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THE ENIGMA OF THE GIANT FOREST HOG, *HYLOCHOERUS MEINERTZHAGENI* (MAMMALIA: SUIDAE), IN TANZANIA REVIEWED

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ABSTRACT

The giant forest hog, *Hylochoerus meinertzhageni*, is distributed across the West African forest belt and into eastern Africa. It is known from Uganda and is reasonably common in suitable habitat in Kenya. Evidence suggests that a taxon described from a photograph as *Hylochoerus schulzi* Zukowsky 1921 from the Mutjek Mountains in northern Tanzania along the western Rift Valley wall is in fact a bushpig, *Potamochoerus larvatus*. Previously published records of the giant forest hog in Tanzania are discussed and shown to be non-definitive; the need for a specimen or unambiguous photographic record of *H. meinertzhageni* from Tanzania still exists.

INTRODUCTION

Three species of pig are known to occur naturally in East Africa.

The warthog, *Phacochoerus africanus* (Gmelin 1788), is found in woodland and more open habitats, and occasionally occurs in forest. It has a head-and-body length of about 150 cm, and a mass of up to 140 kg. It has large facial wart-like masses of dense connective tissue and adults have conspicuous tusks. Its pelage is sparse except for a mane. Warthogs are highly specialised grazers. Recently a second distinct species of warthog has been recognised. *Phacochoerus aethiopicus* (Pallas 1767) is the form of arid northern Kenya and the drier parts of the Cape region (Grubb & Oliver, 1992a; Grubb, 1993a).

The bushpig, *Potamochoerus larvatus* (Cuvier 1822), is widely distributed in the forests and dense vegetation and is often an agricultural pest. It is omnivorous and its tusks are short and knife-like. The bushpig was formerly regarded as a single, highly variable species. A recent revision has concluded that there are two distinct species of bushpig in Africa. The West African red river hog, *P. porcus* (Linnaeus 1758), has a hairy orange pelage with a striking black and white facial mask. The bush pig, which ranges from Eritrea to South

Africa and Madagascar (Grubb & Oliver, 1992b; Grubb, 1993a, b), comprises several subspecies: *P. l. hassama* (Heuglin 1862) from Ethiopia and East African highlands, *P. l. koiropotamus* (Desmoulions 1831) from southeastern Africa, and the nominate form from Madagascar. Literature suggests that both species of *Potamochoerus* are the only African pigs in which the young possess a pattern of short, white or light yellow longitudinal stripes or spots (Kingdon 1979: 208; Smithers 1983: pl. 23; Happold, 1987: 204).

In contrast to *P. porcus*, the bush pigs found in the highlands of East Africa have dark grey to blackish pelage with a whitish head and a dorsal white mane. Head-and-body length reaches 150 cm, and body mass up to 115 kg.

The giant forest hog *Hylochoerus meinertzhageni* Thomas 1904 is the largest of the living Suidae; males may weight up to 275 kg and have a head-and-body length of 210 cm; females are smaller, reaching 204 kg and a head-and-body length of 200 cm. In addition to its larger size, the male has large, naked cheeks and a broad, flat muzzle. The snout ends in a wide, swollen rhinarium. The tusks of the male are larger than those in the female, in which the face has more hair and in which the rhinarium is not as broad. Both sexes have long, black hair. Kingdon (1979) describes the young as straw-coloured with no trace of stripes. The species is distributed discontinuously across the forest belt of West Africa into eastern Africa (Mohr, 1942; Dorst & Dandelot, 1970; Haltenorth & Diller, 1977; d'Huart 1991; Kingdon 1997). Besides the Kenyan subspecies, *H. m. meinertzhageni*, currently two other subspecies are recognised further west (Grubb & Oliver, 1992b; Grubb, 1993a).

The name 'giant forest hog' is somewhat misleading; although the species is undoubtedly the largest of the suids, it is by no means an exclusively forest species; while it shelters in relatively closed vegetation such as scrub or forest, it feeds in much more open situation such as swamps and wooded savannah (Haltenorth & Diller, 1977; Kingdon, 1979); the latter author provides further details on its behaviour and ecology in the Aberdare Mountains, Kenya.

