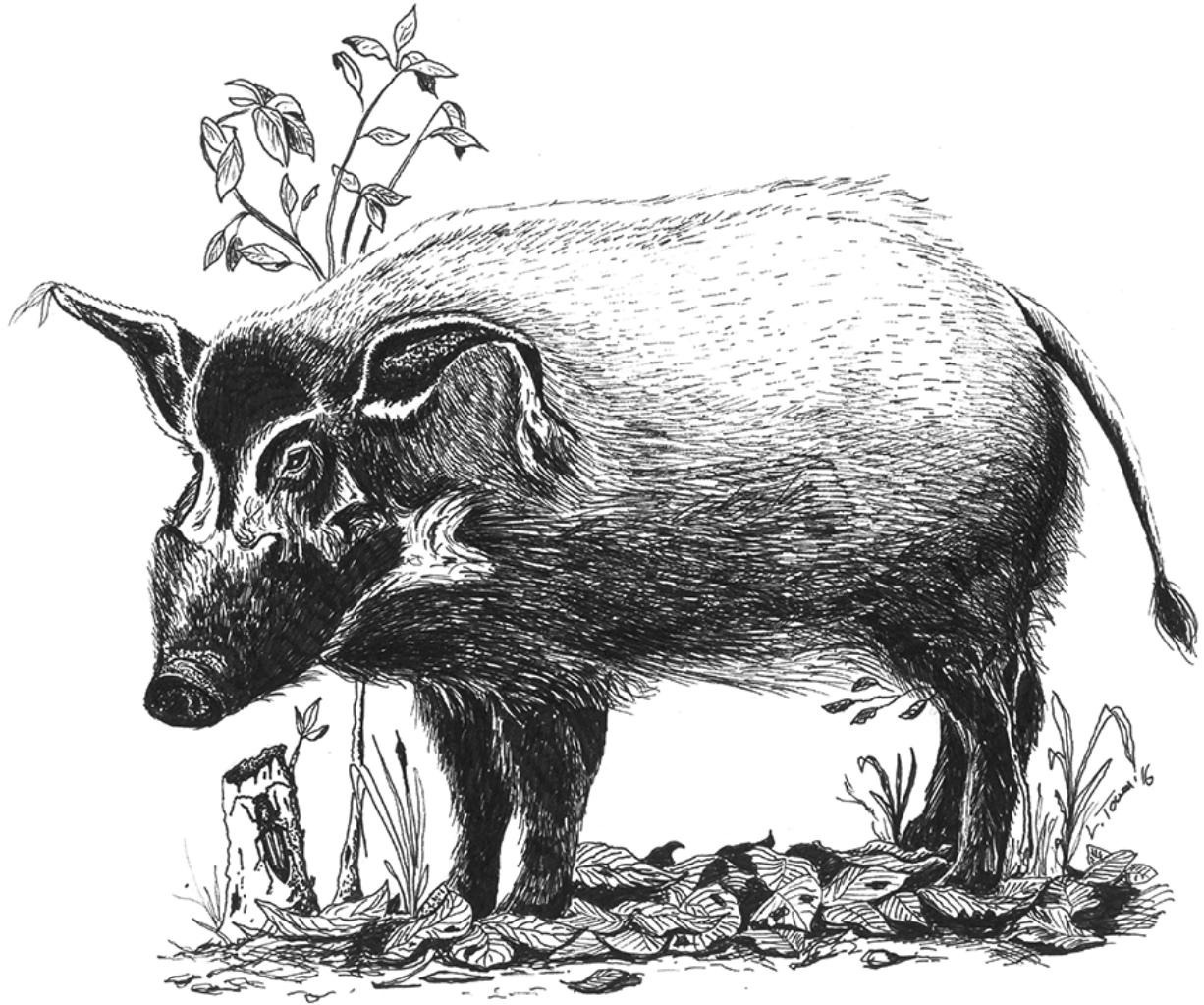


Red River Hog *Potamochoerus porcus* (Linnaeus, 1758)

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Names

Genus: *Potamochoerus* Gray, 1854

Species: *Potamochoerus porcus* (Linnaeus, 1758)

Names in other languages: **French:** Potamochère roux, Potamochère d'Afrique; **German:** Pinselohrschwein; **Spanish:** Potamocero rojo; **Italian:** Potamocero rosso, Potamocero di fiume; **Afrikaans:** Bosvark; **kiSwahili:** Nguruwe; **Lingala in Congo:** Ngulu; **Lingala in DRC:** Nsombo; **Teke, Baya:** Nguea

Taxonomy

The species is monotypic; no subspecies are currently recognized because of the lack of strong morphological differences through its range.

Grubb (1993) and Grubb et al. (1998) stated that the genus *Potamochoerus* should constitute two species: the red river hog (*P. porcus*) and the bushpig (*P. larvatus*). Grubb's work was based mainly on morphological differences and on the fact that the two species show few signs of intergradation or hybridization where their ranges adjoin. However, genetic studies are needed to give a clearer picture about the relations between these two species, particularly in areas of overlap (Kingdon & Hoffman 2013).

The species has been recorded to interbreed with introduced wild boar, *Sus scrofa*, in Wonga-Wongue Presidential Hunting Reserve in Gabon (Kingdon & Hoffman 2013). For more information about the taxonomy of *P. porcus* see Chapter 1 in this book.

Subspecies and Distribution

The monotypic red river hog occurs mainly in rainforest and gallery forest from Senegal to the eastern regions of the Democratic Republic of Congo (DRC) (Figure 13.1). It has been recorded in almost all of the foot surveys carried out in the forest

zone of Central Africa (Cameroon, Central African Republic, Congo, DRC, Equatorial Guinea, and Gabon) and occurs within all of the protected areas in the region surveyed between 2002 and 2016: Table 13.1 shows 88 foot surveys or bai observations across the forest region, and a map of these efforts is shown in Figure 13.2. The southern limit (across most of its range) is the southern edge of the Congo basin rainforest (Leus & Vercammen 2013). The northern limit appears to be the Sudanian transitional region (Stuart & Adams 1990), but there has been a contraction of its historical range, particularly in the west and extreme north. In Cameroon, the species is present as far as the north-east of the country, in the woodland and bushy savannas of the Bouda Ndijsa National Park and the Niwa hunting area. In the easternmost and southernmost regions of its range, the species is replaced by bushpig, although the range boundary is not well defined (Reyna et al. 2016). There is a possible area of intergradation between red river hog and bushpig in southern DRC and southwest Ethiopia, but information is insufficient for any definitive conclusion (Vercammen et al. 1993). One of the areas of overlap between the bushpig and the red river hog is in the Albertine Rift, where there is an altitudinal separation between them, with the bushpig occurring at higher elevations and the red river hog in lowland forests (Meijaard et al. 2011).

