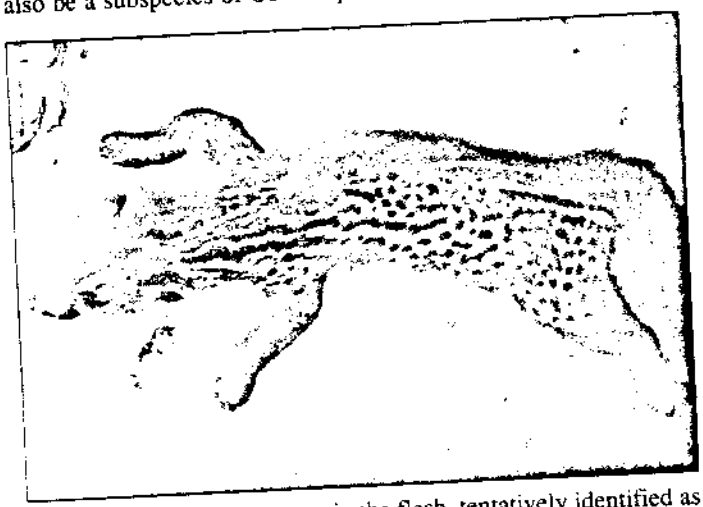

Fig. 3. Photograph of a genet in the flesh, tentatively identified as *Genetta poensis*.

Pardine genet (*Genetta pardina*)

Widely distributed in West Africa, occurring in a wide range of habitats, and in a mixed assortment of forms. Recorded from Comoë NP and Tai NP, as well as from agricultural areas. Status unknown, but in some places like Toumodi known.

African linsang (*Poiana richardsoni*)

Hardly anything is known on the lifestyle of this nocturnal rain forest dweller. There are two records from the ivory Coast: Sangbé NP and Gagnoa (Beaufort, 1965). According to Rosevear (1974), this species is very rare and locally distributed.

Two-spotted palm civet (*Nandinia binotata*)

An arboreal species found in the middle strata of tree crowns, but occasionally encountered when foraging on the forest floor. This species is badly affected by habitat destruction because it is dependent on closed forests. It is still widespread and we observed it frquently in Marahoue National Park during its crepuscular activities.

Ichneumon (*Herpestes ichneumon*)

A very adaptable species, ranging widely in Africa. Both

diurnal and crepuscular, it lives in the Ivory Coast in open forests and cultivated areas in moist and dry savannah. Status unknown.

Slender mongoose (*Herpestes sanguineus*)

Numerous and widespread in secondary vegetation in the rain forest zone, but not in closed forests. A solitary animal easily observed along roads near settlements, even in day time. The slender mongoose is persecuted as a chicken thief, but as a follower of human cultivation it succeeded to increase its habitat considerably during the last 30 years in the Ivory Coast (Aeschlimann, 1965).

Banded mongoose (*Mungos mungo*)

The banded mongoose lives in moist and dry savannahs, but confirmed records are limited to the Comoë National Park. Packs of some 30 animals can be met at day time. Status unknown but probably rare in the Ivory Coast.

Gambian mongoose (*Mungos gambianus*)

Ranges from the moist savannah to Comoë NP in areas of long-grass savannahs. It avoids closed forests. Status little known.

Cusimanse (*Crossarchus obscurus*)

The most common of the social mongooses and widespread in the Ivory Coast. It can be met in Tai NP, where packs counting 20 animals can be observed in day time in secondary growth and gallery forests in the savannah (Comoë NP). Cusimanses are also kept as pets. They occur in all the national parks of the Ivory Coast and are not at risk.

Liberian mongoose (*Liberiictis kuhni*)

We found only five records in the SW of the Ivory Coast. The species is specialized and said to be confined to habitats with sandy soils where it digs for worms. It seems to live in groups and is diurnal. We assume its occurrence in Tai and Peko National Parks but confirmed records are lacking.

White-tailed mongoose (*Ichneumia albicauda*)

A nocturnal mongoose widely ranging through the Sudan and Guinea savannahs. It prefers forest edges, broken country with extensive cover, but occurs also near human settlements. It forages singly or in pairs. Status largely unknown.

Marsh mongoose (*Atilax paludinosus*)

Confined to river and stream systems or swamps. Confirmed records are available from the Bandama, N'zi and middle Comoë Rivers. Due to wetland destruction and rice cultivation, the species seems to be threatened.

Discussion

Viverrids are the least known carnivores. The Liberian rain forest block is one of the global centres for viverrid endemism. Twelve species are found in the Ivory Coast, with 11 of them lacking precise data about their status. Four species only (African civet, two-spotted palm civet, cusimanse, and slender mongoose) are evidently not threatened. For the remaining, the most significant risks are habitat destruction due to agriculture and forestry, and poaching. Rain forest specialists like the Liberian mongoose and the African linsang are badly affected by transformation and use of primary forests, as is the Liberian mongoose, who is specialized for habitats with sandy soil. Hunting has a long tradition in the Ivory Coast and is practised intensively throughout the country, but its relevance to viverrids differs between regions. In the savannah zone larger wildlife is taken, and in the rain forest hunters focus on primates and forest antelopes. In the moist savannah, cane rats are prominent preys. Small, nocturnal, arboreal carnivores are of little interest to rain forest hunters, but viverrids are appreciated food in the moist savannah. In Toumodi, mongooses and civets obtain high prices.