Although it might be thought that its large size and coloration would make its presence easy to confirm in the field, this has not proved to be the case. While records of this species in the form of specimens, hunting trophies and photographs exist from Kenya and Uganda, no such unequivocal records appear to be available for Tanzania.

The purpose of this review is to examine the taxonomic status of a pig described from Tanzania as *Hylochoerus schulzi* and to discuss various reports of giant forest hogs in Tanzania.

IDENTITY OF *HYLOCHOERUS SCHULZI* ZUKOWSKY 1921

Hylochoerus schulzi Zukowsky 1921 (:189) was described on the basis of a photograph (:181) taken by Christoph Schulz in 1912 of an adult female pig he shot at about 2,000 m a.s.l. in the Mutjek Mountains (a German name in use at that time for the Kitete Highlands), approx. 35°42'E-03°17'S, within the 'Winter-Highlands', *i.e.*, that portion of the Crater Highlands he traversed from south of Mt Oldeani to Mt Lomalasin, on the top of the western Rift Valley wall in Northern Tanzania. In his description of the species, Zukowsky compared the photograph with several published illustrations of *H. meinertzhageni* (see Rothschild & Neuville , 1906; Mitchell 1908; Lucas 1912) and drew on information supplied by Ch. Schulz. Zukowsky evidently felt that the large size of the animal in the photograph (1 m shoulder height, 2 m length as given by Ch. Schulz), the large footprints and large volume of faeces as well as the habitat, excluded both warthog and bushpig. (Note: it is not clear if the length measurement represents head-and-body or total length). According to information

supplied by Ch. Schulz to Zukowsky, neither the warthog nor the bushpig was known from the general area. Zukowsky also was apparently very much influenced by Schulz's impression, who felt he had shot a giant forest hog (Schulz, 1922: 125).

H. schulzi as described by Zukowsky has two pairs of warts on its face, an 8 cm one in front of the eyes and a 5 cm one below the eyes. This black-haired animal is marked by a white band which starts 15 cm behind the muzzle on the nasals, broadens towards the eyes, runs across the front of the face, narrows between the ears, and then continues as a longitudinal mid-dorsal line along the back, finally narrowing towards its end in the lumbar region. There is a white spot in front of the eyes. A black supraorbital line is present; this is bordered above with white, which extends by broadening to the base of the ears, and turns sharply downwards where it forms a white cheek-patch. Unfortunately neither skull nor skin could be preserved (see also Schulz 1922: 125).

Zukowsky also reported Schulz's observation of a female pig, which he believed to be this species, with unstriped young at Mt Lomalasin, approx. 35°50'E–03°04'S. He related other observations from the "Winter Highlands" and the southeastern area of Mt Meru.

Schulz later found the carcass of a boar, which had been killed by a poisoned Warusha arrow at 1,700 m on the southeastern portion of Mt Meru. According to Schulz, this specimen showed identical coloration and colour pattern to the animal in his photograph. The occurrence of similarly patterned hogs on Mt Meru in 1909/10 was confirmed from memory by U. Trappe, head of the Trappe family at Ngongongare Farm, who had moved into this area by 1907 (Zukowsky, 1921). The area is now known as Momella and is included in Arusha National Park. Zukowsky (1922) published additional information on *H. schulzi* received from the Siedentopf brothers, farmers in the Ngorongoro caldera, who observed pigs. These had a striking bold white face pattern and a white line along the back, which stood erect and became more conspicuous when the animals were fleeing the observer. The Siedentopfs also reported seeing young pigs that were not unicoloured but either striped or spotted. The possibility of confusion with warthog was discounted by them, as these were absent from the area of forest and bamboo stretching from Ngorongoro to Mutjek. Unfortunately, the only animal shot by the Siedentopfs was not preserved.

