

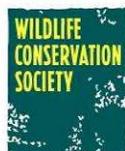


**PROJECT ATELOPUS
CONSERVATION OF CRITICALLY ENDANGERED
AMPHIBIANS, COLOMBIA**



Final report submitted by

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CONTENTS

Acknowledgements	3
Summary	4
Introduction	4
Methods	6
Results	17
Other area of exploration	21
Amphibians found	22
Identified threats	28
Expected outcomes of the monitoring Program for Supata's amphibians	30
Conservation initiatives	31
Awareness public and environmental education: dissemination of information on the local radio stations and local newspapers.	31
Recommendations	37
Follow up activities for project Atelopus at Supatá region	39
Project Atelopus team	40
Bibliography	43

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SUMMARY

Many amphibian species are endangered around the world for a lot of causes that include the habitat loss, the climate changes and the appearance of a pathogenic fungus had decreased the populations of amphibians in worldwide. The *Atelopus* genus is an amphibian group that has shown the most abrupt decline of their populations. For that reason, in this project we assessed the conservation status of some species of harlequin frogs in seven places of the Cundinamarca department, Colombia. Despite of the exhaustive searches in the last relict forests in this department during a year, was not possible to find any of threatened amphibians searched in this project. However, positive results were obtained like the discovery of new species of dendrobatid frogs and a possible new population of a endangered salamander in the Supatá municipality; also in this project was possible the rediscovery of the Carrikeri Harlequin Frog from Sierra Nevada de Santa Marta in the Magdalena department, a species that wasn't in the aims of this study. Another important goal of the project was the strong environmental work which allowed the awareness-raising of the local community. The absence of records of the amphibians studied in this project show the serious problem that face this vertebrate group in Colombia, but the discovery of new species and populations allow to have a great opportunity for knowing and conserving these animals.

INTRODUCTION

Since the 80's decade it has been reported the sudden disappearance of a great number of amphibian populations in several places from USA, Central and South America, Europe and Australia. These decline in the population densities have been substantial, sustained and have affected whole groups of amphibians, as much as in deforested and intervened areas as in natural and protected areas. That is to say, these events can't be explained only for the habitat destruction, which can indicate that these extinction processes are due to the combined action of different disturbance agents such as the contamination, sour rain, radio-active residuals coming from industrialized areas

and the expansion of pathogen organisms through the air, water or accidental vectors. This marked decline has affected the amphibian population of at least 159 species, 35 of these are locally extinct and 2 have disappeared for ever.

Some of these losses are associated with the caused infection for a pathogen fungus of the phylum Chytridiomycota: *Batrachochytrium dendrobatidis*. This fungus never had affected a vertebrate group, but is very common in plants and insects. This mycotic disease affects the skin of the amphibian, suffocating it and liberating toxins that kill the infected animal.

In Colombia there is scientific evidence that show that several endemic Harlequin frog species (from the *Atelopus* genus) are extinct and other species suffered a significant reduction of its populational size during the last 15 years.

The disappearance of the amphibian species could produce serious collateral effects in the ecosystems weakening the transfer cycles of nutritious and the predator-prey interactions. Furthermore, this could have implication for the human society because these alterations can cause an increase in the incidence of some mortal diseases for the humans, such as the malaria, yellow fever, etc, like result of the increase of wadings and insects, which at the same time could increase the plagues for the crop. Also, if the amphibian species disappear of the Earth, the humans could be losing an opportunity for the cure of many diseases and ailments, which are been combated with produced medicaments with the alkaloids, toxins and other substances extracted of the skin of this animal.

METHODS

This project was performed in the Andean mountain of the Cundinamarca department, in the western slope of the Cordillera Oriental of Colombia (Figure 1). Seven zones were explored. Next, these areas will be shown:

