

# Chapter 1

## Taxonomy, Natural History and Distribution of the Capybara

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### 1.1 Introduction

When the Iberian colonists arrived in South America in the late fifteenth century, they encountered a diverse and previously unimagined fauna. The unusual anatomy and behavior of these species intrigued the early explorers. In their reports they named the new-found endemic animals after the most analogous European species.

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In 1576, for example, Pero de Gândavo (2004) described the capybara (*Hydrochoerus hydrochaeris*) as “a type of pig.” However, capybaras were sufficiently unlike any known European species for most explorers to simply adopt a phonetic representation of the local name. Therefore, in 1557, the capybara was called *catiuare* by the German Hans Staden (1557), *capiyûára* in 1560 by the Spaniard José de Anchieta (1997), and *capijuara* in 1625 by the Portuguese Fernão Cardim (1980). The name capybara actually originates from a word in the indigenous Tupi, which in the sixteenth century was the most widely spread language in South America: *kapii'gwara* meaning grass eater (*ka'pii*=“grass” + *gwara*=“eater”; Houaiss et al. 2004).

In the narratives of these early explorers, the capybara was described in terms of its exotic appearance, unusual habits, and usefulness. Staden (1557:174) noted:

There is an animal named Catúare; abides on land and in the water. The reeds that grow by the banks of the fresh water, that they eat. When anything alarms them they flee into the water to the bottom. Are larger than a sheep, have a head in the manner of a hare, but larger, and short ears; have a stumpy tail, fairly long legs and run fast on land from one body of water to another. Its hair is dark grey; has three lumps on each foot; tastes like pork.

Some explorers described capybaras from the narrative of others. These second-hand descriptions, along with the then common view of nature in Christian cultures as being above all the fruit of the Creator’s fertile and eternal power, led to a number of imaginative classifications. The Anglo-Irish Oliver Goldsmith (1870), in 1774, listed the species as being among the “quadrupeds of the hog kind” (Fig. 1.1). Goldsmith (1870:351) wrote that “It seizes the fish, upon which it preys, with its hoofs and feet, and carries them to the edge of the lake to devour them at its ease.” This is almost certainly a confusion with the giant otter found in the same general habitat.

The first detailed description of the capybara by a naturalist came in the mid-seventeenth century from observations in Pernambuco State, Brazil. At that time, northeastern Brazil was occupied by the Dutch, and among their scientific

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**Fig. 1.1** Capybara classified by Oliver Goldsmith, in 1774, as one of the “quadrupeds of the hog kind” (From Goldsmith (1870))

commission was the German naturalist Georg Marcgrave (Vanzolini 1996). Marcgrave, writing in 1648, predated Linnaeus and his work would probably have remained unrecognized if it were not for the inclusion of 39 of his species descriptions by Linnaeus, in the twelfth edition of his *Sistema Naturae* in 1766, among these the capybara.

Marcgrave’s (1648) description of the capybara in the *Historia Naturalis Brasiliae* is the definitive reference used by all subsequent naturalists up to Linnaeus (Jonston 1650; Piso 1658; Ray 1693; Barrère 1741; Brisson 1756, 1762; Linnaeus 1758, 1766; Buffon 1764). Thus, it seems strange that Linnaeus (1766) defined the type locality of the capybara as Suriname. Since both Brisson (1762) and Buffon (1764) cite works from French Guiana and indicate the habitat as “Guyana and Brazil,” it is possible that Linnaeus confused the Guianas. Marcgrave worked in a Dutch colony in America and it is plausible to imagine that Linnaeus assumed that he was referring to Dutch Guiana – Suriname. The type locality for the capybara should more properly be considered the São Francisco River, Brazil, which is the location mentioned by Marcgrave (Mones 1975).

In this introductory chapter, we seek to characterize the subject of this book – the capybara. First we detail the taxonomic history of the capybara and clarify its scientific name – an issue of recent controversy. We then describe the anatomy, physiology, and ecology of the capybara, concluding with its distribution (which remains uncertain in many areas) to delineate the scope of the following chapters in this volume.

## 1.2 Taxonomic History of the Capybara

The history of the scientific nomenclature for the capybara is long and turbulent. Recently, there has been great inconsistency in the genus name adopted and in its spelling. Much of the debate is due to uncertainty over which name takes historical precedence, but some variants seem to be the result of simple spelling errors. It is important to clarify which name is now valid, the first name available, and the evidence available for the choice.

Marcgrave (1648:230) provided the first name for the capybara based on a naturalistic description: “Capy-bara Brasiliensibus: Porcus est fluviatilis.” The first mention of the capybara in the binomial system (the presently accepted scientific naming system) was made by Linnaeus 1758, in describing the guinea pig, which he called *Mus porcellus* (Linnaeus 1758:59). Earlier, in 1756, and later in 1762, Brisson classified the capybara in a separate genus he named *Hydrochoerus* (Brisson 1762:80). Linnaeus, in 1766, sought to correct his earlier mistake and classified the capybara among pigs, as *Sus hydrochaeris* (Linnaeus 1766:103). Since then the capybara has received several generic names, none regularly used (Mones 1984), and the vast majority being a variation of *Hydrochoerus* Brisson, 1762, among them *Hydrochaeris* Brünnich, 1772, *Hydrochaerus* Erxleben, 1777, and *Hydrochoeris* Allen, 1916.

As the first two editions of the work of Brisson, from 1756 and 1762, entitled *Regnum Animale*, did not consistently use binomial names for species, they should not be considered for taxonomic classification (Gentry 1994). However, in 1911 the International Commission on Zoological Nomenclature (ICZN) decided to consider available (Opinion 37) some generic names of birds presented in the work of Brisson, 1760, entitled *Ornithologia*, since they were on the Official Lists and Indexes of Names and Works in Zoology. With the acceptance of some names for birds, Tate (1935 cited by Gentry 1994) suggested the possibility of using the genus names for mammals proposed by Brisson (1762) since some (among them *Hydrochoerus*) were already in use at the time. Meanwhile, Hopwood (1947) proposed the opposite. Since *Regnum Animale* of Brisson (1762) was not Linnean, Hopwood proposed that *Hydrochaeris* from the work of Brünnich (1772), entitled *Zoologiae fundamenta*, should be the generic name of the capybara (Brünnich 1772:36), despite not being regularly used. The generic name *Hydrochaeris* Brünnich, 1772 was included on the Official List in 1954, in Opinion 236 (Gentry 1994).

This inclusion, however, had no effect on general use, and until the 1980s *Hydrochoerus* Brisson, 1762 was still the most widely used genus for the capybara, including in the now classic book by Ojasti (1973, 2011). The adoption of *Hydrochaeris* Brünnich, 1772 only became commonplace following publication by the influential reference guides *Walker's Mammals of the World* (Nowak and Paradiso 1983) and *Mammal Species of the World* (Wilson and Reeder 1993).

However, *Hydrochaeris* Brünnich, 1772 was already a *nomen oblitum*, which had not been used for two centuries (Mones 1973). In 1994, the ICZN (Case 2928) proposed that Brisson's *Regnum Animale*, 1762, should be rejected for nomenclatural

purposes, but supported the retention of 11 of the genus names for mammals (Gentry 1994). Among the retained genera was that of the capybara – *Hydrochoerus* Brisson, 1762 – because of its established use in the zoological literature for over 230 years and the importance of stability in the use of names. The publication of Opinion 1894 on March 31, 1998, in the Bulletin of Zoological Nomenclature officially recognized the genus *Hydrochoerus* Brisson, 1762, for the capybara (ICZN 1998). It also recognized the species *hydrochaeris*, *Sus* Linnaeus, 1766, from the twelfth edition of *Systema Naturae*, as the specific name of the type species of *Hydrochoerus* Brisson, 1762.

The lesser capybara (*Hydrochoerus isthmius*) of eastern Panama, northwestern Venezuela, and northern and western Colombia is not on the ICZN Official List (Melville and Smith 1987; Smith 2001). Nevertheless, Mones (1984) and Mones and Ojasti (1986) recognize *H. isthmius* as a distinct species from *H. hydrochaeris* based on anatomical differences, particularly its smaller size, and a genetic study (Peceno 1983), and the species is included in the latest edition of *Mammal Species of the World* (Wilson and Reeder 2005). The first listing available for the species is Goldman, 1912, from the sixtieth volume of Smithsonian Miscellaneous Collection.