In a popular book, Schulz's description (1922: 185) of his discovery seems to be taken from Zukowsky's papers (1921, 1922), of which he gives a very condensed abstract in his own wording. Mt Lomalasin, which Zukowsky (1921) in error placed in the south of the Winter Highlands, is not mentioned in this shortened version, and Schulz states that the female animal shot and photographed was a young adult. This contrasts with information he provided to Zukowsky (1921), who describes the specimen as adult.

DISCUSSION OF THE IDENTITY OF *H. SCHULZI*

Zukowsky's original description of *H. schulzi* fits fairly closely with that of the eastern African form of the bush pig *Potamochoerus larvatus,* and more specifically the race described from near Nairobi as *P. porcus keniae* Lönnberg 1912 (presently considered synonymous with *P. l. hassama*). The adult female bushpig figured in colour in Lönnberg (1912: pl. 9) should have demonstrated to Zukowsky immediately the true identity of his *schulzi*, but Zukowsky only used Lönnberg´s paper to discuss the habitat and biology of *Hylochoerus*. The relationship between *schulzi* and bush pigs of Mt Kilimanjaro, formerly described as a separate subspecies *P. larvatus daemonis* Forsyth Major 1897 (now regarded as synonymous with *P. l. hassama*), is yet to be examined. Only the skull of the latter form

was figured; its skin was described as "very dark brownish-black", but no white marks were mentioned, and no further illustration of the pelage of the Kilimanjaro bushpig is known to us. However, Child (1965: 84) describes it as larger in size than the savannah bush pig and generally of a black colour with a distinctive white stripe from the face back over the shoulder; that is a colour pattern fairly similar to that described for *schulzi*. That Schulz himself was familiar with the coloration of at least some East African bushpigs is demonstrated by records of live animals which he exported to Germany (Schneider 1930). This conclusion is further supported by a field observation made by Pitman (1942: 243), who records white-faced bush pigs on Mt Elgon, Kenya. Bush pigs of similar coloration were observed together with giant forest hog at the Mountain Lodge, southwest Mt Kenya (27.IX.1975, DK). The statement of the Siedentopfs about the colour pattern of the young supports identification of these animals as bushpigs rather than giant forest hogs. Furthermore, although the Siedentopfs dismissed the possibility of confusion with warthogs, they seemed unaware of the occurrence of bushpigs in the highland forests.

From the above, and lacking any definite specimens of *H. schulzi*, we conclude that *H. schulzi* was in fact described from a bushpig, *P. larvatus hassama*, as has been done by Grimshaw (1998).

TYPE LOCALITY OF *H. SCHULZI*

A rough route map in Schulz (1922) gives the Mutjek Mountains as stretching from the south-southeast side of the Ngorongoro Crater northeast towards Mt Lomalasin (= Mt Loolmalesin or Loolmasion) in the present Ngorongoro Conservation Area (compare with map in Swynnerton *et al.* 1966); he reached this region after passing Mt Oldeani (: 74).

Allen (1939: 459) has rather confusingly given a terra typica as "Mutjek and Meru Mts., west of Kilimanjaro", two areas geographically and biologically quite separate from one another.

Swynnerton (1945: 67) described the Mutjek Mountains as probably synonymous with the 'Engotiek' of modern maps (although he was unable to confirm this) and as the country along the top of the west wall of the Gregory Rift Valley, northwest of the northern end of Lake Manyara and south of Oldeani, approx. 35°40'E-03°25'S. The Mutjek Mountains were taken as the restricted type locality for *H. schulzi* by Swynnerton (1945: 67) and Moreau *et al.* (1946: 433) concurred with that conclusion.

Some years later, the exact position of the Mutjek Mountains again came under scrutiny. Swynnerton & Hayman (1951: 341) describe the terra typica "Mutjek-Gebirge" as "stretching from west of the northern end of Lake Manyara to as far west as the Crater Highlands; the name 'Mutjek'', of Masai origin, had long since fallen into disuse". They accept that *H. schulzi* was found in a high stretch of the Crater Highlands (= Winter-Gebirge) but go on to state: "Forest hogs are known to occur in the bamboo forest high up on Mt Oldeani, ..., and this may be fixed as the type-locality of *H. schulzi* ...".