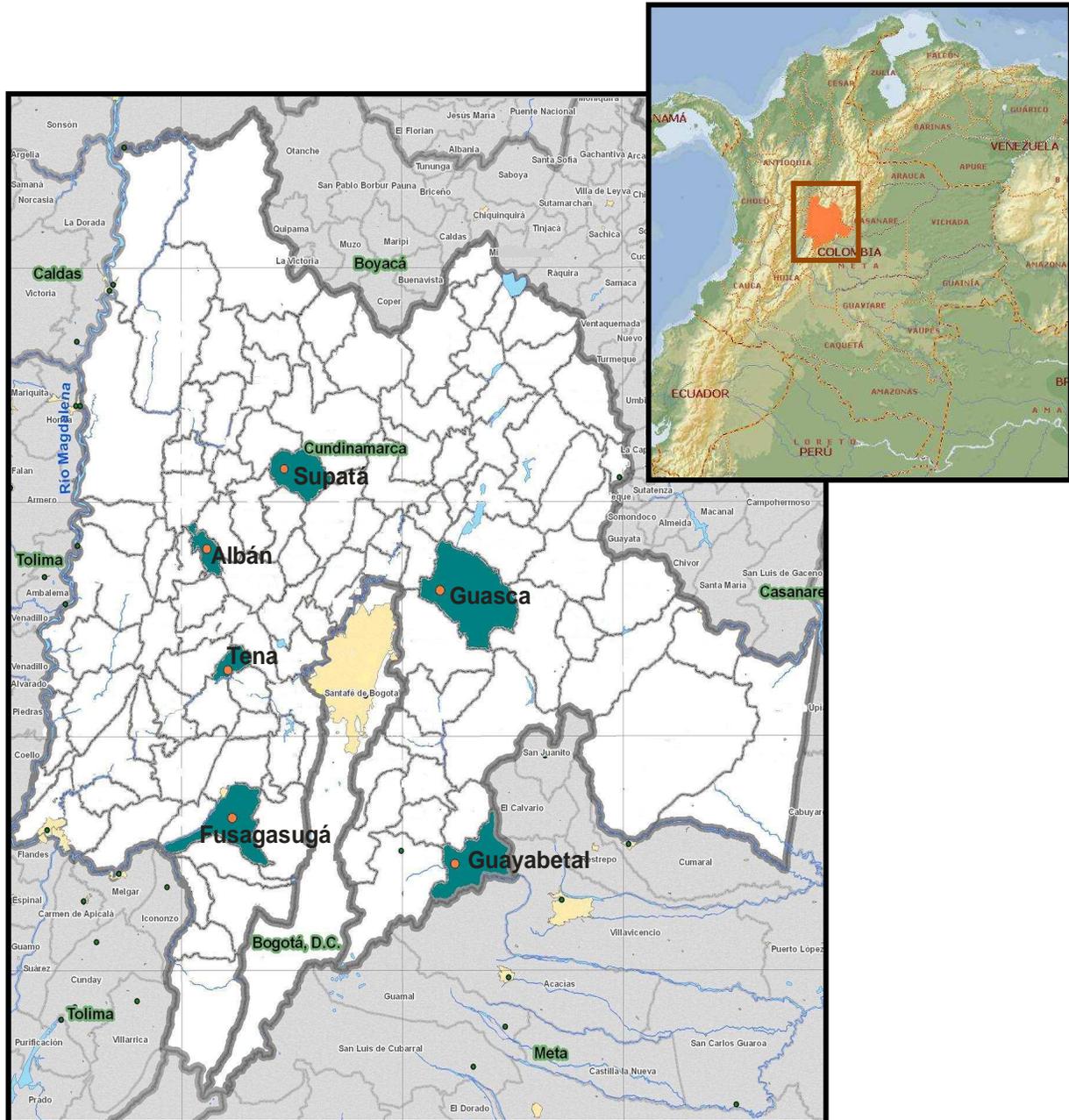


Figure 1. Municipalities explored in this project

Albán Municipality: in this municipality the samplings mainly were in the type locality of the Salamander of Albán (*Bolitoglossa capitana*) and the Harlequin frog of Albán (*Atelopus farci*), the fragments of forest around of Granja Infantil El Gran Ciudadano Padre Luna, vereda Tres Marias (GPS position 04° 53' N; 74° 25' W, 2085 to 2250 meters a.s.l) (Figure 2).



Figure 2. Cloud forest in Granjas Padre Luna, Albán
(Photo by Oswaldo Cortes)

Fusagasugá municipality: the samplings were performed in the area known as La Aguadita and San Rafael (GPS position 04°26' N; 74°18' W, 2200 to 2600 m a.s.l) (Figure 3).

Supatá municipality: this area was the most important place in the Project. There was the place where we were performed the most important discoveries. (GPS position 05° 02' 02" N; 74° 15' 37" W; 05° 02' 03" N 74° 14' 04" W; 05° 03' 27" N; 74° 15' 36" W, 1620 to 2350 m a.s.l) (Figure 4).

Tena municipality: the explorations were performed in the Laguna de Pedropalo's forest (GPS position 04° 41' N; 74° 23' W, 1940 to 2120 m a.s.l) (Figure 5).



Figure 3. Vereda La Aguadita in Fusagasugá
(Photo by Oswaldo Cortes)



Figure 4. Fragment of Cloud Andean forest, Supatá municipality
(Photo by Giovanni Chaves)



Figure 5. Pedropalo Lake, Tena
(Photo by Giovanni Chaves)

Páramo de Sumapaz: Open Espeletia páramo, elfin woodland and upper reaches of tall humid forest (GPS position 04°17'N, 74°13'W, 3300-3 900 m a.s.l.) (Figure 6.)



Figure 6. Páramo landscape. (Photo by Oswaldo Cortes)

Cerros de Bogotá: A large patch of cloud forest (>400 ha) on the crest of the W de Bogota (Figure 7) c. 4 km N of Bogota (4° 35' N, 74 ° 03' 39 W, 2,400-2,850 m a.s.l.), mostly above the main road from Chia to Bogotá.



Figure 7. Cerros de Bogotá (Photo by Oswaldo Cortes)

Municipio de Guasca (Suesca´s lakes): This is a pristine primary Páramo area (6°51' N, 73° 50' W, 2900-3500 m a.s.l.) (Figure 8). This habitat is subject to quite extraordinary levels of precipitation, violent thunderstorms with torrential downpours lasting several hours occurring each afternoon during our fieldwork in the “dry” season, and frequent ground-level cloud cover. However, bright and clear periods in the morning facilitated fieldwork. Forest fragments extend up in sheltered valleys below the páramo and ecotone. Forests here have very thick moss cover, many treefall gaps and bamboo abundant with a low canopy (up to c.8m). Páramo is characterised by low vegetation with spiny plants (due to strong winds). We observed tall *Speletias* (Frallejones), *Blechnaceae* ferns (*Blechnum schomburgkii*), *Eriocaulaceae* (*Paepalanthus*), *Ericaceae* sp., *Clusia* sp, *Bromeliaceae*, *Melastomataceae*, *Orchidaceae* and *Asteraceae*.

OTHER LOCALITIES NOT INCLUDED AT ANALYSIS

Serranía de Cebolleta: Department of Magdalena, located on the northern slope of the Sierra Nevada de Santa Marta ($10^{\circ}50' N$, $73^{\circ}49' W$, 3000-4000 m a.s.l.) (Figure 9).

Guayabetal municipality: located in the Cundinamarca department on the western slope of the western Cordillera ($04^{\circ}17' N$, $73^{\circ}48' W$, 2000-2500 m a.s.l.) (Figure 10).



Figure 8. Suesca's lakes (Photo by Ximena Villagran)