Field studies adressing the ranges and status of the most threatened species are required to formulate conservation recommendations.

It is of special urgency to increase the protection of the national parks and forest reserves, in particular Tai National Park. It is of primary importance:

- to integrate the local human population into all conservation projects, and to offer possibilities for sustainable land use in the buffer zones.
- to promote conservation education
- to install clearer demarcations of the park- and reserve boundaries
- to increase the surveillance in order to stop illegal wood cutting, shifting cultivation, and poaching.

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Ökologische Station der Universität Würzburg, O. T. Fabrikschleichach, 8602 Rauhenebach, FRG.

News

from Jill D. Mellen...

At Washington Park Zoo (Portland, Oregon, USA) we have been planning a West African Exhibit including an exhibit for a species of viverrid native to West Africa. We have plans to acquire and maintain a group of cusimanse (*Crossarchus obscurus*). Further, we have contacted a number of other zoos interested in exhibiting this species so that we can work towards a self-sustaining captive population. While the cusimanse is not a particularly rare species, it will allow us to address some important needs outlined by IUCN: "to develop, increase, and exchange knowledge of captive management techniques".

We plan to conduct conservation-related research, systematically assessing the captive requirements for cusimanses. In addition to the exhibit space for cusimanses, we have planned to construct two off-exhibit areas for their propagation and for determining their captive requirements. (Some of the techniques I developed during my dissertation work on determining environmental requirements for captive small felids will be useful in this proposed cusimanse work).

The exhibition of cusimanses will address another need outlined by IUCN in that our interpretives will present a strong conservation theme to educate the general public about the plight of this interesting group of animals.

Should the establishment of a captive propagation program prove necessary as part of a conservation effort to preserve the similar, but very rare Liberian mongoose (*Liberiictis kuhni*), the Washington Park Zoo has made a long-term commitment to housing this species should captive "spaces" be needed for the establishment of a captive population (see John Carnio's proposal, Mustelid & Viverrid Conservation, April 1990).

Presently we are in the planning stages for construction of an off-exhibit Research and Propagation Facility for small mammals and birds. This area willprovide an ideal setting for not only housing viverrids, but also for carefully assessing their captive requirements.

Conservation Research Coordinator, Washington Park Zoo, 4001 SW Canyon Road, Portland, Oregon 97221-2799, USA

from Fred Swengel...

Two people I talked to in southern India were familiar with the Nilgiri marten (*Martes gwatkinsi*). Mr. Changappa, chairman of the High Range Wildlife Preservation Association, saw Nilgiri martens while he was the manager of the Kadalaar tea estate in the early 1980's. He felt that there were not more than about four on the estate at the time. Kadalaar is about 5 km northwest of Munnar and about 8 km southwest of Eravikulam National Park. A knowledgeable forest officer stated that they also occur in Chinnar Wildlife Sanctuary, a 90 km^2 reserve that borders Eravikulam on the east and Anamalai on the south.

425 S. Warwick, St. Paul, MN 55105, USA

from T. W. Hoffmann...

Regarding the Golden palm civet, *Paradoxurus zeylonensis*, new evidence about the distribution of this species has come to light. It is present and presumably fairly common in the Uda Walawe National Park where it was caught in traps, baited with bananas in the course of a small mammal survey by P. B. Karunaratne. It is also found in the wider Samanalawewa area which lies exactly north of Uda Walawe on an elevated plateau. It is likely to occur in most of the remaining forests, be they in the dry or wet zone, but due to its secretive, nocturnal and arboreal habits, scientific evidence of its distribution can only be obtained through systematic trapping.

P. O. Box 11, Colombo, Sri Lanka

from John Carnio...

As an update to our report on the proposed "Liberian mongoose Research" (Mustelid & Viverrid Conservation 2, April 1990), please be advised that the research has been postponed because of unrest in the area of Liberia that we were going to. Once the fighting has stopped and the area is again safe, we plan to proceed with the project.

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Phototrapping Honey badgers

Merav BEN-DAVID

The Honey badger (*Mellivora capensis wilsoni*) is one of the rarest carnivores in Israel. Although individuals were collected from the Arava valley (south of the Dead Sea), to the Lebanese border (in the north), the distribution seems to be fragmented (Fig. 1). The species has a distribution which extends far beyond the African Continent through the Middle East to India, but the honey badger is nowhere common and in many parts considered rare (Smithers, 1983).

Very little is known on the ecology and behaviour of the species in Israel. Most of the information comes from occasional encounters in the field and observations on a breeding colony in captivity at Tel-Aviv University (Mendelssohn & Yom-Tov, 1987). These observations revealed that the honey badger is not only a very strong animal with high ability of manual manipulation, but also an animal with impressive cognitive ability. Opening and closing the water tab in their cage, on hot days, is a regular behaviour performed by the honey badgers. The same goes for rolling sleeping boxes underneath hanging food and climbing on top to take it. Such behaviour demonstrates the special characteristics of the honey badger which makes it an excellent partner for the Honey-guide (*Indicator indicator*) (Short *et al.*, 1988), and a great harassment to bee-keepers.

