

# Capybara, *Hydrochoerus hydrochaeris*

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SAN DIEGO ZOO  
GLOBAL

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## TAXONOMY & NOMENCLATURE

(McKenna & Bell 1997) (Mead et al 2007)(Rowe & Honeycutt 2002) (Wilson & Reeder 2005) (Wyss. et al 1993) (Kurtén & Anderson 1980)

**Describer (Date):** Linnaeus, 1766. Systema Naturae, 12th ed., 1:103 for *Hydrochoerus hydrochaeris*  
Goldman, 1912. Smithsonian Miscellaneous Collection, 60(2):11 for *H. isthmus*

**Kingdom:** Animalia

**Phylum:** Chordata

**Class:** Mammalia

**Order:** Rodentia

**Family:** Hydrochoeridae

**Genus:** *Hydrochaeris* - Brunnich 1772

**Species:** *Hydrochaeris hydrochaeris*

**Species:** *H. isthmus*

### Taxonomic History and Nomenclature

- Traditional classifications consider capybara to be in its own family, the Hydrochoeridae
- Recent genetic studies place *Hydrochaeris* within Caviidae, the family which includes caviés, maras and guinea pigs
- Much uncertainty regarding how capybara relate to other South American rodents
- *H. isthmus* a distinct species with karyotype 2n=64 and FN=104 (Mones 1991) but not recognized as separate species by other researchers (Flynn 2008)

### Common Name

- Some 190 local common names most of native origins
- *Kapiyva* or "master of the grasses" in Amazon tribe's native language
- In Spanish: carpincho, capibara, chigüiro, maja, poncho

### Scientific Name

- From Greek *Hydro chaeris* meaning "water hog"

### Phylogeny

- Ancestors of modern capybara: cavy-like rodents (cavimorphs)
  - Late Eocene to Early Oligocene (37.5 to 31.5 million years ago), Chilean Andes

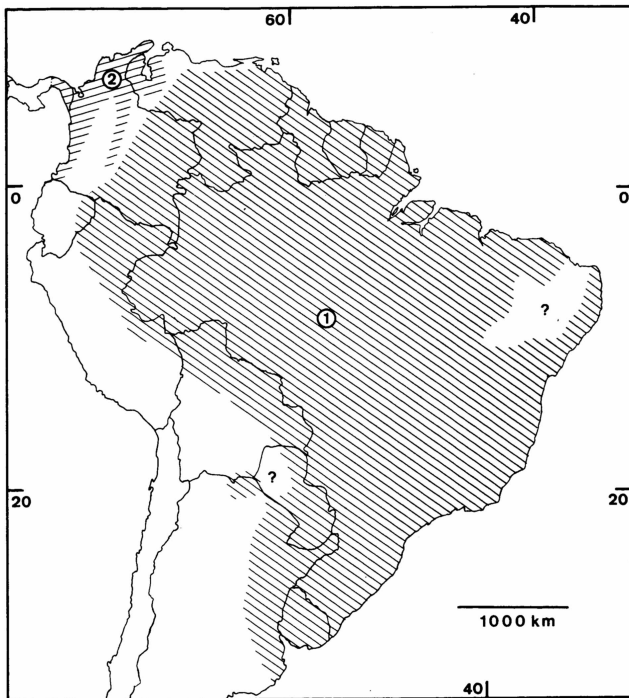
- Cavimorphs perhaps arrived in South America from Africa
- True capybaras first recorded in Argentina about 9 million years ago
- As many as 56 separate fossil species, most described solely on basis of teeth
  - But teeth change shape significantly as a capybara ages
  - In actuality, not so many species
  - Revision needed
- About 3.5 million years ago, capybara dispersed to North America across the Panamanian land bridge
- During the Pleistocene Ice Ages, capybara lived in southern U.S.
  - Pleistocene fossil sites of *Nechoerus pinckneyi* (40% larger than modern capybara) in Florida, South Carolina, Texas
  - Pleistocene fossil discovered in 1995 from Ice Ages pond sediments, San Diego County, California (Deméré 2007)
  - In Pleistocene, capybara often associated with bizarre, large armored glyptodonts in wet habitats
- Only one genus and one (or two) species living today

## DISTRIBUTION & HABITAT

(Herrera & Macdonald 1989) (Mones & Ojasti 1986) (Verdade & Ferraz 2006)

