

**PRELIMINARY INVENTORY OF REPTILES AND AMPHIBIANS OF A 40
HECTARE PROPERTY SITUATED NEAR PUERTO QUITO IN BAMBURE RESERVE NORTH
WESTERN ECUADOR**

Morley Read PhD

Tel: 0999957593
agalychnis@gmail.com

INTRODUCTION

Ecuador has the third most numerous amphibian fauna with a total of 633 species, (Bioweb, Ron et. al., 2019), only Colombia and Brazil have more species. However these countries are much larger than Ecuador. In terms of species per unit area Ecuador has by far the highest value with 2440 species per million km², area three times that of the second highest country, Papua New Guinea with 832 species/million km². Ecuador has 488 species of reptiles and like amphibians, is the country with the greatest number of species per unit area in the world (Bioweb, Torres-Caravajal, 2020).

The study area lies within the Choco biogeographical Region which spans north-western Ecuador and western Colombia. This is one of the most biodiverse areas on the planet and has a very high frequency of endemic species, about 25% of plants and animals, making this a priority area for conservation. Ron et. al. (2019) lists 94 amphibian and Torres-Caravajal et. al. 2020 lists 117 reptile species for the part of this region lying in Ecuador with 28% of the amphibians and 12% of the reptiles being endemic.

Unfortunately this region is in danger of being destroyed in its entirety, the part lying within Ecuador especially so. The study carried out by Dodson and Gentry (1991) revealed that about 63% of the original forest cover remained in western Ecuador in 1957. However by 1988 only 4.4% remained. Since then even more forest has been lost. A study carried out in 2005 indicated that 98% of the original primary forest of north-west Ecuador has been degraded (see review in Mejia 2017). North-west Ecuador is one of the areas with the highest deforestation rate in Ecuador and Ecuador itself has the highest deforestation rate and one of the worst environmental records in South America (McCracken and Forstner 2014). Uncontrolled deforestation for timber, agriculture, cattle ranching, oil palm plantations and mining, aided by easier access with the ever-growing road network has driven this destruction.

In this study the herpetofauna of a 40ha private reserve near Puerto Quito, Ecuador and lying within the Choco Biogeographical Region is evaluated.

METHODS

The study was carried out on the 14th to the 16th of October and from the 8th to the 13th of November 2020. The investigator camped within the forest on a site with easy access to two ravines and to the main trail which traverses the property.

Fieldwork was carried out by day and at night, generally between 6.00am and 1.00pm and 18.00pm to 22.00pm. During the day fieldwork involved searching likely habitats where reptiles would be active in the open, turning logs and searching through the leaf litter, also examining water bodies for tadpoles. Most frogs are hidden by day, although some, principally the family Dendrobatidae may be active in the open.

Reptiles and amphibians are more easily found at night, encountered perching in the open. An effort was made to photograph every individual encountered in its natural habitat. Selected individuals were captured and photographed the next day on white background in a series of poses, dorsal, lateral, ventral, close up of eye and tympanum etc. using a Panasonic GH5 camera with dual flash equipped with diffusers. All photos taken in the field were georeferenced in Adobe Lightroom from the track log of a Garmin 64S GPS, which left running during the fieldwork. Aerial images were taken with a DJI Mavic Air drone. A selection of amphibians were transported alive to the installations of Centro Jambatu de Conservacion y investigaion de Anfibios at San Rafael, near Quito, Ecuador under Ministerio del Ambiente permit number 0023-19 IC-FAU-DNB/MA. Here they were identified to species level and many of the lesser-known species are maintained alive for study or as candidates for a possible captive breeding effort.

Special emphasis was placed on recording frog calls. Each species of frog has its own distinctive call, which once documented greatly facilitates the compilation of species inventories. Sound recordings were made with an Olympus LS11 recorder, using the built in microphones, or with a Rode Videomic Pro gun microphone. An important part of the author's research is compiling a database of frog calls. Part of this, covering the Ecuadorian Amazon was released as an audio CD (Read 2000), but it is important to gather more data for the Andes, western and southern Ecuador where there are many endemic species and less coverage.

The georeferenced in situ photographs of reptiles and amphibians and also of invertebrates, plants and fungi were uploaded to inaturalist: <https://www.inaturalist.org/people/morleyread> .

Photographs of all the species found during this study are presented in this report and will serve as an identification guide to facilitate future studies.

Most fieldwork was carried out in the vicinity of the camp site, the trail on the north slope and the two streams which ran either side of the camp site which were searched on most days. The fishponds and main river were visited twice by night. The southern part of the property from the ridge top down to the south river was visited only on two occasions and only by day.

Much of the information presented in this report is obtained from the on-line encyclopedia Bioweb.bio, Ron et. al. (2019) for amphibians and Torres-Caravajal et. al. 2020, the links given in the references section.

DESCRIPTION OF THE STUDY SITE

The study area is situated about 5kms east of Puerto Quito, Pichincha province, Ecuador. About 40ha in area, it lies between 2 rivers. Rio Caoni (Fig. 1 a) running along the northern boundary and Rio Achiote (Fig. 1 d) along the southern boundary. The property is largely covered in forest. Local accounts indicate that about 20 years ago the larger trees were removed and considerable environmental damage may have happened at this time. However the forest has since regenerated to a semblance of the former primary forest and many larger trees are present (Fig.2 c,d,e,f).

The bank of Rio Caoni to about 300m inland comprises cacao plantations, bamboo groves and secondary regeneration (Fig. 1 a,b). From the edge of the cultivation the terrain is forested and rises for a distance of 400m inland to a ridge top (Fig. 1 c). From the ridge top the terrain descends for about 800m to the Rio Achiote. The southern slope is forested, although the forest along the river is low in stature, evidently being recently regenerating secondary forest. Altitude ranges from about 150m in Rio Caoni, 330m on the ridge top and 170m in Rio Achiote.

There are several small streams running through the forest, three were located on the north slope (Fig. 1 e,f) and at there is at least one stream running through the forest on the south slope.

Coordinates of selected localities

Site	Latitude	Longnitude	Altitude
Rio Caoni (glass frog site)	0.10039	-79.20802	153
Fish Ponds	0.10072	-79.20606	164
Camp	0.09687	-79.20549	210
Ridge top	0.08309	-79.20575	328
Stream on south slope	0.09048	-79.20552	257
Dry creek near Rio Achiote	0.8644	-79.20711	177
Rio Achiote	0.08631	-79.20787	174

The streams on the north slope also run through the cultivated areas and eventually join the main river.

Important habitats lie along the major rivers. In many places along both Rio Caoni and Rio Achiote are overhung by large trees festooned in bromeliads, aroids and orchids (fig 2. b). Both rivers in these dry season visits comprised extensive boulder beaches with small pools of stagnant water (fig. 2 b) a potential breeding site for certain amphibians. River water quality may be poor as the watersheds of both rivers are largely deforested, however the point of union of the smaller forest streams with the main river represent important habitats with better water quality.

Figure 1. Habitat



a) Aerial view looking west along the north branch of the Caoni River. Fish ponds in centre of image. Bamboo grove in foreground. *Boana boans* were calling from the north bank in the foreground. The glass frogs were found beside the river in the upper left.



b) Aerial view of a cacao plantation and the edge of the primary forest on the north slope.



c) Aerial view of the ridge top and the forest on the north slope



d) Aerial view of Rio Achiote on the southern boundary.



e) The small stream east of the camp site lying in a steep gully.



f) The small stream west of the camp site with a *Rhaebo haematiticus* toad in foreground.

Figure 2 Habitat

	
a) Dry gully near Rio Achiote. Many <i>Epipedobates boulengeri</i> were observed here.	b) The bank of Rio Achiote overhung with trees festooned with epiphytic aroids, bromeliads and orchids. Pools of still water, a potential breeding site for amphibians.
	
c) Large <i>Ficus</i> tree (Matapalo) in the north slope forest.	d) Looking up a tall tree in the north slope forest



e) Tree in the south slope forest



f) Large tree and lianas in the south slope forest.