For many years, bee-keepers have complained about damage caused to their bee-hives by badgers. All complaints come from one area - Lachish (A in fig. 1) - where both European badgers (*Meles meles*) and honey badgers co-exist (Mendelssohn & Yom-Tov, 1987). On one occasion three male honey badgers were illegally poisoned near a hive by a bee-keeper. This suggests that honey badgers are responsible for the impairment, but the bee-keepers insist that both species destroy the wooden bee-hives. It seemed that honey badgers attack the hives mainly in autumn and winter, when the bees are less active, while the European badgers attack the hives all year around. The bee-keepers report that the honey badger eats very little honey each time, but that the European badger eats large quantities of honey as well as the bee larvae. On the other hand, the European badger breaks very few hives at one time, whereas the honey badger rolls over and breaks as many as 15 hives in one attack.

These reports of European badgers damaging bee-hives are the only ones in the whole area of their distribution in Israel. In other areas, European badgers have broken in wooden traps set out for Marbled polecats, and eaten the bait, but in the same areas never harmed the wooden bee-hives. Therefore it was interesting for me to determine the species of badger causing the damage.

In mid-October 1989 I was informed about damage to bee-hives in Lachish. In order to identify the intruder, a honey plate was put out as bait for five consecutive nights. The honey plates were checked every morning. Since it is very difficult to distinguish between paw-prints of the two species, and since the plates were eaten completely (including the larvae), and no further damage was caused to the bee-hives, it was thought that the damage was caused by a European badger.

On the sixth night a Kodak VR35 camera was set following Joslin's phototrapping technique with few modifications: instead of a mechanic-shutter camera, an automatic-shutter camera with a built-in flash was used. A metal lever was glued to the shutter button and tied with a thin fishing thread (No 8) to the honey plate. The camera was set one and a half metres away from the bait at a height of half a meter above ground.

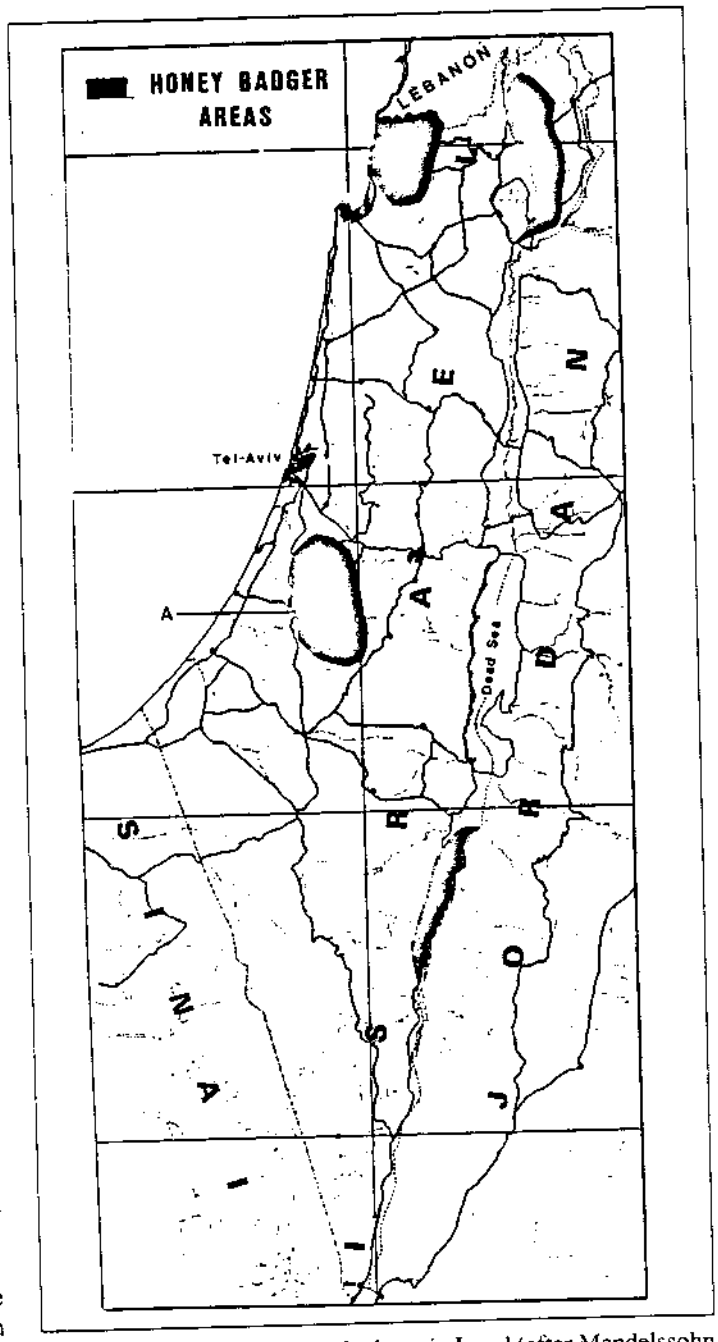

Fig. 1. Distribution of Honey badgers in Israel (after Mendelssohn & Yom-Tov, 1987). A = Lachish area.

On the seventh night (the night after the camera was set), a picture was taken, the camera was pulled off the post it was tied to, the lever was broken off the camera, and the fishing thread was chewed on. Developing the film revealed that the intruder was a female honey badger (Fig. 2).

