

BRIEF REPORT

First Sighting of Eggs and Chicks of the Red-Necked Amazon Parrot (*Amazona arausiaca*) Using an Intra-cavity Video Probe

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Two clutches of the red-necked Amazon parrot, or Jaco (*Amazona arausiaca*), are described for the first time from intra-cavity video recordings of natural nests in Dominican rainforest trees. Using a mini-camera mounted on a telescoping pole, a clutch of two live chicks (~8 weeks old) and one dead chick (~5 weeks old at time of death), and another clutch of one live chick (~4 weeks old) and two unhatched eggs were discovered in nesting cavities roughly 15 m from the ground in Carapite (*Amanoa caribaea*) and Gommier (*Dacryodes excelsa*) trees, respectively, near 600 m elevation. Information from these sightings is essential for quantifying the life history of the Jaco, a flagship species for Dominica's imperiled rainforest ecosystem. Zoo Biol 18:63–70, 1999. © 1999 Wiley-Liss, Inc.

Key words: Dominica; conservation; rainforest; flagship species

INTRODUCTION

The red-necked Amazon parrot, or Jaco (*Amazona arausiaca*), is a large (40 cm in length), predominantly green bird native only to Dominica, largest of the Windward Islands in the Lesser Antilles [Forshaw, 1989]. Although well-known since Columbus' time, the Jaco has often eluded researchers because of Dominica's rough, mountainous terrain and the bird's secretive nesting habits in cavities high in remote rainforest trees [Collar et al., 1992; Durand and Zamore, 1996]. Despite intensive field observation by Dominica's Forestry and Wildlife Division since 1981, no Jaco clutch has been directly observed prior to fledging, and eggs have never before been

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described. Here we document the discovery of two active Jaco nests containing both eggs and chicks, and describe the nesting chambers.

MATERIALS AND METHODS

Active Jaco nests have been monitored for many years by the Dominican Forestry and Wildlife Division, with much accrued information about the timing of the breeding season, nest tree use, nest hole height and orientation, fledging rates, foraging, vocalization and post-fledging parent/juvenile behaviors [Durand and Zamore, 1996]. Using a modified "Treetop II Telescoping Video Probe System" (Christensen Designs, Manteca, CA), originally designed to inspect woodpecker nest cavities, we inspected all accessible, known parrot nesting cavities within and near the Northern Forest Reserve during the period 2–7 April 1998.

The video system consisted of a telescoping 15-m fiberglass pole, atop which was mounted an adjustable boom and a 4×4×4-cm, high-resolution digital color camera with self-contained floodlights (Fig. 1). The video signal was transmitted to a color,

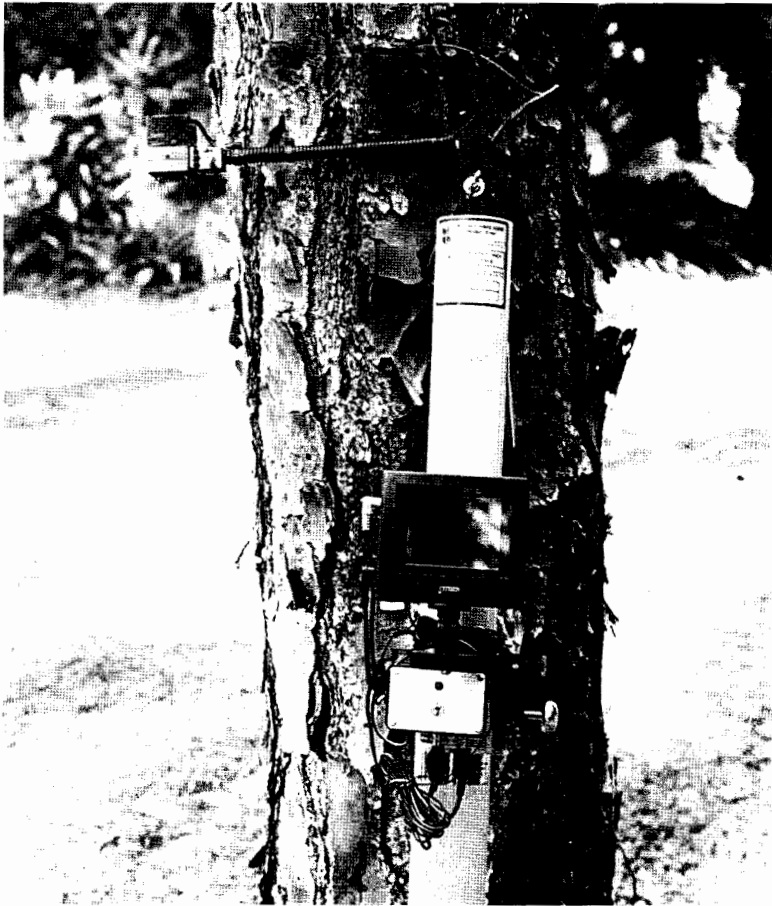


Fig. 1. Video probe system, including telescoping fiberglass Hastings rod, digital color camera (self-illuminating), adjustable boom, and crystal color monitor.

