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Conservation Status of The Military Frog (Atelopus Balios) In the San Miguel Canton Naranjal Community

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Abstract

The present research focused on the conservation status of Atelopus balios, a species classified in the red list in danger of extinction, the destruction of its natural habitat is the main cause not only of the mentioned species but of all the amphibian fauna existing in the locality intervening in its development and reproduction. Three priority conservation areas were monitored within the locality, all this could be carried out with Geographic Information Systems, capturing the coordinates of identification of species records, and thus be able to interpret each of the data, where more specimens were found establishing areas of interest for the conservation of the species where measures for sustainable management should be implemented.

Keywords: *Conservation, Extinction, Species, Habitat*

INTRODUCTION

*Atelopus balios*species categorized on the red list in danger of extinction is part of the amphibians of Ecuador, one of the richest components in terms of vertebrate fauna, with 513 species formally described (477 Anura, 7 Caudata and 23 Gymnophiona), with approximately 579 species, of which 241 are endemic, making their research and conservation a priority(MAE, 2017). Habitat destruction, pollution, introduced species, emerging pathogens, climate change, are the main threats to these species, which is why 33% (186 species) of amphibians are in risk of extinction categories and, among them, 18 species They are possibly already extinct(Lavilla, 2015).

Amphibians, especially those from temperate climates, have restricted distribution ranges, with defined environmental conditions. Climate change alters these conditions and their populations quickly lose the sites that were ideal for their survival.(MAE, 2017). This situation can cause several species to disappear. Additionally, the increase in temperature has caused numerous water sources to decrease critically, sources that are important in the reproduction of amphibians.(IOM, 2011).

In Ecuador, there are ecosystems and areas of greater sensitivity to climate change due to topography and geographical location, influencing the behavior and reproduction of amphibians (Aguirre, Eguiguren and Maita, 2016). The extinction of species is not a new process on the planet, the geological, geographical, climatic changes the difference with the previously known mass extinctions is that on this occasion the causes point to a common factor, the human(Galarza, 2014).

MATERIALS AND METHODS

The research was of a bibliographic, descriptive and field nature to analyze and interpret, quantitative and qualitative data, the variation, the structure (relative abundance, distribution and variation according to the

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type of microhabitat) of the Military Frog Atelopus balios in the commune of San Miguel. Among the

Coordinates	Height	Number of	Micro habitat	Working day

variables we have the independent variable Habitat / State of Conservation, as the dependent variable we have: Community, Structure, Abundance, Distribution, among the resources used: appropriate clothing, Vernier caliper, digital scale, GPS, camera, cotton thread, map , NEXT.

METHODOLOGY

Four outings were carried out to establish differences in abundance, priority areas for the conservation of the species within the community were identified through geographic information systems, determining two transepts that were sampled: El Rio transept, at 184 ms.nm and Estero Arenas transept. at 280 meters above sea level, each one 600 meters long and 4 meters wide from the slope of the river bank to the sides of each side.

The same effort was used in sampling, that is, for each transept, three days of intensive sampling were invested in daytime hours (10:00 a.m.-3:00 p.m.) and nighttime hours (6:00 p.m.-11:00 p.m.), five daytime hours and five nighttime hours, the name was recorded. scientist of the species, number of individuals captured, coordinates of the encounter site and height where it was located. Data were obtained, the same as those used in the calculation of abundance estimates through the detectability coefficient, which requires data on the total number of individuals seen, intersection of the line, width of the transept and total length of the transept.

Statistic Analysis

Descriptive statistics using Emlen's method, detectability coefficient. Within the procedures for estimating densities based on the count of individuals observed along a route in the study area, estimates were calculated for the relative abundance of transepts 1 and 2 with the following results.

$$d = \frac{n}{2wLK} \qquad k = \frac{1-\sqrt{1-P}}{w} \qquad K = = \frac{0{,}717}{20}\ \mathbf{0.035}$$

$$Q = \frac{23}{25} = \mathbf{0.92} \qquad K = = \frac{1-\sqrt{1-0.92}}{20} \qquad Q = \frac{n\ principal}{n\ total}$$

D: population density, n: number of recorded species, w: transept width, P: average of recorded species, K: detectability of recorded species.

RESULTS

Relative abundance and microhabitat use of Atelopus balios frogs in each of the transepts through direct observation.

Board1. Distribution of the Number of Individuals Registered in the Transept (El Rio) Day and Night Time.

Table 1 shows the record of 25 specimens in total, in the El Rio transept in different microhabitats, day and night shifts, coordinates (UTM), height in meters, number of records, daytime activity is intense since The Atelopus balios species is an amphibian with diurnal habits.

