

***2010 Cyclura ricordi* Conservation Activities for the Dominican Republic**

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Introduction

Ricord's Iguana (*Cyclura ricordi*) is considered Critically Endangered according to the IUCN Redlist. The species is endemic to Hispaniola and it is considered a flagship species in a “hotspot” region of high biodiversity and endemism. *C. ricordi* has a very limited, disjunct distribution in the southern central part of the island. Only four subpopulations remain and the total range of occurrence of the species is under 100 km². Three subpopulations are found within the Jaragua-Bahoruco-Enriquillo Biosphere Reserve in the Dominican Republic. A fourth one – the smallest and most threatened – is in Haiti (see report Dr. Masani Accime)

Of the three subpopulations mentioned, only the one on Isla Cabritos is not facing direct human pressure. It is situated within the National Park Lago Enriquillo on an island surrounded by water. This water barrier affords effective protection against both man and feral animals.

In the Pedernales area the main threat for the species comes from destruction of habitat related to agricultural activities combined with issues regarding land tenure and ownership and illegal occupation of government lands including terrains within the Jaragua National Park. Nesting sites are especially under pressure because they are generally located in fertile soil depressions – rare in this part of the DR – and are desirable for conversion to agricultural land.

Charcoal burning is the major threat facing the iguana population on the southern shore of Lake Enriquillo, and is causing serious habitat destruction. This illegal activity also brings along strong persecution pressures – charcoal burners frequently hunt and eat iguanas - which has exterminated a significant number of adult iguanas in the last few years. Only a small part of this subpopulation lies within the borders of the National Park Lago Enriquillo, another nucleus zone of the Biosphere Reserve. For the rest of the area a protected area of the category “Refugio de Vida Silvestre” (wildlife refuge) was proposed by Grupo Jaragua in 2008 which is still awaiting its implementation by the Ministry of Environment.

The following report looks at the activities undertaken by our team during 2010.

Monitoring of Reproduction

In 2010 we have again monitored nesting areas of the 4 major fondos in the Pedernales area. We have now data on nesting and hatching for seven years. Table 1 shows the results for Ricord's iguana. A total 183 nests were marked and coordinates taken with GPS. Of these nests 2 could not be found during hatching season and 6 nests, although spotted, did not present an emergence hole. 174 of the marked nests eventually did show an emergence hole, and hatching success was calculated as 95.8%. During the hatching season an additional 138 emergence holes were found which brings the number of total nests hatched up to 298. This represents an average of 15 nests per ha.

Table 1: Nests of *Cyclura ricordi* in 2010

Place	area fondo (ha)	area transect (ha)	Nests							
			nests marked	Nests not found	Emergence hole not found	Marked and hatched	% nests hatched	non -marked hatched	Total nests hatched	nests hatched per ha
Fondo de la Tierra	10.3	-	72	1	-	71	98.6	75	146	14.3
Fondo de la Malagueta	47.1	4.2	79	1	2	76	96.2	55	131	31.2
Fondo de Robenson	25.1	4.3	11	-	1	10	90.9	8	18	4.2
Fondo de la Jinagosa	0.6	-	5	-	2	3	60.0	0	3	5.0
Total	-	-	167	2	5	160	95.8	138	298	15.4

Table 2 shows the results for *C. cornuta*. A total of 22 nests was marked in the four study areas. 20 nests were found with emergence holes during the hatching season. 13 additional emergence holes were also detected, which brings the number of nests hatched up to 33. An average of 1.7 nests per ha can be calculated.

Table 2: Nests of *Cyclura cornuta* in 2010

Place	total area (ha)	transect area (ha)	Nests							
			nests marked	Nest not found	Emergence hole not found	Marked and hatched	% nests hatched	non -marked hatched	total nests hatched	nests hatched per ha
Fondo de la Tierra	10.3	-	15	-	1	14	93.3	12	26	2.5
Fondo de la Malagueta	47.1	4.2	0	-	-	0	-	-	0	0
Fondo de Robenson	25.1	4.3	7	-	1	6	85.7	1	7	1.6
Fondo de la Jinagosa	0.6	-	0	-	-	0	-	-	0	0
Total	-	-	22	0	2	20	90.9	13	33	1,7

Table 3 and 4 show the combined results of all 4 study areas over the last seven years for *C. ricordi* and *C. cornuta* respectively. For *C. cornuta* the number of total nests hatched over the last four years has been very consistent and has remained low (around 30 nests). In the case of *C. ricordi* the number of hatched nests has moved up over the six year period. It may still be too early to talk about a positive trend. We will await the next years outcomes to see if the future results will actually keep the upward direction. This year the raining season started already during nesting season and the actual number of nest found and marked was less than last year. Rain quickly erases the typical structure and appearance of the nests, so often they are overlooked. This resulted in much higher number of emergence holes of unmarked nests found during hatching season than the years before.

