

MUSTELID & VIVERRID CONSERVATION

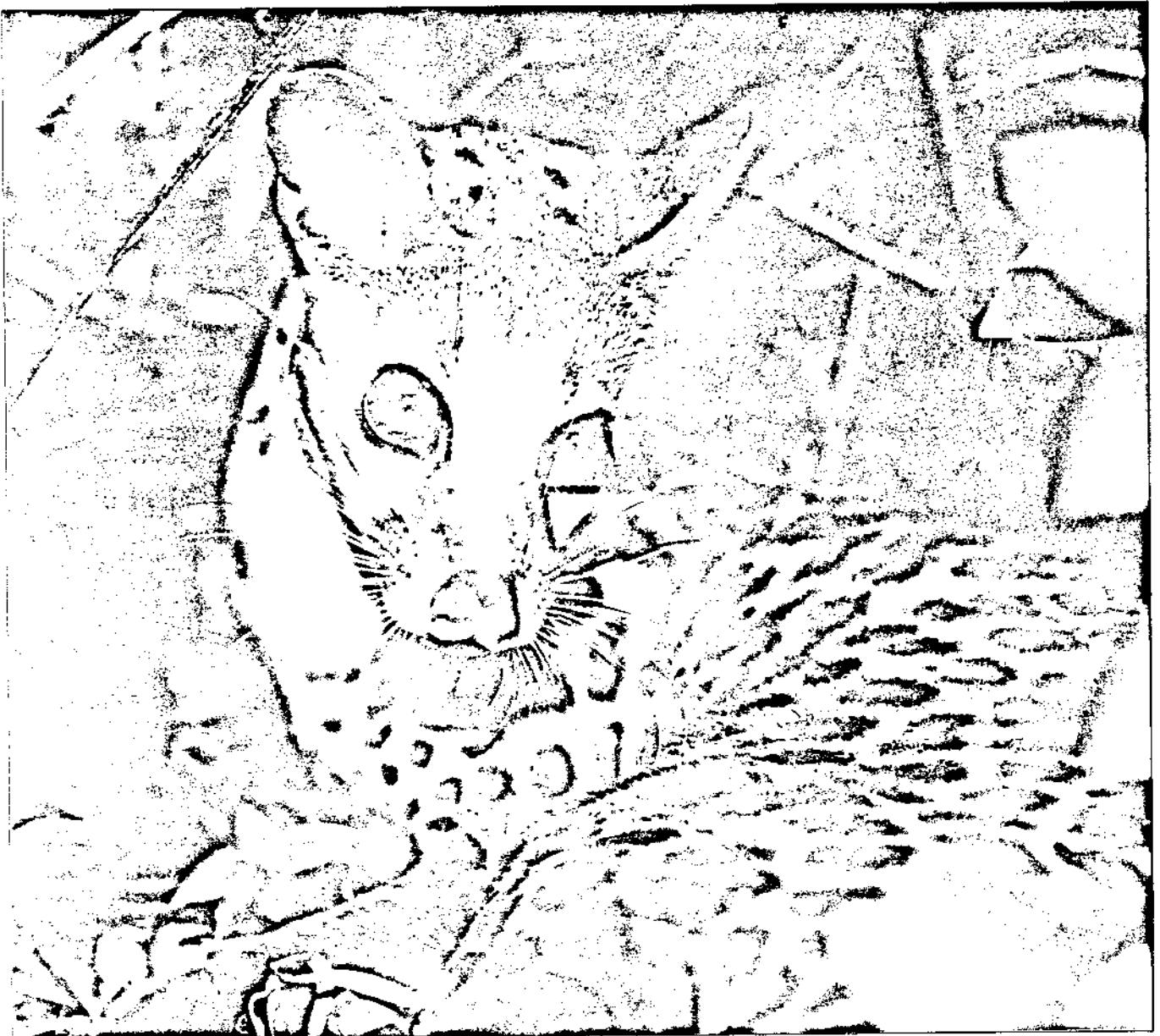


The Newsletter of the IUCN/SSC
Mustelid & Viverrid Specialist Group



Number 3

October 1990



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



This number was produced with the support of the "Royal Zoological Society of Antwerp", Antwerp, Belgium, and the "Zoological Society for the Conservation of Species and Populations", München, Germany.



