The red-billed curassows are persisting in the wild



A male red-billed curassow in the wild, released in September 2007 at REGUA.



Christine Steiner São Bernardo REGUA - Reserva Ecológica de Guapiaçu CP 98112, CEP 28680-000, Cachoeiras de Macacu, RJ, Brazil <u>christinesteiner@yahoo.com</u>

October 2007

CITATION

Bernardo, C.S.S.

The red-billed curassows are persisting in the wild / Christine Steiner São Bernardo - - Reserva Ecológica de Guapiaçu, Cachoeiras de Macacu, RJ, Brazil, October 2007.

3rd Internal Annual Report to Brazilian Atlantic Rain Forest Trust (BART, London, UK).

1. An overview of the Red-billed curassows' status at REGUA

From August 2006 to September 2007, 28 red-billed curassows were reintroduced at REGUA (15 females and 13 males) (Table 1). 46% of the birds are being monitored, 32% died and 11% of the birds are lost (we can't find signal) (Figure 1).

Groups	Reintroduced	Reintroduced	Deaths	Deaths	Signal loss	Signal loss
	9	S	9	S	Ŷ	8
August 2006	3	3	2	1	1	1
October 2006	4	3	0	0	0	0
November 2006	3	4	2	1	0	3
March 2007	1	1	0	1	0	0
September 2007	4	2	1	1	0	1
Total	15	13	5	4	1	5

Table 1. Status of the reintroduced red-billed curassows at REGUA



It is important to notice that local hunters are avoiding to poach the red-billed curassows. Just one female was killed by a hunter; the hunting effects are indirect, because the birds can be used to baits (change of behavior) and also can be captured and hurt by some traps (usually used to capture opossums, lizards).

Dogs have been seen less frequently nowadays than in last months (Figure 2). Dispersal, movement of the red-billed curassows and mortality are described in the next items.



Figure 2. Number of dogs seen in trails at REGUA per month.

The sixth group will be brought to REGUA from Crax Brasil in the end of October 2007 (5 couples red-billed curassows), as we have already the transportation license. We also expect to acquire a transportation license to bring four males and 1 female (because in September 2007, 6 were released, and we need 4 more), as well as a transportation license for 5 females and 4 males (substitutes of the dead ones), to achieve the aim of the initial project: to have 20 couples of red-billed curassows free at REGUA's Atlantic Forest.

- Alive birds
 - 1) How far are they from the release site?

The alive birds released in September 2007 are around the release pen (number 20 and 23), except for female number 6, which hasn't visit the feeders outside the release pen (Figure 3). In Figure 3 we can see when each bide was released (first date in X axis) and if/ when they stopped (y = 0 meters) to feed on supplementary food we put *ad libitum* in the feeders outside the release pen. For instance, the male number 31 returned to the release pen in 4th October 2006 (Figure 3). The supplementary feeding act as a spatial reference for red-billed

curassows. Figure 3 provides us the answer for an interesting question: how long have these birds stayed around the release site after being released in the wild?





Figure 3. The graphics show the distances (in meters) from each location of the current individuals at REGUA in relation to the release pen (when Y=0m, the free bird is around the release pen).

2) How many birds dispersed successfully?

To detect if and when the dispersion of the red-billed curassows occurred, we used Ranges $7^{\text{(B)}}$ software. But how to decide the value of the distance that dispersal occurred? This is subjective. So, to minimize subjectivity in this analysis, the value was selected based on the average of the maximum distances each curassow reached in relation to the release site: this value is 2km. So, we assume that a red-billed curassow had dispersed when it reached a minimum of 2km away from the release pen.

Of 28 red-billed curassows, 18 dispersed (10 females and 8 males). Two females and two males died before dispersion occurred (one couple released in November 2006 and other couple in September 2007, no one in reproductive age).

In Figure 4, we can see that the reintroduced males at REGUA dispersed quicker than females (in average 25 days before females), but this is not a big difference and we can generalize that the red-billed curassows dispersed after an average of 94 days (or 3 months) after the release day.



Figure 4. Mean of days that reintroduced males and females dispersed at REGUA.

By looking at the Figure 5, we realize that there is no difference in days until dispersion, when we compare difference between groups (curassows released at different months of the year - August 2006, October 2006 and November 2006, respectively).



Figure 5. Mean of days that each group, released at different months, dispersed at REGUA.