This finding suggests that what seemed to the farmers as different behaviour of two different species, could be individual differences in one species - the honey badger. The disparities in the feeding behaviour (the annual period, the quantity of honey eaten, the eating of larvae, etc.), might reflect a variation between males and females in the honey badger population, as was seen in the Kalahari by Kruuk & Mills (1982). While tracking honey badgers for two months Kruuk and Mills were able to show a probable difference in foraging- and feeding behaviour between males and females.

Further studies are bound to reveal more intriguing information on the biology, ecology, and behaviour of this special and rare mustelid.

Acknowledgments
I wish to thank the bee-keepers in Israel for their cooperation, especially Na'aman and Arnon Dag. Many thanks to Paul Joslin for teaching me the "Phototrapping technique" in Rome.

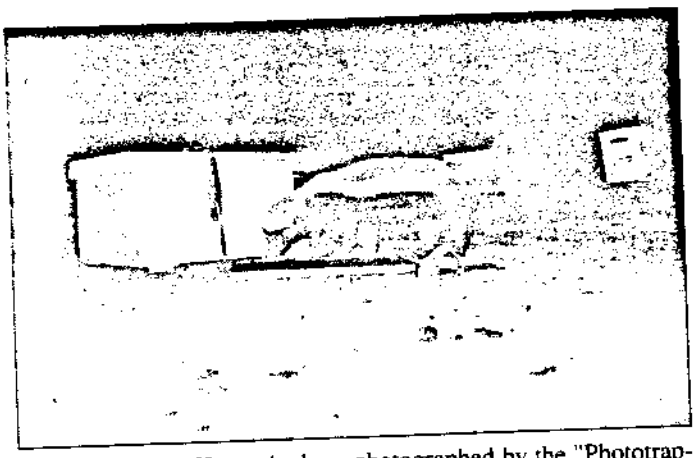

Fig. 2. A female Honey badger, photographed by the "Phototrapping technique" in Lachish area, Israel. The bee-hive on the left is a typical bee-hive used by Israeli farmers. In Lachish area the bee-hives are usually tied to the ground in order to prevent the badgers from overthrowing and dismantling them. Usually the tying method must be changed every few months, when the badgers learn how to overcome the new method.

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Recent evidence of the Brown palm vivet, *Paradoxurus jerdoni*, from Silent Valley National Park, India

K. K. RAMACHANDRAN

During an animal census in March 1988 in Silent Valley National Park, part of a carcass of a civet-like specimen was obtained.

The rump region with some bones along with the tail, which was in intact condition, were recovered. The animal is likely to be the Brown palm civet, *Paradoxurus jerdoni*. Even though the Silent Valley area comes within the known range of this species there is no recent record of the brown palm civet from this locality. The tail is 50 cm in length and is brownish grey (colour code 6F8 of Kornerup & Wanscher, 1989) throughout except for a distinct two cm long reddish golden (colour code 6C7) tip. The tail is about 2.3 cm in diameter including the hair.

A recent publication by Schreiber *et al.* (1989) indicated that there could be one or two races of *Paradoxurus jerdoni* in the evergreen areas of Silent Valley, Anaimalai, and similar areas, and it also reported that this endemic civet is described from 40 museum specimens.

Discussion with Dr. Ajith Kumar (Wildlife Institute of India, Dehra Dun) and comparison with the photograph of a preserved specimen in the museum in Bombey also confirmed that the carcass of the civet obtained from Silent Valley NP was that of a *Paradoxurus jerdoni*.

Location of the area where the carcass was found is between 11°07' and 11°10' N latitude, and between 76°25' and 76°30' E longitude. Altitude of the locality ranges from about 1000 m to 2000 m ASL, which is evergreen forest. Since this species is nocturnal and very shy it is not being readily observed by people.

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The conservation status of mustelids and viverrids in Southern Africa

Chris T. STUART

Of the five species of mustelids and 16 species of viverrids known to occur in Southern Africa (defined here as being south of the Cunene and Zambezi Rivers) none are considered to be endangered, although several are rare, or so poorly known that their current status is difficult to ascertain.

Only one species, *Galerella pulverulenta*, is endemic to the region but it is widespread and common within its range. Two species, *Cynictis penicillata* and *Suricata suricatta*, occur only marginally outside the region in south-western Angola.

In the case of *Rhynchogale melleri* and *Bdeogale crassicauda*, both species have very limited distributional ranges within the region and require urgent surveys to establish exact ranges and habitat requirements. Likewise, *Paracynictis selousi*, although more widespread within the north-eastern sector of the region is nowhere common and its lifestyle is poorly understood. *Nandinia binotata* has a very limited distribution in the forested areas of eastern Zimbabwe and the adjoining sector of Mozambique and its continued survival here will depend on the continued protection of this vegetation type.

Although all other species occurring in the region can be considered secure at present, a number of threats to their survival on a localised basis can be identified. A number of species are recognised as potential disease carriers, notably rabies, and these are *Suricata suricatta* and *Cynictis penicillata*. Although no specific programmes are aimed at their control, this is a possibility in the future and would almost certainly involve the use of non-selective poisons. A number of species, such as the genets, *Mellivora capensis*, *Aonyx capensis*, and *Atilax paludinosus* are frequently targeted by farmers for control because of their occasional predation on small domestic stock and poultry. However, at this stage only *M. capensis* seems to have been significantly reduced in some area by these programmes. Of more concern is the generalised application of non-selective problem animal control programmes, particularly in South Africa, which frequently has an adverse effect on certain non-target species. Unfortunately, no detailed assessment of impact has been undertaken in the region but species most frequently killed in Cape Province, South Africa, are *Galerella pulverulenta*, *Cynictis penicillata*, *Atilax paludinosus*, and the two genet species. There is an urgent need to assess the role of these non-selective methods on the overall health of all carnivore populations.