SPECIES LIST

Table 1 List of amphibians and reptiles encountered during the study

CLASS	FAMILY	SPECIES
Anurans	Bufonidae	<i>Rhaebo haematiticus</i>
		<i>Rhinella horribilis</i>
	Centrolenidae	<i>Espadarana prosoblepon</i>
		<i>Hyalinobatrachium tatayoi</i>
		<i>Sachatamia albomaculata</i>
	Craugastoridae	<i>Craugastor longirostris</i>
	Dendrobatidae	<i>Epipedobates boulengeri</i>
	Hylidae	<i>Boana boans</i>
		<i>Boana rosenbergi</i>
		<i>Scinax sugillatus</i>
		<i>Smilisca phaeota</i>
	Leptodactylidae	<i>Leptodactylus rhodomerus</i>
		<i>Leptodactylus ventrimarmoratus</i>
	Strabomantidae	<i>Pristimantis achatinus</i>
		<i>Pristimantis subsigillatus</i>
		<i>Pristimantis parvillus</i>
		<i>Pristimantis labiosus</i>
		<i>Pristimantis latidiscus</i>
		<i>Pristimantis sp. 1</i>
		<i>Pristimantis sp. 2</i>
Salamanders		<i>Bolitoglossa chica</i>
Lizards	Iguanidae:Iguaninae	<i>Iguana iguana</i>

	Iguanidae:Hoplocercinae	<i>Enyalioides microlepis</i>
	Sphaerodactylidae	<i>Lepidoblepharus buchwaldi</i>
Snakes	Colubridae:Dipsadinae	<i>Dipsas andiana</i>
		<i>Dipsas gracilis</i>
	Viperidae	<i>Bothrops asper</i>

SPECIES ACCOUNTS

Bufonidae – True Toads

Rhaebo haematiticus, Truando Toad – Sapo de Truando

Several individuals were heard calling from the streams running through the cacao plantations and secondary vegetation near Rio Caoni at dusk on the 10th and 11th of November.

An adult female was found in the primary forest beside the main trail at dusk on the 15th of October, and a male beside a stream in primary forest the night of 10th of November. Several juveniles were observed on the 10th and 11th of November at night on the track in cultivated areas near Rio Caoni.

This is a common species in occurring in both primary and secondary forest in north-west Ecuador, elsewhere in South America is distributed northwards to Costa Rica.

Figure 3 *Rhaebo haematiticus*

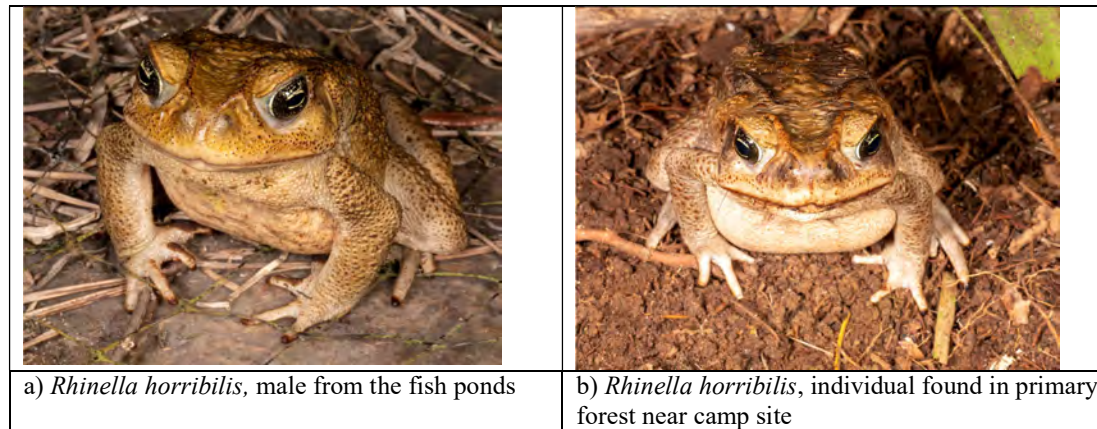


Rhaebo horribilis, Mesoamerican Cane Toad – Sapo Gigante de Veracruz

Several individuals were observed and males were heard vocalizing beside the fish ponds near Rio Caoni on the nights of the 10th and 11th of November. One individual was found within primary forest on the night of the 12th of November.

This large toad may become very abundant in human-altered habitats but is uncommon in undisturbed forest. It is distributed west of the Andes from northern Peru to Texas, USA.

Figure 4 *Rhinella horribilis*



Centrolenidae – Glass Frogs

Espadarana prosoblepon – Nicaragua Giant Glass Frog – Rana de Cristal Variable

One individual was heard calling from a tree above the gully east of the camp site on the night of the 15th of October. It was not possible to locate the individual for photography. No calling was heard in the November visit, probably because the weather was much drier.

This species is widely distributed in western Ecuador in streamside forest vegetation as well as in western Colombia and central America.

Hyalinobatrachium tatayoi – Glass Frog

One individual was encountered on a leaf about 120cm from the ground at the edge of Rio Caoni on the night of the 11th of November. Vocalizations were heard indicating other individuals were present in the area, mostly beside a stream, which joined the main river at this point.

This species has a wide distribution in north-western Ecuador in streamside vegetation to 1640m elevation. Outside Ecuador it occurs northwards to Costa Rica.

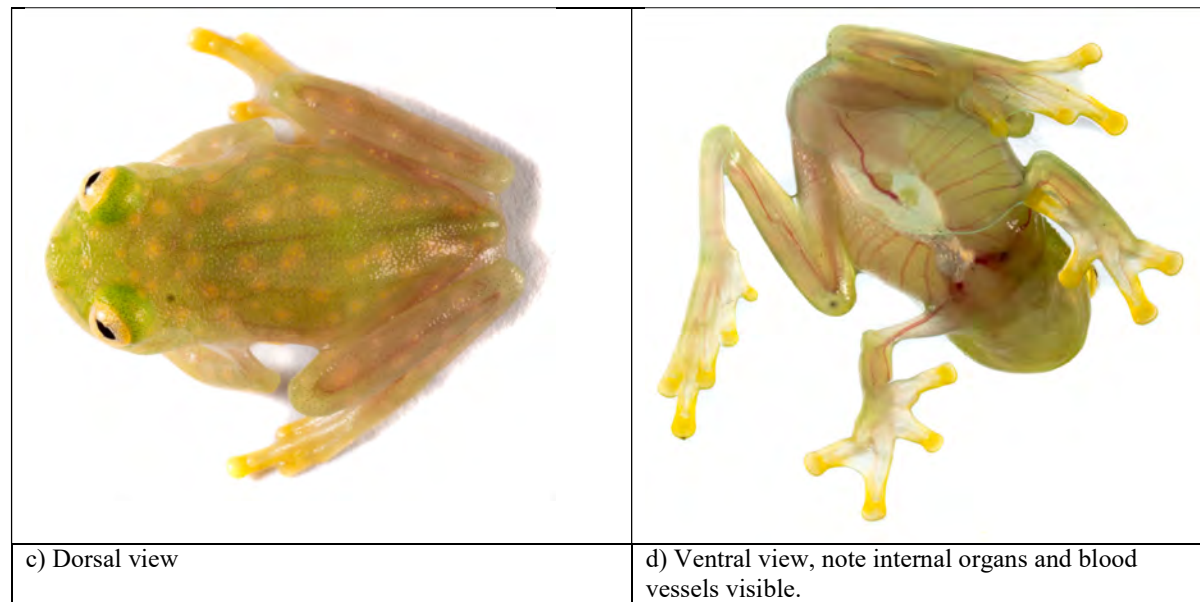
Figure 5 *Hyalinobatrachium tatayoi*



a) *Hyalinobatrachium tatayoi* – in situ on a leaf beside the river



b) *Lateral view*



Sachatamia albomaculata – White-spotted Cochran Frog – Rana de Cristal punteada de blanco

A pair in amplexus (Fig. 6 a) was found on a terrestrial bromeliad growing among rocks on the riverbed on the night of the 11th of November. Nearby were pools of stagnant water among the rocks. These would have been an unlikely breeding site as glass frogs generally prefer clear flowing water and it is likely the pair would have later moved to the nearby small stream for spawning. The pair was captured and they deposited a batch of eggs overnight. The eggs were maintained in the laboratory and developed to fully formed tadpoles 15 days later.

According to Bioweb this species is rare in Ecuador and limited in distribution to streams and waterfalls in pristine or lightly human altered sites. It was unusual to find this species along a heavily human-altered river. As it is poorly known its conservation status is given as DD (data deficient).

Outside of Ecuador this species occurs in western Colombia north to Honduras.

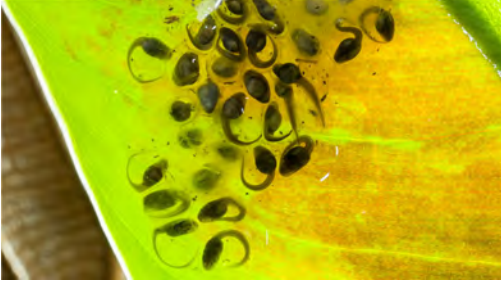
Figure 6 *Sachatamia albomaculata*



a) *Sachatamia albopuntulata*, pair in amplexus on a bromeliad



b) Male on white background

	
c) Underside of female, rear part of abdomen of this species is transparent	d) Batch of eggs laid 3 days previously
	
e) Tadpoles developing within egg membrane, day 11.	f) Tadpoles have hatched and are ready to drop into the water below, day 15.

Craugastoridae

Craugastor longirostris – Longsnout Robber Frog – Cutin de Hocico Largo

This, along with *Pristimantis achatinus*, were the most frequently observed amphibians in the forest near the camp site and the trail on the north slope. While *P. achatinus* was found throughout the forest, *Craugastor* was much more abundant close to the streams. Males were heard calling sporadically throughout the visits.