Table 3: Total nesting results of *C. ricordi* for 7 year period

Area: 19.4 ha		Nests						
year	nests marked	nests not found	emergence hole not found	marked & hatched	% nests hatched	non-marked hatched	total nests hatched	Nests hatched per ha
2004	208	5	20	183	88.0	15	198	10.2
2005	166	1	14	151	91.0	27	178	9.2
2006*	214	5	23	186	86.9	51	227	11.7
2007	194	3	13	178	92.4	41	219	11.3
2008**	251	7	34	210	83.6	9	219	11,3
2009	183	3	6	174	95.1	56	230	11,9
2010	167	2	5	160	95.8	138	298	15.4

* vegetation was destroyed in Fondo de la Tierra before nesting season

** torrential rains and flooding of fondos end of august 2009

Table 4: total nests hatched *C. cornuta* in monitored fondos for a seven year period

Area:19.4 ha		Nests						
year	nests marked	nest not found	emergence hole not found	marked & hatched	% nests hatched	non-marked hatched	total nests hatched	Nests hatched per ha
2004	23	0	0	23	100	5	28	1.4
2005	25	0	3	22	87.0	2	24	1.2
2006*	17	0	2	15	88.2	3	18	0.9
2007	32	0	3	29	90.6	3	32	1.6
2008**	33	1	0	32	97.0	1	33	1,7
2009	31	0	0	31	100	2	33	1,7
2010	22	0	2	20	90.9	13	33	1,7

* vegetation was destroyed in Fondo de la Tierra before nesting season

** torrential rains and flooding of fondos end of august 2008

Monitoring of hatchling predation and survival using cameratraps and radiotracking

The monitoring of nesting activities in the Pedernales area over the last seven years has shown a constant nesting and hatching success with a high percentage output of hatchlings. Last year we put up a Reconyx RC 55 in various places to find out more about the possible predation of hatchlings of *C. ricordi* as well as *C. cornuta*. The results of this first pilot study were very promising leading to the conclusion that actually feral cats seem to be the major predator of hatchlings. Cats seem to be well aware of the time when hatchlings dig their emergence holes and come to the surface. They can be found patrolling and revising nesting grounds regularly during hatching season.

This year we wanted to expand the activities and include the nesting season as well. We put up two Reconyx RM 45 cameras in the Fondo de la Malagueta in early April. Two weeks later the cameras were gone. We started an intensive investigation in Pedernales and were able to retrieve the cameras. They had been taken by iguana hunters who had passed through the Fondo de la Malagueta.

The recovered cameras were still in good working condition and the photos taken by the cameras showed promising results (see figure 1).





Figure: Parts a sequence of a female *C. ricordi* excavating the tunnel of a nest

Due to the uncertain situation of people passing through the Fondo de la Malagueta it was not safe to put cameras up again. We decided not to continue with the experiment in this place.

Starting end of September we installed 6 camera traps around an old abandoned charcoal pit used by *C. cornuta* as nesting ground. The area is close to the small rural community Los Tres Charcos. The pit measures about 500 m². The ground of the pit consists of sandy clay with a high amount of limestone pebbles and stones, The color of the soil is darkened by a high content of charcoal. The pit is surrounded by coral reef limestone which holds a vegetation typical for the transitional forest of the zone with a nearly closed canopy between 5 and 10 m and some individual trees reaching the height of about 15 m. We counted a total 16 emergence holes which eventually were opened up during a 4 weeks time.

The camera traps took very interesting photos. Two feral cats visited the pit regularly (see fig. 2). Also a Hispaniolan racer (*Haitiophis anomalus*) with a size of at least 2m was captured digitally on several occasions (see fig 3 and 4). This snake is considered very rare. Little is known about the species. In the case of the charcoal pit it was actively foraging and looking for iguana hatchlings.



