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# Genets (Viverridae: Genettinae) of the Niger Delta, Nigeria

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**Abstract** The Niger Delta is dominated by swamp forests, some lowland forest and back swamp areas, crossed by old creek levees. Populations of wildlife have declined steeply due to uncontrolled hunting, habitat modification through farming, logging and live capture for export trade. Bushmeat, the meat of terrestrial wildlife is a good source of income. Small carnivores, particularly genets, which play varied roles in maintaining the stability of ecosystems, are also indiscriminately harvested. Genet taxonomy is confused, hence a study was undertaken to identify the genets in Nigeria's Niger Delta. A component of the study was to determine the reliability of exclusive use of morphological features in genet identification in a resource-limited setting. Genet carcasses were bought at 3 major bushmeat markets: Omagwa (4°98'N, 6°91'E), Mbiama (5°03'N, 6°23'E) and Ogwashi Uku (6°09'N, 6°30'E). Specimens were skinned and body measurements taken. Three sets of keys were used for identification. Three genet species were identified: *Genetta pardina* (Omagwa), *Genetta cristata* and *Genetta tigrina* (Ogwashi Uku), *Genetta tigrina* (Mbiama). One specimen from Omagwa was unidentified solely on morphological data. The results are compared to those obtained in the area from previous studies. The limitation of genet taxonomy based solely on morphological data is highlighted. The need for an integrative approach to genet taxonomy is recommended.

**Keywords** Small carnivores, Genet Taxonomy, Morphological Keys, Integrative approach, Niger Delta, Nigeria

## 1. Introduction

Bushmeat, the meat of terrestrial wildlife is a good source of food and protein for rural dwellers in West and Central Africa, because in their setting, it is cheaper than meat from domestic livestock. It is also a major source of income for those involved in the trade. Populations of wildlife have declined steeply, due to uncontrolled hunting, habitat modification through farming, logging and live capture for export trade [1]. Steele [2] estimated the worth of the overall bushmeat trade in Gabon to be US$21 million annually. The estimated worth of the bushmeat trade in Liberia was US$24 million annually Antsey [3] in Cameroon, Infield [4] reported that the worth of the bushmeat from the Korup National Park alone was US$507, 720 annually. More than 1.2 million metric tons of bushmeat, excluding elephants are harvested monthly in Nigeria [5].

The most comprehensive survey of mammals (excluding Chiroptera) in the Niger Delta was undertaken by the Niger Delta Environmental Survey (NDES) over a 3-year period (1998-2000) [6]. Sixty-seven mammalian species were identified: 14 Primates, 12 carnivores, 2 Pholidotes, 1 Hyracoid, 12 Carnivores, 11 Astiodactyls, 26 Rodents. There were four viverrids (African civet, *Civetticus civetta*; Crested Genet, *Genetta prensis*; Large-spotted Genet, *Genetta pardina*; Forest (King) Genet, *Genetta poensis*) among the carnivores. Subsequent investigations recorded 3 viverrids (*Civetticus civetta*, *Genetta maculata* and *Genetta cristata*) [7, 8]. In "Mammals of the Niger Delta, Nigeria", based on materials left by late Bruce Powell and Kay Williamson and incorporating updated materials and analyses, the viverridae listed were Crested Genet, *Genetta cristata*; Large spotted/ Forest Genets, *Genetta spp.*) [9]. In the Niger Delta, the recorded numbers of viverridae (genets and related spp.) and their species compositions varied among authors [10-12] (Table 1). The NDES recorded extended distributions of the pardine genet, *Genetta pardina*, and the crested genet, *Genetta cristata* [6]. Genets from the Niger Delta are poorly known. Accurate identification is a prerequisite to any conservation programme. This study was therefore undertaken to identify the genets of the Niger Delta and adjacent areas and determine the reliability of exclusive use of morphological features.

## 2. Materials and Methods

### Study Area

The Niger Delta swamp forests, an area of approximately

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15,000km$^2$ are contained in a triangle, with the town of Aboh on the River Niger, being the northern most tip [13]. The swamp forests are divided into 3 zones, based on hydrological variation: flood forest; eastern delta flank, containing some lowland forest and non-swamp species and the central back swamp area, crossed by old creek levees [14]. There are no effectively protected areas in the Delta. The three existing forests are: Upper Orashi, Nun River and Lower Orashi, which comprise a total of 238km$^2$. A few small sacred groves are protected by communities; they also protect certain species of wildlife, such as crocodiles and chimpanzees. Recent surveys of the Delta, especially the central section, have shown that small logging efforts have had a devastating, cumulative effect on animal populations, through both loss of habitat and increase in localized hunting. This situation is worsening, as outsiders move into the delta and hunting pressures grow [15].

Genet carcasses were bought at 3 bushmeat markets: Omagwa (4°98'N, 6°91'E), Mbiama (5°03'N, 6°23'E) Rivers State; Ogwashi-Uku (6°09'N, 6°30'E) Delta State. Collected specimens of genets were skinned, preserved in formalin, nailed to flat boards and sun-dried for 1-2 days. They were subsequently taken to the laboratory for morphological measurements: total length (head to tail), head-body length, head length, neck length, trunk length, tail length, ear length, length of limbs (fore and hind), number of spots, presence or absence of crest, length of crest, presence or absence of rings, pattern and number of rings on tail, fur color and pattern, presence and shape of claws. They were identified by several keys [10, 11, 12, 16, 17].