(UTM)		(m)	record		
THIS	*NORTH*				
652382	9694805	168m	1	shore sediment	Daytime
652424	9694807	177m	1	residual layer of leaf litter	Daytime
652459	9694814	178m	1	leaf litter	Daytime
652502	9694839	178m	1	shore sediment	Daytime
652502	9694839	178m	2	aquatic vegetation	Daytime
652540	9694846	185m	1	aquatic vegetation	Daytime
652540	9694846	185m	2	wet rocks	Daytime
651907	9694856	170m	1	aquatic vegetation	Daytime
652616	9694859	184m	1	wet rocks	Daytime
652578	9694860	175m	1	shore sediment	Daytime
651895	9694865	164m	1	wet rocks	Daytime
652538	9694864	176m	1	aquatic vegetation	Daytime
652538	9694864	176m	1	wet rocks	Daytime
651898	9694877	159m	1	shore sediment	Daytime
651898	9694877	159m	1	leaf litter	Daytime
652294	9694880	168m	1	leaf litter	Daytime
652243	9694983	182m	1	aquatic vegetation	Daytime
652598	9694863	199m	2	shore sediment	nocturnal
652328	9694836	168m	1	aquatic vegetation	nocturnal
652284	9694872	168m	1	leaf litter	nocturnal
652277	9694929	169m	1	shore sediment	nocturnal
652277	9694929	169m	1	aquatic vegetation	nocturnal

Relative Abundance

The value calculated to indicate the estimate of the number of individuals within the transept and its surroundings providing the following results.

Relative Abundance of Transept No. 1

$$D=== \frac{25}{(2)(20)(600)(0{,}035)} \frac{25}{696} 0.03591 \text{indv.}$$

Percentages of individuals per microhabitat Transepto El Rio

Microhabitat	Number of individuals present	Percentage
shore sediment	7	28%
Residual leaf litter layer	1	4%
Leaf litter were	4	16%
Aquatic vegetation	8	32%
wet rocks	5	twenty%

In Table 2. It is shown according to the data collected that in (Table 1) the number of individuals present and percentages by microhabitats could be observed.

Coordinates (UTM)		Height (m)	Registry number	Microhabitat	Working day
THIS	*NORTH*				

654236	9695867	281 m	1	aquatic vegetation	Daytime
654220	9695781	276 m	1	leaf litter	Daytime
654203	9695761	276 m	1	shore sediment	Daytime
654172	9695743	276 m	1	leaf litter	Daytime
654142	9695735	276 m	2	leaf litter	Daytime
654136	9695732	276 m	2	wet rocks	Daytime
654125	9695715	277m	1	aquatic vegetation	Daytime
654103	9695718	276 m	1	shore sediment	Daytime
654103	9695718	276 m	1	aquatic vegetation	Daytime
654092	9695709	276 m	1	shore sediment	Daytime
654084	9695692	277m	2	leaf litter	Daytime
654077	9695693	279 m	1	shore sediment	Daytime
654078	9695689	279 m	1	wet rocks	Daytime
654062	9695680	280m	1	wet rocks	Daytime
654052	9695679	280m	1	shore sediment	Daytime
654050	9695673	280m	1	shore sediment	Daytime
654039	9695671	279 m	2	aquatic vegetation	Daytime
654035	9695670	278m	2	aquatic vegetation	Daytime
654043	9695686	279 m	1	shore sediment	nocturnal
654229	9695838	283m	1	aquatic vegetation	nocturnal
654233	9695810	279 m	1	leaf litter	nocturnal
654188	9695748	276 m	1	shore sediment	nocturnal
654188	9695748	276 m	1	aquatic vegetation	nocturnal
654098	9695726	277m	1	aquatic vegetation	nocturnal
654098	9695726	277m	1	wet rocks	nocturnal
654090	9695717	277m	1	shore sediment	nocturnal
654088	9695701	278m	1	shore sediment	nocturnal
654001	9695670	275m	1	leaf litter	nocturnal

Table 3. Distribution of the Number of Individuals Registered in the Transept (Estero Arenas) Day and Night Time.

Table 3 shows the record of specimens found in the Estero Arenas transept where a total of 33 individuals were recorded in the different day and night days. You can see the coordinate (UTM), the height in meters above sea level, the microhabitat where they were observed in this transept, unlike the previous one, a greater record was obtained because we were in front of a less affected area, no agricultural settlements or housing infrastructures were observed.

Relative Abundance in transept 2

The value calculated to indicate that the species is found in a greater or lesser proportion within transept 2 (Estero Arenas), giving the following results:

$$D=== \frac{33}{(2)(20)(600)(0{,}034)} \frac{33}{816} 0.040 \text{indv.}$$

Percentages of individuals per microhabitat Estero Arenas Transept

Microhabitat	Number of individuals present	Percentage
shore sediment	10	31%
Leaf litter	8	25%
Aquatic vegetation	10	31%
wet rocks	5	13%

In Table 4. It is shown according to the data collected that in (Table 3) the number of individuals present and percentages by microhabitats could be observed.