In sum, the generic and specific names to be used for the capybara and the lesser capybara are *H. hydrochaeris* and *H. isthmius*, respectively. The name that should be adopted for the capybara family is Hydrochoeridae (Vucetich et al. 2012), not Hydrochaeridae. However, it is worth noting that some authors consider that the capybara is a member of the subfamily Hydrochoerinae within the family Caviidae (Rowe and Honeycutt 2002; Honeycutt 2012).

The latest edition of *Mammal Species of the World* (Wilson and Reeder 2005) adopted Opinion 1894 and uses the generic name *Hydrochoerus* Brisson, 1762, for the capybara. However, these authors incorrectly presented the name proposed by Brisson, 1762, as *Hydrochoeris*, a misspelling that was no more than a typographic error, but which risks further muddying the waters with a third option. This source of confusion has been perpetuated as the misspelling has been adopted by, for example, Lim and Engstrom (2005) and by Lim et al. (2005a). The error was corrected in later reprints of *Mammal Species of the World*, but not in the publisher's website.

### 1.3 Natural History of the Capybara

The most striking characteristic of the capybara (*H. hydrochaeris*) is its status as the largest living rodent, with adults weighing 49–50 kg, (range 35–65 kg; Fig. 1.2; Mones and Ojasti 1986). There is no difference in weight between the sexes, but there are differences in body mass across its geographical distribution, with capybaras in Venezuela smaller than those of central and southeastern Brazil and Argentina and those found in northeastern Brazil being smaller still (Mones and Ojasti 1986; Emilio A. Herrera, Martin R. Alvarez and José R. Moreira, personal observations). The other species of the genus *H. isthmius* – the lesser capybara – weighs around



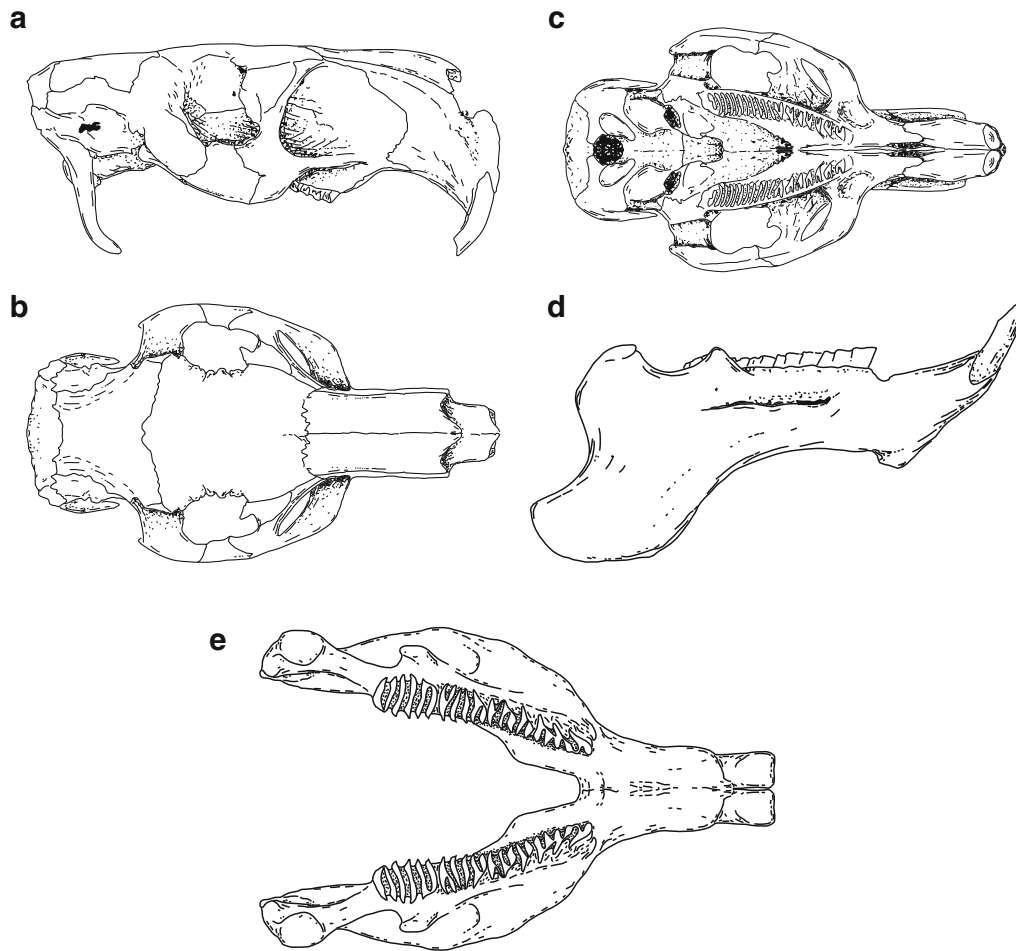


**Fig. 1.2** Adult female of *Hydrochoerus hydrochaeris* Linnaeus, 1766 (Photo by J.R. Moreira)

28 kg (Trapido 1949b). *H. isthmius* is smaller in all external and cranial measurements than *H. hydrochaeris* and features thicker and wider frontal bones, shorter and thicker pterygoids, and a longer diastema (Trapido 1949b). The diploid number of *H. hydrochaeris* is 66 (FN=102). The X chromosome is metacentric and large, while the Y is telocentric and small (Saez et al. 1971). The karyotype of *H. hydrochaeris* is monomorphic (Mones and Ojasti 1986). The *H. isthmius* karyotype is different, possessing  $2n=64$ , FN=104 (Pecceño 1983).

The capybara has a robust, oblong form, with a total length of 1.2 m and height at the shoulders of 0.6 m, short legs and a body covered with rough, dark brown or reddish fur composed of sparse, long, brittle hairs (Fig. 1.2; Mones and Ojasti 1986). The head is large with an elongated skull, high and thick zygomatic arches (Fig. 1.3), a broad rostrum, truncated snout, and cleft upper lip. The ears are small, short, and hairless, with a mobile fold that closes the ear canal. The nostrils, eyes, and ears are positioned near the top of the head, adaptations to a semiaquatic life style (Ojasti 1973).

Capybara extremities are short relative to the body volume, and the hind legs are longer than the forelegs. The forefeet have four toes and the hind feet three, all partially webbed (also an adaptation to a semi-aquatic life), with strong, thick nails similar to perissodactyl hoofs (Mones and Ojasti 1986). The tail is vestigial. Unlike other rodents, the capybara has subcutaneous sweat glands sparsely distributed throughout the body (Pereira et al. 1980). The epidermis is undulating, with numerous folds and cavities. Each hair emerges at an acute angle. The dermis contains numerous hair follicles, usually in groups of three with associated sebaceous gland and arrector pili muscle (Pereira et al. 1980).



**Fig. 1.3** The cranium and lower jaw of *Hydrochoerus hydrochaeris*: (a) right view of the cranium; (b) dorsal view of the cranium; (c) ventral view of the cranium; (d) right view of the lower jaw; (e) dorsal view of the lower jaw

The dental formula is  $2 (i 1/1, c 0/0, p 1/1, m 3/3)$ , with a total of 20 teeth and a large diastema (gap between the incisors and the first cheek tooth; Fig. 1.3). Capybaras' teeth grow continuously. They possess elasmodont molars consisting of a considerable number of transverse dentine laminae, covered with enamel and joined by intermediate layers of cement, almost as thick as the laminae themselves (Mones and Ojasti 1986). The incisors are strong and highly specialized for cutting grass. The last molar of the upper jaw is as long as the previous three molariform teeth together.

The capybara has anatomical and physiological adaptations for its herbivorous diet (Escobar and González-Jiménez 1976; Herrera 2012a) as selective grazer (González-Jiménez and Escobar 1975; Barreto and Quintana 2012). As a monogastric herbivore, it has a simple stomach with a volume of approximately 2 l when fully grown (Parra and Gonzalez-Jiménez 1972). The cecum is well developed, occupying three quarters of the entire volume of the digestive tract (Garrod 1876),

where anaerobic microbial fermentation occurs (Baldizán et al. 1983). To increase the efficiency of protein utilization, the capybara engages in cecotrophic behavior (ingestion of the cecal content) during the morning, when feces are protein-rich due to the presence of microbes used in the fermentation of grass consumed during the previous afternoon and night (Herrera 1985, 2012a; Mendes and Nogueira-Filho 2012).

A nasal gland with the appearance of a dark protuberance is more developed in adult males (Macdonald et al. 1984; Macdonald and Herrera 2012), even though it can be visible in some females. Both sexes show a pair of anal glands but with different positions inside the cloaca (Ojasti 1973). These glands are well developed but different in both sexes. The glands of females are in the form of a pocket producing an abundant, pasty secretion. The glands of males, on the other hand, are open, dry and covered with hair modified to loosen easily and coated by a crystalline substance (Macdonald et al. 1984; Macdonald and Herrera 2012).