Figure 2: Cat with iguana hatchling in its mouth

The use of camera traps is a very efficient tool to document iguana activities. Next year we plan to survey the whole process of nesting and hatching for *C. cornuta*. A good place will be the mentioned charcoal pit. Due to its communal nesting strategy during a short time period of the year the species is an ideal object to be studied. We have not forgotten *C. ricordi*, but we have to consider a safe place there this can be done. We are planning to do intensive surveying for nesting grounds on the southern shore of Lake Enriquillo next year. There the positioning of the cameras should be safer. One little flaw has the use of camera traps. The PIR system used to detect temperature difference and movement, does not detect iguanas coming out of their dens or hatchlings leaving the emergence holes. The difference between ambient temperature and the body temperature of the animals does not seem to be enough to trigger the release mechanism of the cameras.



Figure 4: Sequence of an encounter between cat and snake



Figure 4: Sequence of a snake investigating an emergence hole.

In addition to using camera trapping we also started a program of radio tracking hatchlings. The objective of this program was to train field assistants in the use of the tracking equipment and to get basic data on hatchling predation and survival of *C. cornuta* with the intention of applying proven procedures in the following years on the critically endangered species *C. ricordi*.

We started out with 10 hatchlings which were obtained from different nests with freshly opened emergence holes. ATS transmitters type R 1062, weighing 1.3 gr each, were glued to the inguinal region of the hatchlings. Each was weighed and SVL and tail length measured. Originally we intended to use eye-lash glue as proposed by WAGNER and GERBER (2010), but we were unable to find an adequate source. Therefore we applied cyanoacrylate gel for transmitter attachment as described by GOODMAN (2005). The hatchlings were released at the charcoal pit.

The majority of individuals of the first batch of 10 hatchlings lost their transmitters all with dry skin attached after only a few days. Only two did not fit into this category. These two hatchlings were actually shedding their skin while being fitted with the transmitter. We were able to follow these two individuals for a longer time period. In a communication Tarren Wagener mentioned that actually the skin shedding shortly after emergence might be the problem that the radios detached so quickly. Could it also be that the cyanoacrylate glue is causing skin irritation and is leading to premature shedding?

All the shed radios were recovered and were fitted then to a second batch of hatchlings. These were hatchlings we kept until their skin started to shed and then the radios were attached. The newly attached transmitters kept for a longer period.

Presently we are analyzing the data with GIS. Here we give some of the preliminary results:

Feral cats may be the major cause of predation. We found several detached transmitters with rests of iguana hatchlings at the side: tail, stomach, flesh. Two boas (*Epicrates striatus*) swallowed hatchlings. Boas seem to pick up hatchlings in the trees as opposed to the Hispaniolan racer which pursues them on the ground. After leaving the emergence hole hatchlings seem to spend most of the time in vegetation above ground level. Only to advance (and this very fast and far, up to 500m a day) they leave the trees and bushes to come down to the ground. The furthest distance which we were able to track a hatchling was about 1.5 km.



Figure 5: *C. cornuta* hatchling with transmitter attached. (Photo Arne Drescher)



Figure 6: Hatchling in a tree (very seldom were they so easily detected) (Photo Arne Drescher)



Figure 7: Small boa digesting a hatchling including transmitter (photo Arne Drescher)



Figure 8: Detached transmitter with dry skin attached. (photo Arne Drescher)



Figure 9: Hatchling with transmitter already detached (photo Arne Drescher)



Figure 10: typical vegetation in the study area



Figure 11: Jairo Arache, field assistant from Los Tres Charcos, tracking a hatchling



Figure 12: Gerson Feliz, field assistant from Los Tres Charcos, preparing a camera trap (photo Arne Drescher)

Multiple training courses were held for the local field assistants in appropriate use of camera-traps and telemetry in monitoring the species. They were also trained in data collection and basic maintenance of the equipment. A total of 6 persons from OJAA, Anse-a-Pitres, 2 from CIELO, Duvergé and three from Oviedo as well as 2 members of the German DED participated in the training and actual execution of the program.

Monitoring and surveillance activities in the Pedernales and Southern Shore of Lago Enriquillo

The problems which are confronting *C. ricordi* were shortly mentioned in the introduction. For the two subpopulations in question a monitoring plan has been elaborated (see fig. 13) to prevent further deterioration of iguanas' habitat and to be able to react quickly on the appearance of possible threats.