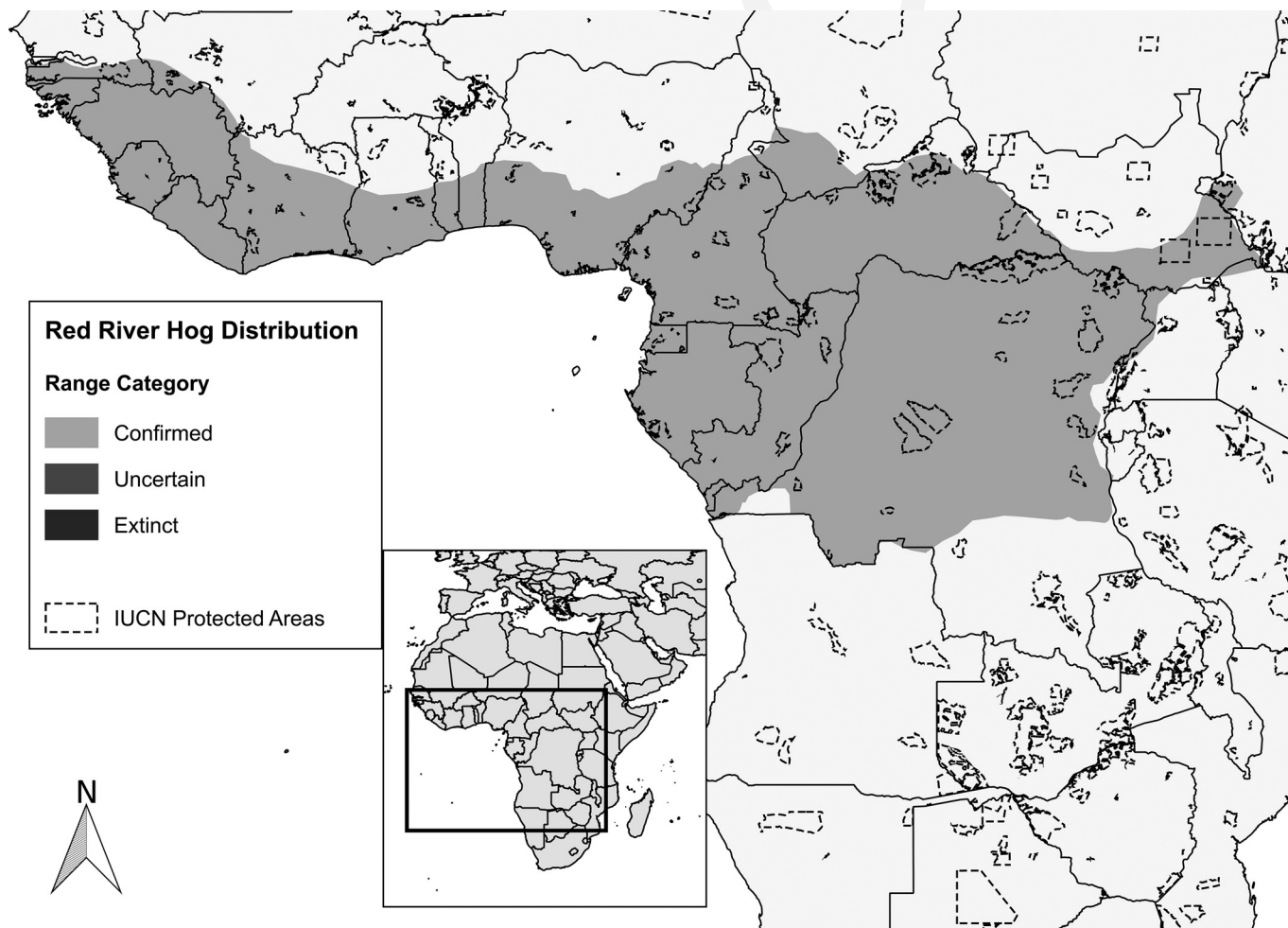


Figure 13.1 Red river hog distribution (source: IUCN 2008, *Red List of Threatened Species*).

Table 13.1 The most recent reports and data sets about the presence/absence of red river hog and forest hog in 88 different sites in Central Africa. (Pp = *Potamochoerus porcus*; Hm = *Hyochoerus meinertzhageni*) The data in this table are those of the author(s) and do not necessarily represent the views of the USFWS and USAID.

Country	Site name	IUCN category	Status	Year of survey	Type of survey	Taxa	Source
Cameroon	Banyang-Mbo Wildlife Sanctuary	IV	Wildlife Sanctuary	2006–2007	Line transects	Pp	Greengrass & Maisels 2007
Cameroon	Boumba-Bek NP	II	National Park	2012	Line transects	Pp	Maisels et al. 2014b
Cameroon	Boumba-Bek NP	II	National Park	2016	Line transects	Pp	Nzooch Dongmo et al. 2016b
Cameroon	Campo Ma'an NP	II	National Park	2016	Line transects	Pp	Nzooch Dongmo et al. 2015
Cameroon	Deng Deng NP	II	National Park	2012	Line transects	Pp, Hm	Maisels et al. 2013c
Cameroon	Deng Deng UFA 10-065	NA	Logging Concession	2010	Line transects	Pp	Maisels et al. 2010b
Cameroon	Dja Biosphere Reserve	II	Biosphere Reserve: small portion	2016	Line transects, recces	Pp	IUCN/MINFOF 2015
Cameroon	Ejagham Forest Reserve	VII	Forest Reserve	2003	Recces	Pp	Nku 2003a
Cameroon	Fossimondi (UFA 11-002)	NA	Logging concession	2006	Recces	Pp	Ekinde & Khumbah 2006
Cameroon	Fungom Forest Reserve	VII	Forest Reserve	2004	Recces, interviews	Pp	Ekinde et al. 2005
Cameroon	Korup NP	II	National Park	2006–2007	Line transects	Pp	Okon & Atanga 2007
Cameroon	Lobéké NP	II	National Park	2015	Line transects	Pp, Hm	Nzooch Dongmo et al. 2016a
Cameroon	Mbam et Djerem NP	II	National Park	2008–2009	Line transects, recces	Pp, Hm	Maisels et al. 2009b
Cameroon	Mbulu Forest	VII	Community Forest	2007	Recces	Pp	Warren & Bila 2008
Cameroon	Mbulu Forest	NA	Community Forest	2008	Recces	Pp	Warren & Bila 2008
Cameroon	Mengamé Gorilla Sanctuary	TBC	Gorilla Sanctuary	2006	Line transects, recces	Pp	Ekobo 2006
Cameroon	Mone River Forest Reserve	NA	Forest Reserve	2007	Recces	Pp	Warren & Ekinde 2007
Cameroon	Mt Cameroon NP	II	National Park	2007	Recces	Pp	Ekobo 2007
Cameroon	Nanga-Eboko	VI	Forest Reserve	2002	Line transects, recces	Pp	Fotso et al. 2002
Cameroon	Ngoyla Mintom	NA	Logging Concession	2011	Line transects	Pp	Foguekem & Nzooch Dongmo 2012
Cameroon	Nki NP	II	National Park	2004	Bai monitoring	Pp, Hm	Gessner 2008
Cameroon	Nki NP	II	National Park	2016	Line transects	Pp, Hm	Nzooch Dongmo et al. 2016b
Cameroon	Nkwende Hills	VII	Forest Reserve	2003	Recces	Pp	Nzooch Dongmo et al. 2003b
Cameroon	Sanaga-Yong	NA	Forest Reserve	2002	Line transects, recces	Pp	Fotso et al. 2002
Cameroon	Takamanda NP	II	National Park	2013	Recces	Pp	Ifkuingei & Kuchambi 2013
Cameroon	UFA 00-003 and 004	NA	Logging concession	2007	Line transects, recces	Pp	Ekobo 2009
Cameroon	UFA 10-007, 009, 011, 012, 013	NA	Logging concession	2015	Line transects, recces	Pp, Hm	Nzooch Dongmo et al. 2016a
Cameroon	UFA 10-063, 064	NA	Logging Concession	2015	Line transects	Pp, Hm	Nzooch Dongmo et al. 2016a
CAR	Bangassou	IV	Forest Reserve	2004	Line transects, recces	Pp	Williamson et al. 2004
CAR	Chinko Nature Reserve	NA	Private Reserve	2015	Confirmed presence	Pp, Hm	Aebischer et al. 2013
CAR	Dzanga NP	II	National Park	2002-2004	Recces	Pp	Melletti et al. 2009
CAR	Dzanga NP	II	National Park	2016	Line transects, recces	Pp	N'Goran et al. 2016
CAR	Dzanga NP	II	National Park	2016	Recces	Pp	N'Goran et al. 2016