The male has no externally apparent scrotum and possesses a baculum (penile bone; Paula and Walker 2012). The female genitalia include a bipartite uterus with a split cervix, characteristic of rodents (Ojasti 1973; Miglino et al. 2012). They have 5–6 pairs of teats (Moreira 1995).

### ***1.3.1 Ecological and Life History Characteristics***

Capybaras are semiaquatic and usually most active during the afternoon and at night (Macdonald 1981). As sweat glands are not well developed, they remain in the water or under shade to regulate their body temperature (Herrera 1986, 2012b). Capybaras also use water for mating, to escape from predators, and as a place to eat their preferred aquatic plants. A capybara group rests in the morning, spends most of the early afternoon in the water, and grazes from late afternoon until dawn (Azcárate et al. 1980; Herrera 2012b).

The capybara is a social animal that lives in family groups of 5–14 adult individuals, usually including a dominant male, one or two subordinate males, and several (probably related) females (Herrera and Macdonald 1987; Herrera 2012b). It is also a sedentary species; home ranges vary from 5 to 16 ha and usually include a large area of grassland for foraging, a permanent body of water, and an area of dry land for resting (Herrera and Macdonald 1989; Herrera 2012b). Many males are found as peripheral elements to the group. In forested habitat, they live in pairs or trios along rivers (Soini 1992).

The gestation period of a capybara is on average 150.6 days (Zara 1973; López-Barbella 1987; Miglino et al. 2012), with the females isolating themselves from the group at birth and during the first days post-partum. An average of 4.2 young are born weighing approximately 1.5 kg each (Table 1.1). In the wild on Marajó Island, Brazil, capybaras produce on average one litter per year (Moreira and Macdonald 1996; Moreira et al. 2012). Females have an estrous cycle of 7.5 days on average (López-Barbella 1982). A female is sexually mature at 12 months of age. Females



**Table 1.1** Life history traits of the capybara (*Hydrochoerus hydrochaeris*) and the lesser capybara (*Hydrochoerus isthmius*)

Species	Body weight (g)	Gestation length (days)	Age at first reproduction (years)	Litter size	Weight at birth (g)	Births per year
<i>Hydrochoerus hydrochaeris</i>	48,900 <sup>a</sup>	150.6 <sup>b</sup>	2.00 <sup>c</sup>	4.2 <sup>a</sup>	1500.0 <sup>c</sup>	1.0 <sup>a</sup>
<i>Hydrochoerus isthmius</i> <sup>d</sup>	20,000	108.0	–	3.5	1100.0	–

<sup>a</sup>Moreira (1995)<sup>b</sup>López-Barbella (1987)<sup>c</sup>Ojasti (1973)<sup>d</sup>Trapido (1949b)

are able to reproduce throughout the year, but in some regions, there is a distinct seasonal peak in births. For example, the breeding season of capybaras on Marajó Island occurs in December, during the early rainy season (Moreira and Macdonald 1996; Moreira et al. 2012). In Venezuela, females are receptive and a lot of sexual activity is observed 2 weeks after the onset of the rains at the end of April (Ojasti 1973; Herrera 1998). A peak in births then occurs 5 months later at the end of September and October (Ojasti 1973). The estimated fertility observed in Marajó Island was 2.59 females/female/year (Moreira and Macdonald 1996).

The evolution of capybara behavioral patterns is attributed to its role as a large grazing herbivore and prey for large carnivores (Herrera 1986). Historically, big cats such as jaguars (*Panthera onca*) and pumas (*Puma concolor*) have been the main predators of capybaras on land, and caimans (*Melanosuchus niger* and *Caiman* spp.) in water. Young are often attacked by caimans; snakes (*Boa constrictor* and *Eunectes murinus*); crab-eating foxes (*Cerdocyon thous*); small cats (*Leopardus* spp.) and some birds, like the caracara (*Polyborus plancus*); and especially black vultures (*Coragyps atratus*; Ojasti 1973; Azcárate et al. 1980; Jorgenson 1986; Yaber and Herrera 1994). Today, in areas where their natural predators are no longer found, the capybara is prey for humans and packs of feral dogs (*Canis lupus familiaris*; Macdonald 1981; Ojasti 1991).

## 1.4 Geographic Distribution

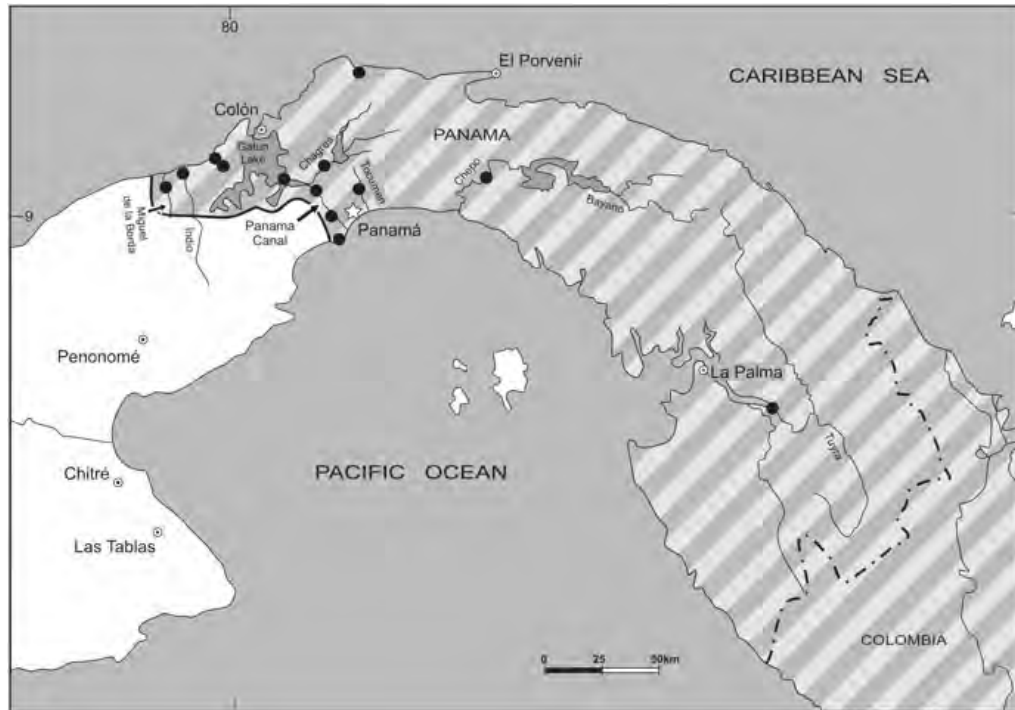
The genus *Hydrochoerus* has two species with distinct distributions. The lesser capybara – *H. isthmius* – is distributed to the west of the Andes, in Panama, Colombia and Venezuela (Fig. 1.4). The larger species – *H. hydrochaeris* – is found east of the Andes, from Venezuela to the mouth of the de la Plata River in Argentina (Fig. 1.4). Chile is the only country in South America that has no capybaras, and Panama is the only Central American country where they are found. Both species inhabit a wide variety of lowland habitats near ponds, lakes, rivers, streams, reservoirs, and swamps (Mones and Ojasti 1986). These habitats include gallery forests, seasonally flooded



**Fig. 1.4** Distribution of the genus *Hydrochoerus*. Shaded area: *Hydrochoerus hydrochaeris*. Diagonal stripes: *Hydrochoerus isthmius*

savannas, and wetlands (Moreira and Macdonald 1996). The maximum elevation recorded for the capybara is 1,500 m in the Chapada dos Veadeiros National Park, Goiás State, Brazil (Moreira 1995).

In the following, we describe in more detail the areas throughout the range of both species of capybara where their presence has been doubtful in previous works (Ojasti 1973; Mones and Ojasti 1986). The frequency with which records of capybara occurrence are represented on maps (below) can rarely be taken as an indication of their relative abundance, but rather of the variously haphazard activities of recorders.