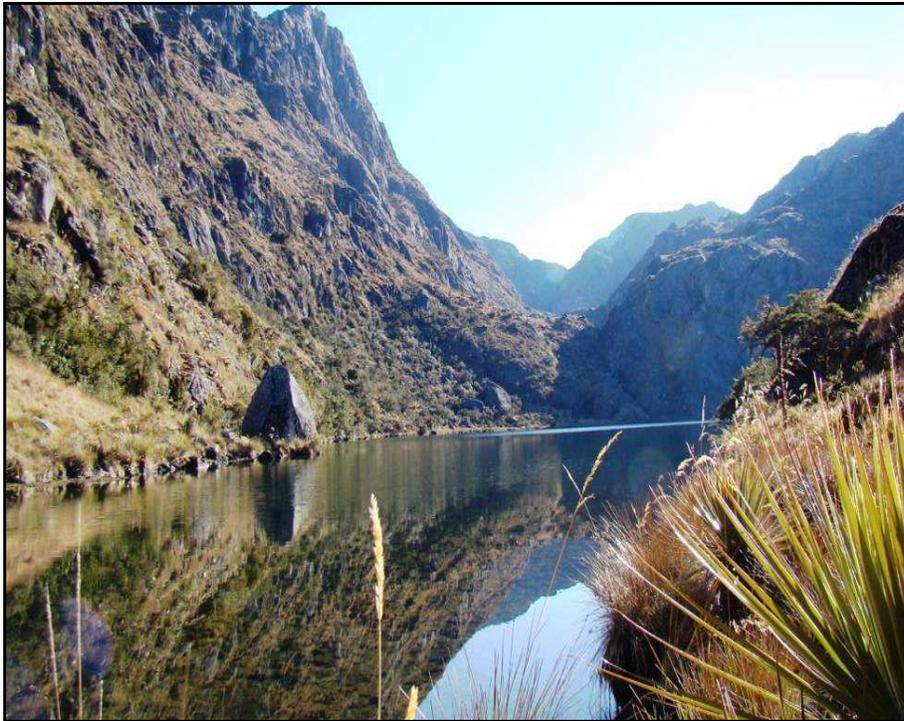


Figure 9. Serranía de la Cebolleta in the Sierra Nevada de Santa Marta (Photo by Luis Rueda).

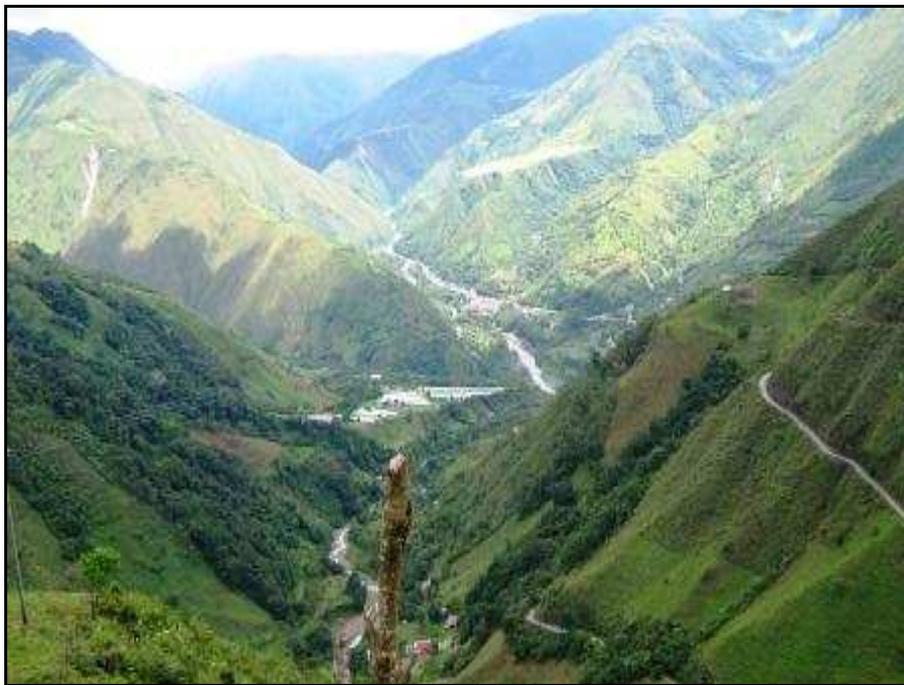


Figure 10. Study area in Guayabetal municipality (Photo by Oswaldo Cortes).

Sampling method

We use in all the sampling areas the technique of Visual Encounter Survey (VES) which is one of the most commonly used survey techniques for frogs and salamanders and can be used to measure species composition, relative abundance, habitat association, and activity. This technique is conducted by observers walking through a designated area for a prescribed time, visually searching, for animals. The number of animals encountered are noted along with time elapsed during the survey (Heyer, et al. 2001 and Lips et al.2001).

Visual encounter surveys are effective in easily identifiable habitats, such as riparian zones or ponds or in uniform habitats with good visibility. Species that are highly clumped are also good targets for VES, for example, pond breeding amphibians. In this case, the survey is restricted to the particular Places (ponds) of interest. VES is also useful in surveying species that are difficult to catch in traps or are rare. It is an inappropriate technique to use in searching for fossorial or canopy dwelling species. VES can be applied in monitoring and surveying designs. Visual encounter surveys can determine species richness, provide information for compilation of a species list, and provide data used to estimate proportion of area surveyed that is occupied by target species. Data collected field information on the presence of a species but does not establish absence, nor does it give reliable estimates of abundance. VES can be used along transects, streams, ponds, in quadrants or larger areas. There are three standard sampling designs for VES, randomized walk, transects, or a quadrant design (Heyer et al. 2001). We use the randomized walks with limit of time as standard sampling for our explorations (Figure 11). To determine the relative abundances we use the categories proposed by Rueda et al. in Angulo et al., 2006.



Figure 11. Stream sampling at Supatá municipality

Relative abundance: The species of the frogs found were tallied, and the time noted when 10 individuals of 1 species had been found. With the aim of saving time that would be used up by continuing to record the common species (perhaps increasing the possibility of finding more cryptic species). Timed counts are designed to be a simple, rapid and effective technique which gives reasonable relative abundances for frogs and birds (Bibby 1998). Therefore an adapted version of the technique was tested for assessing frog assemblages.

Register of field data

To each found amphibian, we registered the following data:

1. Date and hour of the register.
2. Species (if we could determine).
3. Temperature and relative humidity to the beginning and the final of each sampling.
4. Morphological measures (if the specimen was captured).
5. Microhabitat used.

6. Outstanding aspects on life history, behavior, etc. that we could register in the moment of the observations.

7. Photographic records with professional camera (if is possible).

Biosecurity.

Keeping in mind that one of the possible causes of the amphibian declines is a pathogen fungus (see Lips, et al. 2005; Pound, et al. 2006 and Gardner, 2001) we implement a biosecurity protocol for the fieldwork proposed by Speare et al. in 2004 . All the captured specimens were deposited in plastic bags (use one plastic bag per specimen) for subsequently to register the animal's data. When concluding, the bags were discarded.

Environmental Awareness promotion

A number of environmental awareness campaigns (Figure 12) were held at different sites during the course of the survey. These were held at Schools Guasca, Guayabetal and local community Laguna de Pedro Palo. In all areas presentations were given at different locations around local community near to Cloud forest The talks presented covered a number of topics, including the biodiversity of amphibians, with a focus on Colombian frogs, the threats to biodiversity, and recommendations.