liquid-crystal monitor mounted at the base of the pole, with outputs to a portable video cassette recorder. The system minimizes disturbance of the cavity and nest tree and eliminates tree-climbing; the telescoping pole permits the camera, on the adjustable boom, to be maneuvered into the cavity as researchers view the image on the color monitor at ground level.

Cavities were inspected between 1400 and 1800 hr. All recording sessions were completed within 2 hr, and no site was disturbed more than once every 2 days. Tapes were compiled and digitized professionally (Aderman and Associates, West Palm Beach, FL), with still photographs captured directly from a digitized VHS copy, converted to grayscale and printed by inkjet on photographic paper.

Estimates of chick and egg size were made by comparing field images to items of known size as seen at known distances on the monitor. Similarly, cavity dimensions were estimated by comparing field images to known lengths and distances in a darkened room. Chick ages were estimated by comparison to growth stages and trajectories described for similarly sized Amazon parrots [Snyder et al., 1987; Schubot et al., 1992; Reillo, 1993].

RESULTS

One Carapite tree (*Amanoa caribaea*) and one Gommier tree (*Dacryodes excelsa*) revealed active Jaco nests. The first nest was discovered in the cavity of a dead Carapite (575-m elevation) in the Syndicate Estate area 2 km west of Morne Diablotins. Time-lapse video recordings and direct monitoring of the cavity's exterior since January 1998 indicated that the site was active; two Jacos had been seen defending the nest site since late December 1997, with the female entering the cavity and, presumably, incubating eggs since the first week of January 1998.

The opening, facing northwest, was a long hole roughly 1 m in total length and 20 cm in width at its widest point, with the bottom of the opening 14.5 m from ground level (Fig. 2). The interior was characterized by rough splits and caverns running vertically from at least 2 m above the opening to the base of the cavity, approximately 1.5 m from the bottom lip of the entrance. The irregular, coarse cavity shaft varied from 25 cm in width to more than 60 cm in width at the bottom. The cavity appeared dry and dusty, with an accumulation of earthen-like, powdery detritus as the floor.

Three Jaco chicks were seen during inspections on 2 April and 4 April 1998: two alive and active at the center, bottom of the cavity, and another dead chick lying near the back of the chamber within a side alcove (Figs. 3 and 4). Both active chicks were nearly fully feathered, with tail feathers roughly half adult length. They appeared semi-coordinated, able to walk around the cavity floor, stretching and flapping their wings, and clearly oriented visually to the camera's lights. By appearance and behavior, we estimated their ages at 7–8 weeks, with no more than 2–3 days between chicks. The dead chick, lying on its left side, afforded a clear caudolateral view. It was clearly shrunken and dessicated, revealing green wing, back, and scapular feathers, and a protruding right leg. The neck and head appeared less distinct, wedged in a crevasse adjacent to the side, rear wall of the chamber. The body, roughly 2/3 the length of the live chicks, lacked tail feathers. Right wing coverts appeared developed, with primaries roughly half as long as those on the live chicks; plumage development and size suggested the chick to be 5–6 weeks of age at death. During



Fig. 2. Time-lapse video image of telescoping video probe entering Jaco nest at Syndicate as seen from remote surveillance camera.