The execution of the surveillance activities is in the hands of the local support groups. Regular patrolling by members of these groups prevent illegal land occupation, establishment of charcoal production and agricultural conversion of the limited nesting areas. Sustained removal of snares from the entrances of dens restrains iguana hunters from continuing their destructive activities. Integrating local people into the monitoring process of critical habitats is a low cost effective conservation tool that also helps to improve the economy of the persons involved. Frequency of surveillance activities, routes and procedures have been defined with the local support groups. Members of the support groups are being trained in the use of GPS, camera, recording procedures and elaboration of reports. In the region of the southern shore of Lake Enriquillo we are also mapping the areas impacted by charcoal production. Data for this comes from the same survey we are doing on density/abundance (see paragraph on estimating density/abundance).

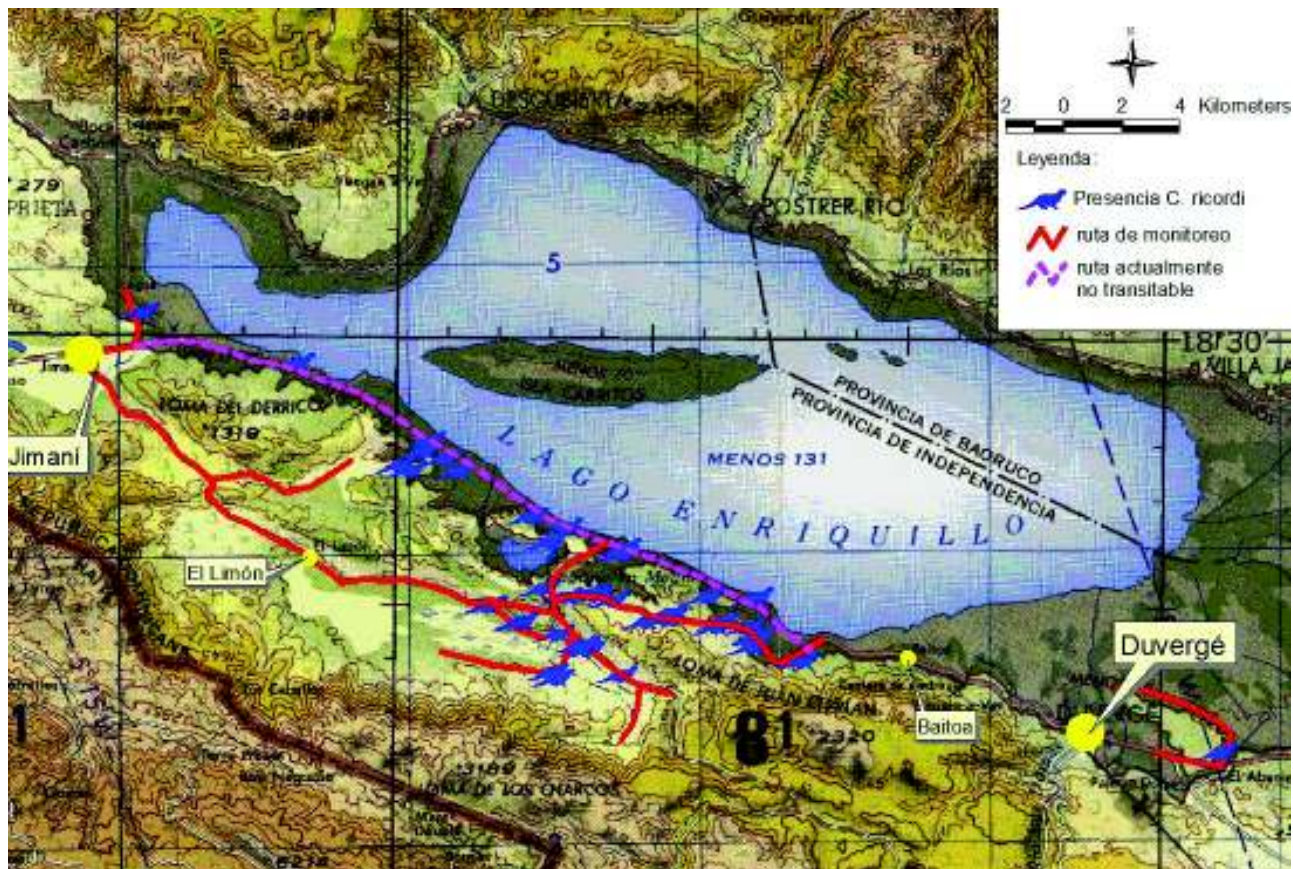


Figure 13: Map of surveillance routes for the southern shore of Lake Enriquillo

In the Pedernales area we have seen an increasing activity of people trying to occupy illegally government land during 2010. This touches also the zone where Ricord iguanas are present. Several groups of occupants have formed in the town to take part in activities to cut aisles through the vegetation and mark trees with paint to emphasize their supposed claim of the land. Some land surveyors have been measuring terrain. We even found a surveying mark within the Fondo de la