This species is widely distributed in north-western Ecuador in primary and secondary forest to 1,200m elevation and occurs as far north as Panama.

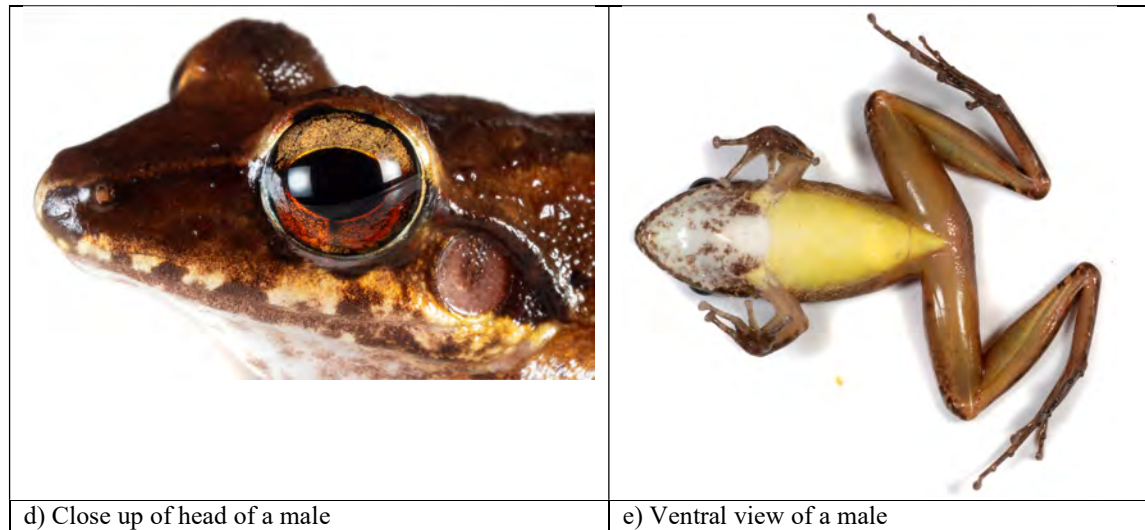
Figure 7 *Craugastor longirostris*



a) Individual photographed in situ



b) a large female photographed in situ



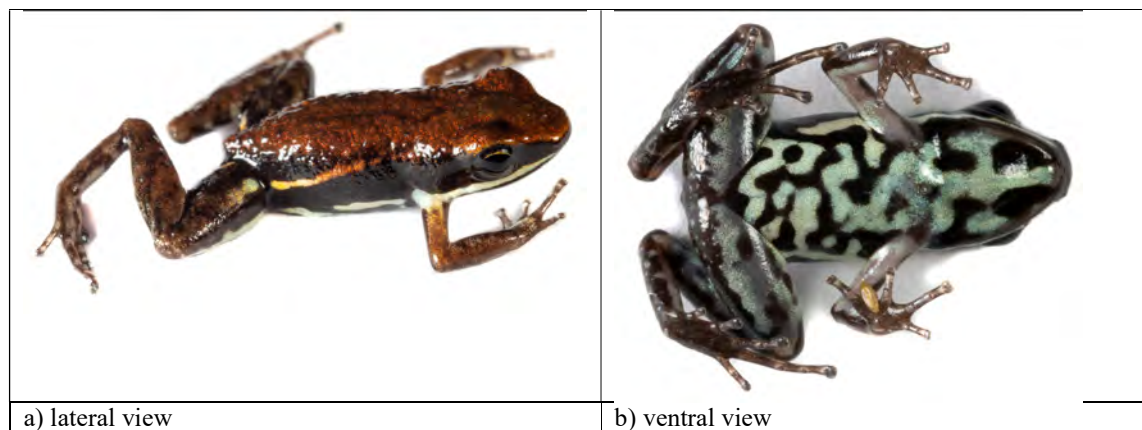
Dendrobatidae – Poison Frogs

Epipedobates boulengeri – Marbled poison-arrow frog – Rana nodriza de Boulenger

Many individuals, some of them juveniles, were observed hopping among the rocks in a dry gully near the river on the south boundary in (Fig 2a). No vocalizations were heard and this species was not observed elsewhere.

Widely distributed in north-west Ecuador to 1500m elevation. Also occurs in western Colombia.

Figure 8. *Epipedobates boulengeri*



Hylidae – Tree Frogs

Boana boans – Giant Gladiator Treefrog – Rana Gladiadora

Several individuals were heard calling from trees beside the river just east of the fish ponds on the night of the 9th and 10th of November. It was not possible to capture an individual because all the males were calling from the far bank of the river.

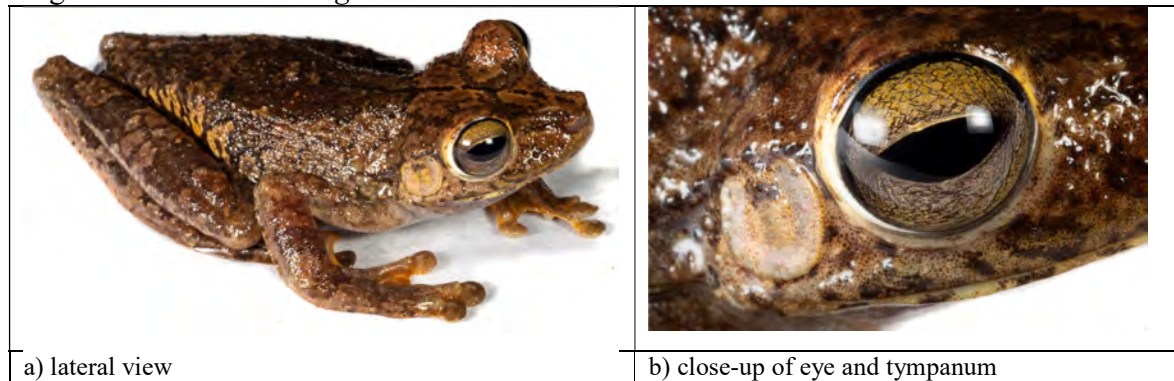
The distribution of this species is unusual in that it is one of only a few amphibians that occur both to the east and west of the Andes in Ecuador.

Boana rosenbergi – Rosenberg's Gladiator Treefrog – Rana Gladiadora de Rosenberg

Several individuals of this large tree frog were heard calling from the vicinity of the fishponds on the nights of the 9th and 10th of November. One was observed vocalizing floating on the water surface of a pond.

Distributed in primary and secondary forest and in human-altered areas near forest in the lowlands of north-western Ecuador to 966m elevation, also occurs in western Colombia northwards to Costa Rica.

Figure 9 *Boana rosenbergi*



Scinax sugillatus – Quevedo Snouted Treefrog – Rana de lluvia de Quevedo

Three individuals were observed perching in a low shrub beside a fish pond on the 9th of November. At least two of the individuals were calling. A recording of the call of one of the males was made, it was then captured for photography (Figs. 10 b, c and d). Two individuals were perching about a metre away from the calling individual (Fig. 10b).

Distributed in the lowlands of western Ecuador generally in low vegetation close to water, at the forest edge, secondary forest and cultivated areas. This species is endemic to Ecuador.

Figure 10 *Scinax sugillatus*

	
a) In situ shot of 2 individuals in low vegetation beside the fish ponds	b) Lateral view of the individual which was captured after its call was recorded
	
c) close up of head	d) dorsal view

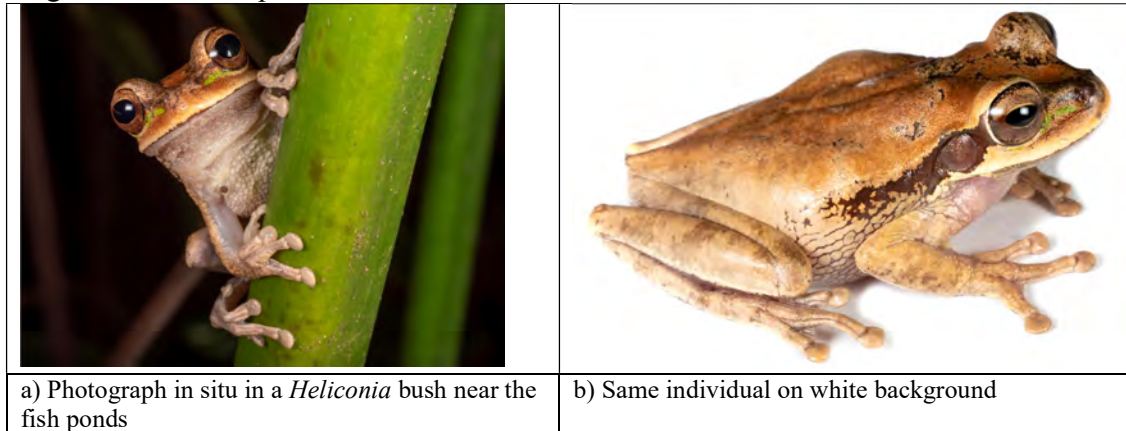
Smilisca phaeota – Tarraco Treefrog – Rana Bueyera

Two individuals were observed perched in shrubs in the secondary vegetation near the fish ponds on the night of the 10th of November. An individual was heard vocalizing nearby.