In the other hand, if we compare the alive birds and the currently dead ones, represented in Figure 6 we realize that the currently dead curassows dispersed significantly quicker than the birds that are still alive (ANOVA one-way, F= 11.36, p=0.005). So, the individuals that dispersed slower present higher probability to survive. In fact, individuals that know and recognize the area have more chances to escape from predators, find food etc.



Figure 6 Mean of days that reintroduced curassows have dispersed, in relation to its current status at REGUA (Y= log days before dispersion).

Signal loss

The signal of 3 males was lost before dispersion occurred (two released in November 2006 and one released in September 2007). In this case we suspect tag detachment (see the item 'tag detachment').

Recently, the male number 18, which presents directional movements to southeast, not only reached Cachoeiras de Macacu city, but also left it behind! This curassow is accompanied by the male 8 and they were released with a difference of 2 months in 2006. Since August 20th 2007 they had been in a locality named Morro João Paulo, recently acquired by REGUA. A fire broke out in some adjacent areas in 21 September 2007 (Figure 7 and both birds moved to an unknown place in the same day. Soon, we will look for these red-billed curassows on the way to Nova Friburgo (Figure 8).



Figure 7 The males number 8 and 18 had moved to an unknown place recently, in the same day fire broke out near the region they were.



Figure 8 Ring number of each red-billed curassow which signal was lost (see text). The red arrows show the direction each 'lost' red-billed curassow was seeing in the last time it was located or signal listened; the little red circle shows the location of the release pen; the orange circle represents the region of REGUA; Três Picos state park is delimited by the yellow contour line.

To help us on tracking the red-billed curassows that dispersed long-distances, a vehicle was acquired (Figure 9).



Figure 9. The new integrant of the curassow team. This is 'Primo – The Great', a VW beetle recently acquired to help Christine and Vanice on tracking the red-billed curassows.

• Tag detachment

The transmitter is attached to the animal body by a Teflon ribbon tissue and silicone tube inside the tissue, to provide limited elasticity when the animal flies or move its wings.

The knot is glued with Super Glue®. Although it is difficult to have tag detachment (accidentally the transmitter can fall down the animal), it is not impossible. All the alive redbilled curassows we suspect that detached their tags are male (3 individuals, or 23% of all males and 11% of all the reintroduced red-billed curassows) (Figure 10). Only one tag was encountered (March 2007) and the tissue was ragged (Figure 10). The other two transmitters were not found, although we could determine a circle of 3m diameter where the tag was (the signal was very strong). In both situations (one in February 2007 and other in October 2007), a river and embankment were present, as well as trees with roughly 20m height.



Figure 10. This is a transmitter we suspect it fell down on the floor in March 2007. We can see in detail both extremities of the Teflon ribbon tissue that was found ragged.

2. Accuracy of the locations

It is always helpful to analyze if the red-billed curassows are being located accurately. Figure 11 shows that the majority of the locations has polygon errors <1 ha. In Figure 12 we can see that from September 2006 to February 2007 the locations were highly accurate (error <1 ha). Between February and May 2007, the locations were less accurate and nowadays the accuracy increased.



Figure 11. This graphic shows that the majority of the locations presents a polygon error size <1ha.



Figure 12. The mean polygon error size per month.

By not considering the months when equipment was broken, we can conclude that the red-billed curassows are usually monitored at an average of 15 days per month or 4 times per week (Figure 13). Is it enough, too much or too few? In telemetry projects, we have to pay attention on the frequency we must get data. According to many authors, too much data is useless and too few also. If we collect data continuously and the individual has not time to move to other place, we collect dependent and spatially correlated data. This certainly bias

home range size. What interval would be appropriate to record the location of each individual?



Figure 13. Mean of monitored days per month and per week. The black circle indicates equipment failure.

So, that's why there is an analysis where we calculate 'Time to Independence', provided by Ranges 7[®] software. According to the output of autocorrelation analysis, the majority of the alive red-billed curassows have not reached independence (so all locations are dependent and some locations may be discarded to assess home range size).

There are three males that presented time to independence (Table 2): the male 34 has independent locations every 2 days (46.5 hours), the male 5 has independent locations every 4 days (96.6 hours) and the male number 28 every 8 days (194 hours). This suggests sampling the red-billed curassow data at these intervals.

		TTI	
ID		(hours)	plot time
	5	96,61	144
	34	46,5	168
	28	194,2	216

Table 2. Some male red-billed curassows reached time to independence.

3. Diet of the red-billed curassows

The movement patterns of the red-billed curassows may have relation to environmental features. They may avoid or walk through regions, depending on the relief, availability of water, availability of forest corridors, fruit availability etc.