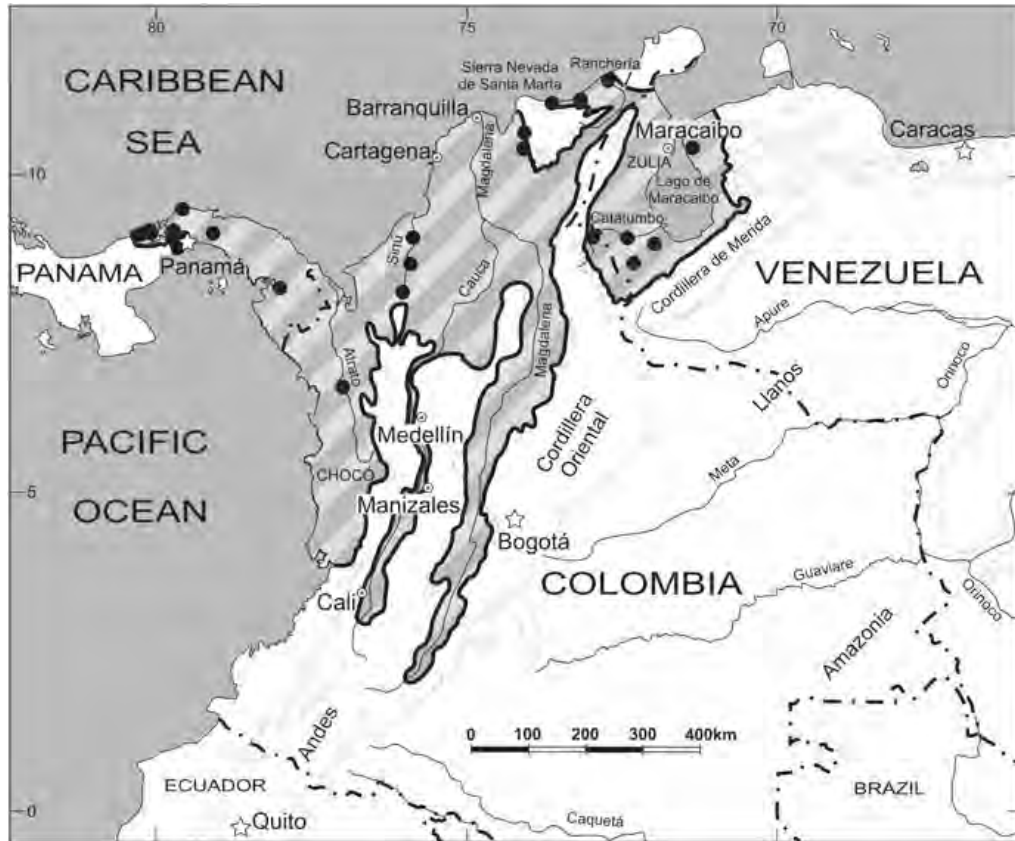


**Fig. 1.5** Western limit of *Hydrochoerus isthmius* distribution in Panama (Trapido 1947, 1949a; Voss and Emmons 1996; Eric D. Núñez and Venicio Wilson personal communications). *Black dots* show records of the species' presence

#### 1.4.1 Panama: Northern Limit of *Hydrochoerus isthmius*

In the 1940s, Trapido (1947, 1949a) reported the presence of the lesser capybara (*H. isthmius*) in Panama, in the Tuyra River valley, and the expansion of its western range (Fig. 1.5). At the time, the species was also found in the Bayano River valley along the Pacific coast to the Tocumen, Cabuya, and Cabra Rivers, near Panama City. There is extensive wetland habitat suitable for the capybara along the Pacific coast, from the Bayano to the Tocumen River. Trapido (1947) subsequently found that the species had colonized the Chagres River and was present at the Panama Canal. It was later seen on Barro Colorado Island and other small islands in Gatun Lake (Voss and Emmons 1996; Emilio A. Herrera personal observation).

In 2002, the species was seen to have occupied an expanded distribution along the Caribbean coast, facilitated by deforestation for cattle pastures (Venicio Wilson, personal communication). In the Province of Colón, the capybara is already found in the Índio and the Miguel de la Borda Rivers, west of the Panama Canal (Fig. 1.5; Eric D. Núñez personal communication). *H. isthmius* is known locally as poncho or capibara, and in other areas as lanco, ponche, or conejo poncho (Rodríguez-Mahecha et al. 1995).



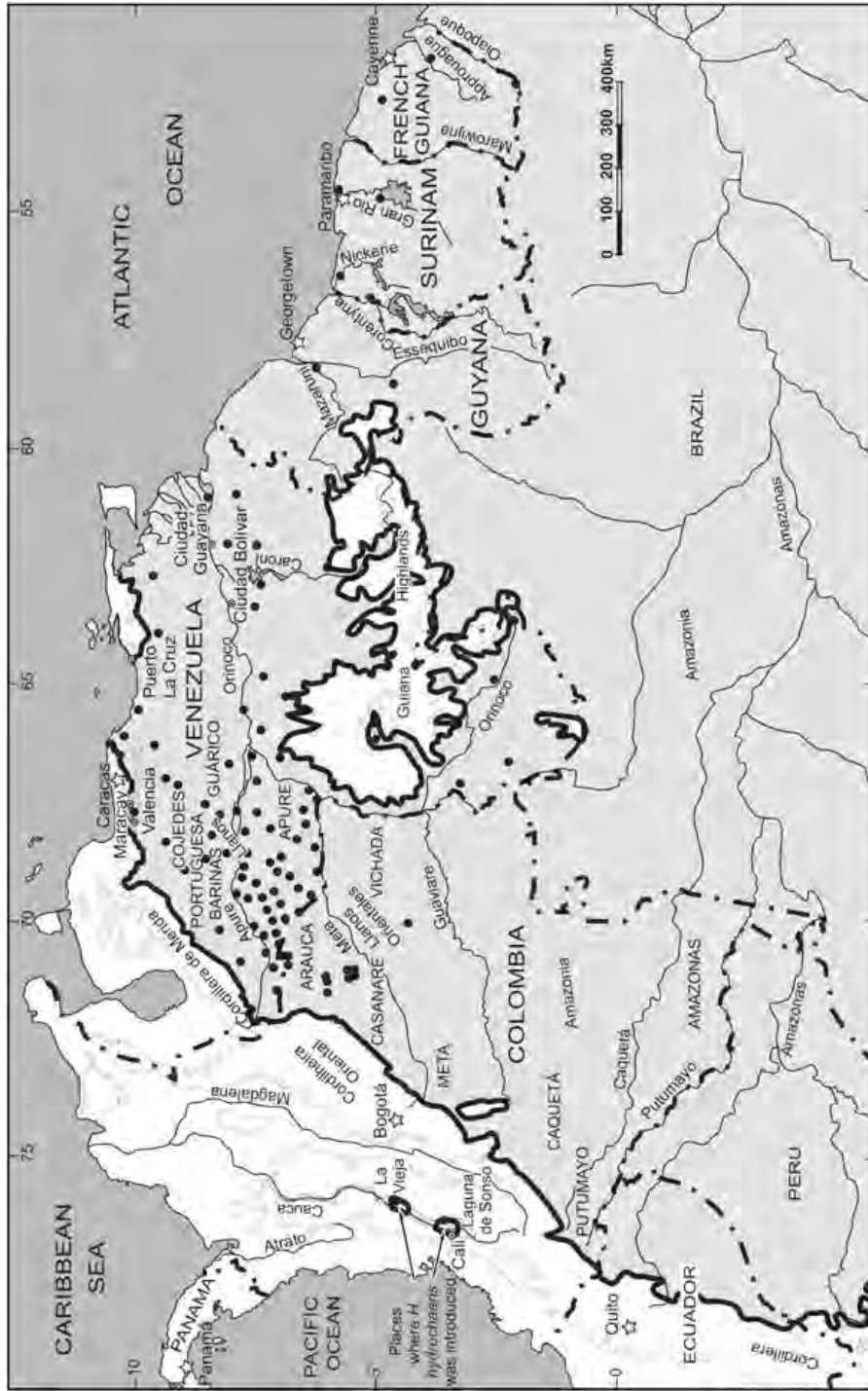
**Fig. 1.6** Distribution of *Hydrochoerus isthmius* in Panama (Trapido 1947, 1949a; Voss and Emmons 1996; Eric D. Núñez and Venicio Wilson personal communications), Colombia (León 1974; Torres and Sanabria 1976), and Venezuela (Ojasti 1973). Black dots show records of the species' presence

### 1.4.2 Colombia

Both species of capybara occur in Colombia, separated by the Andes. *H. isthmius* is found in the northern parts of the country along the Caribbean coast, the lowland headwaters of the Catatumbo and Rancheria Rivers and the rivers to the north and west of the Sierra Nevada de Santa Marta (Fig. 1.6; León 1974). They are also found in the valleys of the Magdalena, Cauca, Sinú, and Atrato Rivers and in the Department of Chocó (Torres and Sanabria 1976). The species is known as ponche or cacó culopando, lancha, lanche, lanchó, lanco, piropiro, and tinajo-ponche (Rodríguez-Mahecha et al. 1995). Little information is available, but populations of *H. isthmius* are thought to be small.