Table 4 shows, according to the data obtained in (Table 3) in the Estero Arenas transept about the record of the species Atelopus balios, the percentage of specimens found according to their microhabitat.

Identification of priority areas for the conservation of the species

Three priority areas were established through geographic information systems in the San Miguel Community for the conservation of (Atelopus balios), taking into account high and medium priority areas, two of these are located in a largely conserved ecosystem, where there is no human activity such as Agriculture and deforestation.

Zone One

In table 5, the El Rio transept had a length of 600 m, which has an abundant population density, a wide agricultural distribution where the highest percentage of the productive areas of the community are mainly specialized in crops. cocoa, passion fruit, banana among others. In the transept it meets important aspects for the conservation of the species, such as high humidity, there is a forest whose canopy reaches 20-25 m high, in general it is an area of semi-open canopies, the vegetation in the bed of the stream presence of herbaceous plants is dominant. (Table 5)

UTM Coordinates WGS84 17 South - Priority Conservation Area

Zone	UTM WGS84 coordinates	Coordinates	
		North (Y)	*This(X)*
The River Transept	Point 1	9694856	651907
The River Transept	Point 2	9694865	651895
The River Transept	Point 3	9694877	651898

Table 5. Zone 1 identification

Zone Two

In table 6, the area was identified in the evaluation of the Arenas estuary transept located at an average height of 260 meters above sea level, which is located in an area far from population settlements and agricultural and forestry activities. In the evaluation of this area, the high density of vegetation was identified. (Table 6).

UTM Coordinates WGS84 17 South - Priority Conservation Area

Zone	***UTM WGS84 coordinates***	***Coordinates***	
		North (Y)	***This(X)***
Estero Arenas Transept	Point 1	9695867	**654236**
Estero Arenas Transept	Point 19	9695838	**654229**
Estero Arenas Transept	Point 20	9695810	**654233**

Table 6. Zone 2 identification

Zone Three

In table 7, zone three is located at an average height of 280 meters above sea level, it was considered high priority, because through the monitoring carried out a considerable number of specimens were found, it also has a high vegetation density.

UTM Coordinates WGS84 17 South - Priority Conservation Area

Zone	***UTM WGS84 coordinates***	***Coordinates***	
		North (Y)	*This(X)*
Estero Arenas Transept	Point 8	9695718	654103
Estero Arenas Transept	Point 9	9695709	654092
Estero Arenas Transept	Point 10	9695692	654084
Transept Estero Arenas	Point 11	9695693	654077
Transept Estero Arenas	Point 12	9695689	654078
Transept Estero Arenas	Point 13	9695680	654062
	Point 22	9695726	654098
Transept Estero Arenas	Point 23	9695717	654090
Transept Estero Arenas	Point 24	9695701	654088

Table 7. Zone 3 identification

Zone	***UTM WGS84 coordinates***	***Coordinates***	
		North (Y)	*This(X)*
Estero Arenas Transept	Point 8	9695718	654103
Estero Arenas Transept	Point 9	9695709	654092
Estero Arenas Transept	Point 10	9695692	654084
Transept Estero Arenas	Point 11	9695693	654077
Transept Estero Arenas	Point 12	9695689	654078
Transept Estero Arenas	Point 13	9695680	654062
	Point 22	9695726	654098
Transept Estero Arenas	Point 23	9695717	654090
Transept Estero Arenas	Point 24	9695701	654088

DISCUSSION

*Atelopus balios*It is a species that is found in natural regions in foothill forest and western montane forest. According to research, this specimen has been found only in four localities in the province of Guayas, in Azuay and Cañar, including the San Miguel community that belongs to it. to the Naranjal Canton, the specimen is categorized as in danger of extinction so its conservation is a priority, its range of distribution is limited, the degradation of its habitat is increasing, which has been deforested, replaced and used by the intensive agriculture and livestock farming within the sector, therefore opting for reparation measures in the sector would be one of the aspects to consider, implementing new agricultural practices intervening in

deforestation activities (Coloma, Frenkel, Felix, Quiguango and Varela, 2018), coinciding with the places where the studied species was found.