In the case of *Lutra maculicollis* the major factor influencing its well being would appear to be the changing water quality in a number of river systems. Being principally a "sight hunter" this otter is largely dependent on clear water. Agricultural mismanagement has resulted in a number of rivers having high siltloads and therefore greatly reduced visibility. This factor would appear to have had a detrimental effect on the populations of this otter occurring in the Cape Province.

In summary it can be accepted that none of the mustelids and viverrids occurring in Southern Africa are endangered but several species have very limited distributions within the region and can be classified as rare. Although most species have extensive distributions in the sub-continent the continued use of non-selective problem animal control methods, particularly in South Africa and southern Namibia, could lead to considerable depletion of numbers of small carnivores on a localised basis. The southern African region is home to 50% of all the viverrid species occurring on the African continent and 45% of all mustelids.

Any individual,or institution, requiring additional information on the viverrids and mustelids of Southern Africa is welcome to contact the African Carnivore Survey.

List of the 5 species of mustelids and 16 species of viverrids known to occur in Southern Africa:

Mustelids

Aonyx capensis - Cape clawless otter
Lutra maculicollis - Spotted-necked otter
Poecilogale albinucha - Striped weasel
Ictonyx striatus - Striped polecat
Mellivora capensis - Honey badger

Viverrids

Mungos mungo - Banded mongoose
Rhynchogale melleri - Meller's mongoose
Bdeogale crassicauda - Bushy-tailed mongoose
Paracynictis selousi - Selous' mongoose
Galerella pulverulenta - Small grey mongoose
Galerella sanguinea- Slender mongoose
Herpestes ichneumon - Large grey mongoose
Atilax paludinosus - Water mongoose
Helogale parvula - Dwarf mongoose
Ichneumia albicauda - White-tailed mongoose
Cynictis penicillata - Yellow mongoose
Suricata suricatta - Suricate
Genetta genetta - Small-spotted genet
Genetta tigrina - Large-spotted genet
Civettictis civetta - African civet
Nandinia binotata - Two-spotted palm civet

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Mongooses of Arabia

A. D. Alkhalili

Introduction

The definition of Arabia here includes all parts of the Arabian peninsula (Saudi Arabia, Kuwait, Bahrain, Qatar, United Arab Emirates, Sultanate of Oman, and the two Yemens). It also includes southern parts of Iraq, Jordan, and Palestine.

Because Arabia is a unique zoogeographical region which represents a meeting point of three main zoogeographical zones, namely the Palaearctic, the Indomalayan, and the Africotropical, its fauna and flora are affected by animals and plants of these zones. Moreover, Arabia has some of its own endemic species of animals and plants.

However, Arabia originally is not a home for viverrids and all the species present in Arabia today descended from the Indomalayan or Africotropical realm by means of introduction or through some land bridges existing before the formation of the strait of Hormoz in the southern Arabian Gulf or the Bab Al-Mandib southern of the Red Sea. The mustelids of the mountainous regions of Iraq, Syria, and Lebanon are elements from the Palaearctic realm.

Distribution

The distribution of some of the viverrid species is limited to the lands near the sea coast where dense palm tree plantations occur in Bahrain, eastern province of Saudi Arabia, and parts of Oman and the United Arab Emirates. Other species prefer the highlands of the two Yemens and south-western Saudi Arabia. In general, their population numbers are not very high, except in some parts of Bahrain where they increased in number occasionally and caused some damage to farms and plantations on a limited scale.

The Arabian mongoose species are: the Indian grey mongoose (*Herpestes edwardsi*), the Small Indian mongoose (*Herpestes auropunctatus*), and the White-tailed mongoose (*Ichneumia albicauda*).

Because this group of mammals has no ethnic or economic importance and because the number of specialists in this region is quite few, this group (as some other groups like rodents and bats) has not been studied in depth. All the available information on their occurrence in Arabia comes from direct observation or from road-kills.

No detailed or long-term studies on the reproductive biology, behaviour or ecology of these animals have been conducted except for those of Al-Khalili (1984, 1988). It was possible to see some local people raise some young mongooses for keeping them as pets in their houses to control rats and mice in their living area, since these animals are easily tamed.

It was also possible to see naturalized specimens in the markets and in some pet shops. These involved Indian grey mongooses in showy and frightening poses, fighting Indian cobras and mostly originating from India and Pakistan.

The most common species in the region is *Herpestes edwardsi* followed by *Ichneumia albicauda*. The rarest species is *Herpestes auropunctatus*.

Arabian mongooses are not able to penetrate the drier parts of the region although there were some reports on the occurrence of the white-tailed mongoose in the Wahiba Sands and Jidat Al-Harrasses of Oman (M. Gallagher, pers. comm.; W. Büttikar, pers. comm.).

Biology and Ecology

From the long-term studies and observation of the mongooses in Bahrain it was possible to draw a good picture of their behaviour, feeding habits, postembryonic development, and other ecological aspects of the animals.