### Distribution

- Prehistoric distribution: North America, Central America, West Indies, South America
- Historically (before livestock introduced): riparian regions throughout South and Central America.
- Currently for *H. isthmus*: eastern Panama and northern coastal Colombia and Venezuela
- Currently: for *H. hydrochaeris*: northern South America east of the Andes from Panama to NE Argentina
  - Portions of Columbia, the Guianas, Suriname
  - Paraguay and Uruguay
  - Northeastern Argentina
  - Amazonian Ecuador, Peru, and Bolivia
  - Concentrations in:
    - Llanos of Venezuela
    - Pantanal wetlands of western Brazil
    - Taim lowlands of southern Brazil



### Habitat

- Lowlands from open plains to tropical rain forests, always near water
  - Swampy, marshy, grassy areas bordering rivers, ponds, streams, lakes
  - Prefer nutrient-rich muddy rivers with aquatic grasses
  - Need extensive meadows at low water times
- Considered a habitat specialist
  - Use open water for drinking, wallowing, predator protection
  - Use dry land for foraging, resting
  - Grassy patches and brushy scrub both essential in extremes of dry and wet seasons

- Ecology largely unknown until 1966 when Venezuelan government began studies in Llanos region

## PHYSICAL CHARACTERISTICS

(Herrera 1992) (MacDonald 1984) (Mones & Ojasti 1986) (Pereira et al 1980) (Nowak 1999)

**Body Weight:** Average adult 48.9 kg (108 lb); 35 to 65.5 kg (77 lb to 144 lb) in Venezuela's Llano region; a record 91 kg (200 lb) in southern Brazil

**Head/Body Length:** 106 to 134 cm (42 to 53 in);

**Shoulder Height:** 60.9 cm (2 ft.)

**Tail Length:** Tail vestigial

### General

- Largest living rodent
- Resembles a cavy but larger, with shorter body
- Barrel-shaped body
- Heavy, blunt muzzle
- Cheek teeth ever-growing
- Spends much time in water
  - Eyes and small ears set high on head (can be alert while nearly underwater)
  - Able to stay completely under water several minutes
  - Slightly webbed toes (four on the front, three on the back)
  - Water immersion helps capybara regulate body temperature
- Front legs shorter than rear legs
- Nails strong, hoof like
- Body size and mass increases with a population's increased latitude

### Pelage and Skin

- Hunted for pelts in historic times and managed on ranches today
  - Between 1960 and 1969, 1.5 million skins exported from Brazil
- Coloration generally reddish brown to grayish on upper parts, yellow-brown on undercarriage; some black on the face, outer limbs and rump
- Long, coarse, and sparse hair may help this water-loving animal dry when out of water
  - Thin hair makes sunburn a problem; mud caked on hair offers protection
- Low number of sweat glands in skin plus large body size make thermal stress a problem

### Sexual Dimorphism

- Males more massive than females with similar length
- Males have large visible scent gland (the morrillo) on top of snout
  - Morrillo used to rub on vegetation to mark territory
  - May function also as status signal
    - Larger morrillos associated with larger testes and greater sexual activity
  - Females have same gland, but underdeveloped

### Other Physical Characteristics

- Teeth of capybara grow throughout life in all dimensions; cutting and grinding surfaces become more complex as animal ages

## BEHAVIOR & ECOLOGY

(Lord-Rexford 1994) (Herrera & Macdonald 1989, 1993)

(Macdonald 1981a, b) (Nowak 1999) (Ojasti 1991) (Rowe and Honeycutt 2002)(Tomazzoni et al 2005)

### Activity Cycle

- Resting close together at water's edge in morning
- Most grazing late afternoon and evening; graze in short sessions at night
- Rest in water or mud during the heat of the day
- After disturbances from humans, more nocturnal and shy
- Group size fluctuates with wet/dry seasons

### Territory Size

- Territories remain very stable for several years

- Along rivers groups space themselves from 100 to 500 m (.06 to .3 mi.) apart
- Groups may occupy a home range from 2 to 200 hectares (4.9 to 494 acres)
- Average group uses 5 to 20 hectares (12.4 to 49.4 acres)
- In one study, each group used a home range averaging about 79 hectares and defended a territory of 9 hectares
- Density of capybara within their territories quite high compared to other tropical herbivores of similar size
  - Biomass of capybara 10 times greater than similar sized grazing Bohr's reedbucks' biomass
  - Density of capybara populations reflects high primary productivity of savanna habitats in Llanos of Venezuela