Malagueta (fig. 14). The driving force behind these activities is a speculative interest. Pedernales has received some government attention lately with the promise to develop tourism on a larger scale. The present land occupation activities are of speculative nature in the sense that the people trying to occupy land are hoping to sell it at a good price later to developers or mining companies. We have been in close coordination with the Jaragua National Park administration and provincial office of the Ministry of Environment to prevent a further deterioration of the situation.

José Luis, our field assistant from Pedernales, has resigned last month. His argument for not continuing with his work was that he had found a better job opportunity. We doubt that this is the real reason. We suspect that he has succumbed to the pressure of his father being one of the leaders of the land occupation movement.



Figure 14: Land surveyor's mark in fondo de la Malagueta

On the southern shore of Lake Enriquillo the situation has improved and the threat of destruction of habitat and persecution due to charcoal production has been reduced. The newly formed monitoring team under the leadership of the two field assistants from the local support group CIELO, Anibal Volquez y Jerbin Volquez, has received a thorough training in procedures and routes. It has been active looking for newly established charcoal pits and has been removing snares from dens. They are in contact with the local authorities from the forestry department to remove any newly established charcoal pits. We have revised the area at the end of October and did not find any major problems. We are hoping that the team can keep up the good work.

The second threat lingering about is the proposal to establish agricultural projects within the Ricord territory for the people who have lost their land due to the rise of the water level of Lake Enriquillo (see update 2009). Grupo Jaragua's proposal to declare the area as a Wildlife Refuge has not been taken up by the Ministry of Environment. Menelio Herasme, leader of the CIELO group, has launched a new initiative to declare the area as a Municipal Protected Area and to look for alternative indemnification concepts concerning the affected farmers. He has been lobbying with the new mayor of Duvergé to advance the project and we have supported him with the necessary information and facts.

Land purchase

Due to the donation of an anonymous supporter we have been able to buy Fondo de la Tierra, the second largest nesting ground for *C. ricordi* in the Pedernales area. We not only acquired the fondo which measures about 10 ha, but we were also able to create a buffer zone between the fondo and the



Figure 15: Our three field assistants at the entrance to Fondo de la Tierra



Figure 16: Typical part of Fondo de la Tierra with adjacent cliffs

next property which holds a plantain plantation. The buffer zone comprises an additional 10 ha. Owing the land is the best guarantee to be able to maintain the fondo for conservation purposes. This year we counted 146 hatched nests in the fondo. The females nesting in this area actually come down from cliffs that are surrounding the fondo. In 2006 the vegetation was removed by bulldozers and about 40 active iguana dens were destroyed. The person responsible for this had recently bought the property and intended to plant plantains. Only the opposition of Grupo Jaragua stopped the activity, but it was not certain that another intent would be made to use the fondo for agricultural purposes. While females continued nesting during the following years, the individual iguanas which have had dens in the fondo did not return or may have been even killed during the destruction in 2006. Finally in 2010 we have seen the first active dens again. We hope that in the coming year the population of iguanas residing in the fondo will increase.



Figure 17: Team of field assistants excavating a hatched nest in Fondo de La Tierra