*H. hydrochaeris*, known locally as chigüiro, is distributed across the savannas of the Llanos Orientales in the Departments of Arauca, Casanare, Meta, and Vichada (Fig. 1.7), where it reaches the highest recorded densities (Aldana-Domínguez et al. 2002; Rodríguez et al. 2003; Caro et al. 2005; Aldana-Domínguez and Ángel-Escobar 2007). It is also found in the rainforests of the Departments of Caquetá, Putumayo, and Amazonas (Fuerbringer 1974; Concha and Vargas 1980) where their





**Fig. 1.7** Distribution of *Hydrochoerus hydrochaeris* in Colombia (Fuerbringer 1974; Concha and Vargas 1980; Usma 1991; Emmons 1997; Aldana-Domínguez et al. 2002; Rodríguez et al. 2003; Caro et al. 2005; Aldana-Domínguez and Ángel-Escobar 2007), Venezuela (Ojasti 1973; Eisenberg 1989; Lim and Engstrom 2005), Guyana (Lim and Engstrom 2005; Lim et al. 2005a), Suriname (Eisenberg 1989; Lim et al. 2005b), and French Guiana (Voss and Emmons 1996; Voss et al. 2001). Black dots show records of the species' presence



densities are lower and populations are restricted to river banks (Emmons 1997). In 1986, *H. hydrochaeris* was introduced into the natural range of *H. isthmus* in the Cauca River valley (west of the Andes), and viable populations have subsequently been established in the Laguna de Sonso (Usma 1991) and the La Vieja River (Aldana-Domínguez et al. 2012). Other names by which both species are known in Colombia are: cabiari, capibara, capiguara, capiouara, chigüire, chindó, copiwara, jesus, ronsoco, sancho, and yulo (Mones and Mones 1981; González-Jiménez 1995; Rodríguez-Mahecha et al. 1995; Tirira 2004).

### 1.4.3 Venezuela

Venezuela is the only other country where both capybara species are present. *H. isthmus* is found in Venezuela only around Lago de Maracaibo (Fig. 1.6) in Zulia State, west of the Andes (Ojasti 1973). It is known locally as piropiro, but is also known as culo-pando and poncho (Mones and Mones 1981). It is separated from *H. hydrochaeris* by the Andes (Cordillera de Mérida). The two species are not sympatric.

*H. hydrochaeris* is common in the flooded savannas of the States of Apure, Barinas, Guarico, and Cojedes. They are also present in other regions, but not with the same abundance as found in the Llanos (Fig. 1.7). The current distribution of the capybara is a fragmented version of that mapped 40 years ago (Ojasti 1973; Herrera and Barreto 2012). There have been drastic reductions in many regions or even local extinctions. There are also large differences in density among regions, with the highest found in the States of Apure and Barinas (in the southwest). The most common name for *H. hydrochaeris* in Venezuela is chigüire, from the Cumanagotos and Palenques indigenous peoples (Ojasti 1973). In the Llanos they are also known as chindó. Around Venezuela, capybaras are also called capiba, capigua, capybara, cerdo de agua, chancho de agua, chigüiro (Ojasti 1973; Mones and Mones 1981; González-Jiménez 1995; Tirira 2004).

### 1.4.4 Guyana, Suriname, and French Guiana

*H. hydrochaeris* is widely distributed in Guyana, Suriname, and French Guiana. They are usually found along major rivers in the savanna and rainforest areas of the sparsely inhabited interior and the coast (Fig. 1.7; Voss and Emmons 1996; Voss et al. 2001; Lim et al. 2005a, b; Lim and Engstrom 2005). As these three countries are in the humid tropics, there is a large amount of suitable wetland habitat for the capybara. The species is not found in areas above 1,000 m in the Guyanan Shield. It is known in Guyana as watras, capybara, laubba, waterhog, waterpig, and thick-nosed tapir (Mones and Mones 1981; Burton Lim personal communication). The common names of the capybara in Suriname are kapoewa, waterzuyn, waterhaas, watra-agoe, and capivard (Mones and Mones 1981). In French Guiana, they are commonly known as cabiai, but are also known as cabionara or cochon d'eau.



**Fig. 1.8** Distribution of *Hydrochoerus hydrochaeris* in Brazil (Schaller and Crawshaw 1981; Alho et al. 1987; Moreira 1995; Mourão and Campos 1995; Fonseca et al. 1996; Voss and Emmons 1996; Eisenberg and Redford 1999; Rechenberg et al. 2000; Moreira et al. 2001; Moreira 2004; Oliveira and Bonvicino 2006; Verdade and Ferraz 2006; Ferraz et al. 2007; José R. Moreira personal observation). *Black dots* show records of the species' presence

### 1.4.5 Brazil

*H. hydrochaeris* is present in all 26 Brazilian states and the Federal District (Brasília; Fig. 1.8; Fonseca et al. 1996; Moreira 2004; Oliveira and Bonvicino 2006), usually associated with riparian and lacustrine habitats and wetlands. The highest densities are found in seasonally flooded savanna areas like the Pantanal Matogrossense (Schaller and Crawshaw 1981), the Região dos Lagos of Rio

Grande do Sul State (Oliveira and Bonvicino 2006), and flood plains of major river systems such as the Amazonas (Voss and Emmons 1996), Paraná, and Araguaia. However, it is extinct in most of the Caatinga biome of northeastern Brazil (Moreira 2004).

Capybaras are widely distributed in the agro-ecosystems of São Paulo State, mainly in agricultural habitats in pastoral areas, with a predominance of C4 plants, such as pastures and sugarcane fields that are also associated with strong human presence (Ferraz et al. 2007). In these areas, capybaras can also reach high densities (Verdade and Ferraz 2006). Here, capybaras are considered pests of a variety of crops including sugarcane, corn, rice, banana, and soybeans, and they are alleged to compete for food with livestock.

Apart from agricultural habitats, capybaras also frequent water bodies (rivers, dams and reservoirs) within urban limits, in public parks and residential areas (Moreira and Pinheiro 2012). In several regions of the country, human-capybara conflicts are increasingly common. In these cases, illegal hunting pressure, urbanization, and associated habitat change encourage capybaras to invade urban properties and eat ornamental garden plants; capybaras may drown in swimming pools, cause traffic accidents along streets and roads, and contaminate lawns with ticks (Moreira et al. 2001). In some rare cases, capybaras attack people as well (Rechenberg et al. 2000). Recently, increasing cases of Brazilian spotted fever in southeastern Brazil (Labruna 2012) and the possible association with high capybara densities have triggered controversy over the desirability of the species' spread into urban areas and possible methods of population control.

The species is known as capivara throughout Brazil. In Rio Grande do Sul State it is also known as carpincho or capincho; in the State of Amazonas as cupido; and on Marajó Island (Pará State) as beque. It is possible that the name beque originates from its regional synonym in Portuguese meaning "big nose" due to the nasal gland of the male. The male capybara is called trombudo or caixa (or cachapu) by the inhabitants of Marajó, also because of its large nasal gland. In some places in the interior of Bahia State, capybaras are known as porco-capivara; in southeastern Pará State they are named cunum and in Goiás State cubu (Sálvio Xavier, personal communication).

#### 1.4.5.1 Distribution in Northeastern Brazil

There has been some doubt about the distribution of capybaras in northeastern Brazil because of the region's aridity (Mones and Mones 1981; Mones and Ojasti 1986; Ojasti 1991). They are almost extinct in the Caatinga biome (Fig. 1.9), possibly due to high hunting pressure and habitat alteration (Moreira 2004). However, they are still found along the major rivers such as the São Francisco, Parnaíba, and Paraguaçu and their tributaries such as the Preto (of the São Francisco), Gurguéia (of the Parnaíba), and Bonito Rivers (of the Paraguaçu), as well as along slopes of some ranges such as Chapada Diamantina (Fig. 1.9). A number of isolated populations are also found on the Vaza-Barris River (Bahia State), in Lago Parnaguá (Piauí State),



**Fig. 1.9** Distribution of *Hydrochoerus hydrochaeris* in the Caatinga of northeastern Brazil (Moreira 2004; José R. Moreira personal observation). *Black dots* show records of the species' presence

and Chapada Ibiapaba (Ceará State), or in areas where they have been reintroduced such as the hills of Maranguape and Aratanha (Ceará State). Along the Atlantic coast, the species is found most commonly in areas of Atlantic Forest biome and the Coastal Zone to the south of Rio Grande do Norte and west of Ceará States. The species is not found along an extensive stretch of coastline between Ceará and Rio Grande do Norte States.