## Social Groups

### General

- Social animals living in groups
  - Dry season: up to 100 individual at water sources
  - Wet season: group size up to 40 individuals
- Bonds between animals maintained by touching, grooming, scent marking, vocalizations
- High levels of sociality possibly a response to risk of predation and resource availability
  - Capybara similar in this trait to South American desert and rock caviars and maras

### Hierarchy

- Herds with dominant and subordinate males plus females and young
- Typical make-up of breeding groups: one male & 4 to 14 females
- Dominance positions very stable, lasting for years
  - Dominant male may claim access to best water holes, parasite-eating birds, and females in estrus
  - Largest males are usually dominant individuals
  - Size not a factor in status among subordinate males
  - Subordinate males tend to occupy positions on edges of resting groups, away from dominant male
- No bachelor groups
  - Males not in groups have little protection from predators
  - Outside the group, no chance for reproduction

### Territorial Behavior

- Groups occupy territories that are defended
  - Exception to this rule: quick unchallenged passage by neighboring capybara to reach distant territory
  - Capybara bark at intruders, then if necessary, jump in river or run away
- Both sexes scent-mark using anal glands
  - This behavior may also play a role in defining territories

### Aggression

- Grooming lessens tension between individuals and removes parasites
- Male aggression more frequent with increasing numbers of males in group
- Harassment and chasing: main form of male/male aggression
  - Subordinate males rarely retaliate
  - Retaliation involves facing opponent, both animals rushing towards each other, rearing on hind legs, grappling, loser fleeing
  - Subordinate males often suffer serious bites to rump as they flee
  - Most commonly, dominant male walks, nudges, or "escorts" subordinate male to edge of group

### Play

- Young in groups play in water, imitate males
- Like other cavy-like social rodents, individuals chase each other, play-wrestle, gallop

### Communication

#### Visual Signs

- Greatly enlarged scent glands on top of snout in male signals status & may attract females
- Size of male's morrillo a sign of rank
- Amount of scent-marking correlates with dominance rank

#### Vocalization

- Infants and young constantly emit a guttural purr, perhaps to stay in touch with group; losers in aggressive matches also make this sound in appeasement
- Low clicking sounds of contentment
- Sharp prolonged whistles, squeals, short grunts
- Alarm bark or cough

- Most warning calls come from subordinate males in a group; companions react by standing alert or plunging into nearest water
- Females emit a whistle when in estrus
- Males tooth-chatter as sign of aggression
- Many other closely related species also highly vocal, especially guinea pigs and caviies

### Olfaction/Scent Marking

- Both sexes scent mark with anal gland; females less frequently
- Group members may recognize each other by their unique mix of scent chemicals

### Locomotion

- Excellent swimmer; good diver, can stay underwater for up to 5 minutes
- Move from place to place in short bursts of travel not more than 200 m. (.12 mi.) with long rests between
- Walks, grazing, in typical day about 700 m (.43 mi)
- Star-shaped footprints
- Rather sedentary habits allow ranchers to manage capybara without fences
- Several juveniles may ride on female's back as she swims

### Interspecies Interaction

- Puma & jaguar prey on capybara
- When attacked by wild dogs, capybara group forms defensive huddle with young in center, adults facing outwards
- Juveniles preyed upon by foxes, ocelots, cayman, raptors, occasional possums (attacking infants), anaconda
- Co-exist with domestic cattle
- At least nine species of birds increase their feeding rate by associating with capybara
  - Especially jacana, scarlet ibis, sharp-tailed Ibis, white Ibis, buff-necked ibis, swifts
  - Egrets hunt from moving and stationary capybara's backs
  - Swifts hunt low overhead or from capybara's head
  - Researcher observed capybara soliciting tick-eating (*Amblyomma spp.*) by yellow-headed caracara
- Five bird species associated with capybara in order to find food. (Tomazzoni et al 2005)
  - Southern caracara, rufous hornero, cattle tyrant, yellow-headed caracara, shiny cowbird
  - Strategies of the birds included using the capybara as a perch, walking with the capybara to catch flushed prey, foraging in capybara skin

## DIET & FEEDING

(Barreto and Herrera 1998) (Borges & Colares) (Nowak 1999) (Quintana et al 1998)

