

Suggested English names for Madagascar's species of Carnivora

J. W. DUCKWORTH¹, A. F. A. HAWKINS², Harison RANDRIANASOLO³,
Aristide ANDRIANARIMISA⁴ and S. M. GOODMAN⁵

Abstract

Madagascar is the only faunal region to which all native species of Carnivora are endemic. These species comprise the family Eupleridae, itself endemic to Madagascar. Until recently, these animals were generally taken to be island representatives of mongooses (Herpestidae) and civets (Viverridae), but genetic investigation proves that they are all descended from one colonisation by a species neither a civet nor a mongoose. Many of the widely used English names for most of the species, such as 'Malagasy Civet' for *Fossa fossana* and 'Malagasy Narrow-striped Mongoose' for *Mungotictis decemlineata*, thus suggest misleading evolutionary relationships. Furthermore, most of the species have multiple English names in use in the main sources used by those who prefer English names to scientific names: over three dozen names for the 11 species here recognised. This inconsistency risks increasing confusion when referring to species. English names that do not suggest incorrect relationships are already available (derived from Malagasy names for these animals) and to some extent in use. Here we recommend one name for each species as unambiguous, short, and not taxonomically misleading. Several other members of the Order Carnivora elsewhere in the world where genetic investigations have dramatically revised previously accepted relationships remain known by taxonomically misleading English names.

Keywords: common name, Eupleridae, misleading name, nomenclature, vernacular name

Tolotra anarana amin'ny teny anglisy ho fiantsoana ireo biby mpihinana hena manta Malagasy

Fehiny

Toeram-ponenan'ny biby tena miavaka loatra i Madagasikara satria ireo karazam-biby mpihinana hena manta mivelona ara-boajanahary rehetra ao aminy dia tokana aman-tany. Voasokajy ao amin'ny fianakaviana Eupleridae, izay tsy hita raha tsy ao Madagasikara ihany koa, ireo karazana ireo. Hoan'ireo karazana samihafa era-tany ao anatin'ny fokon'ireo biby mpihinana hena manta, na dia nisy aza ny fandalinana ara-tarazo maty paika dia mbola misy ihany ny fametrahana anarana mampifangaro ny fiaviana. Noheverina foana fa mitovy fiaviana amin'ireo Mangosta sy ny havany akaiky (Herpestidae) ary ny Sivety (Viverridae) any amin'ny firenena hafa ireo biby voalaza ireo teo aloha. Ny fikarohana ny tarazo anefa dia manamarina fa tena hafa tokoa izy ireo satria sady tsy Sivety no tsy Mangosta. Izany indrindra no ilazana etoana fa maro amin'ireo anarana teny anglisy iantsoana ireo karazana biby Malagasy ireo no mila fanitsiana, tahaka ny filazana fa ny 'Malagasy Civet' dia *Fossa fossana* ary ny 'Malagasy Narrow-striped Mongoose' dia *Mungotictis decemlineata*. Mitarika fikorontanana tanteraka eo amin'ny fiantsoana azy ireo izany tranga izany. Manampy trotraka izany koa ny fisian'ireo anarana teny anglisy maromaro izay be mpampiasa tokoa, entina hiantsoana karazana iray (Misy ireo tia mampiasa kokoa ny teny anglisy noho ireo anarana siantifika). Maherin'ny 36 ireo anarana entina hilazana ny karazana 11 misy. Ireo anarana amin'ny teny anglisy izay tsy mametraka mivantana ny fifandraisana arapivoarana biolojika dia misy ary efa ampiasaina (nitsiry avy tamin'ny anarana teny Malagasy an'ireo biby). Izany tsy fifanarahana rehetra izany dia tena mitarika savorovoro. Anarana tokana, fohy sady mazava, ary tsy atahorana hifangaro amin'ny hafa isaky ny karazana àry no atolotray etoana.

