Phyllostomus hastatus (Greater Spear-nosed Bat)

Family: Phyllostomidae (Leaf-nosed Bats)
Order: Chiroptera (Bats)
Class: Mammalia (Mammals)

Fig. 1. Greater spear-nosed bat, *Phyllostomus hastatus.*

[https://commons.wikimedia.org/wiki/User:Felineora#/media/File:Phyllostomus_hastatus.jpg, downloaded 6 March 2016]

TRAITS. *Phyllostomus hastatus* is a large resilient bat with short, smooth velvet-like pelage (fur). The colour of the pelage ranges from black to dark brown and sometimes appears to be between red and orange, and chestnut across the body (Fig. 1). It also has black wing membranes and facial skin, the wing membranes extend to the foot (Fig. 2), and there is a short tail. The nose leaf is structured as a spear, and is separate from the upper lip. The lower lip has a blackened V-shaped indentation with small protuberances. Two pointy, triangular ears are widely separated on the head. Males have glandular chest sacs, small unpigmented nipples in adult females, pigmented nipples in mothers (Stern and Kunz, 1998).

DISTRIBUTION. There is a wide distribution of the species located in Central and South America (Fig. 3) particularly in tropical lowlands (Smith, 2009). In addition, the species is found in Trinidad and Tobago (Goodwin and Greenhall, 1961).

HABITAT AND ACTIVITY. The habitat preference of the greater spear-nosed bat is diverse ranging from humid forests to savannahs. Moreover, the species seasonally occupies disturbed habitats; in wet seasons, *P. hastatus* can be found in forested areas whereas in the dry season roosting occurs in agricultural regions (Willig et al., 2007). Also, the species is found in occupied and abandoned structures (Goodwin and Greenhall, 1961) and shows tolerance to human presence (Tuttle, 1970); touching them causes little agitation and roosting is not disturbed. The majority of this nocturnal species roost in dark, large caves with pungent musty odours in colonies of thousands (Goodwin and Greenhall, 1961). Furthermore, individuals whether few in numbers or in hundreds hang from the feet with the head pointed downwards in tight formations (Goodwin and Greenhall, 1961). In the Guanapo cave, *Phyllostomus hastatus* coexists with other bats *Chilonycteris rubignosa, Carollia perspicillata, Pteronoius davyi, Natalus tumidirostris and Mormoops megalophylla* (Goodwin and Greenhall, 1961). In Trinidad it is the only gregarious species of bat that travels collectively to and from the roosting site to feed (Goodwin and Greenhall, 1961).

FOOD AND FEEDING. Pellets found at roosting sites contains pieces of fruits, feathers and fur thus the species is omnivorous. *P. hastatus* favours the meat of mice and young birds and are opportunistic predators of small bats found trapped in mist nets (Oprea et al., 2006). In Trinidad the species' diet was found to be seasonal (Wilkinson and Boughman, 1998). From December to January, faecal pellets contained the pollen of *Ochroma lagopus* and *Rullinia multiflora*, then April to June seeds of *Cecropia peltata* and pulp were abundant and finally, insects predominated the diet in June which is wet season (Wilkinson and Boughman, 1998).

POPULATION ECOLOGY. *P hastatus* live in groups ranging from about 10-100 individuals (Goodwin and Greenhall, 1961). A single group is further subdivided, where a dominant or harem male is present and is associated with 14-17 females for medium sized harems. These groups appear static since the harem male stay with those females. Those that are not in a harem, usually young females and the bachelor males, form separate groups (McCracken and Bradbury, 1981). *P. hastatus* are collaborative, social foragers, especially females (Smith, 2009). During the lactation period a few females (1-2) from each harem will remain in the roost and preside over the young whilst the others forage. The foraging females will bring back food to the roost to advertise foraging areas of rich in food resources so that other group members may benefit. The males play a defensive role protecting their harem, hence they forage near the roost (Smith, 2009). Therefore, the harem males and harem females form stable groups (McCracken and Bradbury, 1981). However, bachelor males form unstable groups due to competition amongst individuals for females so members of the group experience constant change, thus foraging groups tend to be smaller and widely dispersed. Typically, mortality rate in adult *P. hastatus* is low. Thus, the species is long lived and are known to survive up to 20 years (Smith, 2009).