An abundant species in secondary forest and cultivated areas.

Widely distributed in western Ecuador from sea level to 1800m elevation. Also occurs in western Colombia, northwards to Nicaragua and Honduras.

Figure 11 *Smilisca phaeota*



Leptodactylidae

Leptodactylus rhodomerus – Red-thighed thin-toed frog – Rana terrestre de muslos rojos

A whoop call, characteristic of the *Leptodactylus pentadactylus* complex was heard in the distance on the nights of the 14th and 15th of October. The male is likely to have been calling in a marshy area at the forest edge adjacent to the stream east of the camp site.

L. rhodomerus has a patchy distribution in forest remnants in north-west Ecuador and western Colombia. It is a relatively poorly known species listed from only 5 localities in Ecuador. Conservatio status DD (Data deficient).

Leptodactylus ventrimaculatus – Bulun White-lipped Frog – Rana terrestre mugidora

The characteristic call of this species was heard from marshy areas surrounding the fish ponds on the night of the 9th of November. No individuals were observed.

A species widespread in western Ecuador both in pristine habitats and human altered areas such as secondary forest, cultivated areas and pastures.

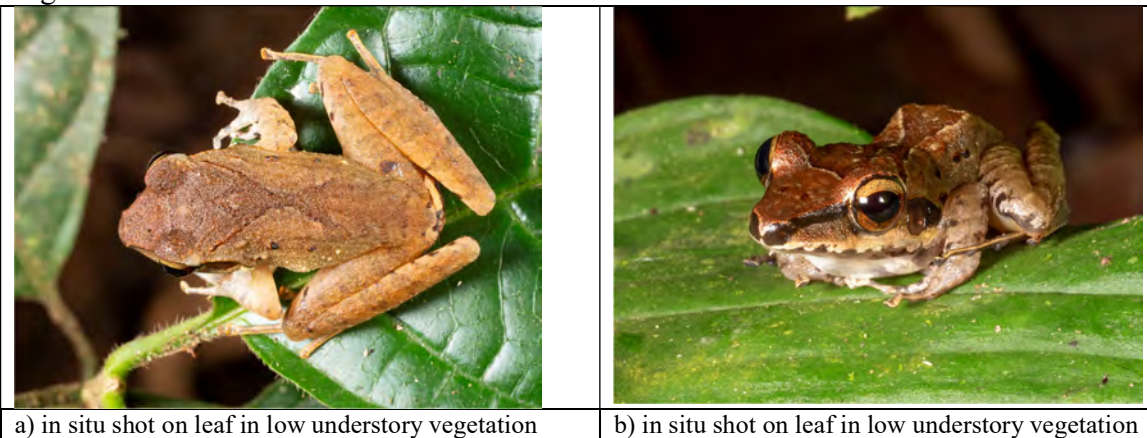
Strabomantidae

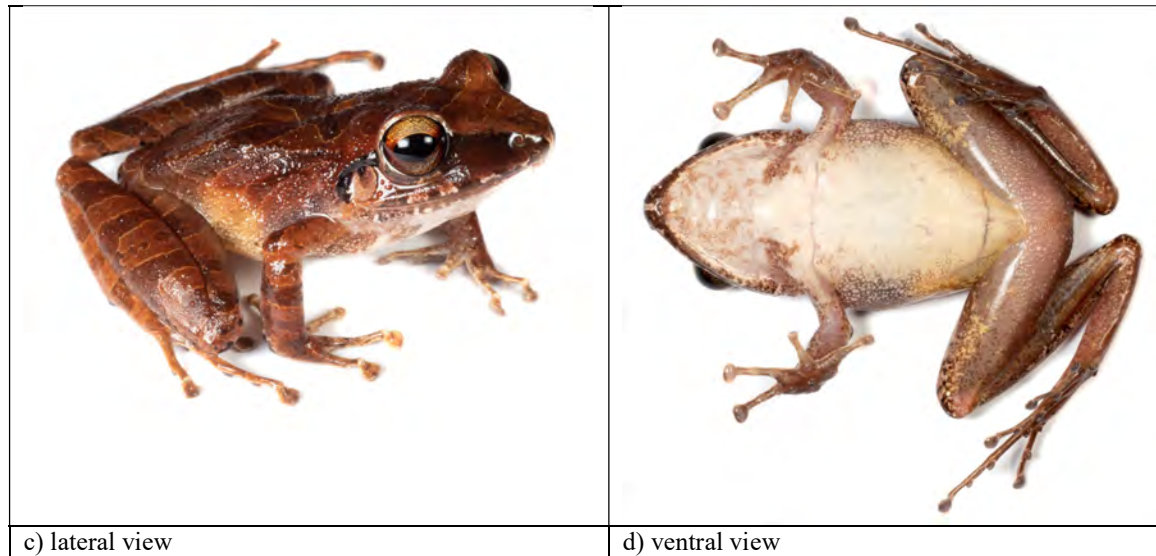
Pristimantis achatinus – Cachabi Robber Frog – Cutin comun del occidente

Many individuals were observed in the forest along the trail on the north slope and in the ravines near the camp site. *P. achatinus* and *Craugastor longirostris* were the most frequently observed species. While *C. longirostris* was mainly found along the streams, *P. achatinus* was more widespread throughout the forest, males were heard calling principally at dusk. These two species have a similar appearance but can be separated readily by eye colouration and that *C. longirostris* has a yellow belly, white in *P. achatinus*.

This is one of the most widespread and abundant frog species in western Ecuador. Not only inhabiting forest but has become very abundant in human-altered habitats such as pastures. Occurs also in western Colombia and Panama.

Figure 12 *Pristimantis achatinus*





Pristimantis parvillus – Pichincha Robber Frog – Cutin de Pichincha

A male was observed vocalizing, partially concealed behind a vine on the trunk of a small tree on the night of the 14th of October. Other individuals were heard from the forest beside the main trail on the north slope on the 14th and 15th of October, suggesting this species is abundant. The call of this individual was recorded.

Occurs in both lowland and montane forest in western Ecuador, conservation status NT (nearly threatened) according to Bioweb.

Figure 13 *Pristimantis parvillus*

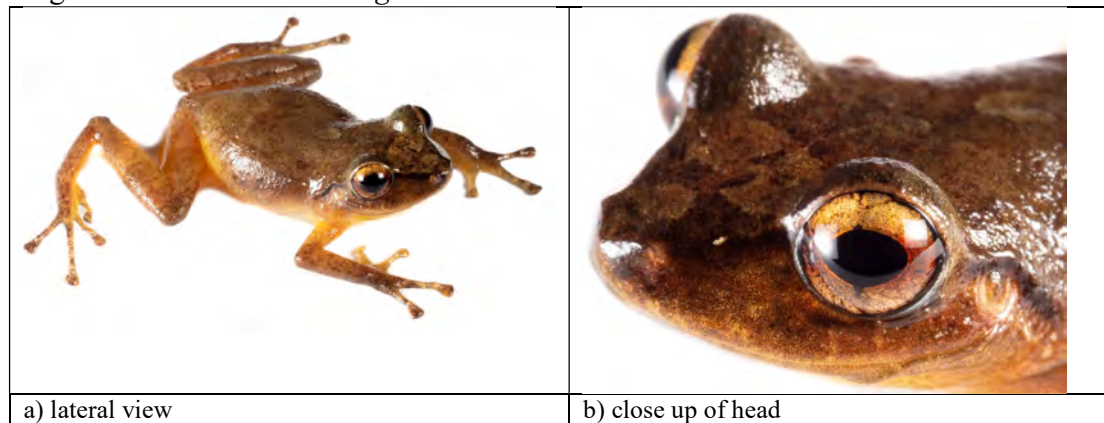
	
a) In situ shot of the male in calling position	b) same individual on white background
	
c) ventral view	

Pristimantis subsigillatus – Salidero Robber Frog – Cutin de Salidero

The characteristic vocalization of this species, a dull sounding dink note, was heard from many sites along the trail on the north slope indicating this species is abundant. Most calling was heard in wetter weather in October, but a few individuals were calling at dusk in November. Most individuals were calling out of reach high in trees and only one individual was captured, on the 8th of November in leaf litter during the day beside the ravine east of the camp.

Distributed in lowland primary and secondary forest as well as in isolated trees in pastures in western Ecuador and Colombia. It is likely to be a widespread species, although may be under represented in collections because of its arboreal habits. Conservation status NT (Nearly Threatened).