Mustelid & Viverrid Conservation

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

Editor-in-chief: Harry Van Rompaey, Edegem, Belgium

Editors: Michael Riffel, Karlsdorf, Germany
Arnd Schreiber, Heidelberg, Germany
Roland Wirth, München, Germany

The views expressed in this Newsletter are those of the authors and do not necessarily reflect those of the IUCN, nor the IUCN/SSC Mustelid & Viverrid Specialist Group.

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

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:

**Mustelid & Viverrid Conservation
c/o Dr. H. Van Rompaey
Jan Verbertlei, 15
2650 Edegem
Belgium**

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.

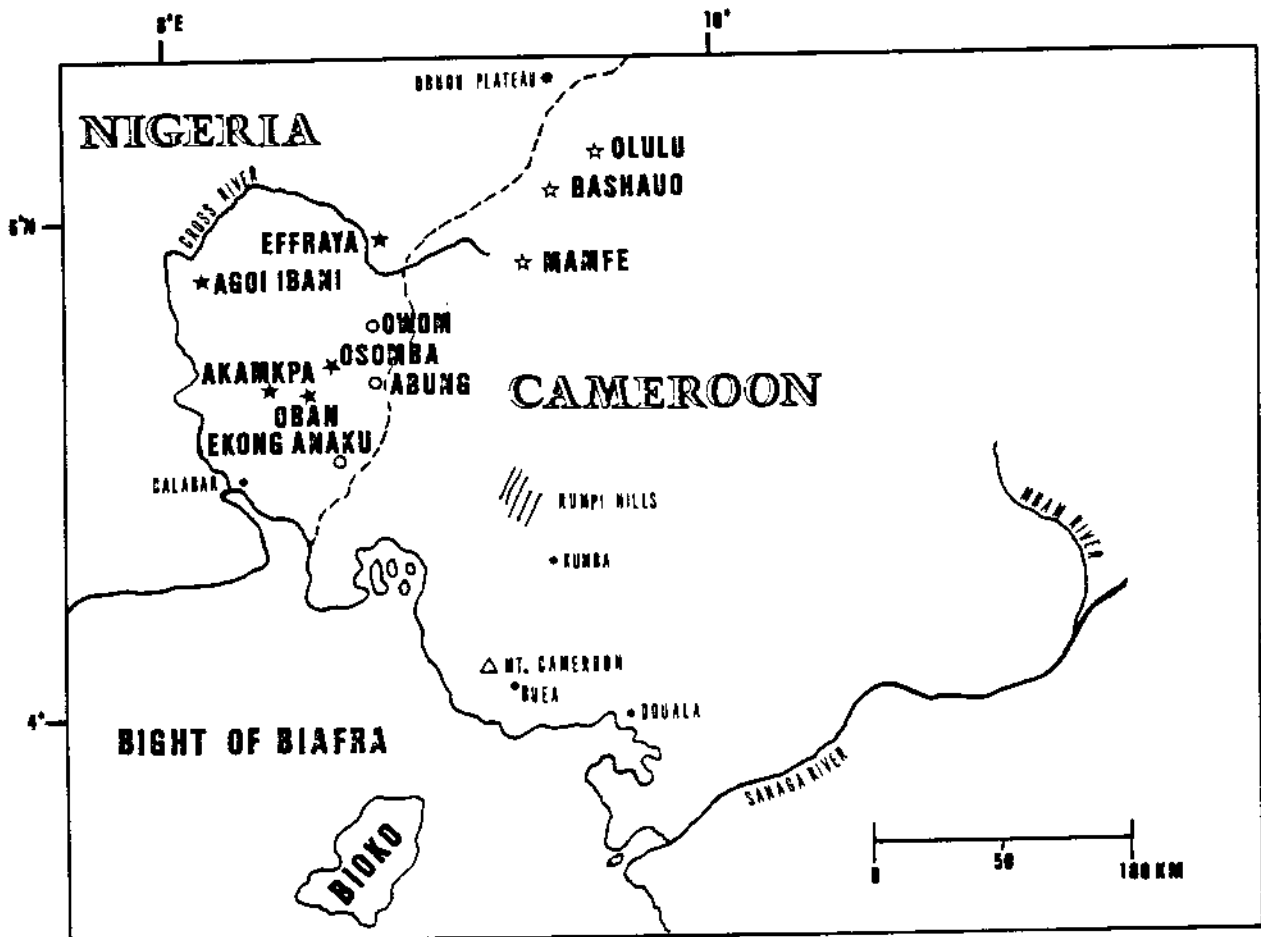


Fig. 1. Localities from where specimens of *G. cristata* were collected by Sanderson (1933): open star; specimens of *G. cristata* by Heard (1989): closed star; specimens of another form of genet by Heard (1990): open circle. Interrupted line shows border between Cameroon and Nigeria.

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&VSG 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

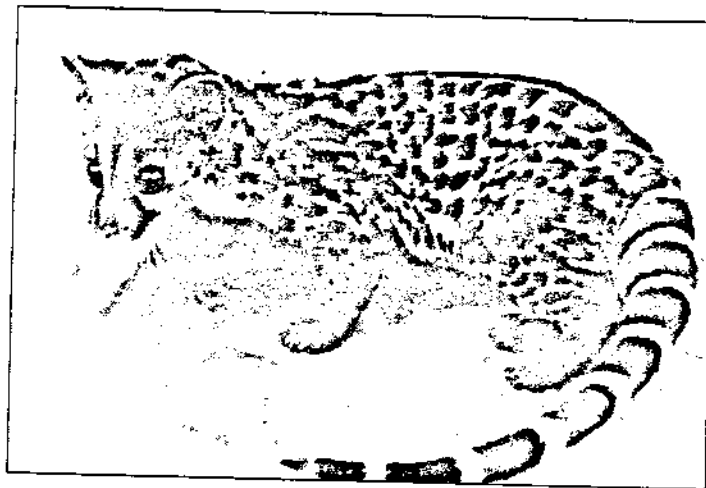


Fig. 2. Five weeks-old *Genetta cristata*. Photo: S. Heard.

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.

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



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

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.

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 described 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.

References