The greatest threat to amphibian populations in Ecuador has been habitat devastation. Most amphibian species in Ecuador are subject to the current reality of natural vegetation. (Bustamante and Ron, 2010). Vegetation forest exchanges in general have been replaced by agricultural extensions or pasture settlements, which generates local extinctions of species adapted to living in the area.(Clinton N., 2014). According to research in our country, 43% of the vegetative area has been destroyed, the rate of deforestation is increasing, it is estimated that by this year in Ecuador 50% of its natural vegetation cover will have been eliminated, which is very worrying in terms of habitat devastation and the irreversible effects that this situation would have on the species and environmental deterioration in general (Merino Viteri, Coloma and Almendariz, 2010).

In the coastal area of Chile, crop areas have expanded, which could be one of the reasons for the decline of the amphibian population. In some cases, the effects on amphibian populations are very evident, showing a level of mortality. mass of frogs. This is attributed to human variation in water systems, and even a viable impact such as global warming (Correa, Donoso and Ortiz, 2016), a similar situation to the problems present in the conservation status of Atelopus balios. 40% of species are in danger of extinction. The main threats they face are related to the loss and deterioration of habitat, pollution, invasive species, overexploitation of resources, infectious pathologies, as well as global pollution. Defense of the care and conservation of amphibians is an urgent task due to their functionality in nature and is of enormous importance for the balance of the ecosystem, since their ecological and biological properties contribute positively to human beings in health and environmental environments. eating of food(Pineda Arredondo, 2010).

CONCLUSIONS

The species is affected by several factors such as the destruction of its habitat, the proximity of human settlements, agricultural expansions that directly or indirectly affect the species by intervening in its development and reproduction, deforestation that alters the conservation of the species. within the community.

Three priority areas were identified for the conservation of the species within the San Miguel community, each of them has been chosen for different aspects, such as the density of the vegetation, fewer human settlements, low percentage of presence of agricultural areas, areas where deforestation is not observed, and a greater number of registered individuals.

In the El Rio transept, fewer species could be identified; however, a priority area was identified within this transept, which was identified due to its isolation from human and agricultural settlements with a very considerable density of vegetation.

In the Estero Arenas transept, a greater number of records could be viewed, because we were in a less exploited area and used in activities within the sector such as agriculture and tree felling. In this area, two areas considered considered were identified. As priorities, like the previous area, these were identified by the same aspects and also by the density of registration.

Recommendations

Reduce disturbances to conserve the habitat and the area of influence of priority areas in order to conserve the species, especially during reproductive periods.

Increase sustainable agricultural practices to reduce the impact on the environment and the natural habitat of the species.

Develop an environmental training and teaching program, aimed at the entire community, in order to obtain greater results in the conservation of the fauna involved.

REFERENCES

Aguirre, N., Eguiguren, P., & Maita, J. (2016). Vulnerability to climate change in the southern region of Ecuador: Potential impacts on ecosystems, biomass production and water production. ResearchGate, 29(9), 99-102. Retrieved from https://www.researchgate.net/publication/298753988_Vulneribilidad_al_cambio_climatico_en_la_region_sur_del_Ecuador_potenciales_impactos_en_los_ecosistemas_produccion_de_biomasa_y_produccion_hidrica

Bustamante, M., & Ron, S. (2010). Changes in Diversity in Seven Anuran Communities in the Andes of Ecuador. Biotropica, 183-186.

Clinton N., J. (May 22, 2014). PNAS. Retrieved from file:///C:/Users/USER/Downloads/Jenkinsetal2013PNAS-earlyedition.pdf

Coloma, L., Frenkel, C., Felix, C., Quiguango, A., & Varela, A. (Tuesday, June 2018). BIO-WEB. Obtained from https://bioweb.bio/faunaweb/amphibiaweb/FichaEpecie/Atelopus%20balios

Correa, C., Donoso, JP, & Ortiz, JC (2016). State of knowledge and conservation of amphibians in Chile: a synthesis of the last 10 years of research.In Evolutionary Biology, Biodiversity and Taxonomy(pp. 103-105). Conception.

Galarza, V.O. (2014). Species in extinction (Ecuador Megadiverse). Biodiversity, 10(3), 89-94.

Lavilla, EO (2015). Threats, danger and extinction of Argentine amphibians. Square hertope, 25(1), 59-85. Retrieved from http://sedici.unlp.edu.ar/bitstream/handle/10915/6348/Documento_completo.pdf?sequence=1&isAllowed=y

MAE. (April 24, 2017). Ministry of the Environment. Obtained from http://www.ambiente.gob.ec/ecuador-es-el-pais-mas-diverso-en-epecies-de-anfibios/

Merino Viteri, A., Coloma, LA, & Almendariz, A. (2010). Studies on Andean Frogs of the Genera Telmatobius and Batrachophrynus Anura: Leptodactylidae. QUITO: Monogr. Herpetol.

IOM. (2011). Migration and climate change. In Migration and climate change (pp. 23-29). International Organization for Migration.