Figure 14 *Pristimantis subsigillatus*

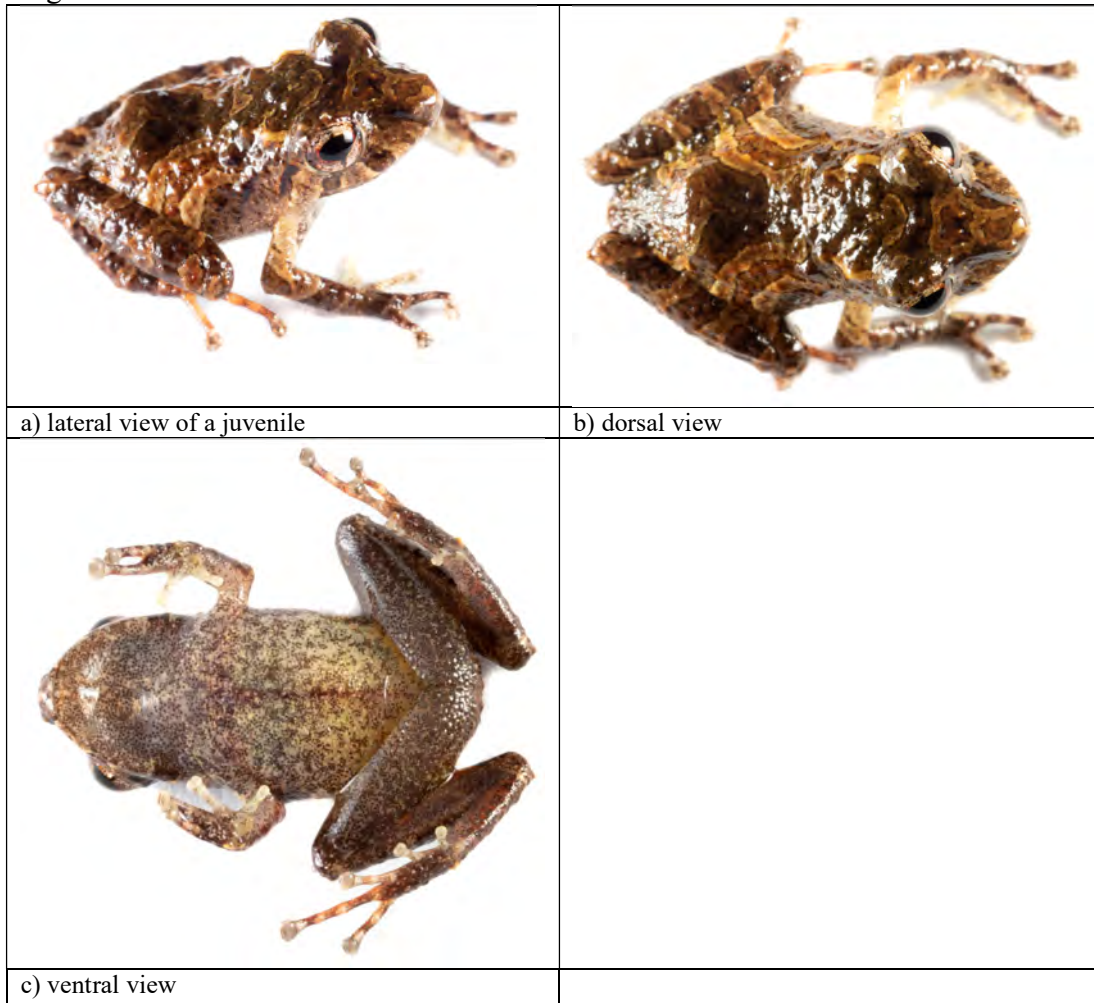




Pristimantis labiosus – Labiated Robber Frog – Cutin trompudo

This juvenile *Pristimantis* was found active in the leaf litter by day in the forest on the ridge top on the 10th of November. It can tentatively be identified as a juvenile of *Pristimantis labiosus*. The characteristic vocalization of this species, a loud laughing note, was heard on the nights of the 14th and 15th of October from the streams neat the camp site, although no adult individuals were found. This species has a wide distribution in primary and secondary lowland forest in north-west Ecuador, also in western Colombia, conservation status given as NT (nearly threatened) by Bioweb.

Figure 15 *Pristimantis labiosus*

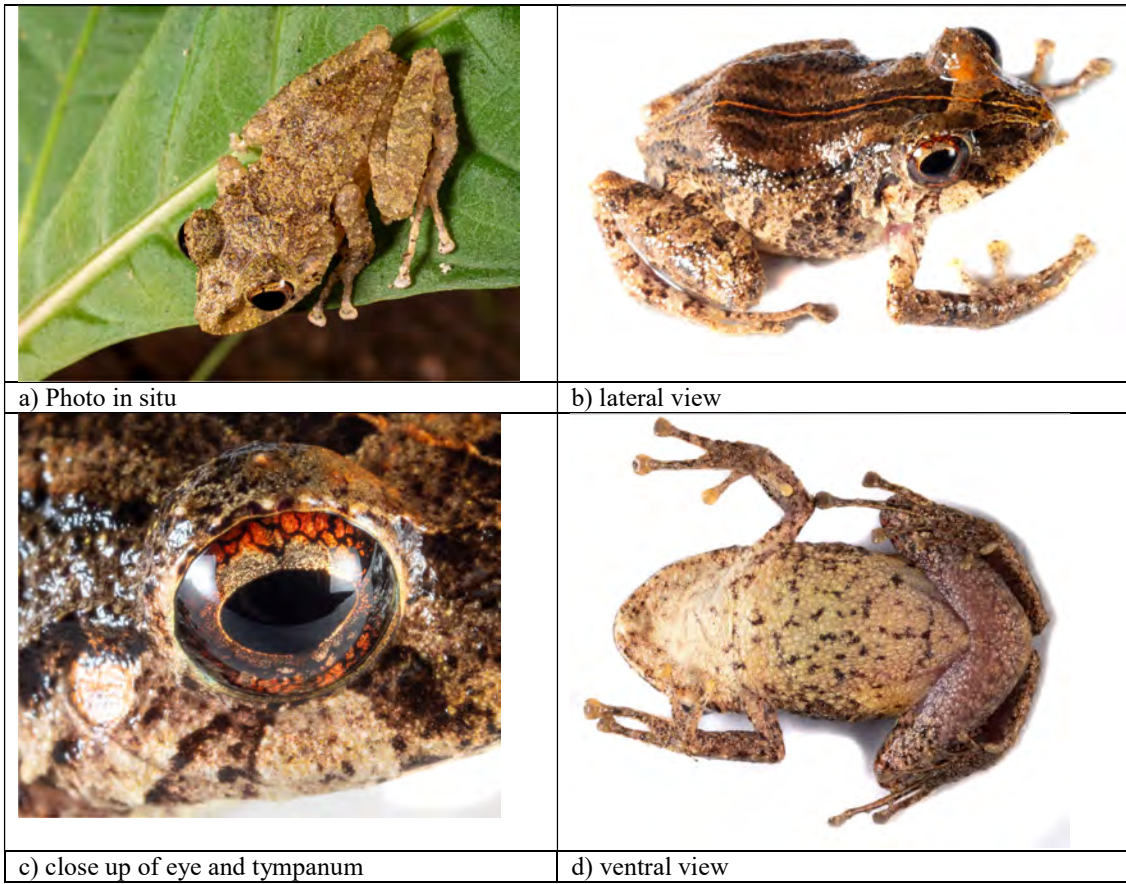


Pristimantis latidiscus – Disc Robber Frog – Cutin del Choco

Only one individual was captured, on the night of the 10th of November 2m from the ground on a leaf near the stream west of the camp site.

This species occurs in lowland primary rainforest in north-west Ecuador and Colombia its conservation status is listed as VU (Vulnerable) by Bioweb.