- Allen, J. A. 1924. Carnivora collected by the American Museum Congo Expedition. *Bull. Amer. Mus. Nat. Hist.*, 47:73-281.
- Coetzee, C. G. 1977. Order Carnivora. Part 8 in: J. Meester & H. W. Setzer (eds.) 1971-1977. The mammals of Africa: an identification manual. Smithsonian Inst. Press, Washington, D.C.
- Corbet, G. B. & Hill, J. E. 1986. *A world list of mammalian species*. British Museum (Nat. Hist.), London.
- Crawford-Cabral, J. 1980-1981. The classification of the genets (Carnivora, Viverridae, genus *Genetta*). *Bol. Soc. Portug. Cienc. Nat.*, 20:97-114.
- Honacki, J. H., Kinman, K. E. & Koeppl, J. W. (eds.). 1982. *Mammal species of the world: a taxonomic and geographic reference*. Allen Press & Ass. of Systematics Collections, Lawrence, Kansas.
- Lönnerberg, E. 1917. Mammals collected in central Africa by Captain E. Arrhenius. *Kungl. Svenska Vet.-Akad. Handl.*, 58(2):1-110.
- Rosevear, D. R. 1974. *The carnivores of West Africa*. Trustees of the British Museum (Nat. Hist.), London, 548 pp.
- Sanderson, I. T. 1940. The mammals of the north Cameroons forest area. Being the results of the Percy Sladen Expedition to the Mamfe Division of the British Cameroons. *Trans. Zool. Soc. London* 24(7):623-725.
- Schreiber, A., Wirth, R., Riffel, M. & Van Rompaey, H. 1989. *Weasels, civets, mongooses, and their relatives. An Action Plan for the conservation of mustelids and viverrids*. IUCN, Gland, 100 pp.
- Wozencraft, W. C. 1989. Classification of the recent Carnivora. Pp. 569-593 in: J. L. Gittleman (ed.). *Carnivore behavior, ecology, and evolution*. Chapman & Hall, London, 620 pp.