Many were ignorant of the rich yet fragile biodiversity of the Cloud forest Cundinamarca region. Time was given for questions, discussions and the sharing of information relating to the environment. During the course of the field work, training in general vertebrate taxonomy was also provide to field guides, and porters that were interested. We found that there were many students and villagers that were ignorant of the biodiversity and especially of the Poisson frogs. As a result of these meetings, we were able to raise the awareness of these species and in general the biodiversity of the region to communities that otherwise would not have access to this information.



(A)



(B)

Figure 12. Awareness campaign with school students and teachers. In **(A)** Albán and **(B)** Guayabatal municipalities.

RESULTS

Next will be shown the results obtained in each one of the study areas:

The species accumulation curves compare species richness and rate of species discovery for transect and timed count techniques. The total species richness approaches an asymptote at 15; species (Table 1) were still being discovered after 150 days (Figure 13). The transect Supatá found 5 of the total 15 species. Two frog species were only not detected during the surveys; *Atelopus farci* and *Bolitoglossa capitana* this species is in extinction at your locality Alban. Based on call recognition, the species found regularly at significant distances from water were particularly cryptic, and could often only be located by their call, these were *Rheobates palmatus* and *Dendropsophus labialis*. Individuals of other species were found at a distance from water, such as *Ranitomeya sp nov*, *Bolitoglossa cf pandi*, *B. adspersa* and species genus *Pristimantis*, but only occasionally compared to their abundance at stream sites.

Albán municipality: such as we said previously, this municipality is the type locality of the two focal species, for this reason this zone had of great importance for this project. In total 96 hours of capture effort were invested in this zone without any register of these two species of amphibians. A total of 192 hours of capture effort were invested in this place. At these hours of sampling only registered three types of amphibians, these are the Palm Rocket Frog (*Rheobates palmatus*) (Figure 14), The Rain Frog (*Pristimantis sp.*) (Figure 15) and The Padre Luna's treefrog (*Dendropsophus padreluna*) (Figure 16). Similarly for this area is reported the presence of another species of threatened endemic amphibian, the Inger's Big- Headed Frog (*Strabomantis ingeri*) (Figure 17) (VU), but was not found in these samplings For our team and other previous ones us, the fruitless of the searches performed in this area, makes thinking in a possible local extinction of these two species of amphibians. (Rueda-Almonacid & Rueda-Martinez, 2004) Is notable the serious destruction of the Andean forests of this region for the adaptation of lands for the agriculture and the raising cattle; is possible to observe small secondary

forest fragments, which have a little connectivity among these. Another confirmation of the alteration in the habitat is evident in the cascade where previously the harlequin frog of Albán (*Atelopus farci*) was observed, today this cascade and the river that the form are contaminated with waste and the lands that surround them are slipping due to the deforestation of the banks of the river.

Family	Specie	Alb #	Supa #	Te #	Suma #	Cerr #	Gu #	Total	Abundance relative (%)
Centrolenidae	<i>Centrolene</i>					1		1	0.0045
Hylidae	<i>Dendropsophus padreluna</i>	2	6	4				12	0.054
	<i>Dendropsophus labialis</i>				5			5	0.022
	<i>Dendropsophus bogotensis</i>						2	2	0.009
Strabomantidae	<i>Strabomantis ingerí</i>			1				1	0.0045
	<i>Pristimantis unistrigatus</i>			33				33	0.15
	<i>P. elegans</i>				8		4	12	0.054
	<i>P. bogotensis</i>	1					2	3	0.013
	<i>P. bicolor</i>			3				3	0.013
	<i>P. affinis</i>					2		2	0.009
Dendrobatidae	<i>Ranitomeya sp. nov</i>		65					65	0.29
	<i>Hyloxalus sp. nov</i>		5					5	0.022
	<i>Rheobates palmatus</i>	1	4					5	0.022
Plethodontidae	<i>Bolitoglossa adspersa</i>					2		2	0.009
	<i>Bolitoglossa cf pandi</i>		54	15				69	0.31
Total individuals		4	134	56	13	5	8	220	

Table 1. Species, abundance relative of amphibians at localities the exploration. Alb (Alban), Fu (Fusagasugá), Supa (Supatá), Te (Tena), Suma (Sumapaz), Cerr (Cerros de Bogotá) and Gu (Guasca): # number individuals

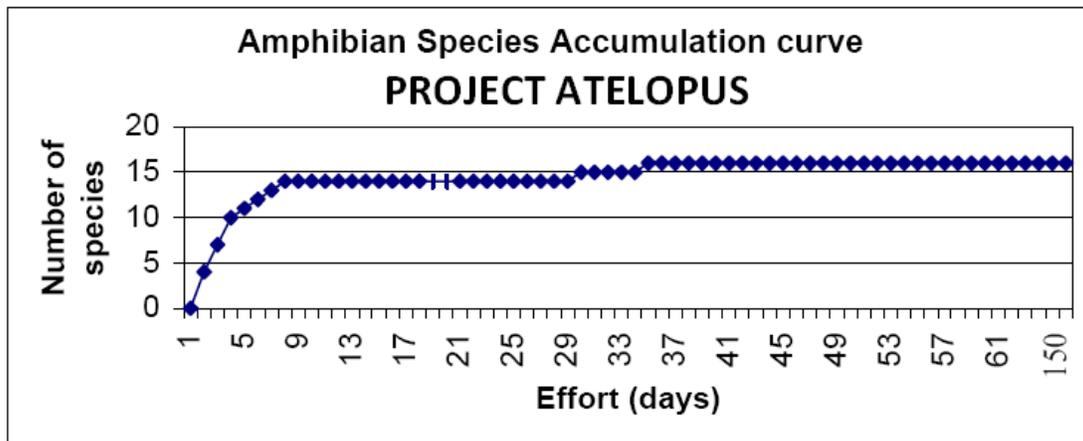


Figure 13. The species accumulation curves compare species richness and rate of species discovery for transect. The total species richness approaches an asymptote at 15; species were still being discovered after 150 days.