CAR	Dzanga NP	II	National Park	2011–2012	Line transects, recces	Pp	Princee 2013
CAR	Dzanga Special Reserve	VI	Forest Reserve	2016	Line transects, recces	Pp	N'Goran et al. 2016
CAR	Dzanga Special Reserve	VI	Forest Reserve	2012	Line transects, recces	Pp	Princee 2013
CAR	Ndoki NP	II	National Park	2016	Line transects, recces	Pp, Hm	N'Goran et al. 2016
CAR	Ndoki NP	II	National Park	2012	Line transects, recces	Pp, Hm	Princee 2013
CAR	Zemongo Faunal Reserve	IV	Faunal Reserve	2015	Confirmed presence	Pp, Hm	Aebischer 2015, personal communication
Congo	Bailly Swamps	NA	Not Protected	2011	Line transects	Pp	Maisels et al. 2012
Congo	Batanga	NA	Not Protected	2012	Line transects, recces	Pp	Iyenguet et al. 2012
Congo	Batéké Forest	NA	Logging Concession	2012	Line transects, recces	Pp	Inkamba-Nkulu et al. 2012
Congo	Conkouati-Douli NP	II	National Park; Ramsar Site	2013	Line transects	Pp	Vanleeuwe 2014
Congo	Dimonika Biosphere Reserve	II	Biosphere Reserve	2009	Line transects, recces	Pp	Pintea et al. 2012
Congo	Djoua-Ivindo	NA	Logging concession	2016	Line transects	Pp	Allam et al. 2016a
Congo	Impfondo	NA	Not Protected	2008	Recces	Pp	Iyenguet et al. 2008
Congo	Kabo	NA	Logging concession	2010	Line transects, recces	Pp, Hm	Maisels et al. 2012
Congo	Lac Télé Community Reserve	VI	Community Reserve	2011	Line transects, recces	Pp	Maisels et al. 2012
Congo	Loundougou	NA	Logging concession	2010–2011	Line transects	Pp	Maisels et al. 2012
Congo	Messok-Dja	NA	Logging concession	2016	Line transects	Pp	Allam et al. 2016b
Congo	Messok-Dja	NA	Logging concession	2013	Line transects	Pp	Moukala Mantsila et al. 2013
Congo	Mokabi	NA	Logging concession	2006	Line transects	Pp	Stokes et al. 2010
Congo	Ngombe	NA	Logging concession	2014	Line transects	Pp	Maisels et al. 2014a
Congo	Nouabalé-Ndoki NP	II	National Park	2010–2011	Line transects	Pp, Hm	Maisels et al. 2012;
Congo	Ntokou-Pikounda NP	II	National Park	2014	Line transects	Pp	Maisels et al. 2014a
Congo	Odzala-Koukoua NP	II	National Park	2012	Line transects	Pp, Hm	Maisels et al. 2013a
Congo	Pikounda N	NA	Logging concession	2007	Line transects	Pp	Maisels et al. 2014a
Congo	Pokola	NA	Logging concession	2010	Line transects	Pp	Maisels et al. 2012
Congo	Tala Tala	NA	Logging concession	2016	Line transects	Pp	Anselme Allam, personal communication
Congo	Tanga	NA	TBD	2009	Line transects	Pp	Malanda et al. 2010
DRC	Bakwanza-Samboko	VI	CBNRM	2010	Recces	Pp	Makana et al. 2010
DRC	Gangu Forest, Biji-Uere area	NA		2012	Camera traps	Pp, Hm	Hicks 2014
DRC	Itombwe	II	Proposed National Park	2008	Recces	Pp, Hm	Plumptre et al. 2009
DRC	Ituri landscape Mai-Tatu	TBD	Proposed Community Reserve	2014	Line transects, recces	Pp, Hm	Makana et al. 2012
DRC	Ituri Okapi Faunal Reserve	TBD	Wildlife Reserve	2010–2011	Line transects, recces	Pp, Hm	Vosper et al. 2012
DRC	Kahuzi-Biega NP Nzovou-Ouest, Nzovou-Est, Tshivanga	II	National Park	2014–2016	Line transects	Pp	Kujirakwinja et al. 2015
DRC	Lac Tumba Bopaka zone	NA	Not Protected	2011	Recces	Pp	Devos et al. 2011
DRC	Lac Tumba Ngiri Triangle	NA		2014	Recces	Pp	Beudels-Jamar et al. 2014
DRC	Lac Tumba Ndimba & Mbanzi-Nsele	NA	Lac Tumba landscape	2015	Recces	Pp	Beudels-Jamar et al. 2015

(cont.)

Table 13.1 (cont.)