Background

Madagascar supports the most taxonomically distinct assemblage of the order Carnivora (hereafter 'carnivore') found anywhere in the world. None of the major faunal regions with native Carnivora—Palaeartic, Oriental (Indomalayan), Ethiopian (Afrotropical), Nearctic and Neotropical—has its entire native species complement composed of forms unique to the region in question. By contrast, in Madagascar all native carnivores belong to the family Eupleridae, and this family is confined to Madagascar (Goodman 2009). Reflecting obsolete taxonomic thinking, many commonly used English names for these animals obscure their evolutionary distinctiveness. For example, *The IUCN Red List of Threatened Species* (IUCN 2013) gives such primary (i.e. recommended from among those listed) English names as 'Malagasy Civet' for *Fossa fossana* and

'Malagasy Narrow-striped Mongoose' for *Mungotictis decemlineata*. These animals do indeed look and behave somewhat like civets (Viverridae) and mongooses (Herpestidae), respectively (Fig. 1). But these names suggest that these animals are simply Madagascar's representatives of the widespread civets and mongooses, so mask the animals' phylogenetic distinctiveness and their remarkable exemplification of convergent evolution.

The proposal of new English names for species that already have them should be avoided wherever possible, because the use of multiple names for one species leads to confusion among the people who rely on them: those with a disinclination to use scientific names (many of the general public). However, other English names not implying misleading relationships are already used by some sources for these animals. Although less widely used outside Madagascar at present, we



Fig. 1. Some of Madagascar's carnivores (left) and the superficially similar animals found elsewhere (right). Top left, Ring-tailed Vontsira *Galidia elegans*, and top right, Common Slender Mongoose *Herpestes sanguineus*; centre left, Spotted Fanaloka *Fossa fossana*, and centre right, Malay Civet *Viverra zibethica*; lower left, Fosa *Cryptoprocta ferox*. There is no lower right image, because no animal in Africa or Asia particularly closely resembles a Fosa. This is no doubt why it has, uniquely among Madagascar's carnivores, been known in English since scientific discovery by its Malagasy name, rather than by a phylogenetically misleading one (Photos: Nick Garbutt (www.nickgarbutt.com) except top right, by Emmanuel Do Linh San).

propose that these should therefore be employed globally and that the 'mongoose' and 'civet' names should be expunged from use for Madagascar's carnivores.

English names of species (e.g. White-tailed Mongoose *Ichneumia albicauda*) are often comprised of a 'group name', which occurs in the name of multiple species (here, 'mongoose') and a 'modifier' that indicates the species within the group (here, 'White-tailed'). Where a group is monospecific (e.g. Aardwolf *Proteles cristata*) or an idiosyncratic name is given to a species within a multi-species group (e.g. Tiger *Panthera tigris*, on conventional classification), no modifier is needed.

The range of existing English names

Table 1 shows the great inconsistency in English names for Madagascar's carnivore species as given in various widely-used sources, including *Mammal species of the world* (Wozen-craft 2005), *Handbook of the mammals of the world* (Goodman 2009), the most-used field guide to Madagascar's mammals as a whole (Garbutt 2007), and *The IUCN Red List of Threatened Species* (IUCN 2013). This abundance of names in itself impedes communication because people accustomed to using one name may not realise that the same species is being referred to under another. This problem alone argues for the selection and promotion of the most appropriate name for each species. Much thought has gone into the English names for birds, including attempts to supply a 'global standard': one unique, unambiguous and non-misleading name for each species (e.g. Cheesman & Oehser 1937, King *et al.* 1975, Sibley & Monroe 1990, Gill & Wright 2006). English names of mammals have received much less attention (Wilson & Cole 2000, Duckworth & Pine 2003, Grubb 2006).

Existing English names for Madagascar's carnivores fall into two categories: (i) those with no vernacular heritage for the Madagascar species, but invented by zoologists using existing English names of other animals for basic group names ('civet' and 'mongoose'); and (ii) Malagasy words used with or without English language modifiers such as 'Broad-striped' and 'Madagascar'. All names in the former category are now problematic through their implication of close relationship to animals outside the Eupleridae. Before genetic investigations, some Madagascar carnivores were believed to be mongooses and others civets (e.g. Schreiber *et al.* 1989). Thus, names using 'civet' and 'mongoose' were not, according to the beliefs of the day, taxonomically misleading. However, there is now no doubt that the native Madagascar carnivores arose from a single ancestor that was neither a civet nor a mongoose (Veron & Catzeflis 1993, Yoder *et al.* 2003). Thus, English names that do not suggest misleading relationships must come either from the Malagasy language, or, as a last resort, be newly coined.