Fusagasugá municipality: although the sampling area has well conserved zones of Andean forest, the efforts to find threatened amphibians were disheartening. besides the two focal amphibians for this study, the area is important to present three species more than amphibians threatened, The Ruiz’s Rocket Frog (*Hyloxalus ruizi*) (CR) , Bogotá Stubfoot Toad (*Atelopus subornatus*) (EN) and Renjifo’s rainfrog (*Pristimantis renjiforum*) (VU). In total 100 hours of capture effort were invested in these places but none of these species was found. The anthropogenic threats that are more remarkable in this area are the destruction of the forest for the raising cattle and the accumulation of waste in the rivers and streams .

Supatá municipality: 120 hours of capture effort were invested in this municipally, in which we achieved the discovery of the Golden Poison Frog of Supatá (Genus *Ranitomeya*), a new species of frog (Figure 18). Other achievement was the discovery a possible new population of the Pandi mushroom-tongue salamander (*Bolitoglossa cf. pandi*) (Figure 19) and another possible new species of frog of the Genus *Hyloxalus*, (Figure 20) although several taxonomic studies are necessary for confirming the identity of these last two amphibians.

Guayabetal municipality: 103 hours of capture effort were invested in this municipality, with an effort of capture of 4, 3 and 5 hours/man respectively for a total of capture effort per month of 103 hours/man. which we not found to *Atelopus minutulus* and this area discovery (bad new) dead of much amphibians may be for the Chytrid fungus. In the numerous gaps and openings in the canopy, dense thickets have grown up, dominated by shrubs and small trees (Urticaceae, Compositae, Rubiaceae, Siparuna and Piper), bamboos (Chusquea), large-leaved herbs (Araceae, Marantaceae, Cyclanthaceae, Heliconia), and vines, which also festoon many of the trees at the edges of the gaps. Palms (Geonoma, Chamaedorea and Prestoea) and tree-ferns are numerous, as are moss and epiphytes (especially orchids, aroids, and bromeliads), indicative of the heavy rainfall and frequent cloud cover in the area. Dense, dark, and virtually impenetrable in older gaps, the understory is fairly open under a closed canopy of taller trees

Páramo de Sumapaz: A total of 52 hours of capture effort were invested in this place. At these hours of sampling only registered two types of amphibians, these are (*Dendropsophus labialis*) (Figure 21), The Rain Frog (*Pristimantis elegans*) (Figure 22) this last frog is endangered. Is notable the serious contamination of the Páramo of this region for the adaptation of lands for the agriculture and the raising cattle.

Cerros de Bogota: We found to populations the *Pristimantis affinis*, *Centrolene andinum* (Figure 23) y *Bolitoglossa adspersa* (Figure 24) this area discovery but Cerros de Bogota have problems the deforestation and contamination water this threatened for the populations the amphibians in this area. Near the road the forest has been selectively cut and some areas are dominated by second growth woodland. Above c. 2,400 m the slopes are much steeper and the forest is nearly intact, continuing beyond the elevations studied to the adjacent mountaintops at over 2,400 m to 2800. This forest was with mist and clouds during most of the mornings; larger trees supported a heavy growth of moss and epiphytes.

OTHER AREA OF EXPLORATION

Serranía de Cebolleta: Magdalena department, Colombia., located on the northern slope of the Sierra Nevada de (10°54' N, 73°55' W), which protects Páramo forest at 3000–4100 m. This Area is rediscovery the populations of The Colorful Harlequin Frog (*Atelopus carrikeri*), discovered in the Year of the Frogs *Atelopus carrikeri* (Figure 25 y 26) is toad of uniform black color, inhabitant of the páramo (3500 – 4800 m a.s.l.) in the Sierra Nevada de Santa Marta (Ruthven 1916). This species belongs to ignescens group since it has a robust body, with relatively short limbs and has tubered skin (Lötters 1996). There are not recent reports on *Atelopus carrikeri*, due to lack of new explorations in the Sierra Nevada, the last report in 1994 at El Paramo de Macostama, La Guajira department and La Serrania de Cebolleta, Department de Magdalena, Colombia.

However, on early February of 2008 in La Serrania de Cebolleta, the *Atelopus* project with sponsorship of Conservation Leadership Program reported the population back with the detection of abundant tadpoles and the discovery of a red morpho in adults of *Atelopus carrikeri*. It is important to note that 2 adults were found sick. The discovery of *Atelopus carrikeri* joins with others *Atelopus* species that inhabit the Sierra Nevada in good state of conservation making the Sierra Nevada de Santa Marta a sanctuary for harlequin frogs in Colombia, compared to other upperland areas where *Atelopus* are apparently already extinct.

It is clear that the Serranía de la Cebolleta will shortly become the focus for large-scale deforestation and colonization. There is a very real sense of urgency for conservation action to be implemented now, if it is to be effective in the region for the conservation to Colorful Harlequin frog, and other species of Harlequin the region.

AMPHIBIANS FOUND



Figure 14. The Palm Rocket Frog (*Rheobates palmatus*)
(Photo by Giovanni Chaves)



Figure 15. The Rain Frog (*Pristimantis* sp.)
(Photo by Giovanni Chaves)



Figure 16. The Padre Luna's treefrog (*Dendropsophus padreluna*)
(Photo by Oswaldo Cortes)



Figure 17. The Inger's Big-Headed Frog (*Strabomantis ingeri*)
(Photo by Luz Dary Acevedo)



Figure 18. The Golden Poison Frog of Supatá (*Ranitomeya* sp. nov.)
(Photo by Oswaldo Cortes)



Figure 19. Supatá's salamander (*Bolitoglossa* cf. *pandi*)
(Photo by Oswaldo Cortes)



Figure 20. New species of Dendrobatid (*Hyloxalus* sp. nov.)
(Photo by Giovanni Chaves)



Figure 21. The Bogotá's treefrog (*Dendropsophus labialis*)
(Photo by Oswaldo Cortes)



Figure 22. *Pristimantis elegans* (VU)
(Photo by Ximena Villagrán)



Figure 23. *Centrolene* cf. *andinum*
(Photo by Juan Pablo López)



Figure 24. *Bolitoglossa adspersa*



Figure 25. Colorful Harlequin Frog (*Atelopus carrikeri*):
(Photo by Luis Rueda)



Figure 26. Toad of Colorful Harlequin Frog (*Atelopus carrikeri*):
(Photo by Luis Rueda)

IDENTIFIED THREATS

While multiple threats were identified for each species, the most alarming result of the assessment is that the threats for 16 species are currently listed as unknown (table 2) . In each case the multiple threatening processes associated with these species do not adequately explain the observed declines. This result is cause for major concern as management actions are hampered by the lack of knowledge on the relative importance of threats for these species. Management actions should place equal effort firstly into mitigating the known threats (e.g. habitat modification) and secondly, continuing research focusing on testing alternative hypotheses for the unexplained declines. Habitat modification remains a key threat to Colombia frogs (associated with the status of 50% of threatened species). Legislative protection is an essential process to ensure the conservation of these species. Species currently listed as Endangered, Critically Endangered or Extinct under the Colombia.