It has been noticed that the animals breed the year around with a high peak during February-June. The female usually has twins. They look helpless, have closed eyes, and are hairless. After three to four days the young open their eyes and the hair appears soon after. Average body weight of a one-day old Indian grey mongoose is 22 g and the total body length is 12.5 cm. The young suckle for about two weeks but are gradually weaned after a month, when they will eat almost any suitable offered food: eggs, minced meat, dead lizards, live insects, bread, etc. The young achieve the appearance and size of the adults between six and seven months and are able to breed when one year old.

The female is very aggressive during the breeding season and is liable to attack any intruder. The animals can form a family group staying together for many years. They may live in a hole in the trunk of a dead palm tree, in a den or in a nest of twigs and leaves in dense bushes. They do not tend to dig their own burrows but may use these of other animals such as hares and spiny-tailed lizards. In general, males are one and a half times as large as females, and many observers have taken an adult female Indian grey mongoose for a small Indian mongoose (*H. auropunctatus*). It proved possible to capture the two species in the same area in Bahrain, even though the latter has been found alone in Kuwait and southern Iraq.

No authentic report has confirmed the occurrence of mongooses in Qatar (Nader, pers. comm.), but there are many rumours of its occurrence in that part of Arabia by local people.

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For further references on Arabian mongooses following scientists may be contacted:

- Dr. M. M. Al-Safadi, P.O.Box 392, University of Sanáa, Yemen Arab Republic
- Prof. I. A. Nader, National Commission for Wildlife Conservation and Management, P.O.Box 61681, Riyadh 11575, Saudi Arabia.
- Dr. D. L. Harrison, Bower Wood House, St. Botolph's Road, Seven Oaks, Kent TN13 3AQ, UK.
- Mr. M. Gallagher, Oman Natural History Museum, P.O.Box 668, Muscat, Oman.
- Prof. W. Büttikar, Lanzenberg, 21, 4312 Magden, Switserland.
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The Eurasian badger: status and legislative protection

M. HANCOX

The Eurasian badger (*Meles meles L.*) is not an endagered species over most of its Palaearctic range, although human pressures via habitat impairment or loss, road mortality, and deliberate persecution continue to reduce population numbers locally to well below carrying capacity. Badger numbers on the Wytham Estate near Oxford more than doubled with the cessation of 'vermin' control when it ceased to be a shooting estate (Anderson & Trewhella, 1985). Attempts to control the European rabies epizootic from the early 1960's decimated badger populations, particularly in parts of Belgium, Denmark, France, Liechtenstein, Luxemburg, Switserland, and West Germany, but the gassing campaign had little effect on the spread of the primary Red fox vector. An oral vaccination programme is proving more effective, and badger populations have gradually recovered in many areas. Captive-bred releases and translocations may be a valuable adjunct to conservation, although settling the stock in abandoned or artificial setts must be a lengthy and thorough process, otherwise, as shown by telemetry, badgers may relocate considerable distances and face traffic and other hazards in unfamiliar country (S. Harris, pers.-comm.; Hancox, 1989; Wiertz & Vinck, 1986).

Such disease-related annihilation of populations, coupled with the recommendations of the 1979 'Bern Convention of European Wildlife and Natural Habitats' furthered moves towards better legal protection for badgers. However, the need for improved laws and their better enforcement varies considerably according to area and local status: -badgers are probably naturally rare in the drier areas of for example Spain and the Middle East (first record from Iracq only in 1937). Whereas in more temperate earthworm-rich northerly areas, such as Finland and the USSR, populations may withstand the cropping of many thousands annually for their pelts and meat (witness two human cases of trichinosis in Russia recently). Several thousand badgers a year were recorded in hunting bag statistics during the 1960's and 1970's for e. g. Austria, Czechoslovakia, Denmark, Japan, Switserland, and East Germany. Illegal hunting and badger digging with terriers or dachshunds is still a problem in parts of Great Britain, West Germany, and elsewhere (Griffiths *et al.*, 1990).

As far as can be ascertained, badger protective legislation ranges variously from: A. None; B. With a closed hunting season (for shooting, or a longer period for digging in France: mostly covering the December-June cub rearing season); C. Full protection, but this does not however protect setts from disturbance by fox hunts or land developers, despite recent attempts to formalise sett protection in Great Britain (June 1990) and Holland. The debate on whether to protect a species or its habitat may lead to rather arbitary 'political' decisions as to whether a species is 'endangered' or not: the British Wildlife and Countryside Act 1981 protects Schedule 5 Great Newt ponds and Otter holts, but not Schedule 6 badger setts (Beebe, 1988).

Badgers may hence be afforded some protection (it is believed, more data needed):
C. Fully protected: Belgium (since 1974), East Germany, Great Britain (1911 Protection of Animals Act; 1973 Badgers Act; 1981 & 1985 Wildlife & Countryside Act), Holland (since 1948), Israel, Italy (since 1977), Luxemburg, Poland, Southern Ireland (Wildlife Act 1976), Switserland (Geneva canton).
B. Protected via closed season: Austria, Bulgaria, Czechoslovakia (limited only?), Denmark (Game Act 1967), France (some departments), Hungary, Japan, Liechtenstein, Norway, Portugal, Spain (probably?), Sweden, Switserland, Turkey, USSR, FRG.
A. No protection: Albania (?), China (?), Finland, France (part), Greece, Romania, Yugoslavia.