Shelagh Heard,
PO Box 1832, Calabar, CRS, Nigeria
Harry Van Rompaey,
Jan Verbortlei, 15, 2650 Edegem, Belgium

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 Sélus-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. biedermani* 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. biedermani*. 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,

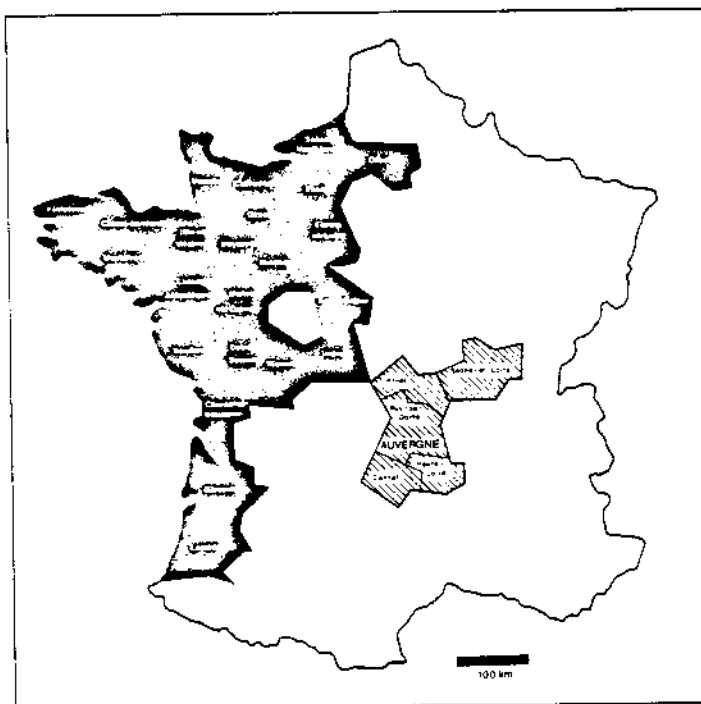


Fig. 1. Past distribution (until the early 1900's) of the European mink (*M. lutreola*) in France. Hatched parts indicate non-documented/non-authenticated regions. Maps after van Bree & Saint-Girons (1966) and Chanudet & Saint-Girons (1981).

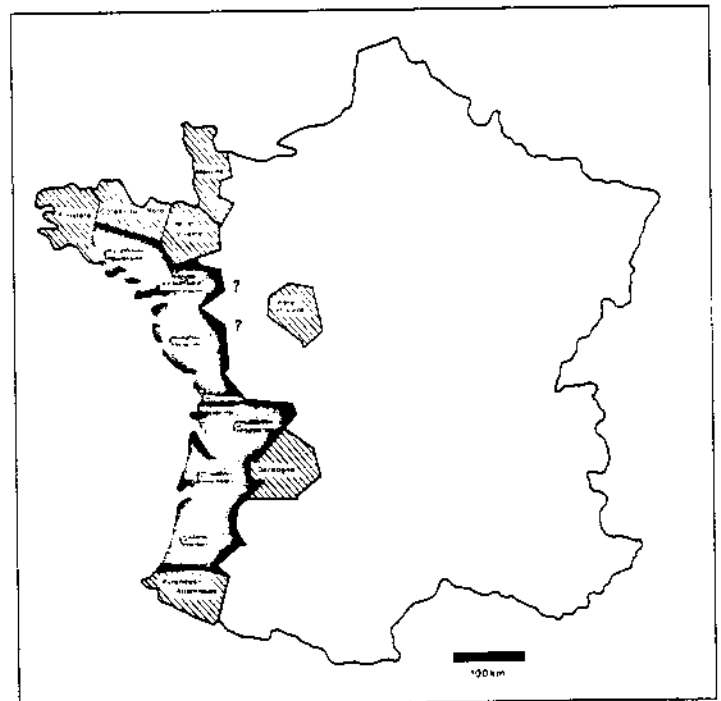


Fig. 2. Present distribution of the European mink (*Mustela lutreola*) in France. Hatched parts indicate regions where the mink is very scarce. Question-mark: possibly present but not authenticated.