As noted the Mutjek Mountains are identifiable and should be taken as the undoubted type locality for the pig named as *H. schulzi*. However, Mt Oldeani is clearly an incorrect fixation of the type locality, unsupported by any evidence found in the original description and the sources associated with it, as considered above. Unfortunately this incorrect fixation of the type locality was accepted by Ansell (1971: 10).

TAXONOMIC STATUS OF *H. SCHULZI*

The taxonomic history of *H. schulzi* has been a varied one. Bouet & Neuville (1930) considered *H. schulzi* a valid species, but in a more detailed consideration (1931: 254, 303) noticed that its pelage coloration was similar to that of bushpig.

In the English-language scientific literature and sources influenced by it, the taxon *schulzi* was treated as follows: Allen (1939: 459), Moreau *et al.*, (1946: 433), Haltenorth & Trense (1956: 211), Swynnerton *et al.* (1966: 37), d'Huart (1978, based on Grubb in litt.) and Grubb (1993b) considered *schulzi* as synonymous with *H. meinertzhageni*.

Swynnerton & Hayman (1951: 341) doubted even the distinction from nominate *H. meinertzhageni*, and Ansell (1971: 10, followed *i.a.* by d'Huart 1978) considered *schultzi* (sic!, lapsus) as synonymous with the nominate race. None of the authors cited mentioned additional material or information available on which to base their conclusions. However Grubb (1993a), while listing *schultzi* (sic!, lapsus) as synonymous with *Hylochoerus m. meinertzhageni*, states that "..it has not yet been shown that the populations in ... Tanzania represent the nominate race".

In German language studies dealing with the status of *H. schulzi*, a different point of view developed. The taxon was completely overlooked by Boetticher (1933). It was Mohr (1942) who, apparently after an analysis of the original description (no further material being available), concluded that *schulzi* cannot be a member of the genus *Hylochoerus* Thomas 1904, but rather is close to the eastern African *Potamochoerus koiropotamus* (currently regarded as a subspecies of *P. larvatus*). However Mohr (1960: 93), apparently influenced by Schulz's estimated body size of a male even larger than the female he shot, later considered that *schulzi* might even be generically different from *Potamochoerus* Gray 1854, an impression shared by d'Huart (1978). E. Mohr withheld an opinion, however, pending the examination of further specimens.

Haltenorth (1963: 27) changed his previous view (Haltenorth & Trense 1956) and dismissed *schulzi* from *Hylochoerus* and placed it in *Potamochoerus*, but did not give his reasons for doing so. However, he did not list it under the latter genus (1963: 26) and continued to include northern Tanzania as part of the range of *H. meinertzhageni*.

From Zukowsky's papers (1921, 1922) it is obvious that he dismissed at a very early point in his considerations any possible similarity with the forms of *Potamochoerus* found in northern Tanzania and even within eastern Africa. For example, he does not comment upon the size difference of the warts in *schulzi* as compared with the much more prominent suborbital bulges in *H. meinertzhageni*, which had appeared in illustrations at the time he wrote (Rothschild & Neuville 1906; Mitchell 1908; Lucas 1912).

Nor does Zukowsky account for or comment on the striped or at least white-spotted colour pattern of piglets related to him by the Siedentopfs and which Schulz described as unstriped. Instead, Zukowsky equates the white face markings of *schulzi* with whitening cheeks in an adult or aging *Hylochoerus*. His dismissal of any possible relationship with *Potamochoerus* may also have been due to lack of familiarity with the colour of the eastern African *P. larvatus*, dark grey to blackish, compared with that of the reddish, western African species. Despite the views of other authors noted above, Zukowsky (1963: 123) has never doubted the original generic identity of *schulzi* and has even supplied a German common name: "Weißmähnen-Waldschwein" (= white-maned forest hog).