The legal situation in some Middle Eastern countries and the south of Asia remains unclear. Some island populations may be very precarious, although little is known of their status: those of Sardina and Sicily, and the island subspecies on Crete (*arcalus*), Rhodes (*rhodius*), the Balearics (Majorca, *marianensis* ?). Seemingly badgers never reached Corsica, Cyprus, Malta; nor the Channel Islands, Isle of Man, Orkney, Shetlands, Hebrides, or Iceland. Badgers apparently introduced to some Scottish islands, may survive on Arran and Seil Island; more doubtfully on Bute, Holy Island, Mull; but soon died out on Ailsa Craig, and Jura.

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Preliminary survey of the Malabar civet & the Brown palm civet

A three-month survey of the Malabar civet (*Viverra civettina*) and the Brown palm civet (*Paradoxurus jerdoni*) was conducted by N. V. Ashraf Kunhunu in the Western Ghats of southwest India. The survey was initiated by the "IUCN/SSC Mustelid & Viverrid Specialist Group", conducted by the "Wildlife Institute of India" under the supervision of A. J. T. Johnsingh, and funded by the "Zoological Society for the Conservation of Species and Populations", München, Germany.
Its aims were: (1) to assess the status of the surviving populations of both species and their conservation requirements in selected areas of the Western Ghats; (2) to gather information on their ecology and habitat preferences; and (3) to assess the feasibility of a long term study on the ecology of both species.

The Malabar civet

During the last 50 years there have been only two possible sightings of this species, one in Kudremukh in Karnataka by K. U. Karanth, the other in Tiruvella in Kerala by G. U. Kurup. Listed "possibly extinct" in the IUCN Mammal Red Data Book (1978), the Malabar civet was rediscovered in Elayur, Malappuram district, Kerala, South Malabar in 1987.

The 600 km² Kudremukh NP in Karnataka was selected as a survey area because it is the only protected area from where a ossible sighting of the Malabar civet was reported and also because its evergreen forests fall within the limits of the distribution of the northern subspecies of the brown palm civet (*P. j. caniscus*). Unfortunately little field work could be carried out here because of unexpected torrential rains. The survey was chiefly carried out in the districts of Malappuram, Calicut, and Palghat.

A three-month survey being too short to employ live-traps and camera-traps, other surveying methods were used. Interviews with Forest Department staff, tribals, native hunters, Ayurvedic physicians, civet-rearers, and trappers were held, and brochures with pictures of the animals were distributed. Spotlight-transects were made both by jeep and on foot. Though attempts were made to sample each vegetation type, cashew thickets especially were intensively surveyed.

No Malabar civets were sighted and ca. 90% of the interviewed persons were not aware of the "Jawad", local name of the Malabar civet. In Kudremukh NP none of the six hunters interviewed recognized the Malabar civet, but out of 22 areas surveyed in parts of South Malabar, seven areas had seen one or two specimens in captivity during the past 30 years. The animals were kept for the 'civet', a glandular substance used in Ayurvedic medicine for thoracic ailments but also used for flavoring 'beedies' (cigarettes). Literature references and the fact that during the survey two skins were identified in Poongode (near Wandoor, Kerala) strengthen the view that the Malabar civet is largely an inhabitant of the coastal lowlands of the Western Ghats.

ECOLOGY

Coastal Kerala has no protected areas and the natural forests have disappeared everywhere except for a few scattered pockets of privately owned "lowland moist deciduous forest" in coastal Malabar and Travancore. The drier hill tops and upper slopes have mostly cashew-, rubber-, and sometimes coconut plantations; the lower moist slopes have betel palms; and the valleys are dominated by paddy fields and sometimes coconut. The cashew thickets with their undisturbed growth of dense shrubs and grasses may well be a "refuge" and cover for a terrestrial species like the Malabar civet rather than their preferred habitat. The fact that most of their captures in the last 30 years have been in the valleys, around riparian areas, suggests their possible dependence on shallow water courses to which they come down from the cashew thickets at night. They are known to have specific defecation sites ('civetries') and have been observed mostly alone or in small parties of two to four animals. Stomach contents of the two Poongode specimens were reported to consist of parts of frogs and fishes. One trapped specimen was also a suspected fish raider. In captivity, they are reported to thrive on meat, fish, milk, and fruits.

THREATS

The survey shows that the Malabar civet has disappeared from most of its known range in Kerala, human disturbance, habitat destruction and fragmentation, and hunting and trapping being the main causes.

Cashew plantations which probably hold most of the surviving populations of the Malabar civet are now threatened due to large scale clearance for planting rubber or coconut. Consequently the civets are flushed out and killed. The few that escape into adjoining undisturbed areas are usually killed during weeding operations among rubber saplings. When the rubber trees reach their full growth, the dense canopy prevents the growth of shrubs and grasses, essential as cover for the terrestrial Malabar civet, thus rendering the habitat unsuitable.

In most of the surveyed villages in Kerala hunting is not selective and Malabar civets are killed whenever encountered. Some of them are hunted by dogs, who are reported to become excited by the civet-scent and are also easily provoked by the civet's fierce respose. The captures are also done manually or by trapping or shooting.