### Anatomy and Physiology

- Digestive system similar to rabbit's
  - Simple stomach
  - Large intestinal pouch (caecum) with microorganisms for fermenting cellulose
  - Excrete two kinds of feces
    - Olive colored oval balls
    - Also colorless, protein rich "paste" which is re-ingested for maximum digestion of nutrients (= coprophagy)
  - Regurgitate and re-chew food while resting
- Front incisors crop native grasses too short for cattle

### Feeding Strategies and Food Items

- Are selective grazers; eat approximately 3 kg/day fresh forage, mainly grasses
  - Tend to be more selective when more plant species available
  - 80% of diet is only 5 species of grasses (Poaceae)
  - Most common plant species in areas typically the ones eaten most often, especially in winter when fewer species available
  - Various estimates for amount of aquatic plants in diet from .6 % to 87 %
    - As wet season advances, more reeds and water hyacinths consumed
- Capybaras raid cultivated fields for grains, melons, squashes, bananas, sweet potatoes, manioc leaves and corn

## REPRODUCTION & DEVELOPMENT

(Macdonald and Herrera 2001) (Nogueira et al 1999) (Ojasti. 1968) (Paula et al 1999) (Rowlands and Weir 1974) (Weigl 2005)

### Courtship

- Female estrus cycle: every 7.5 days; remain receptive only 8 hours
- In mating season, dominant males conspicuously guard females
- When female in estrus, dominant male sniffs her frequently
- Female whistles when in estrus to attract males

- Mating season year round with peak at beginning of wet season

### Reproduction

- One litter/yr; two litters possible under good conditions
- Harem-based polygynous breeding (one dominant male, several females)
- Female pursued by male enters water and swims back and forth
  - Pair mates in water; female often submerged for brief copulation
  - Females not wanting to mate may dive deep enough to dislodge male
- Mating pair often interrupted by a second male
- Life span of male's sperm longer than that in most rodents; capybara mating system promotes sperm competition
- Group association essential for raising young; groups smaller than four adults fail to rear any young

### Gestation

- 150 days

### Life Stages

#### Birth

- 4 to 5 pups most common; a breeding group may have 15 pups or more at one time
- At birth young weigh about 1,500 grams (3.3 lb)
- At birth all cheek teeth already erupted, with signs of wear (Kramarz 2002)
- Young can follow mother and eat grass shortly after being born (are precocial)
- Young nurse about 16 weeks

#### Infant (< 1 year old)

- Young may suckle indiscriminately from several females;
- Small groups of young move about herd, nudging females until one stands to allow nursing
- Very young ride on females' backs'
- Very young avoid water where caimen and anaconda lurk
- Females spend a lot of time caring for young of different ages

#### Juvenile

- Yearlings disperse from parents' group

#### Subadult

- By 18 mos. weigh about 40 kg (88 lb.)

#### Adult

- Females sexually mature age 7 to 12 mos.
- Males between 15 and 24 mos.

#### Longevity

- Average life span 7-10 years;
- In captivity in the Adelaide Zoo in Australia, 15 years
- One *H. isthmus* at the San Diego Zoo: 9 years, 6 mos.

#### Mortality

- Preyed upon by foxes, bush dogs, feral dogs, ocelots, cayman, jaguars, eagles, caracaras, black vultures and human hunters
- Wild capybara, especially in Venezuela, are poached and illegally hunted more intensely in the weeks before Easter, when they are sanctioned by the Catholic Church as a substitute for fish (because of their semi-aquatic habits).
- Jaguars prey most often on young males at the periphery of the group (and furthest from the water)
- Infanticide in captive populations, but not in wild

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## DISEASES AND PATHOLOGY

(Labruna et al 2004, 2007) (Lord & Flores 1983)(Mones & Ojasti 1986) (Meireles et al 2007) (Saraiva 2004)

### Diseases & pathogens in wild capybara

- Parasites include species of intestinal protozoa (Ciliata), spore-producing parasitic protozoa (Apicomplexa), parasitic worms

or flukes (Trematoda), tapeworms (Cestoda), roundworms (Nematoda), insects and fungi.

