



## FIELD STATION PROFILES

### ESTACIÓN BIOLÓGICA QUEBRADA BLANCO

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#### NAME OF FIELD STATION

Estación Biológica Quebrada Blanco (EBQB)

#### GEOGRAPHIC LOCATION

- Peru, Departamento Loreto, Distrito Fernando Loes
- Lat. 4°21'S, Long. 73°09' W; 705305 Easting, 9518934 Northing, UTM Zone 18 (WGS 84); ~130 m a.s.l.

#### GEOGRAPHIC CONTEXT AND HABITAT

The Estación Biológica Quebrada Blanco (EBQB) is one of very few research stations in the region of north-eastern Peru bounded by the rivers Amazon/Ucayali to the north and west and Yavarí to the east. This interfluvium includes large stretches of remaining little or undisturbed lowland rainforest (Fig. 1). It is a region of high biodiversity



**Figure 1.** EBQB is located in an area of little disturbed to undisturbed forest. Source of satellite image: Google Earth

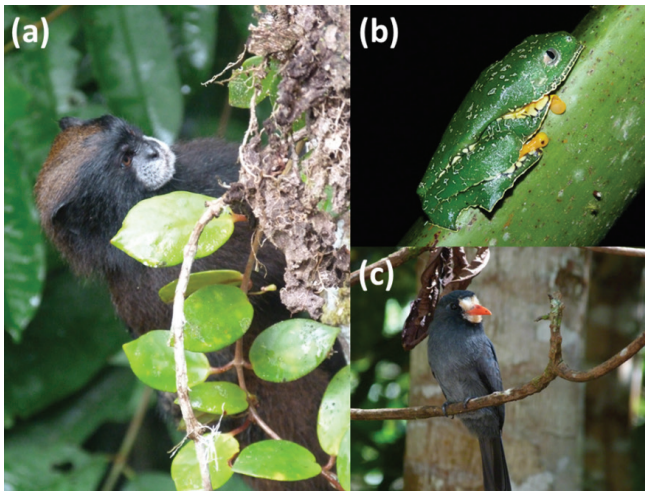
(e.g., trees: ter Steege et al. 2000; mammals: Brum et al. 2017), much of which remains uninvestigated.

The habitat at and around EBQB is characterized by primary *terra firme* forest (“*bosque de altura*” in the terminology of Encarnación 1985) on flat to strongly undulating terrain (“*bosque de terraza*” and “*bosque de colina*”; Encarnación 1985), interspersed with limited swampy areas along small creeks. Strips of seasonally flooded forest along Quebrada Blanco are covered by riparian vegetation (“*bosque de tahuampa*”; Encarnación 1985). While Quebrada Blanco carries white water, the creeks at EBQB carry clear or black water. The soils are mainly ultisols, with sometimes high proportions of sand (up to 75%; Pitman et al. 2008); soil fertility shows a strong gradient within the study area (Cárdenas Ramírez et al., in press).

Annual rainfall in the area averages around 3000 mm, with December to May receiving on average >250 mm and July to September <200 mm (data from the nearest meteorological station at Tamshiyacu, 40 km north of EBQB).

#### FAUNA

Intensive surveys have identified >90 species of non-volant mammals in the area, including 12 species of primates (Valqui 2001) and ca. 350 species of birds (Lars Pomara & Jacob Socolar, unpubl. data) (Fig. 2). Other animal taxa have not been surveyed intensively, but provisional lists of amphibians (51 species) suggest a high diversity. A new species of tarantula (Theraphosidae), *Cyriocosmus giganteus*, was discovered recently at EBQB (Kaderka 2016). Many samples of orthopteran prey of tamarin monkeys could only be identified to genus or subfamily level (Nickle & Heymann 1996), suggesting the existence of undescribed species.



**Figure 2.** (a) A *Leontocebus nigrifrons* foraging at an ant garden; (b) *Cruziohylla craspedopus* have irregular lines and shapes on their back, possibly imitating mined leaves; (c) *Monasa morphoeus* often follow monkeys and other birds to capture flushed prey. Photos © Eckhard W. Heymann.

## FLORA

An inventory of trees >10 cm dbh in two 1-ha plots of “bosque de terraza” recorded ca. 350 species from 44 plant families (Dávila Cardozo & Ríos Paredes 2006). Inclusion of “bosque de colina”, “bosque de tahuampa” and swampy areas is likely to reveal additional tree species. An intensive survey of ferns and lichens found at least 81 species (Cárdenas Ramírez, unpubl. data). Other plant taxa or life forms have not been surveyed systematically.

## ACCESS, INFRASTRUCTURE AND FEES

Access to EBQB is via river transport from Iquitos. A trip by speedboat takes ca. 4 hours, but during the relatively dry season between July and September, this access can be difficult to impossible. Alternatively, local transport using so-called “colectivos” regularly travelling between Iquitos and Chino, the last major village on the Rio Tahuayo, can be used; the trip by “colectivo” takes ca. 10 h. From Chino it takes another 2-3 hours with a small boat to reach EBQB, depending on the water level.