CONCLUSION AND RECOMMENDATIONS

Isolated populations still survive in less disturbed thickets on hillocks and gentle slopes of South Malabar in Kerala, but they are seriously threatened and the Malabar civet is to be considered as a vanishing species, unable to adapt to human disturbance.

As conservation measures, like the creation of protected areas, are not feasable in these thickly populated areas it is strongly recommended that enough specimens be captured to start a captive breeding programme.

The present geographic range of the Malabar civet is poorly known. As the present survey was carried out in parts of South Malabar, a similar investigation in North Malabar, Travancore, and the remaining parts of South Malabar (coastal Western Ghats) for a period of one year is essential in order to: (1) locate more surviving populations; (2) create awareness among the local people about the conservation values of the species which is completely lacking; (4) understand the distribution pattern in the coastal Ghats; and (4) identify relict patches of natural vegetation, if any, for conservation.

Especially a survey of two proposed sanctuaries: Kurathimalai and Ponmudi in Kerala, as well as of the Palghat gap (Valayar area), using live-traps, camera-traps, and spotlights, is essential.

Seven major conservation units have also been recognized in the Western Ghat Mountains. Surveys in one or two protected areas in each of these conservation units might demand 20 to 25 months but would be essential to a. o. confirm the existance of the Malabar civet in protected areas.

Of utmost importance would also be an assessment of the impact of human disturbances on the isolated populations of Malabar civets in Kerala. Also the effect of pesticides in the food (fish, frogs), habitat requirements, feeding ecology, movement pattern, and social organisation could only be studied if specimens were radio-collared.

The Brown palm civet

Unlike the Malabar civet, the brown palm civet is known to occur in at least two of the protected areas of the Western Ghats. Most of the museum specimen were obtained from elevated moist forest tracts. Two subspecies are recognized: *P. j. jerdoni* from Palni, Anaimalai, Wynad, Nilgiri, and Travancore, and *P. j. caniscus* from Coorg.

In recent years several sightings have been noted: one each in 1983 and 1990 by A. Kumar, and one in 1976 by Davidar in Coonoor, Tamil Nadu.

The 987 km² Indira Gandhi WS and Kudremukh NP were selected as survey areas. Because of the arboreal habits of the brown palm civet small temporary wooden platforms were erected as vantage points for overnight observation. These were restricted to locations with fruiting trees or natural water points in the Indira Gandhi WS. In addition to 64 hs of watchtower observation the sanctuary was also transected by jeep and on foot but no evidence of the brown palm civet could be gathered. Little information could be obtained from the people living in Anaimalai and Kudremukh, as they are, in general, not active in hunting.

ECOLOGY

It is not certain if this species is restricted to evergreen forests. It has been reported from the same localities as the Common palm civet (*Paradoxurus hermaphroditus*), but unlike the latter it has not been observed near coffee- or tea plantations and adaptibility to habitat disturbances is likely to major difference between the two species.

THREATS

Unlike the Malabar civet, the habitat of the brown palm civet is not immediately threatened but the species has probably disappeared from localities like Ooty, Coonoor, Wellington, and Kodiakanal due to development programmes. Mining activities in Kudremukh and large scale plantations of coffee, cardamon, and tea in and around these protected areas have vastly depleted the forest cover. Hunting is unlikely to be a major threat.

CONCLUSION AND RECOMMENDATIONS

No evidence of the presence of the brown palm civet could be gathered during the survey at Anaimalais, but the species, being nocturnal and probably largely arboreal, may have been unnoticed by the local villagers who rarely venture into the forests at night. As the animal has been reported from elevated tracts of the Western Ghats where there are about 25 protected areas in its distribution range, it is not considered immediately threatened, but various development activities might threaten its survival in the future.

Surveys in one or two of the protected areas of the Western Ghats are necessary to (1) determine the distribution range and describe the geographic variation of the brown palm civet; (2) assess the relative abundance of the common- and brown palm civets and of the Nilgiri Marten (*Martes gwatkinsi*).

N. V. Ashraf Kunhunu. 1990. A preliminary survey of the two endangered viverrids of Western Ghats: Malabar civet (*Viverra civettina*) and Brown palm civet (*Paradoxurus jerdoni*) (July, 1990)

Report submitted to the Mustelid & Viverrid Specialist Group of IUCN/SSC, 41 pp., 7 pls, 5 tabls, 3 figs.

Binturong studbook update

Paul Robinson of Southport Zoo (UK) recently compiled and published a second edition of the "Regional Studbook of the Binturong (*Arctictis binturong*) in the British Isles".

Following subjects are treated: summary of the UK population 1988 & 1989, summary of changes 1988 & 1989, current population status 1988 & 1989, as well as a historical listing of 103 binturongs kept in the UK from 1957 on.

Also inbreeding coefficients, notes on conservation and population status, and recommendations for 1990.

From the studbook we learn that the population in the UK remained stable between 1988 and 1989 at 27 animals, but that, due to three deaths at the beginning of 1990, the number is now down to 24 animals with a sex ratio imbalance towards females (9.15). There is also a trend towards loss of genetic diversity and we are still far away from successfully breeding binturongs.

We hope that the studbook may see a large distribution (also outside the UK) and that the "Recommendations" made in it will be followed. With the ongoing destruction of the Asian forests time is running out for this uncommon but magnificent animal.

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