As the availability of fruits at REGUA may be related with curassows' behavior, we take pictures of the fruits encountered in the forest (see Figure 18, for instance) and we record

the location and month/year. It is a random sample design, because we record fruit data in every trail/ road we walk to monitor the birds by triangulation method. We also record fruit data when we follow an individual to check if it is alive or not, by walking in regions without trails.

The graphic below (Figure 14) is useful to check which month has diversity of fruiting trees. However, the fruits found in the region are not necessarily being consumed by the redbilled curassows. And which fruits are they consuming?



Figure 14. Some tree families identified at REGUA.

We are now beginning to analyze fecal samples we are collecting since August 2006, with a stereomicroscope. We will separate some items (leaves, fruits, insects etc) in the feces and, if possible, present the proportion of the items in the red-billed curassow's diet (Figure 15).



Figure 15. Flesh feces of red-billed curassow collected and analyzed by a stereomicroscope. In detail we can see many items consumed, and they will be identified latter.



4. The community around REGUA engaged in the reintroduction project

Figure 16. The communities around REGUA are being involved in the reintroduction project, by visiting the release pen to see the birds (A,B), by drawing their favorite bird (see the backpack transmitter represented in the picture C! it was made by a 5 years-old child) and by attending lectures (D, E, F).

All these communities are surrounded by forest and some red-billed curassows frequented the region at least once (located in the forest or, rarely, seen in a backyard). That's why we chose these communities to inform them about the curassows and what they can do to help on the establishment of the reintroduced birds (Table 3). Nowadays we are targeting on adults, mainly going to local churches.

Lectures have been eventually done to guests of REGUA's lodging-house, as birdwatchers come from all parts of the world, including Brazilian birdwatchers. It is important to inform them about the great reintroduction project we are developing at REGUA. Besides, it is a very good way to practice my English, because the results of the reintroduction must be presented not only at National Scientific Congress, but also at International ones.

	Local	Event	Date	Public
National Geographic (Brazil)	Magazine	Report – Section 'Biology'	February 2007	Public all over Brazil
Universidade Estadual Paulista	Rio Claro- SP	Lecture	February 2007	Students
On-line journal O Eco	Internet	Report	March 2007	All over the world
Conselho Rural (REGUA's partner)	REGUA	Lecture	March 2007	Adults (Rural people)
Guapiaçu community	Guapiaçu School	Lecture	April 2007	Children/ teenagers/ Adults
Matumbo community	Matumbo School	Lecture	May 2007	Children/ teenagers/ Adults
Areal community	Areal School	Lecture	June 2007	Children
Santo Amaro community	Santo Amaro School	Lecture	June 2007	Children/ teenagers/ Adults
XV Brazilian Ornithological Congress	Porto Alegre- RS	Oral presentation	July 2007	Researchers and Students all over Brazil
Boa Sorte community	REGUA	Lecture	August 2007	Children
Santa Maria community	REGUA	Lecture	August 2007	Children
Serra Queimada community	REGUA	Lecture	August 2007	Children
Clube de Ornitólogos Amadores	REGUA	Lecture	August 2007	Brazilian Birdwatchers
Birdwatchers/ tourists	REGUA	Lecture	Eventually	Adults

Table 3. Divulgation of the red-billed curassow's reintroduction project (January-September 2007).

5. The reintroduction of the Black-fronted piping-guan (*Aburria jacutinga*)

Ten jacutingas were released at REGUA on October 12th 2007, after a quarantine in the release pen (5 couples) (Figure 17). They have coloured rings for identification and, differently from the red-billed curassows, they do not carry any transmitter. The information we will have about them will be provided by the curassow team, the park rangers, students, researchers, birdwatchers and visitors of REGUA. A notebook will be left in REGUA's lodge, in order to people take note about the encounters with jacutingas.

Eight jacuting were seen around the release site in the first day, 5 roosted and 3 on the floor of an embankment.

After 4 days three were seen roughly 500m from the release pen while the curassow team was looking for a female red-billed curassow, recently reintroduced. They were all roosted at 3m height, and we collected some fruits in a radius of 20m around them (Figure 18). The female curassow was not together with jacutingas.



Figure 17. Jacutingas in the release pen at REGUA were released in October 2007.



Figure 18. Some different type of fruits collected in the region where a female red-billed curassow were walking on the floor and where 3 jacutingas were, next to the curassow, but roosted.