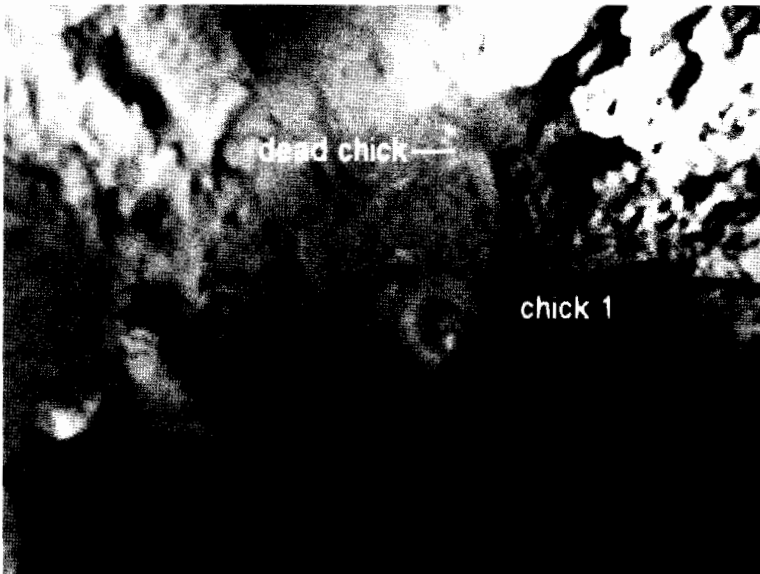


Fig. 3. Intra-cavity video image of largest Jaco chick and dead chick in Syndicate nest.

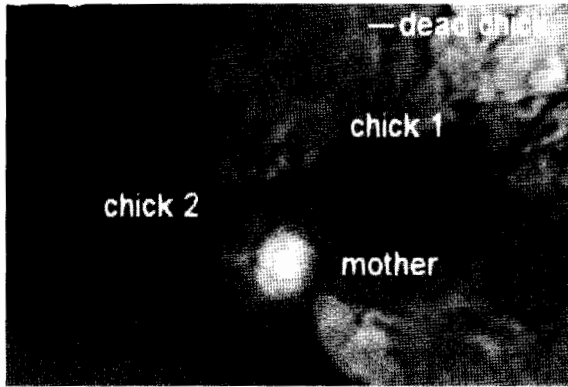


Fig. 4. Intra-cavity video image of chicks and mother in Syndicate nest. Camera spotlight is directly on top of mother's head (facing left, directly into tail feathers of chick 2). Chicks 1 and 2 at center are touching beaks (white wedges as in Fig. 3); dead chick is oriented as in Fig. 3.

inspection of the cavity on 4 April 1998, the mother also was seen (Fig. 4); identity was confirmed by time-lapse recordings of the hen entering the nest (1540 hr) prior to our inspection (1635 hr) and leaving the nest with the male (1755 hr), who had entered the nest (1735 hr) after the video probe was removed (1715 hr). The parents returned to the nest within 30 min of our departure, and the hen stayed with the chicks as usual in the cavity overnight (previously documented from time-lapse recordings). Both parents resumed their regular foraging routine the next day. Inspecting the nest cavity likely disturbed and inconvenienced the birds temporarily, but apparently did not disrupt typical behaviors.

The second active cavity was located 15 m from the ground in a live Gommier at 590 m elevation in the Carholm area, near Petit Macoucheri, 3 km south-southeast of Morne Diablotins. A pair of Jacos had been seen visiting the site since January 1998, with sporadic nesting activity reported here since the late 1980s [Durand and Zamore, 1996]. The opening, facing southwest, was an oval roughly 50 cm in length and 25 cm width, with a smooth lip at least 30 cm wide. The cavity plunged straight down roughly 2 m from the opening with smooth walls and few reflective surfaces, save a smooth tongue approximately 1 m in length extending from the cavity floor to the lip at an angle of at least 60° (vague outline, bottom left Fig. 5). The cavity was at least 75 cm in maximum width at the floor, with no detectable sunlight reaching the interior due to the aspect of the opening, its small size, and the thickness of the xylem around the opening.

Intra-cavity inspection with the video probe at 1400 hr on 4 April 1998 revealed two unhatched Jaco eggs and a chick clustered at the center of the cavity floor, and a hatched egg 20 cm away (Fig. 5). The chick, approximately 20 cm in total length, was covered with downy feathers, with pinfeathers visible on the crown, mantle, scapulars and coverts. Eyes open, it oriented visually to the camera's lights and walked around clumsily. From coordination, size, and plumage, we estimated the chick's age at 4–5 weeks. The two eggs near the chick were intact, white and typical in shape to other Amazon eggs [Forshaw, 1989], measuring roughly 4.5 cm in length and 3.5 cm in width. The hatched eggshell was somewhat crumpled and missing the large end; we consider this egg to be the source of the chick.