Country	Site name	IUCN category	Status	Year of survey	Type of survey	Taxa	Source
DRC	Maringa Loporri landscape-Djoulou Wamba multiple use zone	NA		2006	Recces	Pp	Likondo Lokonga 2006
DRC	Misotshi-Kabogo	NA	Not Protected	2007	Zig-zag transects, interviews	Pp, Hm	Plumptre et al. 2008
DRC	MLW landscape Lomako-Yokokala	NA	Not Protected	2010	Line transects	Pp	Lushimba 2012
DRC	Rubi-Tele area	NA		2012	Recces	Absent	Hicks 2014
DRC	Salonga landscape corridor	NA	Not Protected	2007–2008	Recces	Pp	Maisels et al. 2009a
DRC	Salonga NP Lokofa	II	National Park	2010	Recces	Pp	Liengola et al. 2010
DRC	Salonga NP north	II	National Park	2003–2006	Line transects, recces	Pp	Blake 2005
DRC	Salonga NP south	II	National Park	2003–2006	Line transects, recces	Pp	Blake 2005
DRC	Sankuru Nature Reserve	TBD	Protected area/Natural reserve	2009	Recces	Pp	Liengola et al. 2009
DRC	Tshuapa-Lomami-Lualaba	TBD	Proposed protected area	2008–2010	Recces	Pp	Hart et al. 2009
DRC	Usala	NA	Proposed Community Reserve	2007	Recces	Pp	nkuet al. 2007
DRC	Virunga NP	II	National Park	2006	Aerial survey	Hm	Kujirakwinja et al. 2006
Equatorial Guinea	Nationwide	NA	Entire country	2012	Line transects	Pp	Ruffler et al. 2012
Gabon	Batéké Plateau NP	NA	National Park	2005–2006	Recces	Pp	Bout 2006
Gabon	Birougou NP	II	National Park	2006–2007	Line transects, recces	Pp	Aba'a & Bezangoye 2007
Gabon	Djouah-Zadie	NA	Logging concession	2016	Line transects	Pp	Le-Duc Yeno & Ngoran 2016
Gabon	Evaro area	NA	TBD	2005	Recces	Pp	Latour 2005
Gabon	Ivindo landscape	NA	Logging concessions	2009	Line transects	Pp	Maisels et al. 2010a
Gabon	Ivindo NP	II	National Park	2008	Line transects, recces	Pp, Hm	Maisels et al. 2010a
Gabon	Loango NP	II	National Park	2006	Line transects, recces	Pp	Leduc Yeno 2006
Gabon	Lopé NP	II	National Park	2008–2009	Line transects, recces	Pp	Bezangoye & Maisels 2010
Gabon	Lopé-Waka corridor	NA	Logging concession	2007	Line transects, recces	Pp	Maisels et al. 2008
Gabon	Mayombé area	NA	Logging concession	2011	Line transects	Pp	Aba'a et al. 2011
Gabon	Mayumba NP	II	National Park	2006–2011	Recces	Pp	Makaya 2010
Gabon	Minkébé NP	II	National Park	2012–2013	Line transects	Pp	ANPN, WCS, WWF 2013
Gabon	Monts de Cristal NP	II	National Park	2005	Recces	Pp	Aba'a 2006
Gabon	Moukalaba Doudou NP	II	National Park	2012	Camera trapping	Pp	Nakashima 2015
Gabon	Mwagna NP	II	National Park	2012	Line transects, recces	Pp	Maisels & Ella Akou 2013
Gabon	Pongara NP	II	National Park	2006	Line transects, recces	Pp	Latour 2006
Gabon	Waka NP	II	National Park	2005–2006	Recces	Pp	Abitsi 2006
Gabon	Wonga Wongué	Ib?	Presidential Reserve	2011	Line transects, recces	Pp	Motsaba & Aba'a 2012

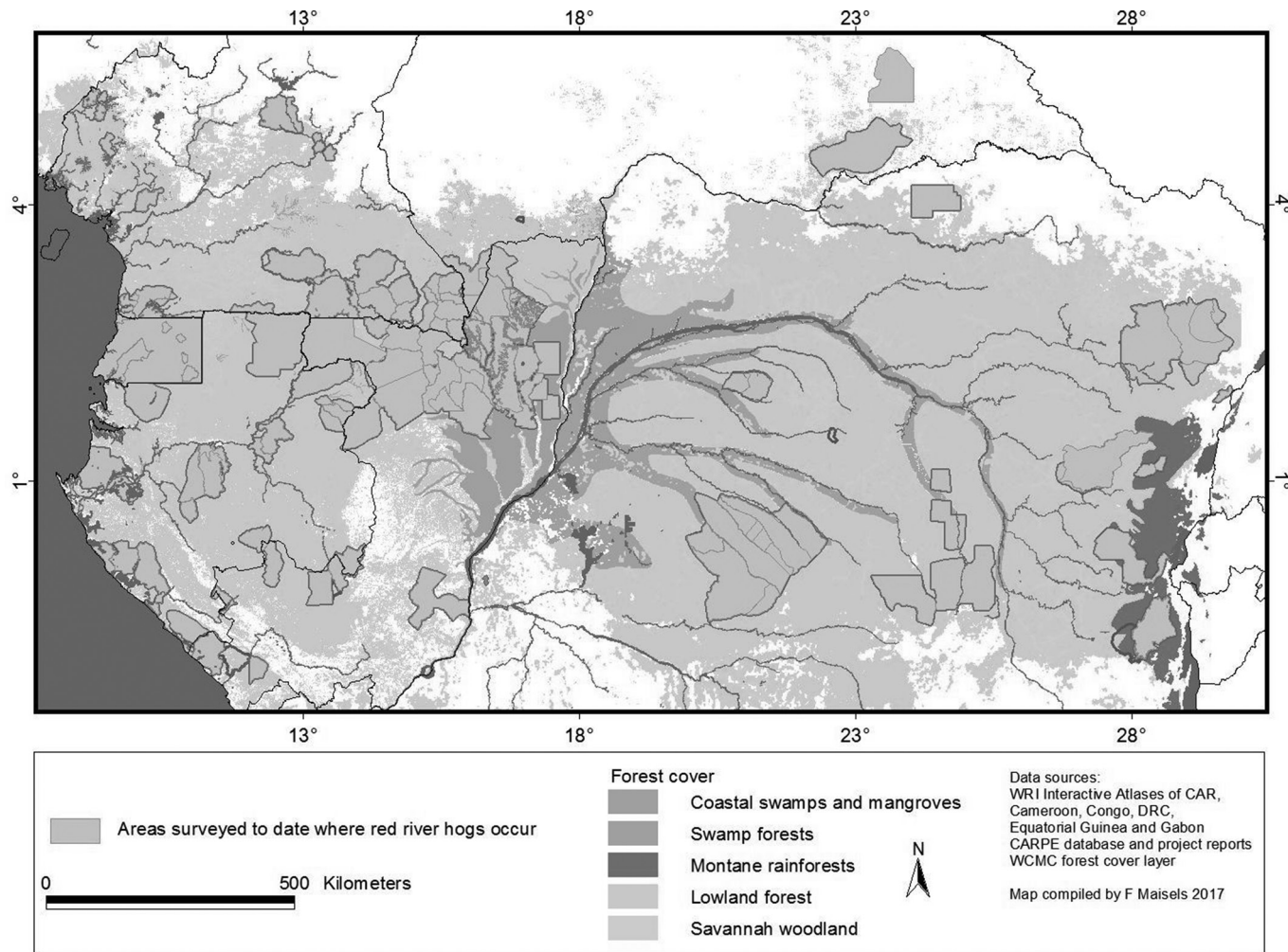


Figure 13.2 Areas surveyed where red river hog occur in Central Africa (see also Table 13.1).

Local discontinuities in distribution in recent years may have been caused by ongoing intensive bushmeat hunting and trade.

The list of countries where the red river hog is considered native includes: Benin, Cabinda (Angola), Cameroon, Central African Republic, Ethiopia Republic of Congo, the Democratic Republic of Congo, Ivory Coast, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Nigeria, Senegal, South Sudan, Togo, and Uganda (Reyna et al. 2016). Red river hogs were recently photographed in southern Sudan (Dasgupta 2015). The presence of this species in southwest Ethiopia and Gambia has not been confirmed (Grubb et al. 1998; Leus & Vercammen 2013). It occurs in the Cabinda region of northern Angola: although Angola is not mentioned on the Red List page, the Red List distribution map shows this clearly.