EBQB has three local-style buildings, one for sleeping; another one for cooking, dining and meetings, with additional sleeping places; and a third used as office and laboratory (Fig. 3); the latter also hosts a small library, mainly holding field guides to plants and animals.

Electricity is provided by seven solar panels. Very clean drinking water is available from a small creek 50 m downhill from the buildings. EBQB owns two small motor boats run with a 15 hp or a “peque-peque” motor.



**Figure 3.** Aerial view of the EBQB buildings. Photo © Katrin Heer.

The study area is covered with a grid system of trails (made up of ca. 100 m x 100 m sections) over an area of ca. 1.2 km<sup>2</sup>. Apart from providing easy access to the forest, the grid system facilitates systematic point, transect and plot sampling (e.g., Heymann *et al.* 2014).

A basic fee of 15 US-\$ per day is charged; depending on the services requested, a higher rate may apply.

## LEGAL REQUIREMENTS

Research at EBQB and the collection and export of biological samples require permits from the Servicio Forestal y de Fauna Silvestre (SERFOR) of the Peruvian Ministry of Agriculture (<https://www.gob.pe/serfor>). A formal agreement with a Peruvian cooperation partner is mandatory. Applications have to be made in Spanish. It is advisable to contact SERFOR as early as possible before the onset of a planned field study.

## KEY RESEARCH

Research at EBQB has focussed mainly on the behavioural ecology of primates, particularly of moustached tamarins, *Saguinus mystax*, black-fronted saddle-back tamarins, *Leontocebus nigrifrons* (previously *Saguinus fuscicollis nigrifrons*; see Rylands *et al.* 2016), and red titi monkeys, *Plecturocebus cupreus* (previously *Callicebus cupreus*; see Byrne *et al.* 2016), and on animal-plant interactions, particularly seed dispersal.

Research topics in primate behavioural ecology have included: [a] social behaviour and organization (e.g., Dolotovskaya *et al.* 2020a; Löttker *et al.* 2004); [b] mating systems and infant care (e.g., Dolotovskaya *et al.* 2020b; Huck *et al.* 2005); [c] olfactory communication (e.g., Heymann 1998; Lledo Ferrer *et al.* 2011); [d] feeding ecology (e.g., Nadjafzadeh & Heymann 2008; Nickle & Heymann 1996); and [e] sensory ecology (e.g., Smith *et al.* 2012).

Research in animal-plant interactions has focused on: [a] patterns and consequences of primate seed dispersal (e.g., Culot et al. 2011; Heymann et al. 2017); [b] chemical ecology of seed dispersal (e.g., Nevo 2015); and [c] vertical stratification of animal-plant interactions (birds, bats, primates) (Thiel et al. in progress).

EBQB was one of several sample sites for large-scale studies of bird community ecology (e.g., Pomara et al. 2014; Socolar & Wilcove 2019) and tree diversity in Western Amazonia (Honorio *et al.* 2009; Pitman et al. 2008). The research station is open to researchers and students addressing research topics beyond those mentioned above.

### FIVE SELECTED PUBLICATIONS

Bialozyt R, Luettmann K, Michalczyk IM, Pinedo Saboya PP et al. (2014) Primate seed dispersal leaves spatial genetic imprint throughout subsequent life stages of the Neotropical tree *Parkia panurensis*. *Trees* 28:1569-1575

Culot L, Huynen M-C, Heymann EW (2015) Partitioning the relative contribution of one-phase and two-phase seed dispersal when evaluating seed dispersal effectiveness. *Methods in Ecology and Evolution* 6:178-186

Dolotovskaya S, Roos C, Heymann EW (2020) Genetic monogamy and mate choice in a pair-living primate. *Scientific Reports* 10: 20328

Heymann EW, Culot L, Knogge C, Smith AC et al. (2019) Small Neotropical primates promote the natural regeneration of anthropogenically disturbed areas. *Scientific Reports* 9:10356

Nevo O, Heymann EW, Schulz S, Ayasse M (2016) Fruit odor as a ripeness signal for seed-dispersing primates? A case study on four Neotropical plant species. *Journal of Chemical Ecology* 42:323-328

### LINKS AND CONTACT

EBQB; EBQB@dpz.eu

### ACKNOWLEDGMENTS

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would have been much more difficult if not impossible. We are also very thankful to the late Filomeno Encarnación Cajañaupé for his long-term support, advice and friendship, and to Rogerio Castro Coronado for "luring" EWH into this marvellous site in 1985. Research at EBQB was made possible through continuous support by DPZ and through grants from the Deutsche Forschungsgemeinschaft (DFG), Deutscher Akademischer Austauschdienst (DAAD), Primate Action Fund, Leakey Foundation and others. Finally, we are grateful to the Universidad Nacional de la Amazonía Peruana for supporting research at EBQB through a Letter of Understanding and to the Peruvian authorities who issued research permits.

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