Many Malagasy vernacular names have been documented for the island's carnivores (Goodman 2012). Only one, 'fosa', has so far been the basis for an English name in pre-eminent use outside Madagascar. Confusingly, in English ('Fossa' or 'Fosa') this means *Cryptoprocta ferox*, yet a different Madagascar carnivore has the scientific name *Fossa fossana*. The original, correct, use of this name is for *Cryptoprocta* (e.g. Goodman 2012). Unfortunately, by the International Code of Zoological Nomenclature (International Commission on Zoological No-

menclature 1999), *Fossa* must remain permanently in use as a scientific name for a different animal. This animal, *F. fossana*, is widely called 'fanaloka' in Madagascar.

'Fanaloka' is applied by the Malagasy also to *Eupleres* and even *Salanoia* (Goodman 2012). This is assumed to be the same word which when applied to *Eupleres* in English is typically transcribed as 'fanalouc' or, much less often, 'fanalouc' (e.g. Schreiber *et al.* 1989) or 'fanaluk' (e.g. Haltenorth & Diller 1980). These spellings appear to be transcription errors. 'Fanalouc' is not itself a Malagasy word (HR pers. obs.); even to western ears, 'fanaloka' is certainly a better rendition of the spoken word. Goodman (2012) did not record 'fanalouc' for any species; and in numerous discussions with rural Malagasy at localities scattered across the island from 1988 to 2007, AFAH has never heard villagers distinguishing 'fanaloka' and 'fanalouc' as two animals or words.

Another problematic name in use in Madagascar is 'jaboady'. This is generally applied to the introduced Small Indian Civet *Viverricula indica* (Goodman 2012). The word itself is evidently also an introduction, being used for this same species in its Indian native range (Wroughton 1912 ['jabadio'], Rao *et al.* 2007 ['jawadi']). It is doubtless related to the Arabic word 'al zabad' for civet (see Dannenfeldt 1985). The name is applied sometimes to other species (e.g. Hawkins 1994), although whether this results from identification error (people think the animal in question is Small Indian Civet), non-specificity or a genuine, species-specific use by at least the interlocutor in question has not been documented.

Selecting the optimal English name for each species

Table 1 presents, for each species, our chosen English name and the alternative names as used in publications available to the general public. Long experience with bird names has shown that the English names most likely to be optimal are familiar (even better if in established usage), non-ambiguous, short and informative (summarised in Duckworth & Pine 2003).

Cryptoprocta

Because of the conflict over which animal is referred to by 'fossa' in English and scientific nomenclature, the spelling 'fosa', the direct Malagasy spelling (Goodman 2012), is superior. Although it is far less widely used than is 'fossa', it is starting to appear (e.g. Garbutt 2007). A second species of the genus, Giant Fosa *C. spelea*, survived to about 1,500 years before present (Goodman *et al.* 2004, Crowley 2010). Because this second species is now extinct, it seems unnecessary to require *C. ferox* to have a modifier to prevent 'fosa' being both a species name and a group name for two species.

Recommendation: *Cryptoprocta ferox*: Fosa

Eupleres

Although several Malagasy names have been documented for this genus (Goodman 2012), of them only 'fanalouc' (and variant spellings) seems ever to have been used in English and thus this, despite its etymological bastardy (see above), is the only non-destabilising group name for the genus. This would constitute also the full species name if the genus is consid-

Table 1. English names in use for Madagascar's species of Carnivora.