Descriptive Notes

Body measurements: *Shoulder height:* 55–80 cm; *Head and body length:* 100–145 cm; *Tail length:* 30–45; *Body mass:* 45–115 kg. Dental formula: I 3/3, C 1/1, P 4/3, M 3/3 ($\times 2$) = 42. Few measurements of skulls have been recorded: in adult males the skull length varies between 33 and 40 cm and in adult females

between 27 and 38 cm. The number of chromosomes is $2n = 34$. This species is considered the smallest and most brightly coloured of the African hogs. The pelage is characteristically reddish-orange, and is short and dense, with scattered longer hairs on the flanks. A narrow white dorsal stripe of longer hairs extends from neck to tail and can be erected when the animal is excited. The head is patterned with a grey muzzle and whitish rings around eyes, contrasted by black on the forehead, ears, and jaws (Figure 13.3). In males, long white hairs grow from prominent facial swellings along the jaw and beneath the eyes (Figure 13.4); females do not have these swellings, but often have long white facial hair (Figure 13.5). Adult males develop a pair of protuberances on the side of the muzzle. The canine teeth of males are tusk-like, but as the upper and lower canines rub against each other, they remain short and are usually not visible (Meijaard et al. 2011). The elongated tips of the ears have prominent tufts of white hair. The tail is long and hairless and has a tuft of hair at the tip. Young hogs are dark brown with pale yellow longitudinal marks (Figure 13.5).

Red forms of bushpig (*P. larvatus*) can be confused with red river hog in areas of overlap, as for example in north-west Uganda where up to four colour morphs have been recorded



Figure 13.3 Red river hog head and muzzle pattern with a grey muzzle and whitish rings around eyes, contrasted by black on the forehead, ears and jaws (photo by B. A. Huffman).



Figure 13.4 Particular of an adult male white hairs grow from prominent facial swellings along the jaw and beneath the eyes (photo by B. A. Huffman).



Figure 13.5 Particular of female muzzle with long white facial hair and young hog with pale yellow longitudinal marks (photo by B. A. Huffman).

(Ghiglieri et al. 1982; Seydack 1990, 1991); in these cases the black and white facial markings of *P. porcus* appear diagnostic. Some authors have recorded slight geographic variation in size with the largest animals occurring in East Africa and the smallest ones in the west (Vercammen et al. 1993), although Grubb (1993) did not note any significant variation in size within the species' range.

Habitat

The red river hog mainly occurs in moist tropical forests with dense cover; however, it is very adaptable and can also be found in secondary rainforest, gallery forest, closed woodland savanna, dry forest, mixed scrub, and cultivated areas. Its scientific name, *Potamochoerus*, is derived from ποτάμι (potámi), the Greek word for river, and χοίρος (choíros), Greek for pig, indicating the species' preference for habitats near water. It is a strong swimmer and frequents swamps and reed beds, although it has been observed in very dense bush at a considerable distance from any large stream (Woodhouse 1911). This species is found throughout the intact old-growth forests of the region, although some authors have found that they appear to favour areas with forest openings and edges where they find a greater diversity of food resources (Oduro 1989; Vercammen et al. 1993; Meijaard et al. 2011; Reyna et al. 2016), possibly related to elephant presence (see below). The species is rarely recorded in open woodland, savanna, or other open habitats unless crossing savanna patches to access forests or woodlands on the other side or to reach isolated forest fragments.

In the Dzanga sector of the Dzanga–Ndoki National Park (Central African Republic), during a two-year study utilizing recce transects (Melletti et al. 2009), red river hogs were encountered in a variety of habitats. Relative use of habitat types appeared to be roughly proportional to their relative coverage in the study area, suggesting no specific habitat preference: this species was primarily recorded in mixed forest, the dominant habitat type (72 per cent coverage), but also in *Marantaceae* forest (18 per cent coverage), monodominant forest of *Gilbertiodendron dewevrei* (4 per cent), seasonally inundated forest (5 per cent), and clearings (1 per cent). Similar habitat use, with a preference for mixed closed-canopy forest, was also recorded in Gabon (White 1994; Tutin et al. 1997). The presence of the species in monodominant forest (often with an open understorey) is linked to seasonal peaks in mast fruiting of *Gilbertiodendron* in the Nouabale–Ndoki and Ituri Forests (Republic of Congo and DRC, respectively) (Blake & Fay 1997; Hart 2001).

Abundance

Monitoring rainforest mammals is difficult, as estimates are rarely based on direct observations and often have to rely on proxy signs, such as dung abundance. Because we know very little of average group size and dung decay (Breuer et al. 2010), extrapolations from dung density to pig density are prone to error. Most studies suggest that density normally ranges between 1 and 6 ind./km² but can be much higher on occasion if a superabundant seasonal food resource is available. For example, in Equatorial Guinea, Fa and Purvis (1997) reported 3.1 ind./km². In Lopé National

Park, Gabon, the species can reach 18 ind./km² in the mosaic of equatorial savanna and forest (Tutin et al. 1997), while in forest patches White (1994) recorded 1.3–5.6 ind./km². In Loango National Park, Gabon, Morgan (2007) found densities of 7.3 ind./km². In Ituri Forest (DRC), Hart (2001) reported densities that varied from 0.1 to 8 ind./km² and in other locations densities may be much lower at 1 ind./km² (Kingdon 2013). In Uganda, Laws et al. (1975) estimated the average population density to be 1.29 ind./km². Broadly speaking, population density of red river hogs ranges between 0.1 and 18 ind./km², with an approximate average of 3 ind./km². Density variation is likely caused by local resource availability and predation pressure, including human hunting.

Movements and Home Range

There is limited information on the home range and movement patterns of red river hog.

Daily movements may vary considerably depending on habitat type, food resources, and human pressure. Sounders (groups of wild pigs) may travel up to 6 km within 24 hours as they move between feeding sites and resting places (Meijaard et al. 2011). In Dzanga–Ndoki National Park, Melletti (personal observation) recorded daily movements ranging between 2 and 4 km in secondary rainforest. In this area, a system of forest clearings was regularly visited on a rotational basis. Moreover, during the mast fruiting of *G. dewevrei*, daily travel distances of groups in this park were reduced compared to other seasons. Home ranges in the study area varied between 4 and 10 km² (M. Melletti, personal observation).

Activity Patterns

Where hunting is absent or highly controlled, red river hogs are very active during the day, so this is most likely the normal behaviour. In areas where hunting pressure is high, red river hogs are primarily nocturnal or remain in areas with dense cover during the day to avoid exposure (Meijaard et al. 2011).

The forests of northern Congo, parts of the Dzanga–Ndoki complex in Central African Republic and many of Gabon's National Parks are typical of un hunted areas. In Lopé National Park (Gabon), red river hogs can be seen easily during daylight as they cross savannas between forest patches, and they can be encountered in most forest types during the day (Maisels, personal observation). In Langoué Bai (bai is a local word for forest clearing) in the heart of Ivindo National Park in Gabon, and in Mingingi, Mbeli, and Bonye Bais in the Republic of Congo, they are also often visible during daylight. At Mbeli Bai, where observational data have been collected since the early 1990s, daily records of red river hogs range from 06.00 to 16.00 with two peaks: one in the morning and another in the afternoon (Figure 13.6). Within the bai, the hogs used a tiny terra firma portion where they often fed on elephant dung. Human presence at all of these clearings is limited to a spatially predictable site: a tall viewing platform where the observers are located at all times. Human activity within and around these clearings is highly controlled and very rare.