Species	Status ICN	Restricted geographic range	Chytrid Infection recorded	Fire	Habitat modification	Introduced Species	Global Weather Change	Threat Unknown
<i>Centrolene andinum</i>				F	F	F (FISH)		
<i>Dendropsophus padreluna</i>			F	F	F			X
<i>Dendropsophus labialis</i>								
<i>Dendropsophus bogotensis</i>				F	F			
<i>Eleutherodactylus ingeri</i>	VU			F	F	F (FROGS)		
<i>E. unistrigatus</i>								
<i>E. elegans</i>	VU	F		F	P			X
<i>E. bogotensis</i>								
<i>E. bicolor</i>								
<i>E. affinis</i>				F	P			
<i>Ranitomeya sp. Nov</i>	NE	F	F	F	P			
<i>Hyloxalus sp. Nov</i>	NE	F	F	F	P	P (FROGS)		
<i>Rheobates palmatus</i>			F			P(FROGS)		
<i>Bolitoglossa adspersa</i>					P			X
<i>Bolitoglossa cf pandi</i>	EN	F	F	F	P	P(FROGS)		
<i>Atelopus carrikeri</i>	CR	F	F	F	P	P (FROGS, FISH)	P	

Table 2. Multiple threats identified for each species, ranked as either Foremost (F) or Potential (P). Totals represent foremost in bold, with Potential in brackets, X, an unknown threat is suspected as know threats do not adequately explain observed declines. Bold type denotes species found primarily in upland areas.

In Colombia, the chytrid fungus is unknown associated with declines for species the amphibians but in all area the Project is recorded presence of this fungus the populations may be extinction *Atelopus muisca*, *Atelopus lozanoi* and *Atelopus farci* may be affected for this fungi but not information recorded. Clearly other factors are contributing to declines associated with chytrid infection (e.g. altitudinal distribution,

breeding habitat etc.). Continuing research on this emerging infectious disease is an important step in resolving global amphibian declines.

Introduced fish (*Oncorhynchus mykiss*) and Rana Toro (*Rana castesbeinana*) have been notably associated with declines in project Atelopus because we recorded presence of this species in area de explorations. Action to mitigate these effects are feasible, e.g. introduce legislation to stop fish stocking and movement of both native and non-native fish species, and promote active management of threatened species by eradicating introduced species from their breeding habitats. Few studies have investigated the impacts of fire on frogs. Fire has been proposed as a potential threat to several amphibians. Following severe declines in the geographic distribution of amphibians corroborated in the Cundinamarca, wildfires affected the few remaining breeding sites in amphibians. Protection measures should be investigated and an experimental approach to examine the impacts of fire on these species implemented. Changing weather patterns (global warming and increased UV-B radiation) have not been strongly associated with frog declines in Project, but we don't have much information about this problem. While this hypothesis has not been investigated thoroughly, we conclude that increased UV-B is currently not expected to be a major threat to frogs in Cundinamarca.

Expected outcomes of the monitoring program for Supata's amphibians

There are several important outcomes of the proposed monitoring program, including the opportunity to detect climate changes at high elevations in SUPATA AREA due to global weather changes, and the resulting shifts in distribution of *Ranitomeya* sp Nov, *Hyloxalus* sp Nov, and *Bolitoglossa* cf *pandi* at higher elevations. We expect an increase in human pressure or changes in human activities at lower elevations in SUPATA due to the Common Agriculture Policy that will affect rural communities. The amphibian monitoring program could provide a much needed and rapid assessment of the resulting environmental impact. It will also provide support for the protected areas management plans for Project Atelopus follow up, currently being prepared for SUPATA and awaiting

revision. Monitoring activities usually yield a low publication output and are thus unattractive to the highly competitive scientific community. The baseline data gathered during the proposed monitoring program can identify and support the establishment of directed research projects and thus become more attractive. Finally, the approach outlined in our proposed monitoring program could be extended to three other large protected areas linking the SUPATA REGION.

Conservation initiatives

Awareness campaign: Awareness campaigns have been conducted among the local community of most of the identified threatened species. Altogether formal and informal awareness campaigns have been conducted so far in different parts of Cundinamarca region. The target groups ranged from fishermen, community leaders, school students, teachers and managers.

To popularize the amphibians research and conservation in Cundinamarca region, the project established and has been maintaining good linkages with the local media, spreading from Newspaper to television, from regional to national level. Different activities of the Project Team were conveyed to the common people of Cundinamarca region through these media and the Team felt the impact during the field survey. Besides the minor communications, altogether 19 major media coverage were made during the reported period.

Awareness Public and environmental education: Dissemination of information on the local radio stations and local newspapers.

The expedition worked hard to increase the public's awareness regarding the plight of this amphibians, inform nationally and internationally the work being conducted and foster a sense of national pride towards the species in the hope of aiding future conservation measures. The local community was informed about the project aims through radio stations, newspapers and television news. Caracol TV, Radio LAUD, El Tiempo published information about the Atelopus project. During these dissemination

activities we encouraged people to value the neighboring forests and to work together for its conservation



La UD radio interview at Bogota city.



El tiempo newsletter Local newspaper, EL TIEMPO: Short article highlighting plans for a team of local students to go on an expedition to help conserve this critically endangered AMPHIBIANS.