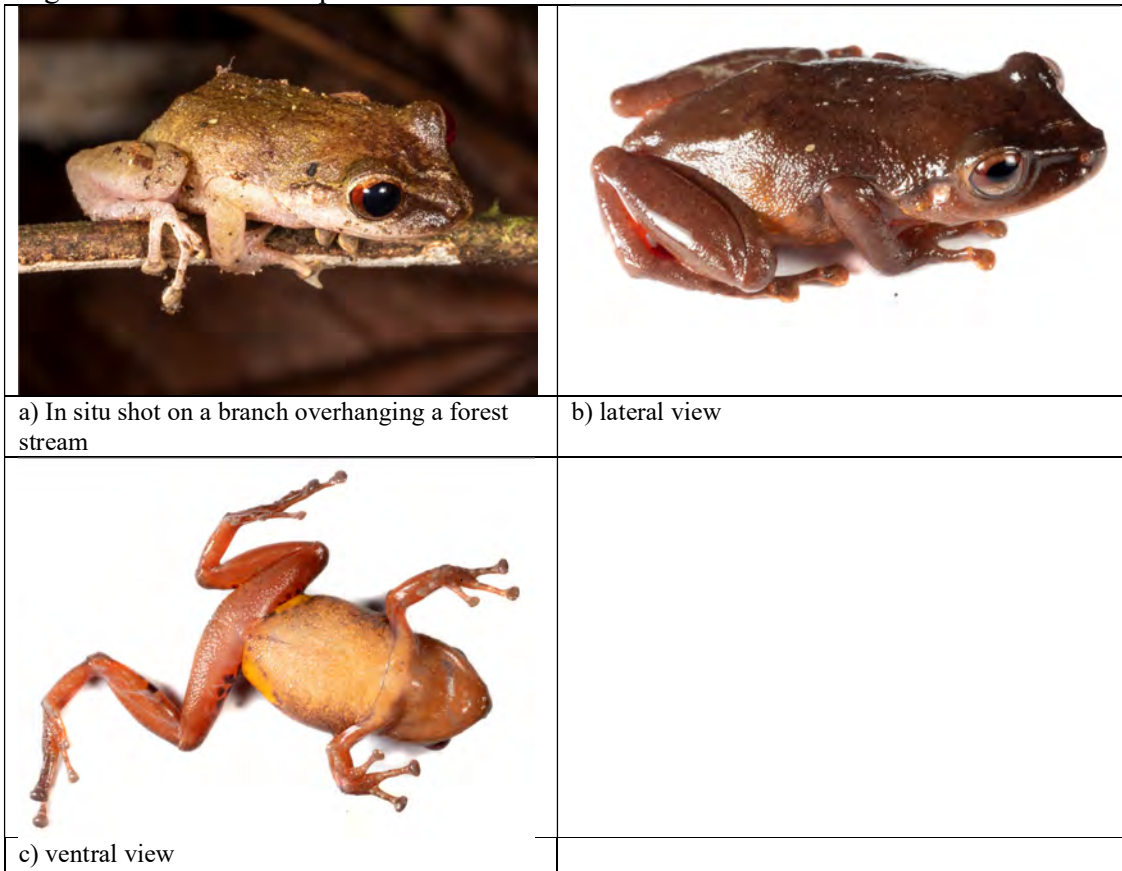
Figure 16 *Pristimantis latidiscus*



Pristimantis species 1

Only one individual of this distinctive *Pristimantis* was found. It was encountered at night on a branch overhanging the stream east of the camp site the night of the 9th of November. It has a distinctive dull red iris, orange belly and yellow markings in the groin. However it currently remains unidentified.

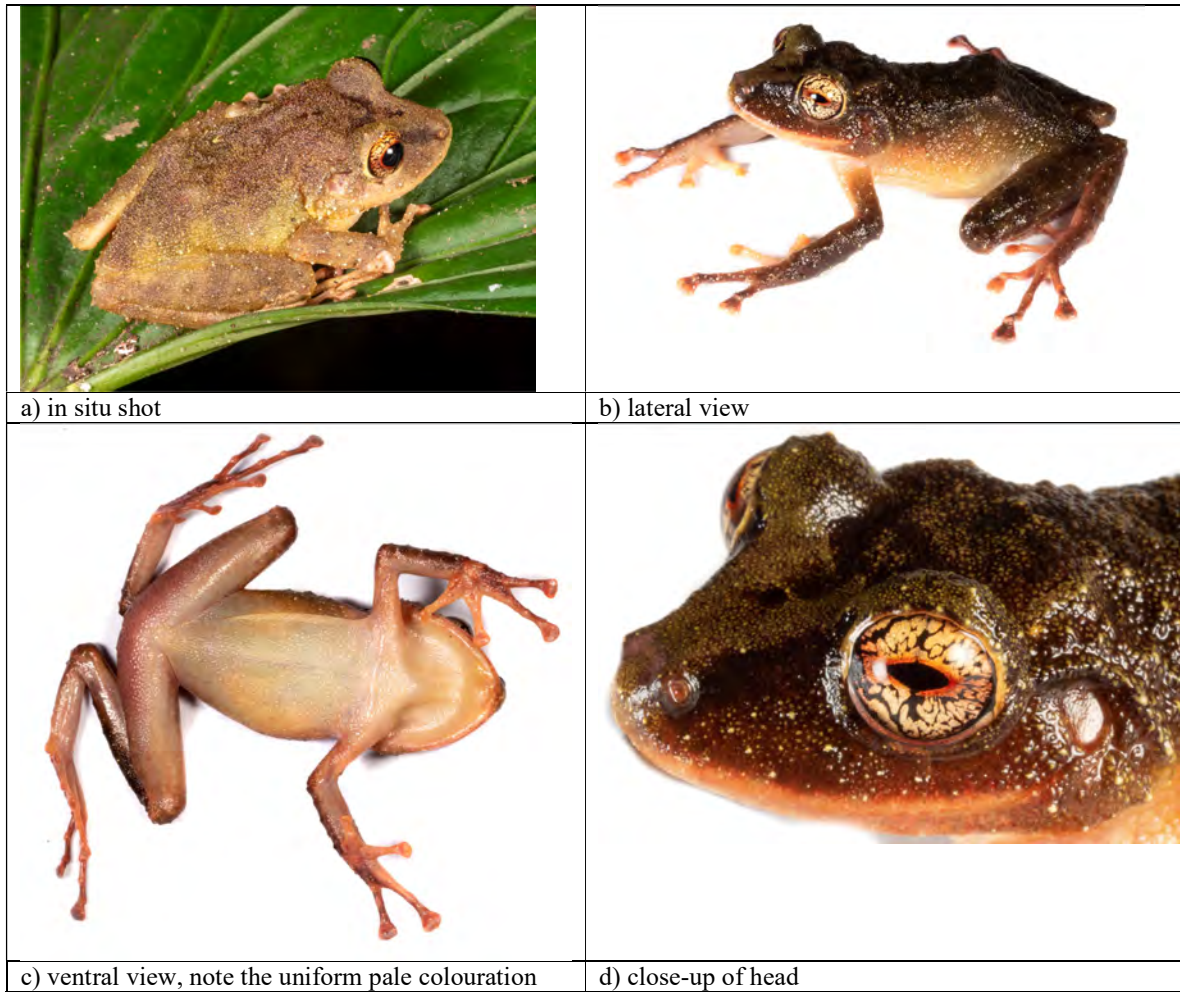
Figure 17 *Pristimantis* sp. 1



Pristimantis species 2

Several individuals of this large and distinctive *Pristimantis* were found, all were perched in vegetation near the streams to the east and west of the camp site. It resembles somewhat *Pristimantis labiosus*, but may not be this species as all the individuals found here had a uniform pale, rather than a marbled ventral surface and a different coloured iris. It currently remains unidentified.

Figure 18 *Pristimantis* species 2



Plethodontidae

Bolitoglossa chica – Hotel Zaracay Salamander

One individual was found perched on a leaf at night on the 14th of October. During the course of the night and following day it laid 2 batches of eggs in captivity. The eggs are being maintained in the laboratory, they appear to be slow in developing compared to other amphibians and after 42 days the developing embryos were visible.

This species has a wide distribution in the lowlands in north-western Ecuador, occurring in primary forest, secondary forest and banana plantations, is uncommon and listed at NT (Nearly Threatened) by Bioweb. It also has been reported in western Colombia.

Figure 19 *Bolitoglossa chica*



a) In situ shot on a leaf next to a flat-backed millipede



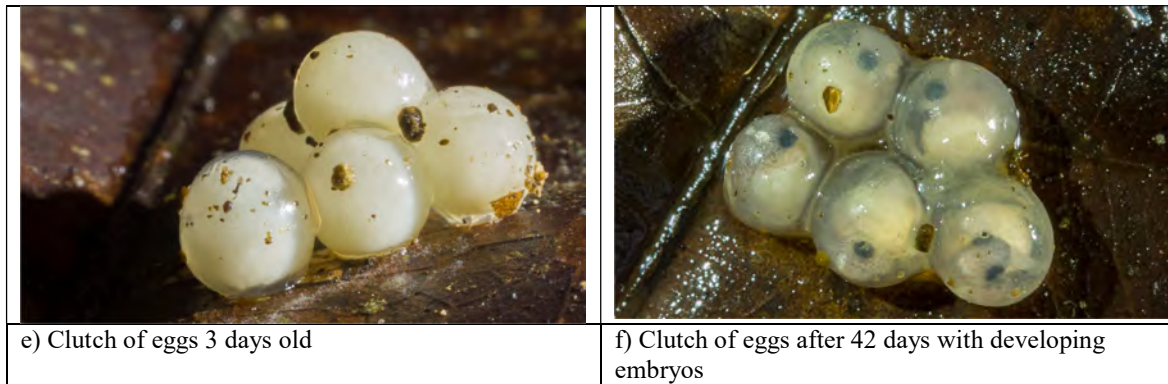
b) The following day laid 2 batches of eggs in captivity