At certain other clearings in the region, red river hogs visit mostly at night. This appears to be the case in the Central African Republic's Dzanga–Sangha complex, and in Cameroon's

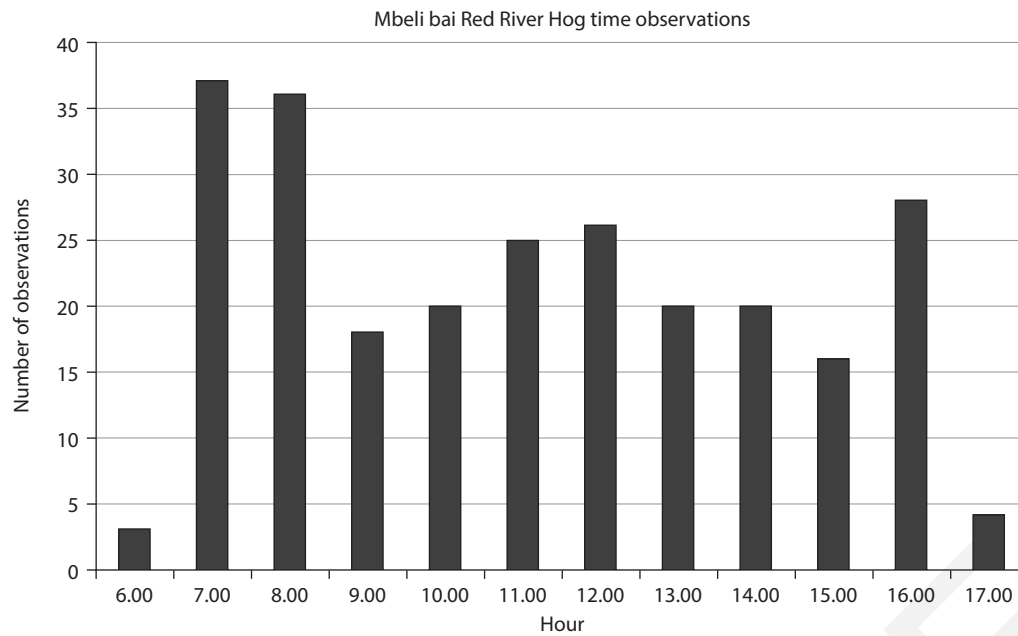


Figure 13.6 Daily observations per hour at Mbeli bai through the year (Nouabalé–Ndoki National Park, Republic of Congo; T. Breuer, unpublished data). Number of observations increased in the morning and in the afternoon.

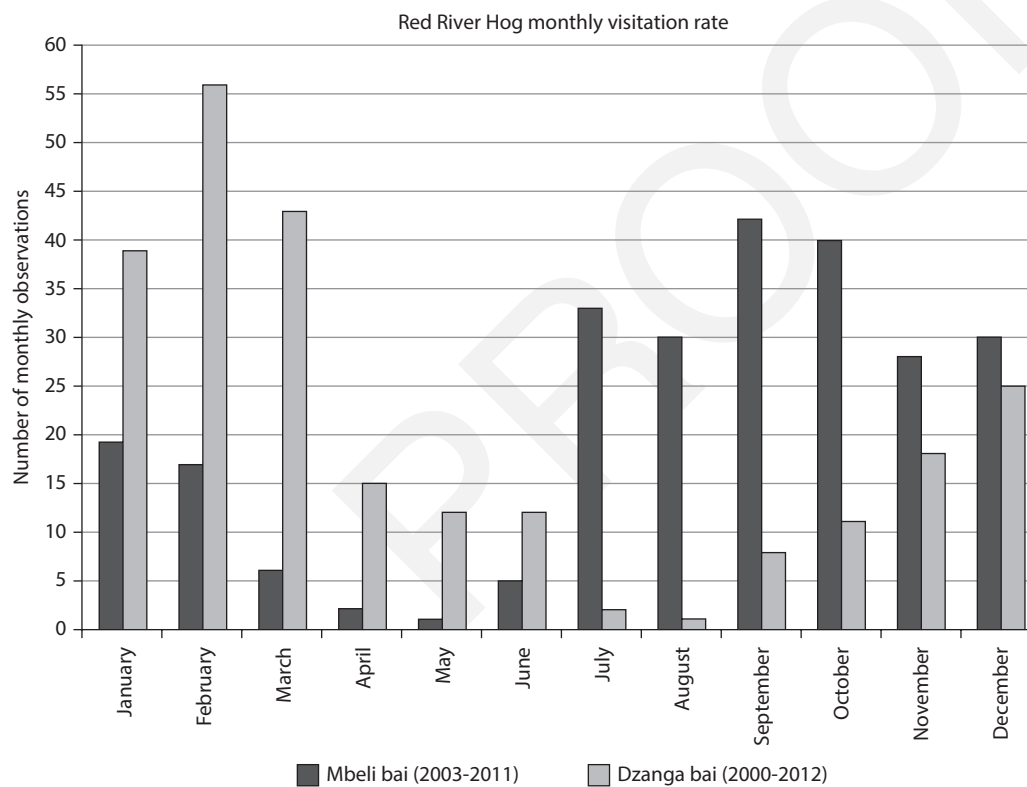


Figure 13.7 Red river hog monthly observations in Dzanga Bai (2000–2012; Dzanga–Ndoki National Park, Central African Republic; A. Turkalo, unpublished data) and in Mbeli Bai (2003–2011; Nouabalé–Ndoki National Park, Republic of Congo; T. Breuer, unpublished data). Unlike Dzanga where the observations increased between January and March (the dry season), at Mbeli the peaks were observed from September to December (from the wet season to the start of the dry season).

National Parks in the southeast of the country. The very long-term data set (from January 2000 to December 2012; see Figure 13.7) from the Dzanga Bai in the Dzanga–Ndoki National Park (Central African Republic) shows that the species uses the clearing throughout the year, but visits most frequently during the drier months (December–March; A. Turkalo, personal observation). The few daylight observations of red river hogs at this site are generally of single individuals; in contrast, daytime observations of giant forest hogs (*Hylochoerus*

meinertzhageni) occur on average five times per week with an average group size of seven individuals (A. Turkalo, personal observation). In two years of field work in the same park, red river hogs were never observed in other forest clearings during daylight hours, although this habitat type was used intensively at night. Occasional sightings during daylight were all in dense cover (Melletti et al. 2009). During a 10-month study at Ikwa Bai, Cameroon, red river hogs visited the clearing only at night (Gessner 2008). It is possible that the clearings had a lower



Figure 13.8 A small group of red river hog feeding on fruits (photo by B. A. Huffman).

anti-poaching effort and higher hunting pressure than the clearings in Republic of Congo, or that the pigs perceived any human presence in the forest, including that of researchers, as a danger at these sites.

Feeding Ecology

This species feeds on a great variety of foods, particularly tubers and roots which are uprooted with the snout, along with seeds gleaned from elephant dung and fruits, grass, aquatic plants, bulbs, fungi, and other seeds (Figure 13.8). Occasionally they will also eat invertebrates, reptiles, eggs and young birds, and carrion. They feed on a wide range of cultivated plants, and in proximity to human settlements they can cause severe damage to crops.