Canal Caracol Noticias Rana dorada de Supatá, única en el mundo



Canal Caracol Noticias Rana dorada de Supatá, única en el mundo



Canal Caracol Noticias Rana dorada de Supatá, única en el mundo

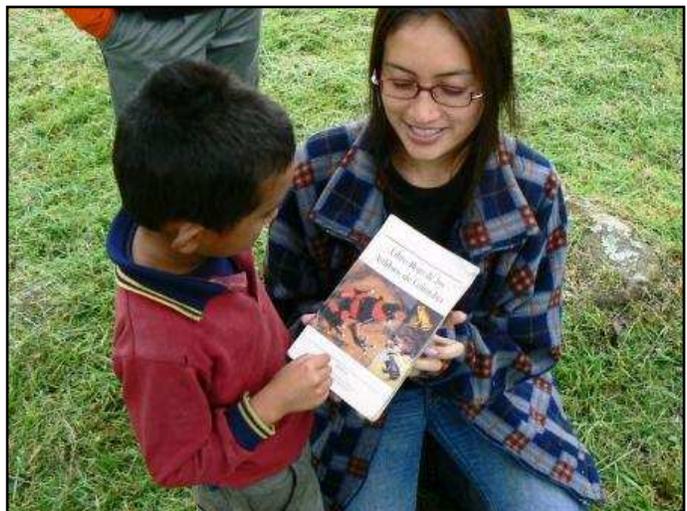
The Channel Caracol TV, the more important of Colombia, This Channel Speak about the new species Golden Frog Supatá and the Project Atelopus

Awareness campaign among local communities in Region Cundinamarca and Awareness campaign among school student and teachers



(1)

(2)





(3)

Awareness campaign in Supatá (1), Albán (2) and Guasca (3)



(1)

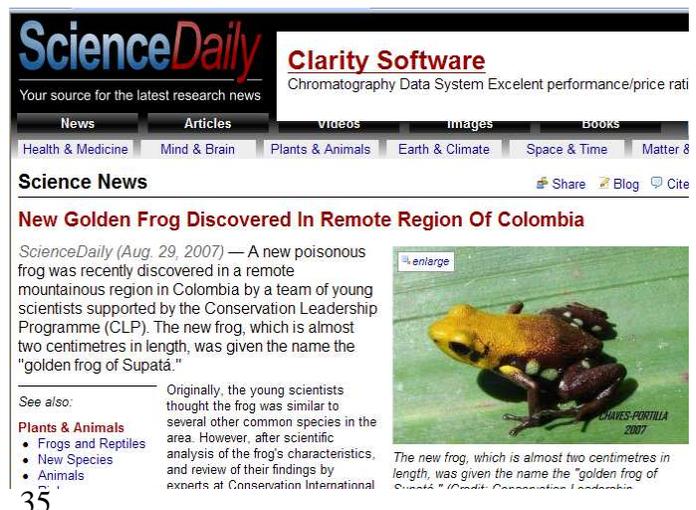


(2)

Awareness campaign among community leaders and conservationists at Universidad Distrital (1) and Feria Internacional del Medio Ambiente (FIMA) Corferias (2)

As part of Project Aim worked hard to increase the public's international awareness regarding the plight of this frogs, inform nationally and internationally the work being conducted and foster a sense of national pride towards the species in the hope of aiding future conservation measures.

<http://news.nationalgeographic.com/news/2007/08/070830-poison-frog.html>





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Science News Share Blog Cite

Harlequin Frog Rediscovered In Remote Region Of Colombia

ScienceDaily (Mar. 15, 2008) — After 14 years without having been seen, several young scientists supported by the Conservation Leadership Programme (CLP), have rediscovered the Carrikeri Harlequin Frog (*Atelopus carrikeri*) in a remote mountainous region in Colombia.

See also:

- Plants & Animals**
 - Frogs and Reptiles
 - New Species
 - Endangered Plants
- Earth & Climate**
 - Rainforests

The critically endangered Carrikeri Harlequin frog was recently rediscovered by the Project Atelopus team in the Sierra Nevada de Santa Marta Mountains in Colombia's Magdalena department. Colombia is one of the world's richest countries in amphibian diversity with more than 583 species. Unfortunately, in the



Carrikeri harlequin frog. (Credit: Conservation Leadership Programme)

Revista ambiental

Catorce, 6°

NÚMERO 1 / AGOSTO A SEPTIEMBRE DE 2007

8 Actualidad
Por qué Colombia decidió jugarla por la modificación manual.

20 Perspectiva
Los códigos de la justicia ambiental indígena en la justicia penal colombiana.

44 Jorobadas
Empieza la temporada de aislamiento de ballenas en el Pacífico colombiano.

74 Cifras en verde
Español. Balance de 30 meses de unión entre alcohol tabacame y gasolina.

EL REFLEJO AMBIENTAL



Mafia
Un tigreillo en Bogotá se consigue por un millón de pesos; un armadillo, por 300 mil, y una tarántula por 80 mil.

Denuncia
El Parque Natural Isla de Salamanca está a punto de convertirse en un parque industrial.

EL TESORO ESCONDIDO DE SUPATÁ



Una nueva atracción para el mundo
 Descubrimiento de *Atelopus carrikeri* en la Sierra Nevada de Santa Marta, Colombia. Este nuevo hallazgo es el resultado de una expedición científica liderada por el equipo de investigadores del Proyecto Atelopus, financiado por el programa de conservación de la biodiversidad de la Universidad de los Andes.

Rana Dorada de Supatá
 Esta especie de rana se caracteriza por su coloración brillante y sus patrones de manchas amarillas y verdes sobre un fondo oscuro. Es considerada una especie altamente vulnerable debido a su distribución restringida y a la pérdida de hábitat en su área de distribución.

Piel
 La piel de esta rana contiene compuestos bioactivos que pueden tener aplicaciones farmacológicas importantes.

Potencial farmacológico
 Los extractos de la piel de esta rana han demostrado actividad antiinflamatoria y analgésica en estudios preliminares.

Tamaño real
 Escala de tamaño para la rana dorada de Supatá.

Ranas en Colombia
 Colombia es uno de los países con mayor diversidad de ranas del mundo, con más de 200 especies registradas.

Especies "hermionito"
 Este tipo de rana es conocida por su comportamiento peculiar de hibernar en cuevas durante meses.

El grupo que la descubrió
 El equipo de investigadores estuvo liderado por el Dr. Juan Carlos Rodríguez y contó con la participación de estudiantes de la Universidad de los Andes.

Bioprospección
 Este hallazgo es el resultado de un programa de bioprospección que busca descubrir nuevas especies y compuestos bioactivos.

18 AGOSTO SEPTIEMBRE 07

Article in environmental magazine where is shown the discovery of the new poison frog found in this project.