The scarcity and even disappearance of the species in this region have been noted in recent decades (Rocha 1948; Paiva 1973). Capybaras no longer occur in protected areas where once they were found, such as the Ubajara and Sete Cidades National Parks. The capybaras of Chapada do Araripe (Ceará and



Pernambuco States) and the Curu and Jaguaribe Rivers (Ceará State), which still existed in the 1960s (Paiva 1973), are now extinct. The same is the case along the Paraíba River (Paraíba State). Populations in the center of Piauí State, observed by the Scottish botanist George Gardner (1975) in 1839, are now extinct. The capybara no longer occurs in many areas with names that indicate its previous presence, like the Capivara River, a tributary of the Poti River, in Piauí State. In contrast, the National Park of Serra da Capivara (in the south of Piauí State) gets its name from wall paintings in local archeological sites that resemble the capybara (but are perhaps more likely to be the paca – *Cuniculus paca*), not from the presence of the species in the recent past.

#### 1.4.6 Ecuador

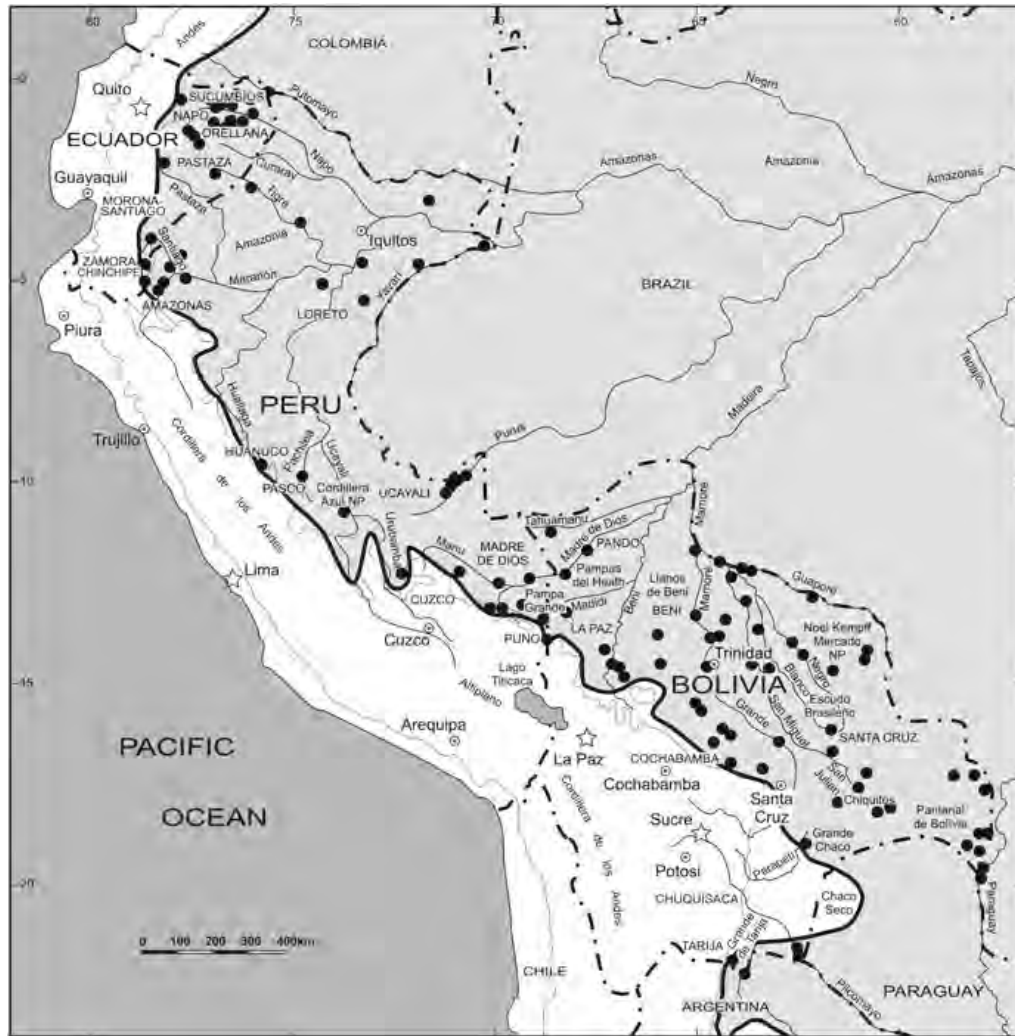
*H. isthmius* is not found in Ecuador, but *H. hydrochaeris* is a common and widely distributed species in the country's Amazon region (Fig. 1.10), where it inhabits tropical rainforests, usually below 400 m altitude (Tirira 2007). It is found in forests in the headwaters of several tributaries of the Amazon and Marañón Rivers, including the Napo, Curaray, Pastaza, and Santiago Rivers, in the Provinces of Sucumbíos, Napo, Orellana, Pastaza, and Morona-Santiago. The highest elevations recorded for capybaras in Ecuador are at the confluence of the Pastaza River and a tributary (1,130 m), in the Province of Pastaza (Rageot and Albuja 1994). Its presence was also documented in several conservation units in the Amazon region (Mena-Valenzuela 1997; Mena-Valenzuela et al. 1997; INEFAN 1998; Tirira 2007). Capybaras are locally known as capibara, capihuara, ronsoco, carpincho, capibaro, chigüiro, chigüire, and yulo (Tirira 2004).

#### 1.4.7 Peru

*H. hydrochaeris* is widely distributed in eastern Peru, throughout the Amazon River basin, at elevations ranging from 130 to 915 m. Their presence has been recorded in the Region of Amazonas along tributaries of the Marañón River. In the Region of Loreto, capybaras are rarely seen along tributaries of the Amazon River close to Iquitos (Valqui 2001). However, they are abundant on the Yavarí River and its tributaries (Salovaara et al. 2003; Amanzo 2006). They are also found in this Region along the tributaries of the Putumayo (Montenegro and Escobedo 2004), Tigre (Soini et al. 2001), Marañón, and Ucayali rivers (Aquino et al. 2001), and also in the Cordillera Azul National Park (Pacheco and Arias 2001).

In the central region of the country, capybara presence has been recorded in the Region of Ucayali along the Purus River and tributaries (Leite et al. 2003). They are also present in the Huallaga River and tributaries (Hutterer et al. 1995) and in the Regions of Huánuco and Pasco. To the south, there are records of the species in the Region of Cuzco along tributaries of the Urubamba River (Figueroa 2004;





**Fig. 1.10** Distribution of *Hydrochoerus hydrochaeris* in Ecuador (Rageot and Albuja 1994; Mena-Valenzuela et al. 1997; INEFAN 1998; Tirira 2007; Diego G. Tirira personal observation), Peru (Grimwood 1969; Patton et al. 1982; Soini and Soini 1992; Emmons et al. 1994; Emmons and Romo 1994; Hutterer et al. 1995; Pacheco and Vivar 1996; Emmons and Feer 1997; Aquino et al. 2001; Pacheco and Arias 2001; Soini et al. 2001; Valqui 2001; Leite et al. 2003; Salovaara et al. 2003; Figueroa 2004; Montenegro and Escobedo 2004; Amanzo 2006; Solari et al. 2006; Victor Pacheco personal observation), and Bolivia (Emmons 1991; Aguirre 1992; Altamirano 1992; Anderson et al. 1993; Arias et al. 1994; Barrera et al. 1994; Taber 1994; Perry et al. 1996; Anderson 1997; Torrico et al. 1997; Emmons 1998; Guinart 1998; Rumiz et al. 1998; Alverson et al. 2000; Tarifa et al. 2001; Maffei et al. 2002; Romo et al. 2002; Rumiz et al. 2002; Cuéllar and Noss 2003; Acosta and Aguanta 2006; Andrew Taber personal observation; N. Bernal personal communication). *Black dots* show records of the species' presence

Victor Pacheco, personal observation). In the Region of Madre de Dios, capybaras have been recorded in tributaries of the Manu (Pacheco and Vivar 1996; Solari et al. 2006) and of the Madre de Dios River (Emmons and Romo 1994; Emmons et al. 1994). In the extreme south of Peru, the capybara is found in Pampa Grande, Region of Puno. The species is known in Peru as ronsoco or capibara.

### 1.4.8 *Bolivia*

In Bolivia, the capybara (*H. hydrochaeris*) is commonly known as capibara, capiwara, capiguara, or carpincho. Generally, capybara meat is not appreciated in Bolivia and is usually consumed only by indigenous populations (Andrew Taber personal observation).