- Rare case of natural infection with avian eye trematode *Philophthalmus lachrymosus*;
  - This parasite also infects humans
- Carry *Cryptosporidium*, a protozoa causing gastro intestinal infections in humans;
  - Safety of human water supplies near capybara populations is a concern
- Bites and massive lesions from *Amblyomma* (Ixodidae) ticks carrying *Rickettsia rickettsii* bacteria
  - This pathogen responsible for Brazilian Spotted Fever in humans
  - In southeastern Brazil incidence this disease may be rising due to capybara populations moving into urban areas (and vice versa)
- Blood studies show capybara may host two species of a *Brucella* bacteria, *B. suis* and *B. abortus*
  - Infect pigs and cattle
  - Symptoms of this disease in capybara not known
- Carry a parasitic protozoa, *Trypanosoma evansi*
  - Some capybara with the parasite appear in perfect health; others show signs of weight loss, apathy, lack of coordination of hindlimbs, hair loss, eye infections, enlarged spleen, death
  - *T. evansi* reported in capybara populations in Argentina, Brazil, Panama, Paraguay
  - *T. evansi* causes disease of horses and wildlife ("*mal de caderas*" in Argentina)
    - Most common in first half of wet season when prolonged flooding reduces available habitat
    - Anecdotal reports that trypanosomiasis is *milder* for horses living in areas where capybara are common

### Diseases In Captivity

- Mange or scabies from mites (*Sarcoptes scabiei*), a common skin problem in animals without water access
- Wounds from male-male aggression a problem
- Scurvy in animals without source of Vitamin C
  - Symptoms included bleeding gums and noses, tooth loss, fragile bones, disruption of reproduction in males and females, death
- Can be experimentally infected with foot-and mouth disease, but natural infection not known

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## MANAGED CARE

(Chapman 1991) (Nogueira et al 1999)

### Captive Breeding

- Zoo-raised capybara have higher survival rate than those in wild
- Females in captivity reach sexual maturity later than in wild (26 vs. 18 months)
- Capybaras bred in many zoos and also commercially for meat and skins in South America
- Some populations managed in natural areas
- Problems with enclosed or penned individuals
  - Male/male aggression when overcrowded
  - Hierarchical group social structure disrupted when new individuals introduced
  - Infanticide by female pen mates
    - Females' lack of experience not a factor
    - No infanticide when females have been raised together (are familiar with each other)
    - No aggression by females except at birth of pen mate's young

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## POPULATION AND CONSERVATION STATUS

(Moreira & Macdonald, 1996) (Ojasti 1991) (Verdade & Ferraz 2006)

- **ISIS captive population**

### Population Density

- 195 individuals/sq. km. ( 0.4 sq. mi) in southeastern Brazil wetlands
- Between 10 and 200 individuals/ sq. km.(0.4 sq mi) in Venezuelan llanos
- Status in all areas depends on management practices
  - Some areas allow controlled harvest and tolerate subsistence hunting
  - Elsewhere all hunting prohibited but poaching may be common
  - Protections enforced in other areas
  - Management for cattle may improve habitat for capybara
  - Populations considered a potential nuisance in east central Sao Paulo Brazil where they often live near humans
    - Blamed for crop damage
    - Associated with Brazilian Spotted Fever

### Conservation

**1953:** Hunting regulated in Venezuela

**1967:** Hunting prohibited in Brazil (Federal Law No. 5.197) but harvesting being considered to reduce population densities and

impact on agriculture in some areas

**1968:** Venezuela develops management plan using studies of capybara biology and ecology

**1980:** Hunting prohibited in Columbia

**2000:** Central Suriname Nature Reserve established on North Atlantic coast of South America; 1.592 million hectares ( 6,146 sq mi.)

- **IUCN Status** 2006: Lower Risk; Conservation Dependent (1C).
  - Locally common; farmed for meat and skin in some areas
- **CITES Status:** Not listed

#### Threats to survival

- Status not threatened at present, but habitat loss and hunting/farming need controls and monitoring
  - Predators' declines due to habitat loss may offer short-term benefit to capybara populations
  - Hunting often removes larger and older individuals from population (large males, pregnant females) and reduces group size
    - Long-term effect: decrease in body size of hunted population
    - Smaller groups mean fewer young survive per female
    - Hunting drives normally savannah-dwelling animals to forested habitats where resources are not optimal
  - Encroachment of human development
  - Clear-cutting/burning, farming
  - Human perception of their role in competing with cattle for food, as pests of sugarcane and rice mono cultures, or as carriers of diseases

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#### Important Web Resources:

- [IUCN Red list of Threatened Species: Capybara](#)
  - [CITES List](#)
  - [Rainforest Alliance](#)
  - [The Capybara Page](#)
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