**RECOMMENDATIONS FOR AMPHIBIANS IN SPECIAL REGION SUPATA
CONSERVATION AT COMMUNITY AND MANAGEMENT LEVEL**

Supatá is great area for the conservation de amphibians because in this area team discovery new species of the dart poison frogs and local community is interest for conservation the cloud forest and endemic amphibians.

Issue	Approach taken so far	Approach need to be undertaken
Monitoring	5 monitoring units in Supatá and Tena in collaboration with local community and management authority have been formed through this project.	More units should be formed in the entire Supatá valley to monitor the new species amphibians which will work together under a single platform of Fundación Ecodiversidad Colombia.
Local community involvement in amphibians conservation	Local communities have been involving in amphibians conservation through the formed 5 Monitoring Units in this project	Monitoring and protection of the cloud forest SUPATA should be made involving the local communities after detail training to the community's new generation leaders.
Involvement of Department of Environment (CAR) to control poaching and habitat disturbance	Legal protection to the species through Wildlife by the Department of Environment CAR Corporación Autónoma de Cundinamarca	The Department (CAR) and Fundación Ecodiversidad Colombia should be involved in amphibians monitoring SUPATA region. These offices should work together with the local communities of the area.
Protected area	The cloud forest SUPATA stretch is necessary to a legally protected being as a part of conservation from endemic amphibians	All area the cloud forest SUPATA should be declared as Important amphibians Habitats by CAR and any anthropogenic activities should be strictly banned in these Protected Areas.

**Supatá is area key for the conservation the amphibians in
Cundinamarca**

**Prioritized conservation works on amphibians Supatá in Cundinamarca Region
Involving management authority and local community**

Action	How	Output	Otherwise
Involvement of major stakeholders (CAR & community leaders) in conservation actions	Organizing workshops and meetings at management level and community level	a. Legal helps (management) to check by catch from CAR (Corporación Autónoma) b. Involvement of local communities in amphibians & their habitat monitoring	The conservation initiatives will be only wastage of time and money
Establishment of a amphibians Conservation Networks	Formation of amphibians SUPATA Monitoring Units in collaboration with management authority and local communities in the identified Important amphibians Habitats and through networking of all these Units, after detail training to the activists.	a. Information on habitat disturbance and population declining will be updated quickly, based on which site & factor based legal action can be undertaken. b. Close monitoring of amphibians at Supatá.	Habitat disturbance and population declining will continue.
Awareness campaign and capacity building of local people	Organizing workshops at community level and publications on amphibians at Supatá through various media	a. New generations of SUPATA will be more interested in amphibian's conservation. b. The conservation will be a people oriented movements. c. More man-power in amphibians' conservation. d. The anthropogenic disturbances will be decreased	The research and conservation initiatives will not touch the common people of SUPATA and thus will not be a 100% success conservation initiative.

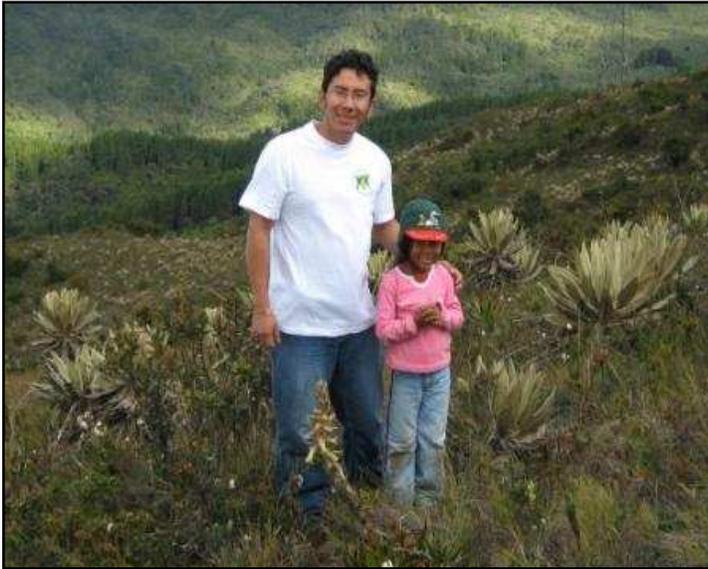
Follow up Activities for PROJECT ATELOPUS AT SUPATA REGION

The follow-up activities will include the following items:

1. Annual monitoring, research in habitat selection, density populations and natural history of *Ranitomeya sp nov*, *Hyloxalus sp nov* and *Bolitoglossa cf pandi* population.
2. Conservation actions will focus on different awareness-raising programs to reach all groups in the communities where the frogs are found and all the stakeholders that use the resources (radio, TV, etc).
3. Recommending the establishment of amphibian conservation zones (Supatá Region) within the Fundación Ecodiversidad Colombia which should ensure the protection of key areas. Furthermore, these designations should afford protect to the watersheds and the fragile tributaries that make up these watersheds where the amphibians are found. Many areas where inhabit the amphibian are under direct human impact and are readily accessed. These activities should be regulated.



PROJECT ATELOPUS TEAM



**Oswaldo Cortés
(Leader team)**

Astrid Nossa and Sergio Pulido



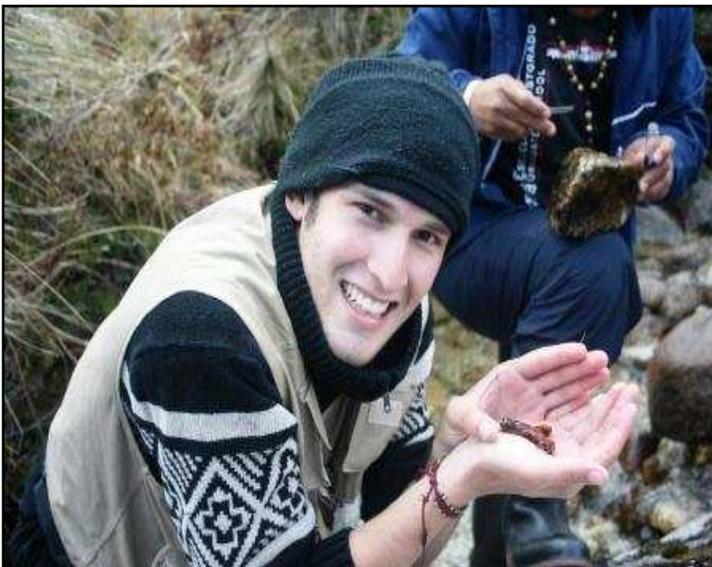
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