Large groups of red river hogs aggregate seasonally during times of fruit and nut production. Large groups have been observed feeding on the nuts of *Coula edulis* and *Irvingia gabonensis* in Gabon (Blake & Fay 1997; White & Abernethy 1997; Meijaard et al. 2011) and during the mast fruiting of *G. dewevrei* in Dzanga–Ndoki National Park. In Dzanga, red river hogs appear to regularly move between forest clearings throughout the year, especially during the dry season (December–April), presumably in reaction to seasonal availability of food resources (M. Melletti, personal observation). In Mbeli Bai, this species is regularly observed around fruit trees (*Anonidium mannii*, *Klainodoxa gabonensis*, *Chrysophyllum* spp.; T. Breuer, personal observation).

During a study of seed predation by red river hogs in LuiKotale research site (Salonga National Park, DRC), the seeds from 26 tree and two liana species were recorded in the diet (see Table 13.2). Based on a 12-ha plot census and a conservative list of seed species eaten, Beaune et al. (2012) estimated that 15.5 per cent of the tree species in the study areas in LuiKotale were seed-predated by red river hogs. Analyses of eight faeces evidenced that none of them contained whole seeds. However, the sample

was too small for any conclusion on the degree of seed predation. Studies in other regions have shown that seeds can pass intact through the digestive system of other pig species (Castley et al. 2001; Westcott et al. 2005), which then act as seed dispersers (Kerley et al. 1996). However, the role of red river hog as seed dispersers remains to be determined (Seufert et al. 2010).

Red river hogs regularly forage through elephant dung for seeds (e.g. from *Panda oleosa* – A. Turkalo, personal observation) and larvae; this food source is especially abundant in bais compared to neighbouring forest and appears to be a major draw for the pigs. Red river hogs will venture into the middle of the clearing seeking dung, unlike giant forest hogs which are observed only along the perimeter. At Mbeli, red river hogs were more frequently observed during the second half of the year, which corresponds with increased elephant activity at that site (Figure 13.7; T. Breuer, personal observation). Red river hogs are also scavengers and have been seen to feed on a baby elephant carcass in Bonye Bai in Republic of Congo (C. Inkamba Nkulu and F. Maisels, personal observations).

Reproduction and Growth

Very little is known about reproduction of this species in the wild and most information comes from observations in captivity. The gestation period ranges between 120 and 130 days (similar to bushpig, *P. larvatus*). Parturition appears to be seasonal; neonates have been recorded in February–March in Nigeria and in December–January in Gabon, while in captivity sows can give birth twice a year (Meijaard et al. 2011). The number of piglets may vary between one and six but generally only one or two survive (Vercammen et al. 1993); the mean litter size is 3.4 (Macdonald 2000). During farrowing, sows dig a hollow in the ground and cover it with a nest of grass, leaves, and other vegetation where piglets stay for several days to two weeks, after which they follow their mother. Adult males play an active role in the rearing and defence of the young (Vercammen et al. 1993). Piglets are independent at around 2–4 months, and lose their

Table 13.2 List of seed species eaten by red river hog in LuiKotale area, Salonga National Park (D. R. Congo), in Dzanga–Ndoki National Park (Central African Republic) and in Nouabalé–Ndoki National Park (Republic of Congo).

Species	Family
<i>Anonidium mannii</i>	Annonaceae
<i>Austranella congolensis</i>	Sapotaceae
<i>Coula edulis</i>	Olacaceae
<i>Colletoecema dewevrei</i>	Rubiaceae
<i>Colletoecema</i> sp.	Rubiaceae
<i>Crotonogyne manniana</i>	Euphorbiaceae
<i>Dacryodes buettneri</i>	Burseraceae
<i>Dialium gossweileri</i>	Caesalpiniaceae
<i>Dioscorea prahensilis</i>	Dioscoreaceae (liana)
<i>Drypetes gossweileri</i>	Euphorbiaceae
<i>Gambeya lacourtiana</i>	Sapotaceae
<i>Gilbertiodendron dewevrei</i>	Caesalpiniaceae
<i>Gilbertiodendron mayombense</i>	Caesalpiniaceae
<i>Guibourtia demeusei</i>	Caesalpiniaceae
<i>Irvingia gabonensis</i>	Irvingiaceae
<i>Irvingia grandifolia</i>	Irvingiaceae
<i>Klainodoxa gabonensis</i>	Irvingiaceae
<i>Lasianthera africana</i>	Rubiaceae
<i>Mammea africana</i>	Guttiferae
<i>Manilkara yangambiensis</i>	Sapotaceae
<i>Panda oleosa</i>	Pandaceae
<i>Parinari excelsa</i>	Chrysobalanaceae
<i>Pentaclethra macrophylla</i>	Mimosaceae
<i>Pycnanthus marchalianus</i>	Myristicaceae
<i>Synsepalum longecuneatum</i>	Sapotaceae
<i>Tetracarpidium conophorum</i>	Euphorbiaceae (liana)
<i>Treculia africana</i>	Moraceae
<i>Tridesmostemon omphalocarpoides</i>	Sapotaceae
<i>Vitex</i> sp.	Verbenaceae
<i>Xylopiya aethiopica</i>	Annonaceae
<i>Zeyherella longepedicellata</i>	Sapotaceae

Sources: Beaune et al. (2012); T. Breuer, M. Melletti, A. Turkalo, personal observations.

neonatal coat pattern at around 6 months (Leus & Vercammen, 2013). Red river hogs reach adult size at around two years of age, and may reach sexual maturity as early as 18–24 months.

The life span in the wild is estimated at between 8 and 10 years, but may surpass 20 years in captivity (Vercammen et al. 1993; Meijaard et al. 2011).

Behaviour

As for most pigs, the red river hog is a gregarious species. In Nigeria, group size ranges between 1 and 15 individuals (mean = 10.5) with a ratio of immature to adult animals of 2:1 (Oduro 1989). In Dzanga and Mbeli Bais, observed group size ranges from single individuals to groups of up to 27 animals, although

single individuals are most common (A. Turkalo and T. Breuer, personal observation; Figure 13.9). In Dzanga, the average group size is 4.9 if one includes single individuals and an average of 10.2 if the single observations are eliminated (A. Turkalo, personal observation; see also Figure 13.9). Much larger groups of up to 60 individuals have been reported from Gabon, Central African Republic, Guinea, and Democratic Republic of Congo (F. Maisels, personal observation (Gabon); Meijaard et al. 2011; M. Melletti, personal observation (Central African Republic); L. Macky and J. Hart, personal communication, respectively). Such large assemblages are believed to be the fusion of more than one group when abundant food resources are available (see Feeding Ecology section for more details); permanent family units are smaller.

Groups are generally composed of multiple adult females, accompanied by subadults, piglets, and one large mature male; groups are mainly sedentary. During moving and feeding, red river hogs emit low grunts to maintain contact and cohesion with other individuals. Adult males may communicate their presence by rubbing and tusking vegetation and soil in a similar way to Eurasian wild boar (*Sus scrofa*). When two groups meet, ritualized threat displays may occur, but rarely is there serious fighting. Large groups are sometimes followed by flocks of plumed guineafowl (*Guttera plumifera*) looking for food in the ground rooted by hogs (Meijaard et al. 2011; M. Melletti, personal observation in Dzanga–Ndoki National Park). When wounded and threatened, red river hogs, like other pig species, exhibit considerable courage and will form tight defensive groups or attack predators, including humans. This anti-predator defence has been observed (M. Melletti, personal observation) in Dzanga–Ndoki National Park, where the playback of recorded leopard vocalizations resulted in an aggressive rush of the group towards the sound source. This reaction has been capitalized on by the BaAka people (pygmies), who will imitate a leopard's roar when hunting to bring pigs into closer proximity (M. Melletti, personal observation). Besides significant predation by people, red river hogs are depredated by lion, leopard, spotted hyena, and python. For example, in Lopé National Park, Gabon, red river hog make up 20 per cent of the diet of leopards (Henschel et al. 2005).