Scientific name	Optimal English name	Alternative English names
<i>Cryptoprocta ferox</i>	Fosa ^{3,7,9}	Fossa ^{1,2,4,5,6,(7),8}
<i>Eupleres goudotii</i> sensu lato	n/a (Falanouc ^{2,3,5,7,9})	Malagasy Mongoose ⁽¹⁾ , Slender Falanouc ⁽¹⁾ , Small-toothed Mongoose ^{(1),8} , Fanalouc ⁶
<i>Eupleres goudotii</i> sensu stricto	Eastern Falanouc ⁷	Falanouc ¹
<i>Eupleres major</i>	Western Falanouc	Major's Falanouc ¹ , Giant Falanouc ⁷
<i>Fossa fossana</i>	Spotted Fanaloka ^{1,3,(7)}	Malagasy Civet ^{(1),2,5,6,(7)} , Striped Civet ^{(1),8} , Malagasy Striped Civet ^{4,(7)} , Fanaloka ^{7,9}
<i>Galidia elegans</i>	Ring-tailed Vontsira ^{1,3,7}	Malagasy Ring-tailed Mongoose ^{(1),5,6} , Ring-tailed Mongoose ^{(1),2,4,(7),8,9}
<i>Galidictis fasciata</i>	Broad-striped Vontsira ^{1,3,7}	Malagasy Broad-striped Mongoose ^{(1),6} , Broad-striped Mongoose ^{(1),5,8,9} , Broad-striped Malagasy Mongoose ^{2,(7)}
<i>Galidictis grandidieri</i>	Grandidier's Vontsira ^{1,3,7}	Grandidier's Mongoose ^{(1),2} , Giant-striped Mongoose ^{(1),5,(7)} , Giant Striped Mongoose ^{6,9}
<i>Mungotictis decemlineata</i> sensu lato	n/a (Bokiboky)	Malagasy Narrow-striped Mongoose ^{(1),5,6} , Narrow-striped Mongoose ^{(1),2,4,(7),8,9} , Narrow-striped Boky ^{1,3,7}
<i>Mungotictis decemlineata</i> sensu stricto	Northern Bokiboky	
<i>Mungotictis lineata</i>	Southern Bokiboky	
<i>Salanoia concolor</i>	Brown-tailed Vontsira ^{1,3,7}	Malagasy Brown-tailed Mongoose ^{(1),6} , Brown-tailed Mongoose ^{(1),2,5,(7),9} , Salano ^{(1),(7)} , Plain Mongoose ⁸
<i>Salanoia durrelli</i>	Durrell's Vontsira	Durrell's Salanoia ¹

A reference in parentheses indicates that the source gives this name as an alternative (specifically, called a 'former name' in Goodman 2012); note that not all sources contain all species. Guidance on pronunciation is given in the Appendix.

1, Goodman (2012); 2, Wozencraft (2005); 3, Goodman (2009); 4, Goodman & Benstead (2003); 5, *The IUCN Red List of Threatened Species* (IUCN 2013); 6, Schreiber *et al.* (1989); 7, Hunter & Barrett (2011); 8, Haltenorth & Diller (1980); 9, Garbutt (2007).

ered monospecific. If two species in the genus are accepted (as by Goodman & Helgen 2010), the segregate needs an English name and the name for the residual requires a modifier. 'Major's Falanouc' is unsuitable for *E. major*: although the original description of the taxon (Lavauden 1929) lacked an explicit etymology of 'major', this word can mean 'larger' in Latin: because the name is introduced directly after the author's statement that the animal is much bigger than is *E. goudotii*, it was plausibly used by him in this sense. Some Madagascar animals are named after C. I. Forsyth Major, but it seems implausible this was Lavauden's intent: Major collected no *Eupleres* (Jenkins & Carleton 2005) and it is exceptional for a species name commemorating a person to be a noun in apposition, not in the genitive form (which would usually be *majori*, as in the synonym [of *Fossa fossana*] *Fossa majori* Dollman, 1909). Hunter & Barrett (2011) used 'Giant Falanouc' and 'Eastern Falanouc' for *E. major* and *E. goudotii*, respectively. With 'Giant Falanouc' not yet in wide use, for an animal that is hardly gigantic (camera-trap images can be difficult to tell to species: Evans *et al.* 2013) the names 'Eastern Falanouc' and 'Western Falanouc' (as used by Evans *et al.* 2013) are more informative. **Recommendation:** *Eupleres goudotii*: Eastern Falanouc; *Eupleres major*: Western Falanouc

Fossa

With only one species in the genus, there is no requirement for the group name 'Fanaloka' in English to have a modifier, because *F. fossana* needs to be distinguished from no other 'fanaloka'. However, because 'fanaloka' in Malagasy can mean several genera of carnivores, use of 'Spotted' as a modifier will help reduce confusion in situations where both Malagasy and English are in use.