c) dorsal view



d) ventral view



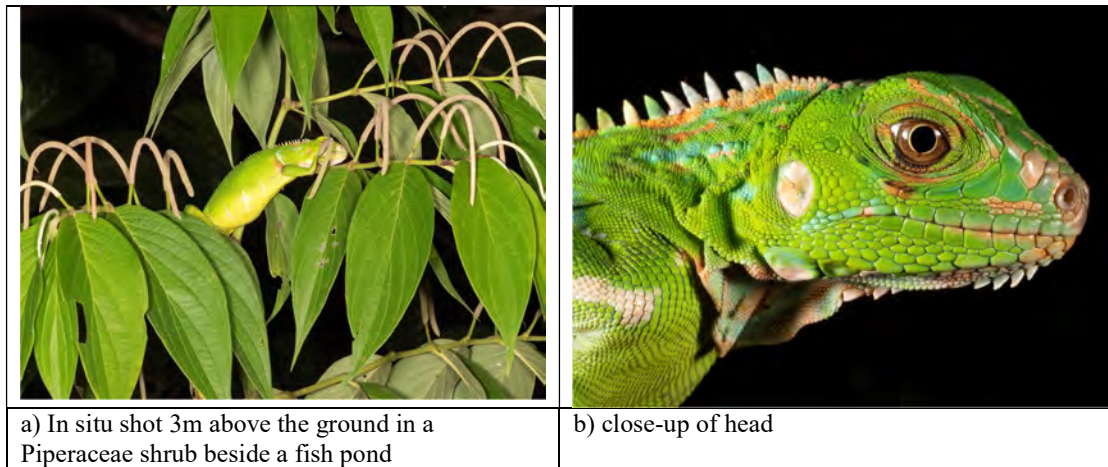
Lizards

Iguanidae: Iguaninae

Iguana iguana – Green Iguana – Iguana Verde

A juvenile was encountered roosting at night in a bush, family Piperaceae beside a fish pond on the night of the 10th of November. Inhabits primary, secondary forest and areas with isolated trees, usually near water. Inhabits western Ecuador from sea level to 1,000m altitude. This species has a widespread distribution throughout much of tropical south and central America.

Figure 20 *Iguana iguana*

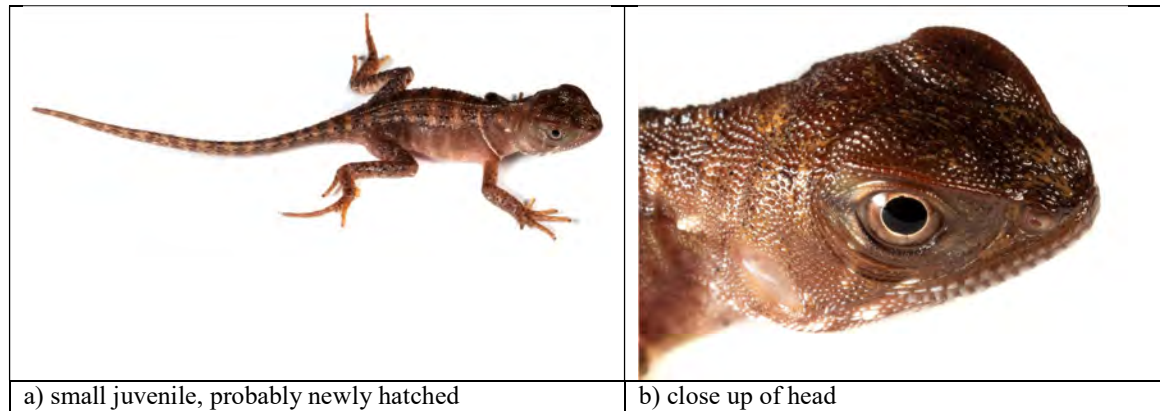


Iguanidae: Hoplocercidae

Enyalioides heterolepis – Spiny Wood Lizard – Lagartija de Palo Espinosa

One individual, a tiny juvenile, probably newly hatched, was found by day in the leaf litter in the forest near the south river. This species occurs in western Ecuador from sea level to 1053m altitude, also distributed in western Colombia and Panama.

Figure 21 *Enyalioides heterolepis*

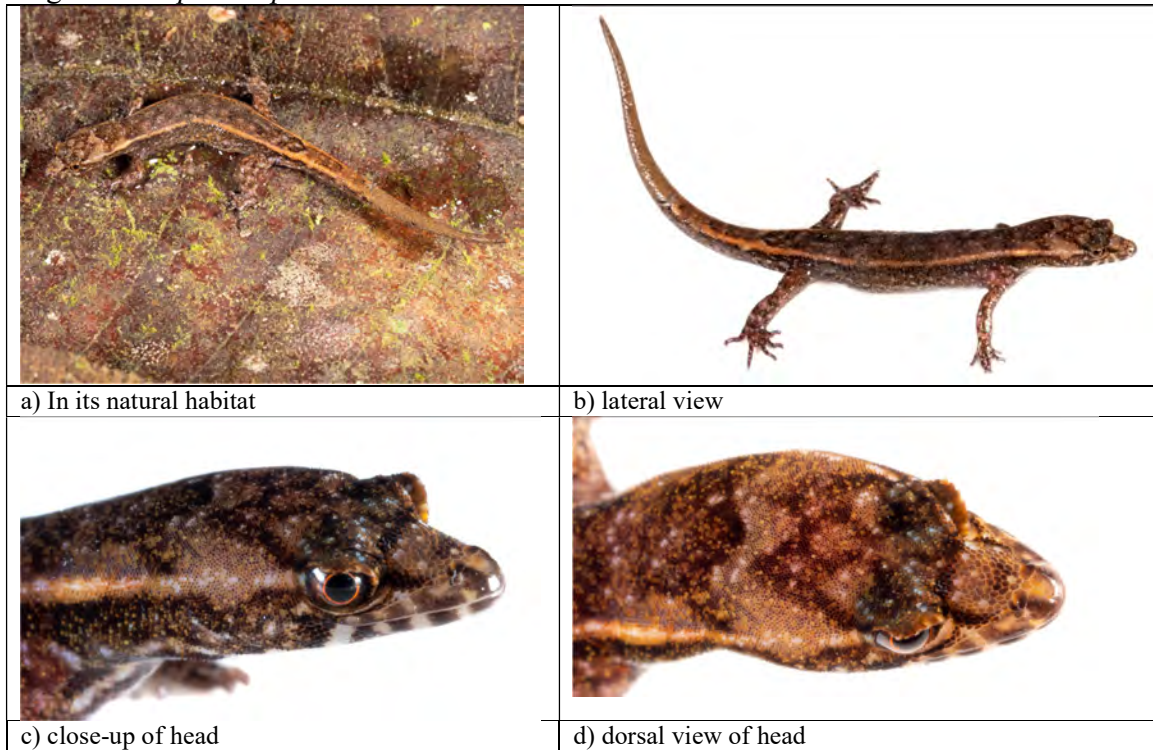


Sphaerodactylidae - Geckos

Lepidoblepharus buchwaldi – Buchwald's Gecko – Salamanquesa de Buchwald

One individual was encountered active in the leaf litter at dusk beside the trail on the north slope.
This tiny gecko is endemic to Ecuador, occurring in the leaf litter of forest from sea level to 1029m elevation.

Figure 22 *Lepidoblepharus buchwaldi*



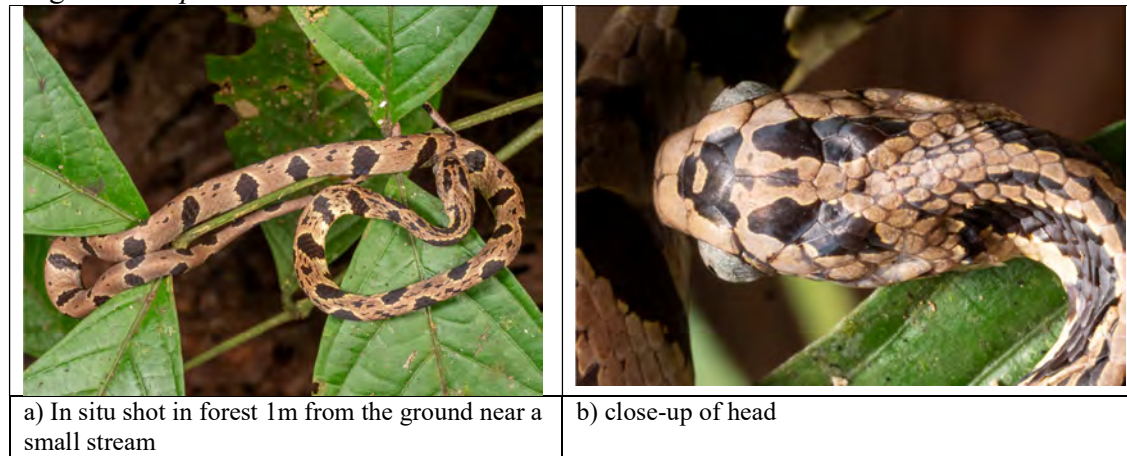
Snakes

Colubridae: Dipsadinae

Dipsas andiana – Andean Snail-eater – Caracolera Andina

One individual was found in a shrub at night on the 13th of November near the stream west of the camp site. This species is endemic to western Ecuador where it is found from sea level to 1750m elevation. It has been found in primary and secondary forest but not in cultivated areas. Conservation status NT (Nearly Threatened).