Recently Grimshaw (1998) concluded that the distinctive white markings and the rootling behaviour described for *H. schulzi* are characteristic for *P. larvatus*, but unknown or uncommon in *Hylochoerus*, and that this taxon is synonymous with *P. larvatus hassama*.

If indeed a population of giant forest hogs is discovered in northern Tanzania and proves to be subspecifically distinct, *schulzi* is not an applicable name within the genus *Hylochoerus* and a new name will be required.

RECORDS OF THE GIANT FOREST HOG IN TANZANIA

Northern Tanzania

Moreau (1944: 59) records *H. m. schulzi* to the west of Rift valley in his study of biogeography. However, the examination of a large number of references cited by Swynnerton & Hayman (1951) and Kingdon (1979) failed to reveal exact details or even confirmation of the existence of the giant forest hog in Tanzania.

Best *et al.* (1962) note that since the discovery of *H. meinertzhageni* in the Nandi area and on Mt Kenya, numerous specimens have been obtained by hunters, but although they record the species as occurring in the high mountain forests of Tanzania, not a single trophy is listed from this country. Mountain forest and bamboo are given as its Tanzanian habitat by Moffett (1958: 421).

Kingdon (1979: 213) gives a distribution map for *Hylochoerus* including the mid-twentieth century habitat, which would have suited the species before human settlement including the Crater Highland, but excluding areas east of the Rift Valley.

We are not aware of any more information about Tanzanian *Hylochoerus* by Schulz himself, who later exported live bushpigs from the critical area (Schneider 1930: *Potamochoerus* from Mt Meru).

As we were informed in 1998, the collection of the Mweka Wildlife Training College near Moshi does not contain any *Hylochoerus* skull of Tanzanian origin.

Crater highlands

The reports of animal collectors such as the Director of the Berlin Zoological Garden, Lutz Heck (1930: 95-100) collecting live animals in the Mbulu area, or of big game hunters as Kalman Kittenberger (1962: 93) hunting in the Mutjek mountains in 1903, and John Hunter (1953: 50-52) shooting in the Ngorongoro area, all failed to confirm the existence of the giant forest hog in Tanzania (Ionides, 1969). Swynnerton & Hayman (1951: 341) record *H. meinertzhageni* from the higher reaches of Mt Oldeani, but give no further details. Swynnerton (1958: 443) confusingly records the species only doubtfully for the eastern Serengeti (which at that time included the Crater Highland forest) but positively indicates its presence (: 449) for the mountain mist forest in the same area (followed by d'Huart, 1978).

Moffett (1958: 465) wrote that positive identification of the species had been made in the forested parts of the Crater highlands. Child (1965: 89) recorded the species as collected on Mt Oldeani. Swynnerton *et al.* (1966: 37) include forest hogs in their list of mammals for the Ngorongoro Conservation Area as restricted to the mountain mist forest.

Williams (1967: 107, 201) records the species from forest on the Ngorongoro Crater rim (followed by d'Huart, 1978) and on Mt Oldeani. Guggisberg (1970: 61) records it from Mt Oldeani, and Guggisberg & Guggisberg (1978: 118, 139) from both the Ngorongoro Conservation Area and Mt Oldeani.

Frame (1982) had found no evidence for giant forest hogs at Empakaai Crater or anywhere else in the Crater Highlands, only bush pig, either red-brown or dark-brown, and solitary large grey-black ones, with white cheeks and a long white dorsal crest, were common. Frame (1982) and Grimshaw (1998) quote Barns (1923) and Fosbrooke (1972) for

the statement that giant forst hogs live on the Crater Highlands, but both Frame (1982) and Grimshaw (1998) refute such records of *H. meinertzhageni* as mistaken sightings of bush pig.

To define an Eastern Forest Fauna Region, Grubb (1983) also includes *H. meinertzhageni* as a West and Central Forest species ranging as far as the Tanzania Crater Highlands.