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 cm² (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

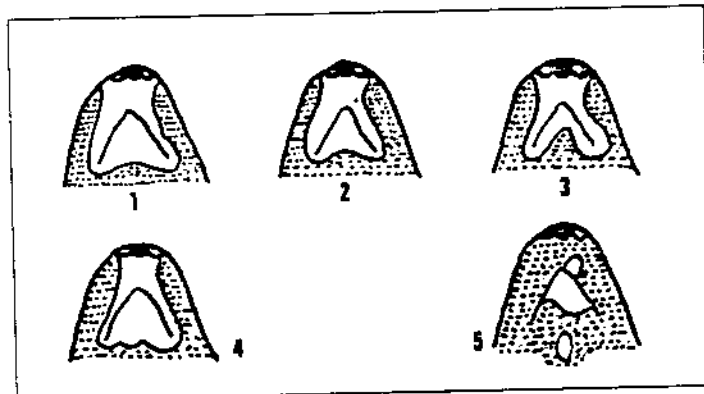


Fig. 3. Diagrammatic sketches of the white pattern of four European minks (road kills) from Brittany (1 to 4) and one atypical American mink from the same region (5). 1: from Callac, Côtes-du-Nord; 2 and 3: from Noyal, Morbihan; 4: from Bubry, Morbihan; 5: from St-Avé, Morbihan.

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).

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).

References

- Anfrue, E. 1896. Le vison de France et le putois commun. *Feuille des Jeunes Naturalistes* 311:222-223.
- Braun, A.-J. 1985. Rapport préliminaire sur la présence et la répartition du vison d'Europe- *M. lutreola* - (espèce protégée) dans le département du Morbihan. Fédération départementale des chasseurs du Morbihan. Unpubl. report, 4 pp.
- Braun, A.-J. 1985. Statut et répartition du vison d'Amérique - *Mustela vison* - dans le département du Morbihan et les départements limitrophes. Fédération départementale des chasseurs du Morbihan, pp. 21, 22-24, 26, 3-17.
- Braun, A.-J. 1986. Causes de mortalité chez *Lutra lutra* en Bretagne pour la période 1970-1986 et propositions de mesures destinées à réduire les pertes. Unpubl. report to WWF-France.
- Braun, A.-J. 1987. The otter in Brittany. *J. Otter Trust* 1(10):13.
- Braun, A.-J. 1987. Répartition de la loutre à proximité de la RN 165. Analyse de la mortalité routière et propositions d'aménagements techniques destinés à supprimer les accidents. *Centre d'Etudes Techniques de l'Équipement de l'Ouest* 3:7-11.