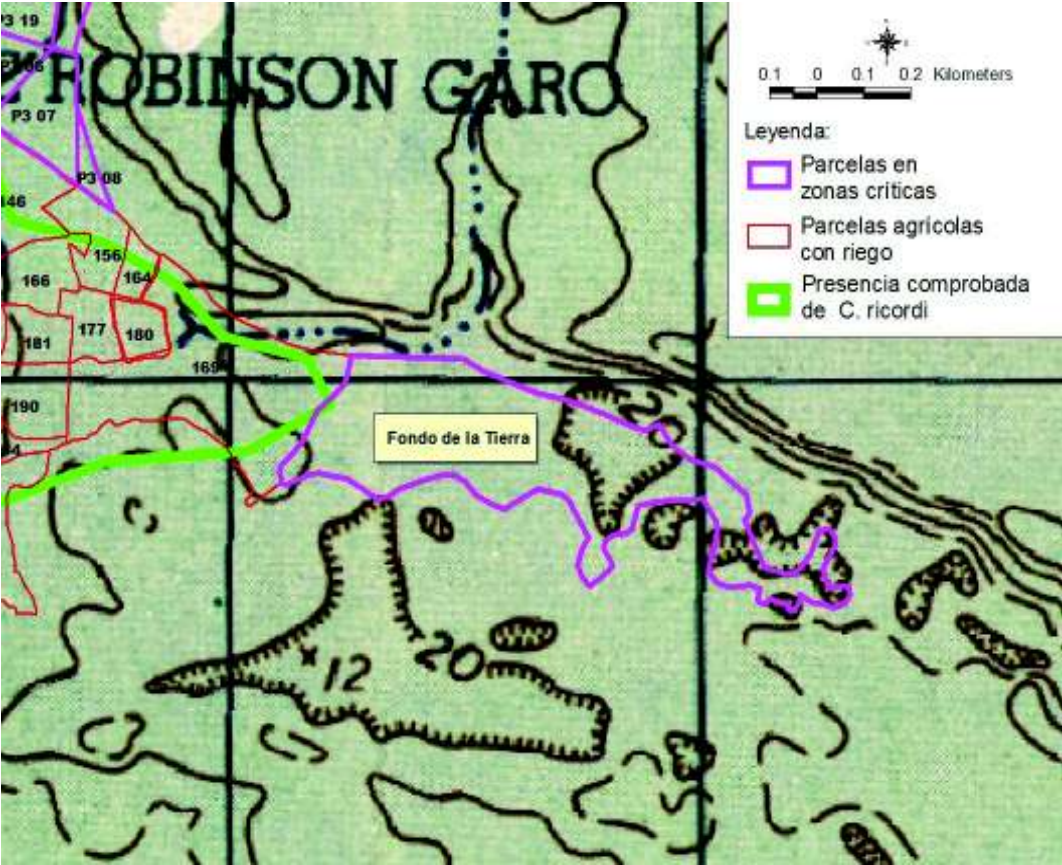


Figure 18: Map of Fondo de la Tierra

Estimating abundance/density of adult animals in the Pedernales and Lago Enriqueillo area:

Up to date we have no reliable estimate of the actual number of Ricord iguanas. In the wild Ricord iguanas are very shy and disappear rapidly when humans are approaching. The terrain where they can be found is difficult to penetrate due to dog-tooth limestone outcrops in some parts and big blankets of a cholla-like cactus (*Cylindropuntia caribaea*) in others. This makes estimating numbers of iguanas difficult by using and walking transects. We thin it is more practical to use an indirect method and base estimate on non moving objects.

Our estimation of abundance/density is based on using active iguana dens as a measure of presence of the species. Adult Ricord iguanas seem to stick in a quite reliant fashion to their dens. Dens are easily detectable. We are using random sampling within defined stratum (vegetation cover, ground conditions). We have started to sample plots in the Fondo de la Malagueta in the Pedernales region and also have worked several plots on the Southern shore of Lago Enriqueillo. The position of dens inside each plot is recorded with GPS. Dens are classified according to activity. The number of active dens per plot will give an indication for abundance. We have been able to acquire Spot satellite photos which we will used to define the extension of each stratum. Based on the extension of each stratum and the average density of plots derived for each stratum we will arrive at a more reliable estimation. In the area of the southern shore of Lake Enriqueillo the extension of the charcoal problem is being measured by registrating all former and recent charcoal pits with GPS.

Our field assistant from Los Tres Charcos are doing the work in the Pedernales area. The monitoring team from CIELO, Duvergé is active on the Southern Shore of Lake Enriqueillo. We have been able to integrate two unviuersity students, Liz Adebio and Rosanna Carreras, from Santo Domingo in the project. The contact has been made through Dr. Yolanda Leon who is teaching at the INTEC university. The two students will be working on their thesis. Rosanna Carreras on genetics of both iguana species, while Liz Adebio will pick up the part on density/abundance for *C. ricordi*. The integration of these two students is very important, not just in the sense of getting answers to important scientific questions, but hopefully to have more people with an academic background getting involved in the conservation of Ricord's iguana.



Figure 19: Active Ricord's den within an older excavated den. Note the fresh tale drag in the center.

Acknowledgment

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