It is widely distributed to the east of the Andes, occurring in the phyto-geographic units of the northern wet grasslands (or Llanos de Beni; Fig. 1.10). Capybara presence has been recorded in the northwest of Pando Department, around the Tahuamanu River, where it was considered abundant (Alverson et al. 2000) and in the tributaries of the Madre de Dios River (Aguirre 1992). In the Department of La Paz, they are found in the region of Pampas del Heath (Romo et al. 2002), in the Madidi River (Emmons 1991; Tarifa et al. 2001), and the tributaries of Beni River (Barrera et al. 1994; Perry et al. 1996). The most extensive distribution area for capybaras in Bolivia is the wide savanna floodplains of the Beni and Mamore Rivers, in the Department of Beni (Anderson 1997). They are also found on the tributaries of these two rivers (Altamirano 1992). In the Department of Cochabamba, the capybara has been documented along the tributaries of the Grande River (Fig. 1.10; Rumiz et al. 1998).

Capybaras are found in the Department of Santa Cruz along tributaries of the Mamoré River (Fig. 1.10; Anderson et al. 1993; Acosta and Aguanta 2006). To the north of this department, the species is found in the Blanco and Negro Rivers (Arias et al. 1994) and to the east, in the Noel Kempff Mercado National Park (Emmons 1998). They are also abundant in the Bolivian Pantanal (Torrico et al. 1997; Teresa Tarifa personal observation). In the Chiquitos region of the Department of Santa Cruz they are found in small populations along some rivers such as the San Julian River (Fig. 1.10; Guinart 1998; Rumiz et al. 2002; Cuéllar and Noss 2003).

### 1.4.9 *Distribution in the Gran Chaco Region*

The distribution of the capybara in the Gran Chaco region of Bolivia, Paraguay, and Argentina has been questioned by various authors (Mones and Mones 1981; Ojasti 1991). However, although only reported at low densities, capybaras are found in isolated areas of the Gran Chaco in all three countries (Andrew Taber personal observation). In Bolivia, they are present along the San Miguel River to the south of the Sierra de San José de Chiquitos (Cuéllar and Noss 2003). In the north of the Gran Chaco, a few records were obtained in the region of Tucavaca (Maffei et al. 2002), while its presence in the northwest is restricted to the Parapetí River (Taber 1994) and the seasonal wetlands of Izozog. The capybara is also found on the border of Argentina in the floodplains formed by the Grande de Tarija and Bermejo Rivers, and near the common borders of Bolivia, Argentina, and Paraguay along the Pilcomayo River (Fig. 1.11; N. Bernal personal communication).

In the Chaco Seco of Paraguay, capybaras are restricted to permanent streams and swamps (Ziegler et al. 2002). Groups are found along major waterways like the



**Fig. 1.11** Distribution of *Hydrochoerus hydrochaeris* in the Gran Chaco between Bolivia (Taber 1994; Maffei et al. 2002; Cuéllar and Noss 2003; Andrew Taber personal observation; N. Bernal personal communication), Paraguay (Ziegler et al. 2002; Andrew Taber personal observation), and Argentina (Heinonen and Bosso 1994; Heinonen and Chébez 1997; Andrew Taber and Martin Alvarez personal observations). Black dots show records of the species' presence

Pilcomayo River, where individuals and small groups are often sighted. Throughout the remainder of the Chaco Seco, capybaras persist around small, permanent ponds, for example, along the seasonal Timane River basin of the Chaco in northwestern Paraguay (Fig. 1.11; Andrew Taber personal observation), where annual rainfall can be less than 500 mm. Pools and more durable small ponds can be found along old water courses across this vast plain. These water courses no longer drain into the Pilcomayo and Paraguay Rivers basins, except during exceptionally wet years, but still provide semi-permanent habitats for capybaras. Mones and Mones (1981) report that in the Gran Chaco, the capybara is known as yeptahang (in various indigenous languages).

In the Argentine Provinces of Jujuy and Salta, the capybara is found in the Yungas biome (sensu Cabrera 1971). In Jujuy, the species is present in an area that includes the San Francisco River, the largest tributary in the region of the Bermejo River (Fig. 1.11), and in lakes connected by the rivers' meanders (Heinonen and Bosso

1994; Martin Alvarez personal observation). In the Province of Salta, capybaras are seen in the lakes neighboring the upper reaches of the Bermejo River and the lower area of its major tributaries, and on the upper reaches of the San Francisco River (Heinonen and Chébez 1997). All these are areas of tropical mountain forest, with rainfall higher than that of the Chaco Seco. In the Argentine Chaco biome, capybaras are found only along the Bermejo and Pilcomayo Rivers. Unlike the Dry Chaco of Paraguay, the capybara is heavily hunted in the Argentine Chaco.

#### **1.4.10 Paraguay**

Capybaras (*H. hydrochaeris*) are widespread in central and eastern parts of Paraguay (Fig. 1.12), but their presence is always associated with the Paraguay and Parana Rivers (Myers 1982; Yahnke et al. 1998) where they are particularly abundant. These regions are dominated by forests and fields. The capybara is among the fauna of seasonally flooded palm savannas of the Paraguayan Humid Chaco. Due to the climate, soil type, and vegetation, the Chaco Seco (in the north) is considered inhospitable and capybaras are found only in wetter areas (Fig. 1.11; Ziegler et al. 2002). The species is known locally as carpincho or capibara.

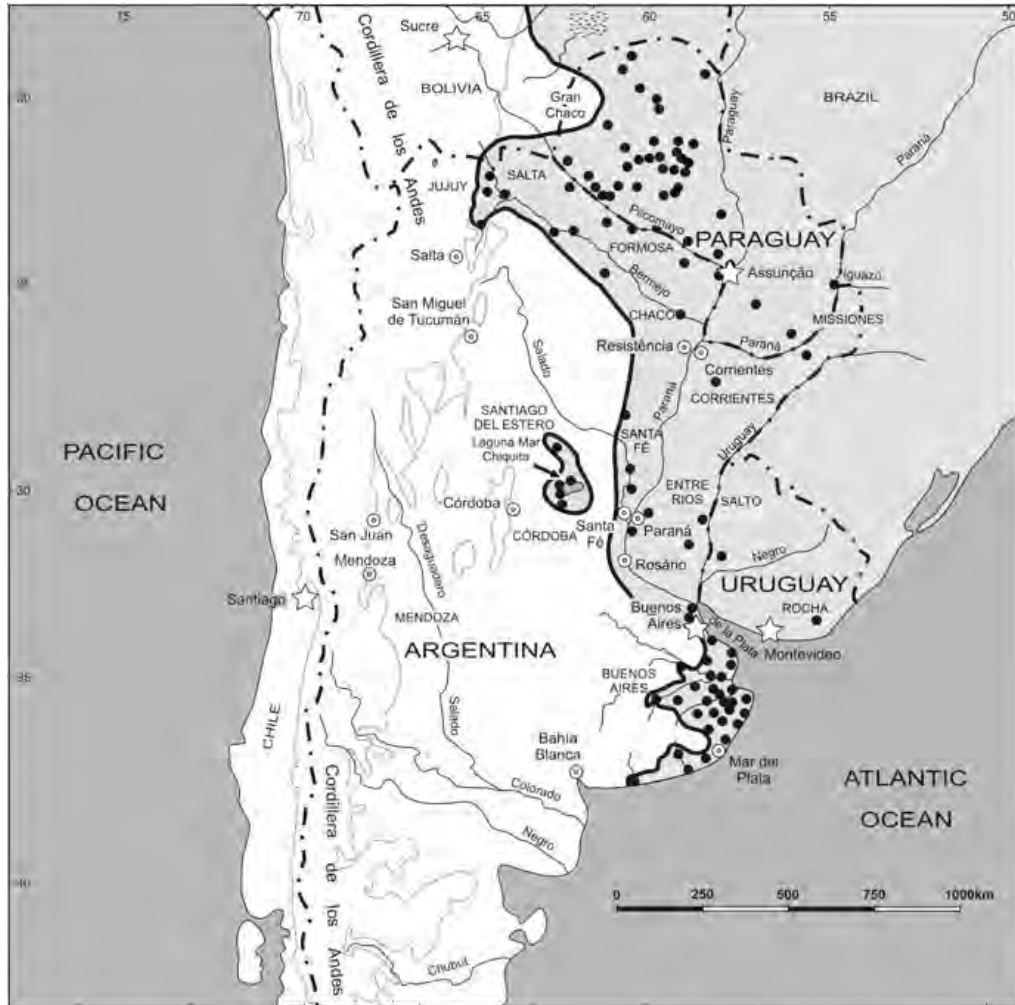
#### **1.4.11 Uruguay**

In Uruguay, *H. hydrochaeris* is found in damp environments, from the banks of the Uruguay River to the Atlantic coast (Fig. 1.12), throughout the country. It is abundant in the Department of Salto, where hunting is allowed, and there were some attempts at captive production. In the interior of the country, capybaras are abundant in the valley of the Negro River along the Atlantic Coast, and on the plains of the Department of Rocha (Bocage 1995; González 2000). Although often hunted, the species is not endangered in Uruguay. However, populations are scarcer in the more populous south. Capybaras in Uruguay are known as carpincho or capincho. Mones and Mones (1981) suggested that the origin of this name was possibly from the indigenous Quechua language in which “rabincho” means “without tail.” However, it is possible that the origin of the first part of the word, carpin or capin, is the same as that for the capybara in the Tupi language – ka’pii, which means grass.