Figure 23 *Dipsas andiana*

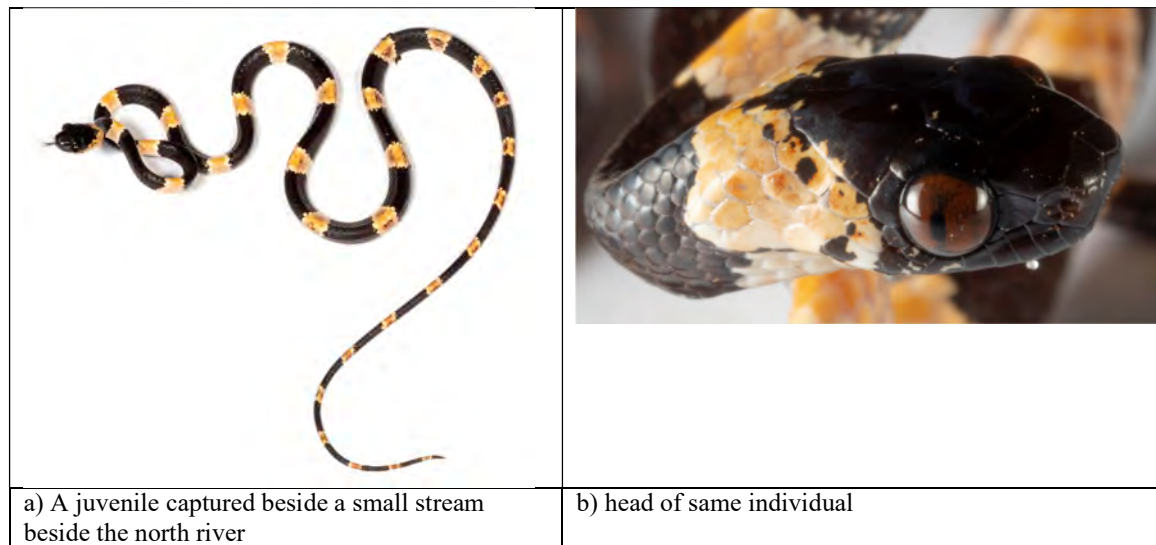


Dipsas gracilis – Slender Snail-eater – Caracolera delgada

One individual, a juvenile was found active at night on the 10th of November crawling in a shrub in secondary vegetation beside a small stream leading into Rio Caoni.

Widely distributed in western Ecuador, Peru and Colombia from sea level to 1700m elevation. Can be found both in primary forest and human altered areas.

Figure 24 *Dipsas gracilis*



Viperidae - Vipers

Bothrops asper – Fer-de-Lance – Equis del Occidente

Three individuals were observed. One was in the forest near the trail on the north slope, the others were in cultivated areas near the fish farm. Two of the three individuals were juveniles and were observed active at dusk. The adult individual was active at approx. 21:00pm. This is the only venomous snake species observed during the study, however it is apparently abundant both in the forest and cultivated areas.

This species is widespread and common in western Ecuador and Colombia, central America and the north of Peru. It occurs both in pristine and human-altered habitats.

Figure 25 *Bothrops asper*



a) In situ shot on the ground under cacao trees

RESULTS AND DISCUSSION

During this short survey and 6 species of reptiles 21 species of amphibians were identified. All but four species were documented photographically. The records of *Espadarana prosoblepon*, *Boana boans*, *Leptodactylus rhodomerus* and *Leptodactylus ventrimaculatus* were not observed directly but were heard vocalizing. We are likely to have found only a fraction of the herpetofauna and many more species are likely to be present. A search on Bioweb for the terms Provincia de Pichincha and Bosque Humedo Tropical del Choco reveal 71 species of reptiles and 54 species of amphibians. In the Ecuadorian Choco Region as a whole 117 reptiles and 94 amphibians are known. Reptiles are under-represented in our survey. While it is relatively easy to obtain an inventory of the much more abundant and vocal amphibians, snakes in particular tend to be uncommon and many hundreds of hours of fieldwork are necessary to obtain an adequate inventory.

A subgroup of species that were found during this study are those which have benefited from the destruction of the original forest and have become much more common in agricultural land and disturbed areas. These include *Rhinella horribilis*, *Smilisca phaeota*, *Boana rosenbergi*, *Leptodactylus ventrimarmoratus*, *Pristimantis achatinus* and *Bothrops asper*. These were found predominantly in the agricultural land bordering the river, except for *P. achatinus*, and *B. asper*, which was also found in the forest.

The majority of the species of reptiles and amphibians however decline and may become extinct when the original forest is removed. For this reason most of the sampling effort was spent in the forest and ravines where the rare and interesting species are likely to be found. It was significant that 7 species of craugastorids and strabomantids were found, two of which could not be identified readily and have the potential to be undescribed species. Except for *P. achatinus*, members of these families mainly occur only in undisturbed forest. More species are certainly present in the study area to judge from the many different *Pristimantis* calls heard during the wetter weather in October. The salamander *Bolitoglossa chica* is a significant find and also a species requiring undisturbed forest. Only one centrolenid, *Espadarana prosoblepon*, was identified in the forested ravines, however it is very likely other species are present. It however came a great surprise the discovery of a very rare centrolenid, *Sachatamia albomaculata* in a disturbed habitat beside the main river. That *Hyalinobatrachium tatayoi* was found at the same site is less surprising, it is a more widespread species and known to tolerate lower quality water than most centrolenids. It was also surprising that both species were calling and reproducing in dry weather, generally centrolenids are only heard calling during rainy weather.

The forest, especially along the small streams running through the forest, represent habitat for certain critically endangered species of frogs which are on the brink of extinction, most notably the critically endangered *Atelopus elegans*. The habitat does indeed appear suitable, although more searching effort would be needed to confirm its presence. We should also search for other endangered listed species such as *Rhaebo andinophryniodes*, *Rhaebo blomeri*, and the glass frog *Cochranella mache*. We have already found a number of species listed by the IUCN as Vulnerable or Nearly Threatened in the study area. These include *Pristimantis labiosus*,

Pristimantis latidiscus, *Pristimantis parvillus*, *Pristimantis subsigillatus* and *Bolitoglossa chica*. The glass frog *Sachatamia albomaculata* and *Leptodactylus rhodomerus* are also rare species but listed as Data Deficient as they are too poorly known.

We did not find *Boana picturata* even though the forest streams provided suitable habitat. Also surprisingly we did not find any *Anolis* lizards which are normally very abundant in western Ecuador. No individuals of *Oophaga sylvatica* were found even though it has been recorded previously on the property. This species is usually easy to locate as it is conspicuously coloured and has a loud and distinctive call, so it is likely it does not occur on the parts of the reserve visited during this study.

This visit has certainly shown the potential that this site may harbor important remnant populations of the herpetofauna of the original forest, species which are now largely lost from most of western Ecuador. However we have only sampled a small part of the reserve and conditions were less than ideal in November because amphibians are less active and do not call in dry weather. It was not possible to sample the south slope at night. This area is likely to have an interesting herpetofauna as the entire area is forested down to the riverbank.

It is recommended carrying out making a more intensive visit of at least 2 weeks duration in the wet season. The team preferably should include two herpetologists and 2 experienced assistants.

REFERENCES

- McCracken SF, Forstner MRJ (2014) Oil Road Effects on the Anuran Community of a High Canopy Tank Bromeliad (*Aechmea zebrina*) in the Upper Amazon Basin, Ecuador. PLOS ONE 9(1): e85470. <https://doi.org/10.1371/journal.pone.0085470>
- Dodson, C. H. and A. H. Gentry (1991) Biological Extinction in Western Ecuador. *Annals of the Missouri Botanical Garden*. 78:2 (1991), pp. 273-295.
- Mejia (2017) ¿Cómo están protegiendo los bosques del Chocó ecuatoriano? Tres iniciativas de conservación: <https://es.mongabay.com/2017/03/ecuador-bosques-biodiversidad-conservacion/>
- Read, M. 2000). *Frogs of the Ecuadorian Amazon, a Guide to their Calls*. Compact Disc. Morley Read Productions, Fowey, Cornwall, U.K.
- Ron, S. R., Merino-Viteri, A. Ortiz, D. A. 2019. *Anfibios del Ecuador*. Version 2019.0. Museo de Zoología, Pontificia Universidad Católica del Ecuador. < <https://bioweb.bio/faunaweb/amphibiaweb>>, fecha de acceso 30 de noviembre, 2020.

Torres-Carvajal, O., Pazmiño-Otamendi, G., Ayala-Varela, F. y Salazar-Valenzuela, D. 2020. Reptiles del Ecuador. Version 2020.1. Museo de Zoología, Pontificia Universidad Católica del Ecuador. < <https://bioweb.bio/faunaweb/reptiliaweb>>, 30 de noviembre 2020