- Birks, J. D. S. & Linn, J. J. 1982. Studies of home range of the feral mink *Mustela vison*. *Symposia of the Zool. Soc. London* 49:231-127.
- Braun, A.-J. 1988. Statut et répartition de *Lutra lutra* à Grandlieu (44). Causes de mortalité et propositions de mesures de protection. Deuxième phase: 1985-1987. Report to WWF-France:15,33, 36-39, 41-46.
- Chanudet, F. & Saint-Girons, M.-C. 1981. La répartition du vison européen dans le Sud-Ouest de la France. *Ann. Soc. Sci. Nat. Charente-Maritime* 6(8):851-858.
- Ellerman, J. & Morrison-Scott, T. C. S. 1966. *Checklist of Palaearctic and Indian mammals 1758 to 1946*. Trustees of the British Museum (Natural History), London, 810 pp.
- Gadeau de Kerville, H. 1887. Faune de Normandie. 1. Mammifères. *Bull. Soc. Amis Sci. Nat. Rouen*: 117-246.
- Heptner, V. G. & Naumov, N. P. 1974. *Die Säugetiere der Sowjetunion. Vol. 2. Seekühe und Raubtiere*. Jena.
- Lapouge, G. 1896. Le vison en Bretagne. *Feuille des Jeunes Naturalistes* 305:101.
- Lataste, F. 1884. Catalogue provisoire des mammifères sauvages non marins du département de la Gironde. *Proc. Soc. Linn. Bordeaux* 37:39.
- Linn, J. J. & Birks, J. D. S. 1981. Observations on the home-ranges of feral American mink *Mustela vison* in Devon, England, as revealed by radio-tracking. Pp. 1088-1102 in: Chapman & Pursley (eds.). *Worldwide Furbearer Conference Proc. Vol. 2*.
- Linn, J. J. & Birks, J. D. S. 1989. Mink (Mammalia; Carnivora; Mustelidae): correction of a widely quoted error. *Mamm. Rev.*, 19(4):175-179.
- Maran, T. 1988. Naaritsa Levik Eeestis. Ajalooline Ulevaade. *Eesti Ulukid* 5:29-54. (in Estonian, with summary in English & translation by Maran to Braun)
- Matschie, P. 1912. Einige bisher wenig beachtete Rassen des Nörzes. *Sitzber. Ges. Natf. Freunde Berlin*: 345-354.
- Mermet, L. 1984. Wetland drainage in Europe: France. Pp. 27, 38-39 in: *Wetland drainage in Europe. The effects of agricultural policy in four EEC countries, in cooperation with D. Baldock, B. Hermans, and P. Kelly*. The Institute for European Environmental Policy & the International Institute for Environment & Development.
- Pucheran, O. 1861. Note sur les stations en France du *Putorius lutreola*. *Rev. Mag. Zool.*, 24:193-197.
- Raspail, X. 1896. Le vison d'Europe (*Mustela lutreola*). *Feuille des Jeunes Naturalistes* 308:162-163.
- Schreiber, A., Wirth, R., Riffel, M. & Van Rompaey, H. 1989. *Weasels, civets, mongooses, and their relatives. An Action Plan for the Conservation of Mustelids and Viverrids*. IUCN, Gland.
- Sély-Longchamps, E. de. 1839. *Etudes de micromammalogie .. suivies d'un index méthodique des mammifères d'Europe*.
- Trouessart, E. L. 1884. *Histoire naturelle de la France. Tome 2. Mammifères*.
- Tumanov, J. L. & Zverev, E. L. 1986. Sowremennoje rasprostraneniye i tschislennost jewropejskoj narki (*Mustela lutreola*) w SSSR. *Zool. Zhurnal* 65(3):427-435.
- van Bree, P. H. J. & Saint-Girons, M.-C. 1966. Données sur la répartition et la taxonomie de *Mustela lutreola* (Linnaeus 1761) en France. *Mammalia* 30:270-291.
- Youngman, P. M. 1982. Distribution and systematics of the European mink *Mustela lutreola*, Linnaeus 1761. *Acta Zool. Fenn.*, 166:1- 48.

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 Museum 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 km²), 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

Table 1: 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)
<i>Mellivora capensis</i>		+(c)	?(d)			++(e)		+(g)	?(h)	
<i>Civettictis civetta</i>	+(a)	+(c)	++(d)	+(e)	+(c)	+(e)	+(f)	+(g)	++(h)	++(i)
<i>Genetta thierryi</i>						?(c)				
<i>Genetta johnstoni</i>	+(a)		?(d)							
<i>Genetta pardina</i>	+(a)		?(d)	+(e)		++(e)		+(g)	+(h)	+(i)
<i>Genetta sp.</i>		+(c)			+(c)					
<i>Poiana richardsoni</i>			?(d)					+(g)	?(h)	
<i>Nandinia binotata</i>	+(a)	+(c)	+(d)	?(e)	?(c)		++(f)	+(g)	++(h)	++(i)
<i>Herpestes ichneumon</i>			?(d)			+(e)	+(f)	+(g)		(+)(i)
<i>Herpestes sanguineus</i>		+(c)	?(d)			+(e)	+(f)	++(g)	++(h)	(+)(i)
<i>Mungos mungo</i>						+(e)				
<i>Mungos gambianus</i>						+(e)		+(g)	+(h)	(+)(i)
<i>Crossarchus obscurus</i>		+(c)	+(d)		+(c)	++(e)	+(f)	++(g)	++(h)	+(i)
<i>Liberiictis kuhni</i>			?(d)							
<i>Ichneumia albicauda</i>						++(e)		+(g)	+(h)	
<i>Atilax paludinosus</i>			+(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.)