Recommendation: *Fossa fossana*: Spotted Fanaloka

Galidia and Galidictis

Two of these animals, the widely sympatric *Galidia elegans* and *Galidictis fasciata*, are each known as 'vontsira' across their geographical ranges (Goodman 2012, 2013). The only Malagasy name documented by Goodman (2012) for the third, *Galidictis grandidieri*, is 'votsotsoke'. This species's lack of a name using 'vontsira' reflects its range, widely disjunct from the other two species, where a different dialect of Malagasy is spoken. In English, calling them all vontsiras reduces the number of group names to be learnt. A shared group-name by the two *Galidictis* species is also appropriate given their morphological similarity: *G. grandidieri* was not named until 1986 (Wozencraft 1986), even though its holotype (skin and skull) had been collected in 1929, identified at the time as *G. fasciata* (Rand 1935), and held in an international zoological collection. The modifiers could be English or Malagasy: for *G. fasciata*, for example, 'Broad-striped Vontsira' or the directly documented full Malagasy name 'Vontsira Fotsy'. For global ease of communication, it seems advisable to use English-language modifiers for these species. *Galidictis grandidieri* has already, despite its late discovery, three alternative English-language modifiers in use: 'Grandidier's', 'Giant-striped' (i.e. the stripes are giant) and 'Giant Striped' (i.e. the striped animal is giant). Use of 'giant' in either context seems fanciful.

Recommendation: *Galidictis grandidieri*: Grandidier's Vontsira; *Galidictis fasciata*: Broad-striped Vontsira; *Galidia elegans*: Ring-tailed Vontsira

Mungotictis

In modern times, *Mungotictis decemlineata* (sensu lato), of the western dry forests, is allopatric from the species known in Malagasy as 'vontsira' (of the eastern humid and northern dry deciduous forests). Given its similarity in body form, it is

likely that if one were presented to residents of the eastern forest, they would call it a 'vontsira'. This could be an acceptable English group name for the animal. However, there appears to be no tradition of this usage. 'Boky-boky' and 'Boky' have been used in English (e.g. Goodman 2012, Jansen van Vuuren *et al.* 2012); 'Boky' has the advantage of being shorter, but the doubled form is in much wider use in Madagascar. Its usual rendition in European languages, 'Boky-boky', does not accord with the Malagasy correct form, which is 'Bokiboky'. This spelling has been used only rarely in English (within, e.g., Woolaver *et al.* 2004), as has 'Bokyboky' (e.g. Burney & Ramilisonina 1999). Conventionally, the genus has been considered monospecific, so a modifier ('Narrow-striped') unnecessarily lengthens the name. If the genus contains two species (*Mungotictis decemlineata* and *M. lineata*; see Hawkins *et al.* 2000, Goodman *et al.* 2005, Goodman 2013), as will shortly be proposed formally by B. Jansen van Vuuren, then modifiers for each would be required, appropriately 'Northern' and 'Southern', given their relative ranges.

Recommendation: *Mungotictis decemlineata*: Northern Bokiboky; *M. lineata* Southern Bokiboky

Salanoia

Both *Salanoia* species are called 'vontsira' by the Malagasy living where they occur (Goodman 2012) and using this as the English group name is thus preferable to introducing another, also locally used group name, 'salano' or 'salanoia'. The two species, which are extremely similar (Durbin *et al.* 2010), should have the same group name.

Recommendation: *Salanoia concolor*: Brown-tailed Vontsira; *Salanoia durrelli*: Durrell's Vontsira

Discussion

These recommendations for English names of Madagascar's carnivores propose for most species a name already in use in at least one influential source (Table 1). Of the four minor exceptions, three relate to recent species-level taxonomic change: (i) the recognition that two species of *Mungotictis* exist, so a necessarily new modifier for each; (ii) the replacement of both existing modifiers for a newly elevated species by a more meaningful one; and (iii) the correction of an apparently unintended group-name for a newly discovered species. The fourth involves minor correction of presentation of a Malagasy word. These 11 species possess between them over three dozen other names used in major bibliographic sources, a situation generating unnecessary and considerable confusion. Together with the recent clear demonstration that all members of the family Eupleridae are a unique evolutionary group, it is high time to support one clear English name for each species. Currently, the phylogenetically misleading names still seem to be those predominantly in use, at least for some species: on 15 April 2014, a Google search for "Ring-tailed Mongoose" found about 141,400 results versus that for "Ring-tailed Vontsira" finding about 7,420. This means that there may be some resistance to adoption of the names proposed here. In a parallel case, the British Ornithologists' Union (BOU) intended all BOU publications to follow the internationally proposed English names for bird species of the International Ornithological Congress (IOC) (Gill & Wright 2006). After some years of trial where the IOC draft names were listed