#### **1.4.12 Argentina**

In Argentina, *H. hydrochaeris* occurs in the Provinces of Jujuy, Salta, Formosa, Chaco, Misiones, Corrientes, Entre Rios, Santa Fe, Santiago del Estero, Cordoba, and Buenos Aires (Fig. 1.12; Alvarez 2002; Alvarez and Martinez 2006; Quintana and Bolkovic 2012). However, the distribution of the species during the eighteenth





**Fig. 1.12** Distribution of *Hydrochoerus hydrochaeris* in Paraguay (Myers 1982; Yahne et al. 1998; Ziegler et al. 2002; Andrew Taber personal observation), Argentina (Adámoli et al. 1988; Redford and Eisenberg 1992; Goldfeder 1993; Heinonen and Bosso 1994; Miatello 1994; Heinonen and Chébez 1997; Alvarez 2002; Miatello 2003; Alvarez and Martinez 2006; Andrew Taber and Martin Alvarez personal observations), and Uruguay (Bocage 1995; González 2000). *Black dots* show records of the species' presence

century also included habitats to the south of the current distribution and a larger portion of western Argentina, including the Province of Mendoza. For example, the skin of this species was collected in about 1915, from a tributary of the Desaguadero River, in the south of the Province of Mendoza, (Roig 1991). As the drainage systems were changed in the nineteenth century, the species disappeared from the southern portion of its distribution. Subsequently, these areas have experienced desertification and are no longer suitable for capybaras.

Currently, the Bermejo, Pilcomayo, Salado, Paraguay, Iguazu, Paraná, Uruguay, de la Plata Rivers, and other smaller rivers and their tributaries form a prodigious network of water bodies where capybaras remain abundant (Adámoli et al. 1988). However, there are three areas in the country where populations of the species are



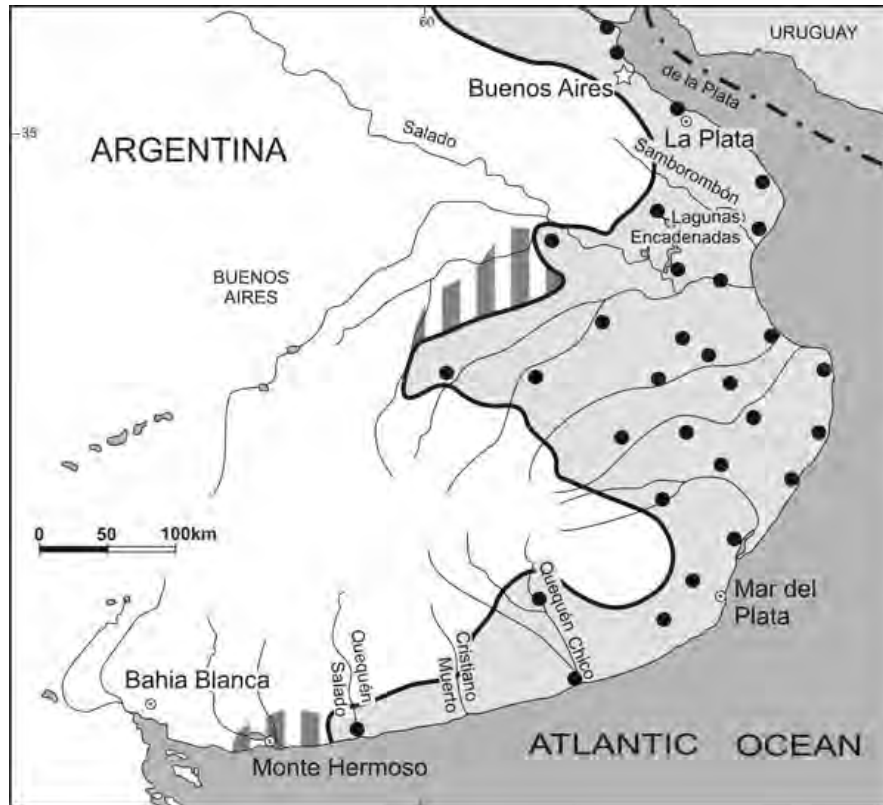


**Fig. 1.13** Distribution of *Hydrochoerus hydrochaeris* in the central region of Argentina, in the Provinces of Santiago del Estero and Córdoba (Goldfeder 1993; Miatello 1994, 2003). Black dots show records of the species' presence

practically isolated: North, Central, and South (Alvarez and Martinez 2006). The distribution in the northern region was previously described in the section covering the Gran Chaco. The capybara is known in Argentina as carpincho.

#### 1.4.12.1 Central Distribution (Provinces of Santiago del Estero and Córdoba)

Between the Provinces of Santiago del Estero and Córdoba, capybaras can be found in the endorheic basin (a closed drainage basin) of the Laguna Mar Chiquita (Fig. 1.13), where they most likely survive as remnant populations. The Laguna Mar Chiquita is found at the confluence of the Dulce, Primero, and Segundo Rivers. Its waters are brackish, with halophyte vegetation along the water margins (Reati et al. 1997). Although capybaras have low tolerance for brackish water (Ojasti 1973), they seem to select the mouths of the Primero, Segundo, and Dulce Rivers, where salinity is apparently lower than that found in the Laguna Mar Chiquita (Goldfeder 1993).



**Fig. 1.14** Southern distributional limit of *Hydrochoerus hydrochaeris* in the Province of Buenos Aires, Argentina (Adámoli et al. 1988; Alvarez 2002). Black dots show records of the species' presence. Vertical stripes: possible presence of *H. hydrochaeris*

In the 1980s, these populations dispersed upstream of the basin along the eastern bank of the Dulce River, occupying the southern tip of the Province of Santiago del Estero (Miatello 1994). The whole region north of the Laguna Mar Chiquita was occupied and, in the 1990s, all the banks of the lagoon and the wetlands of the Dulce River were inhabited by capybaras (Goldfeder 1993; Miatello 2003).

#### 1.4.12.2 Buenos Aires Province: Southernmost Limit of *Hydrochoerus hydrochaeris*

The Province of Buenos Aires is the southern limit of the geographic distribution of the capybara, but the exact location of the limit within the Province is unclear. Alvarez (2002) reported the presence of capybaras to the mid-east of the Province, where there is a profuse network of lakes that form the Encadenadas system of lagoons and the basins of the Samborombón and Salado Rivers. The distribution reaches the south of the Quequén Salado River (Fig. 1.14). Although there are no recent records, capybaras may also inhabit the rivers close to Monte Hermoso. It is possible that the dispersal and establishment of capybara populations in the region

is hampered by the salinity of water bodies (Adámoli et al. 1988). However, recurrent floods in this region may alter the distribution of the species. Capybaras are hunted in the eastern portion of this region.

## 1.5 Final Comments

Inconsistency in the use of the capybara's scientific name is unhelpful, and we emphasize that the species should be referred to by the generic name *Hydrochoerus* Brisson, 1762, and the species name *Hydrochoerus hydrochaeris* Linnaeus, 1766 (for the capybara, living east of the Andes) and *H. isthmius* Goldman, 1912 (for the lesser capybara, found west of the Andes).

Although the genus is not threatened with extinction, some populations deserve particular attention. Of these, we highlight the populations of *H. hydrochaeris* in northeastern Brazil and the Chaco Seco region of Argentina where hunting is intense. A mounting concern is that the populations in the Llanos of Venezuela and Colombia are at increasing risk of overexploitation, and local extinctions cannot be ruled out. Governments, and those responsible for wildlife in the capybara's range states, should take note of the species' value and act to mitigate the risks it faces – the material in this book will, we hope, provide them with the basis for policy and action.

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