REPRODUCTION. *P. hastatus* are harem breeders where the males will have more than one female. *P. hastatus* can be monoestrous (one reproductive cycle in a year) and polyoestrous

(multiple reproductive cycles in a year), this depends on the geographical location, in Central and South America respectively (Smith, 2009). Although lactating females are reported throughout the year in Brazil, reproduction appears to be seasonal in Trinidad and Tobago during the period of March to September, where births are concentrated in the dry season and weaning in the rainy season (Smith, 2009). Moreover, according to Porter and Wilkinson (2001) each female births a single offspring at a time which is highly synchronised among the group, and occurs over a period of 2-3 weeks. After birth, the females nurse the young whilst the harem male, usually the father, defends the harem which contains an average of 19 females (Smith, 2009). Thus, reproduction varies geographically and is due to environmental factors such as patterns in rainfall (Porter and Wilkinson, 2001). The juveniles are carried with the mother during foraging only for a few days after birth. On subsequent days the juveniles are left in the caves, but once the mother returns to the roost the juvenile will latch on to the breast of the mother. Females continue to lactate for a period of 92-101 days (Smith, 2009).

BEHAVIOUR. Juvenile behaviour: Sometimes juveniles will fall to the floor or crash into the walls of the roost cave since they are unskilled fliers. They then signal for help by sounding isolation calls that are simple, double-note sounds, yet specific such that the mother of that pup can recognise the call (Bohn et al., 2007). The calls changed with respect to age, becoming shorter and increasing in frequency. In addition to isolation calls the pups are agile and frantically flap the wings and scampers up the walls to gain attention for retrieval. Moreover, calls are essential for the survival of the pups since death is the result of unretrieved pups (Smith, 2009). Adult members of different groups such as harems or single colonies utilize vocalisations to identify each other (Boughman, 1997). Harem males vocalises in addition to wing beating to warn off intruding males from invading the harem. Harem males would also mark females with a distinctive odour secreted from the chest gland and rubbed on the females (Smith, 2009).

APPLIED ECOLOGY. The greater spear-nosed bat is a widely distributed species and hence it is not listed in the IUCN. Thus, there are neither threats nor actions of conservation towards *P. hastatus* (Diaz and Barquez, 2015). *P. hastatus* was found to be negative for rabies and causes no diseases (Goodwin and Greenhall, 1961). Greenhall (1966) reported the species consuming oranges, leaving bite marks on the fruit during the dry season; hence in this way the species appears to be a pest. However, since other pests that destroy agriculture such as insects and smaller bats are preyed on, *P. hastatus* is also beneficial to humans.

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Posted online: 2016

Fig. 2. Greater spear-nosed bat, showing black wing membranes connected to the feet.

[https://www.inaturalist.org/observations/327620, downloaded 11 March 2016]

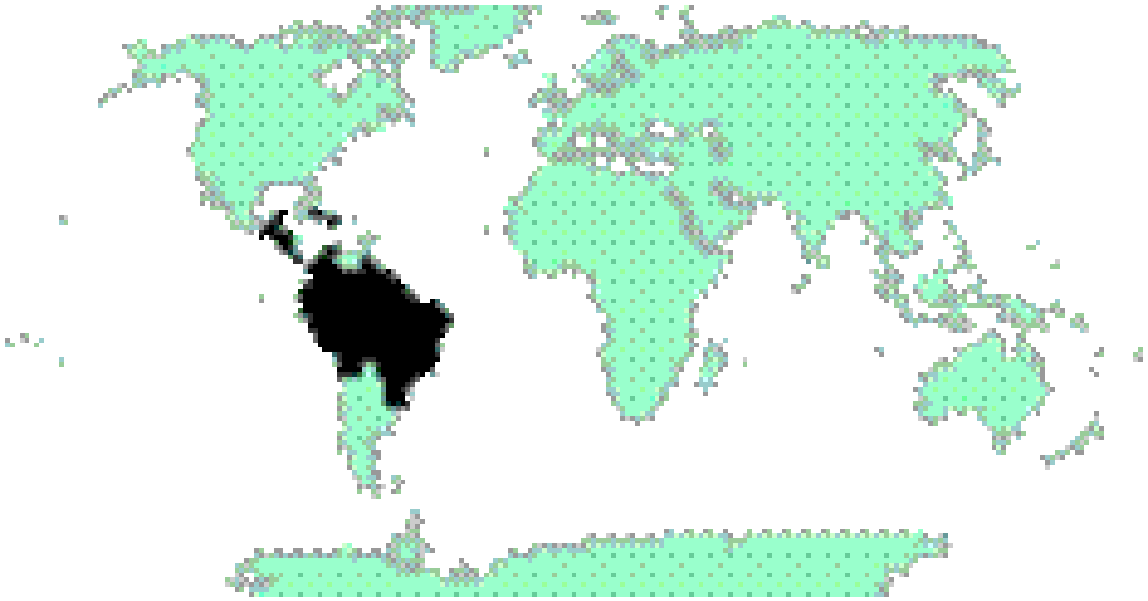

Fig. 3. Greater spear-nosed bat geographic distribution.

[http://www.uwsp.edu/biology/VertebrateCollection/Pages/Vertebrates/Mammals%20of%20Paraguay/Phyllostomus%20hastatus/Phyllostomus%20hastatus.aspx, downloaded 10 March 2016]