**Table 1.** Temporal Variations in Species Composition of Viverridae caught by different authors in the Niger-Delta, Nigeria

| Genets species | Happold (1987) | Dorst & Dandelon (1990) | Kingdon (1997) |
|---|---|---|---|
| *Genetta bini* | Yes | No | No |
| *G. felina* | Yes | No | No |
| *G. genetta* | No | Yes | Yes |
| *G. pardina* | Yes | Yes | No |
| *G. poensis* | Yes | No | No |
| *G. tigrina* | No | Yes | Yes |
| *G. servalina* | No | Yes | No |

Source: Adapted from [10, 11, 12]

# 3. Results

Detailed results on measurements of body parts are shown (Table 2). The two species from Omagwa were identified as *Genetta pardina* and the other species could not be identified exclusively based on morphological features. The two species from Ogwashi-Uku were identified as *Genetta cristata* and *Genetta tigrina.* The sole specimen from Mbiama was identified as *Genetta tigrina*. The skin of the unidentified species has been preserved for an integrative approach to the identification.

**Table 2.** Genet species identified based exclusively on Morphological features

| | **Bushmeat markets** | | | | |
|---|---|---|---|---|---|
| | **Rivers State** | | | **Delta State** | |
| **Carcass measurements** | **Omagwa** | | **Mbiama** | **Ogwashi-Uku** | |
| Total length (cm) | 98 | 96 | 89 | 72 | 78 |
| Head length (cm) | 10 | 10 | 09 | 09 | 12 |
| Neck length (cm) | 08 | 06 | 06 | 05 | 5 |
| Trunk length (cm) | 37 | 37 | 33 | 27 | 32 |
| Tail length (cm) | 43 | 42 | 41 | 37 | 29 |
| Ear length (cm) | 04 | 1.5 | 04 | 02 | 01 |
| Fore limb length (cm) | 16 | 14 | 15 | 08 | 07 |
| Fore Foot length (cm) | 05 | 05 | 05 | 02 | 01 |
| Hind limb length (cm) | 18 | 16 | 14 | 09 | 10 |
| Hind foot length (cm) | 07 | 09 | 07 | 02 | 02 |
| **Number of spots** | 116 | 86 | 43 | 138 | 148 |
| **Colour/Shape of spots** | Black, Large, Round | Black, Large, Round | Black, Elongated | Black, Elongated | Dark Brown |
| **Number of rings on tail** | 10 | 11 | 14 | 14 | 13 |
| **species** | ***Genetta pardina*** | **Un-identified** | ***Genetta tigrina*** | ***Genetta cristata*** | ***Genetta tigrina*** |

## 4. Discussion

The *G. tigrina* of Dorst and Dandelot [11] and Kingdon [12] and not recorded by Happold [10] was identified at two market towns, Mbiama and Ogwashi-Uku. The *G. pardina* of Happold [10] and Dorst and Dandelot [11] not listed by Kingdon [12] was recorded at Omagwa. The genet species, *G. poensis*, endemic to Africa that had not been seen for decades, and classified as data deficient by the IUCN [18] was not encountered. A major threat to this species was hunting as per IUCN view, because this was the main source of the museum specimen of *G. poensis* and no records of live *G. poensis* since 1946. The *G. cristata* of Angelici [7], Angelici and Luiselli [8] and, Blench and Dendo [9] was encountered. A recent IUCN situation analysis of terrestrial and freshwater fauna in West and Central Africa [19] listed eleven Viverrids. Three were Data Deficient (*G. poensis*, *G. piscivora*, *Polana leightoni*); six were at Lower Risk (either Near Threatened - *G. bourton* or Least Concern - *G. pardina*); *G. servalina*, *G. thierryi*, *G. victoriae*, *P. richardsoni*, *G. cristata* and *G. johnstoni* were vulnerable. Blench and Dendo [9] who grouped the unidentified Large Spotted/Forest Genets as *Genetta* spp also faced difficulties identifying one of the specimens. The genets from the Niger Delta are poorly known; their confused status is due to the presence of several cryptic species, and some forest forms of large-spotted genets with debated taxonomic status [16]. Undertaking a taxonomic revision of forest forms of genets, Gaubert [16] showed that the *G. poensis* of Happold [10] was actually *G. cristata*. Fortunately, the advent of integrative (combined, multidisciplinary, collaborative, multidimensional) taxonomy [20, 21] has provided improved rigour in alpha taxonomy, which deals with defining taxonomic categories such as species [22]. Alpha taxonomy is central to biology; species are the basic units of many fields [23, 24]. Small carnivores from West Africa were described as little studied, despite their varied roles in maintaining the stability of ecosystems [25]. The limited number of genet species recorded was similar to figures from earlier studies [6-9].

## 5. Conclusions

The limited species diversity observed was probably due to the fact that the Niger Delta was not ideal for genets. The inability to identify one of the specimens based exclusively on morphological features from three sets of keys could be associated with the presence of cryptic species in the area. The use of an integrative approach (morphological, molecular, ecological and behavioural, etc.), expanding the range of tools is recommended for the taxonomy of *Genetta* spp.

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