before names in common use in Britain (e.g. Dudley *et al.* 2006), opposition from the bird-watching community in Britain reversed this policy such that in the most recent *Checklist of birds of Britain* (Harrop *et al.* 2013) the parochial name is placed first and emboldened, at variance with the Union's general policy to use English names that are internationally meaningful and unambiguous (BOURC 2007). There are far fewer people who have got into the habit of using any particular English names for Malagasy carnivores than there are British birdwatchers, so we hope for rapid general adoption of the names recommended here. This will be expedited if these names are used by the sources (both printed and internet) most used by the general public. An example of a successful shift in names, for exactly the same reason, is Strahan's (1983, 1985) prominent adoption of the Australian aboriginal names for mammals known for some time by Europeans under names such as 'native cats' and 'marsupial rats'. Thirty years later, taking 'Wikipedia' as an arbiter of popular usage, the only English names for species in the list of Australian monotremes and marsupials that are such misleading hangovers are for the two 'marsupial-moles' *Notoryctes* (http://en.wikipedia.org/wiki/List_of_monotremes_and_marsupials_of_Australia).

With genetic investigation showing that traditional morphology-based classifications of mammals sometimes do not reflect the real history of evolution, Madagascar's carnivores are not the only ones where English names need fresh attention. The discovery that the African animals known as 'linsangs' *Poiana* are not closely related to the Asian linsangs *Prionodon*, but constitute another remarkable case of convergent evolution (Gaubert & Veron 2003), has stimulated a propensity to refer to *Poiana* as 'oyans', not 'linsangs' (e.g. Gaubert *et al.* 2008, Jennings & Veron 2009, Hunter & Barrett 2011). This remains far from universal, with 'linsang' still used for this genus, unfortunately, in the recently published landmark handbook *Mammals of Africa* (Kingdon & Hoffmann 2013). There seems to have been no progress with English name review for the other small carnivores subject to recent major change in phylogenetic placement. Most notably, *Nandinia binotata*, usually called 'African Palm Civet' or 'Two-spotted Palm Civet' is not a civet (Viverridae) any more than is *Fossa fossana* (Flynn & Nedbal 1998). It is merely somewhat similar in habits to the Asian palm civets (Viverridae: Paradoxurinae). With apparently no existing English name not including the word 'civet', this would be a prime case for a new English name, perhaps one based on a name in a local language in its native range. Similarly, the two stink-badgers *Mydaus* of the Sunda Shelf (South-east Asia) are not close relatives of badgers (Mustelidae) but are the only Old-world skunks (Mephitidae) (Dragoo & Honeycutt 1997). Finally, Giant Panda *Ailuropoda melanoleuca* is an aberrant bear and is not closely related to the original provider of the name 'panda', Red Panda *Ailurus fulgens* (Yu *et al.* 2004), despite the implications of the shared group name.

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¹6 Stratton Road, Saltford, Bristol BS31 3BS, UK.

Email: will.duckworth@iucn.org

²IUCN, 1630 Connecticut Avenue, NW, Suite 300, Washington DC 20009, U.S.A.

³Conservation International, BP 5178, Antananarivo 101, Madagascar.

⁴Wildlife Conservation Society Madagascar Program, BP 8500, Soavimbahoaka, Antananarivo 101, Madagascar and Animal Biology Department, Faculty of Science, University of Antananarivo, BP 906, Ankatso, Antananarivo, Madagascar.

⁵Field Museum of Natural History, 1400 South Lake Shore Drive, Chicago, Illinois 60605, U.S.A. and Association Vahatra, BP 3972, Antananarivo 101 Madagascar.

Appendix. Notes on pronunciation of the Malagasy names.

Fosa = Fòòs(a)

Falanouc = Fàhlahnook

Fanaloka = Fahnàhlook(a)

Vontsira = Voontsìr(a)

Bokiboky = Bookibook(y)

The grave accent shows the syllable of emphasis. Bracketed letters are slightly de-emphasised, or swallowed. A long 'a' is followed by an 'h', otherwise each 'a' is short.