However, no specimen of *H. meinertzhageni* has been reported by any of these authors from the areas listed. No evidence of a specimen nor of an unequivocal sight record was obtained during our own visits in the Ngorongoro area (23-24 March 1971, 25-26 July 1979, DK; December 1968, KMH), Interviews with long-term resident hunters in the Karatu and Oldeani areas in August and September 1984 (KMH) failed to provide definite sight records and no hunter claimed to have shot or seen the remains of a giant forest hog.

Mt Meru area

Numerous authors have reported the giant forest hog from the Mt Meru area. These include the observations of Ch. Schulz and U. Trappe published by Zukowsky (1921; followed by Swynnerton & Hayman, 1951) and the listing by Williams (1967: 112; followed by d'Huart, 1978) for Ngurdoto Crater National Park (now Arusha National Park) as well as Guggisberg (1970: 61, "Ngurdoto and Momella National Parks", now included in Arusha National Park) and Guggisberg & Guggisberg (1978: 118, 139) for Arusha National Park. However, Child (1965) and Ansell (1971, according to D.E.F. Vesey FitzGerald in litt.) noted that giant forest hogs are unconfirmed for Mt Meru.

A report of giant forest hog for Rasha-Rasha (Monduli) west of Arusha (Sayers 1930: 429) is the only one for the Monduli area. Moffett (1958: 460) apparently used the same record to indicate the presence of the giant forest hog on Mt Monduli. Earlier however, Shorthose (1923: 303) had met with only hartebeest and rhinoceros at Rassa-Rassa in 1920, thus this area was unlikely to be suitable habitat for giant forest hog.

Mt Kilimanjaro

Grimshaw *et al.* (1997) and Grimshaw (1998) refuted Johnston's (1971) statement that giant forest hog occurs on Mt Kilimanjaro as in error for bush pig. While *H. meinertzhageni* was never recorded by any other authorative source from Mt Kilimanjaro, the dark-coated bush pig, like those sighted by Grimshaw (1998) on the northern slope, could easily have been mistaken for giant forest hog. However, the rumour is dying hard, and recently Hemp *et al.* (1999), recording animal names used in local dialects by showing illustrations in field guides, obtained one for *H. meinertzhageni* around Old Moshi.

Serengeti National Park

A large male pig was sighted in September 1970 four miles east of Wogakuria, northern Serengeti National Park, approx. 34°55'E-01°40'S, and reported as the first record of *H. meinertzhageni* for this protected area (Anonymous, 1970), constituting at the same time the second record for Tanzania (we presume that *schulzi* is meant to represent the first Tanzania record). In the Serengeti ecosystem in Kenya the giant forest hog was mapped for the southern parts of the Mara Massai Game Reserve by Stewart & Stewart (1963: 13) and it was listed by Astley Maberly (1965: 117) from the Mara National Reserve and from Mara River by Guggisberg (1970: 61) and Guggisberg & Guggisberg (1978: 139); the latter reference also gives the NW-Serengeti of Tanzania as a locality for giant forest hogs. However, these records from the Serengeti ecosystem require substantiation by photograph or specimen.

CONCLUSION

The bushpig that occurs in the Crater Highlands of Tanzania is a large animal with dark grey to black pelage, with a white face and a mid-dorsal mane of white bristles. The young animals are pattern with white or yellow-white spots or short white lines.

There appears to have been little consideration given to the possibility that reports of the giant forest hog in Tanzania in the northern highlands may have involved confusion with large bushpigs that occur in the same area. Despite early accounts of its presence and the description of a new species of giant forest hog from the Crater Highlands, no specimen or unambiguous photographic record exists to support the occurrence of this or indeed any form of giant forest hog in Tanzania.

On the evidence available, we conclude that a species of giant forest hog described by Zukowsky in 1921 and other records of giant forest hogs were based on bushpigs. These records have been repeated by subsequent authors.

There is still the need to document the presence of the giant forest hog in Tanzania with unequivocal photographic evidence or specimen. Its presence would be of considerable biogeographic and conservation significance. There is also the need to preserve series of specimens from the hundreds of bushpigs killed annually as pests to gain a better understanding of the distribution and ecology of these animals.

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