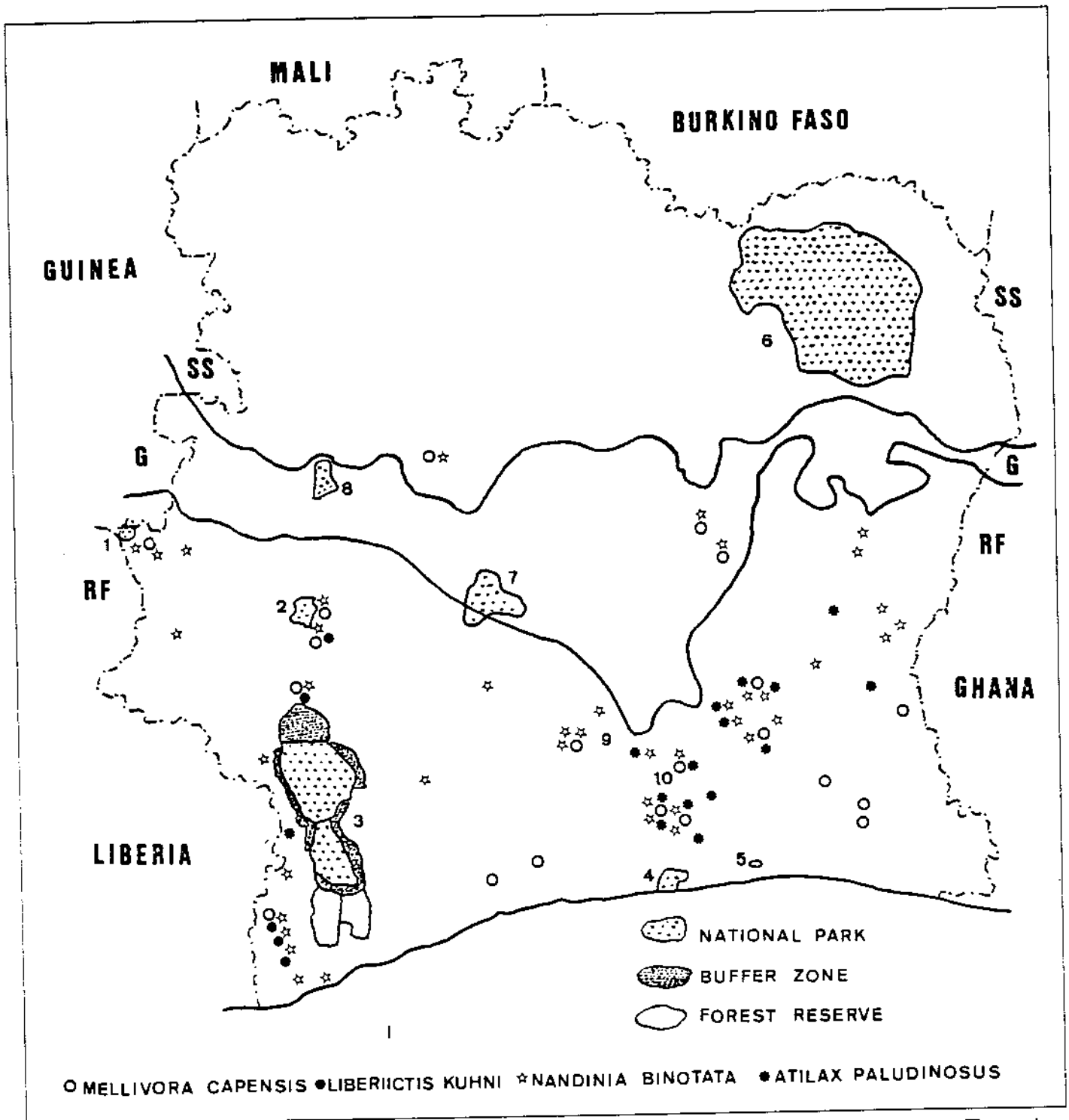


Fig. 1. Records of the honey-badger, Liberian mongoose, two-spotted palm civet, and marsh mongoose in Ivory Coast. The numbers designate the National Parks and other localities, and are explained in the table.

for marks or footprints of easily identifiable species, such as chimpanzee, elephant, pygmy hippo, buffalo, 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.