Parasites and Diseases

Very little is known about the ecology and epidemiology of infectious and parasitic diseases in this species.

Red river hogs are reservoirs for some infectious or parasitic diseases, such as trichinosis, African swine fever, and probably trypanosomiasis (Anderson et al. 1998). Their role as reservoirs of African Swine Fever can facilitate the dissemination of the virus to domestic pigs (Luther et al. 2007). Every one of 30 carcasses examined in a study in Gabon were infested by around 20 larvae of the nasal botfly *Rhinoestrus nivarleti* (Payne 2002), and this is apparently common in the region.

Status in the Wild

Red river hog is listed on the IUCN Red List as Least Concern (Reyna et al. 2016) and is not listed by CITES. The species is still widespread and is locally common in many areas. Across its

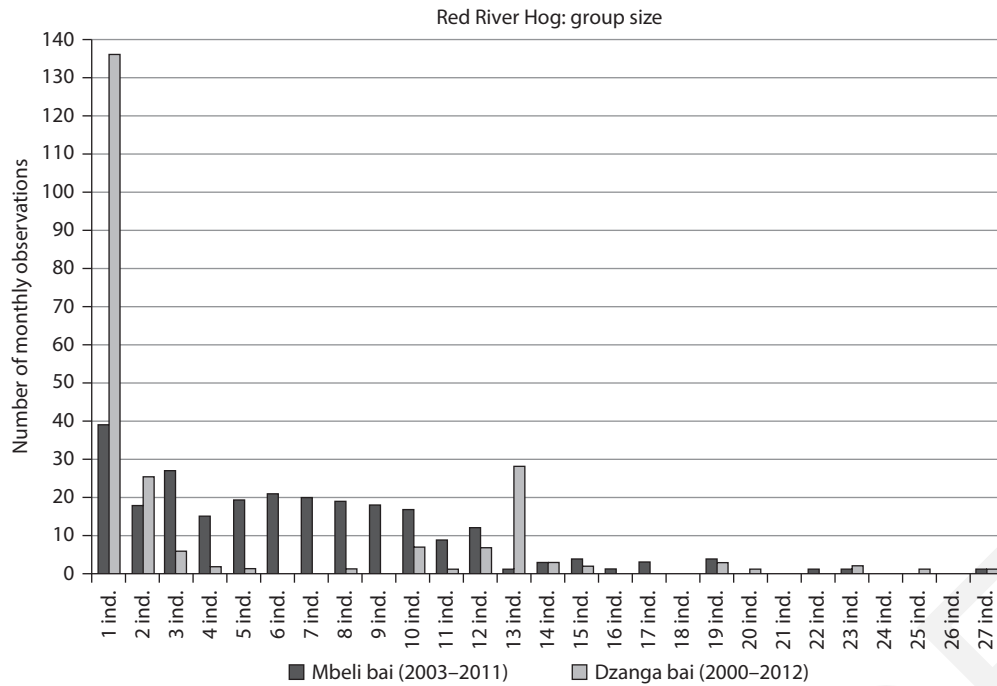


Figure 13.9 Comparison between groups size observed in Dzanga and Mbeli bai (Dzanga–Ndoki National Park, Central African Republic and Nouabalé–Ndoki National Park, Republic of Congo, respectively; A. Turkalo and T. Breuer, unpublished data). In both sites group size ranges from 1 to 27 individuals.

range, red river hogs are present, although sometimes very rare, in almost all areas surveyed. However, most surveys have been carried out in protected areas; more work is needed to determine its presence in areas where it is known to be hunted.

The main threat, especially in the Congo Basin, is the bushmeat trade, which is increasing due to growing demand and greater access to forests (Abernethy et al. 2013; Ziegler et al. 2016). Hunters tend to select for medium-sized mammals if they can, especially ungulates and pigs, as they provide a large meat reward for the same effort as a much smaller species. During a study in Gabon, red river hogs, together with duikers, made up between 34 and 37 per cent of the biomass in two urban bushmeat markets of Eastern Gabon (Starkey 2004). In the wild biomass can also be up to 14%, as recorded in the Loango National Park, Gabon (Morgan 2007). However, in more remote, rural areas, they only made up about 7 per cent of the bushmeat eaten (Foerster et al. 2012). Severe population declines were noted as a result of hunting in both northern and coastal Gabon (Lahm 1994; Laurance et al. 2006). Similarly, in northern Congo, red river hogs are a preferred bushmeat species, making up an important proportion of the biomass consumed by local communities (WCS–Nouabalé–Ndoki Project, unpublished data). Furthermore, in the Cross River National Park (Nigeria) and in the south-east of the country, this species remains one of the most hunted and sold in the markets (Angelici et al. 1999; Lameed et al. 2015).

Where red river hogs live near humans, crop predation may lead to persecution by farmers. Such hunting typically fails to eradicate this hog locally because the species avoids active hunting through its nocturnal behaviour (Vercammen et al. 1993).

Although the species is protected in most reserves and national parks in West and Central Africa, the enforcement of such legal protection is challenging and in many cases non-existent.

Deforestation is not considered a real threat to red river hog populations, as the removal of primary-growth forest for timber may increase the availability of preferred secondary growth. However, human activity is often associated with high hunting pressure (Abernethy et al. 2013).

In Burkina Faso, Gabon, and DRC, red river hogs may be threatened genetically by the introduction of Eurasian wild boar, which may also introduce and transmit disease. In these areas, hybrids between these two species have been recorded, although the extent of this hybridization has not been fully described (Vercammen et al. 1993). In other areas, hybridization with feral domestic swine (*Sus scrofa*) further threatens the species' genetic integrity and health. Addressing this threat is difficult because of the considerable challenge in eradicating feral pigs.

The red river hog remains poorly known and many aspects of its biology, ecology, behaviour, and population status need to be studied. In addition, in some regions populations appear to be in sharp decline due to the bushmeat trade and these populations require much improved protection and management to prevent their extinction (Vercammen et al. 1993; Wilkie & Carpenter 1999). Finally, genetic studies should be conducted in areas of overlap with the bushpig to resolve the systematic relationships between these two species. Reports exist of polymorphism in some of these overlapping populations and full-genome studies are needed to elucidate levels of gene flow and to draw appropriate taxonomic conclusions.

Status in Captivity

Red river hogs are kept in many zoological institutions worldwide, mainly for educational purposes. The captive world population, based on 2013–2016 data, includes 177 individuals in 64 North American facilities (Burvenich 2014; see also Chapter 37 for more details), 253 animals in 65 European collections, 21 in

Asia and seven in African institutions for a global population of 458 individuals (Reiter 2013; see also Chapter 37 for more details; www.species360.org).

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