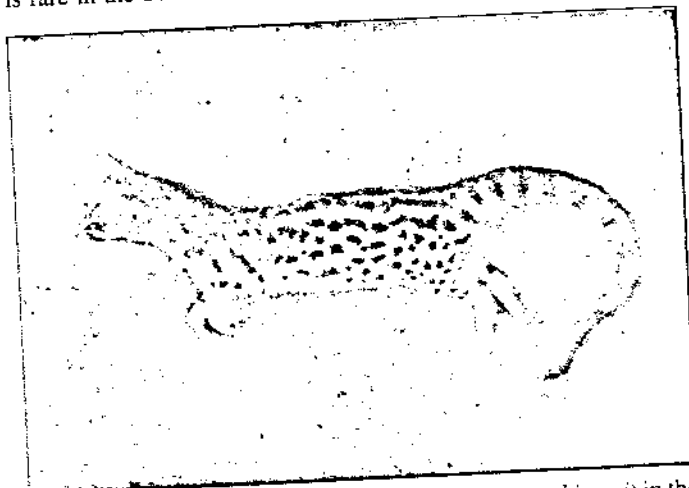


Fig. 2. Rare photograph of a Haussa genet (*Genetta thierryi*) in the flesh. The colour photograph shows the pale colour, the brown spots in longitudinal rows, and the typical reddish-brown colour dorsally on the first five of the dark tail-rings.

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*.

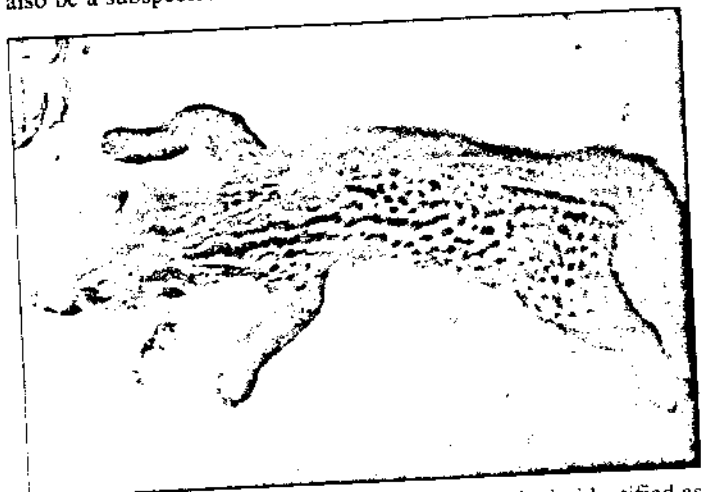


Fig. 3. Photograph of a genet in the flesh, tentatively identified as *Genetta poensis*.

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 frequently in Marahoué 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 addressing 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.

References

- Aeschlimann, A. 1965. Notes on the mammals of the Ivory Coast. *Afr. Wildl.*, 19(1):37-55.
- Beaufort, F. de. 1965. Répartition et taxonomie de la poiane (Viverridae). *Mammalia* 29(2):275-280.
- Bourrière, F., Minner, E. & Vuattoux, R. 1974. Les grands mammifères de la région de Lamto. Côte d'Ivoire. *Mammalia* 38(3):433-447.
- FAO/BANQUE MONDIALE. 1988. Rapport du programme de coopération FAO/BANQUE MONDIALE centre d'investissement. Côte d'Ivoire. Programme sectoriel forestier. Rapport de préparation. Rome.
- Hoppe-Dominik, B. 1989. Premier recensement des grands mammifères dans le Parc National de la Marahoue, en Côte d'Ivoire. *Rev. Zool. Afr.*, 103:21-27.
- Lamotte, M. 1942. La faune mammalogique du Mont Nimba. *Mammalia* 3(4):114-119.
- Lamotte, M. & Tranier, C. A. 1983. Un spécimen de *Genetta johnstoni* collecté dans la région du Nimba (Côte d'Ivoire). *Mammalia* 47(4):267-304.
- Minner, E. 1983. Etudes et propositions pour l'aménagement et la mise en valeur du Parc National du Mont Sangbé. Rapport Eaux et Forêts. Biankouma.
- Rosevear, D. R. 1974. *The carnivores of West Africa*. London.
- Roth, H. H., Mühlenberg, M., Roeben, P. & Barthlott, W. 1979. Gegenwärtiger Status des Comoë- und Tai Nationalparks sowie des Azagny-Reservats und Vorschläge zu deren Erhaltung und Entwicklung zur Förderung des Tourismus.