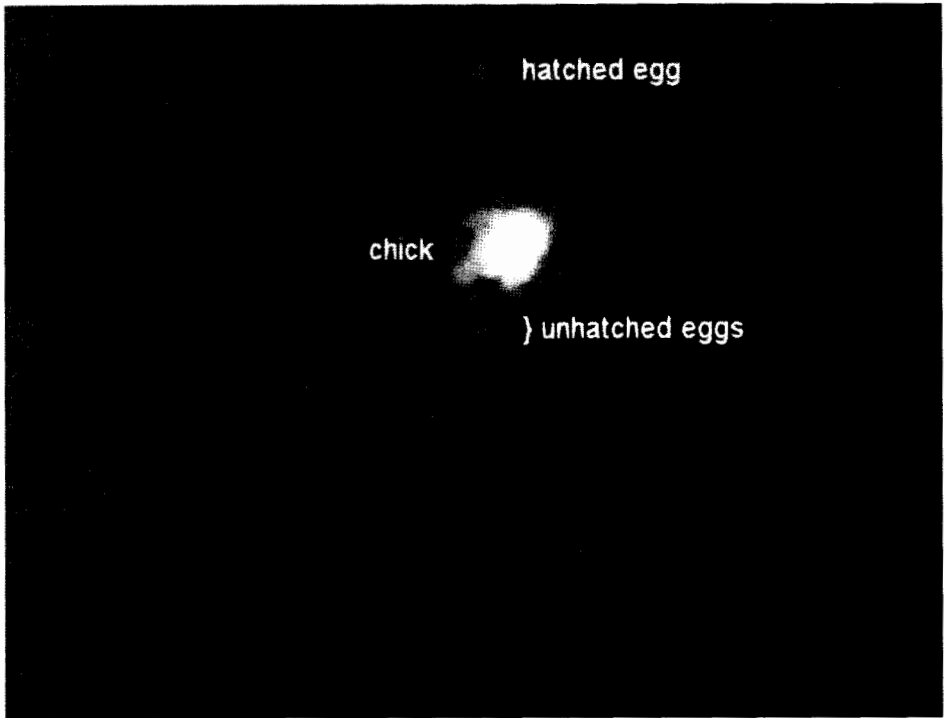


Fig. 5. Intra-cavity video image of Jaco nest at Carholm. Spotlight is directly on back of chick facing left bottom corner of page. Pale region in lower left half of image is a smooth interior slope extending from cavity entrance to floor.

DISCUSSION

Previous observations of reproduction in *A. arausiaca* reside primarily in anecdotal, verbal reports from field researchers and unpublished manuscripts (see citations in Collar et al. [1992]). The only referenced accounts of nesting infer clutches of two eggs laid perhaps only every other year with pairs seldom raising more than one young per clutch [Gregoire, 1981; Evans, 1988], although there exists a suggestion that a pair of Jacos fledged two young in each of 3 successive years [Amberger, 1989]. Our discovery of chicks and eggs in two active Jaco nests represents the first quantitative account of reproduction in this species substantiated by intra-cavity photographic records.

Video records from both nest sites provide incontrovertible proof that *A. arausiaca* is capable of laying clutches of three eggs. Evidence that the eggs are laid within a few days of one another as a clutch, as in other Amazon parrots [Low, 1980; Snyder et al., 1987; Schubot et al., 1992], comes from the observation of similarly sized siblings in the nest at Syndicate (Figs. 3 and 4). The unhatched eggs at Carholm must have been inviable and can be explained as either fertile eggs that failed during incubation or infertile eggs. The possibility that either or both of these eggs were observed prior to hatching is ruled out because 1) Amazon parrots lay their eggs as a clutch, with three eggs typically requiring no more than 7 days to lay; 2) Amazons typically exhibit incubation periods of 30 days or less [Snyder et al., 1987; Jordan,

1989; Schubot et al., 1992]; and 3) the nest contained a healthy chick approximately 28–35 days post-hatching. Variation in timing of reproduction in Jacos within the Northern Forest Reserve is apparent from the 3–4 week difference in development between the chicks at Syndicate and the chick at Carholm. From our age estimates, and assuming a 28-day incubation period, the Syndicate clutch was laid 8–15 January; similarly, the Carholm clutch was laid 31 January–7 February.

The nest at Syndicate further augments our knowledge of the Jaco life history by revealing that clutches of three chicks can be raised at least partially. We can only speculate on the cause of death of the chick at Syndicate, but competition for food with older, larger siblings is most likely, as in other avian species with staggered egg laying/hatching within clutches [Willson, 1984]. Few large Amazons, particularly Caribbean species (e.g., the St. Vincent Amazon [*A. guildingii*]), raise more than two chicks per clutch [Forshaw, 1989; Collar et al., 1992]. Whether Jaco fledging success is a function of food availability and/or intra-clutch competition is uncertain, and few ecological studies have focused on this issue in wild psittacines [Snyder et al., 1987]. The discovery of two nests with the potential for three chicks each in the same breeding season indicates that the potential reproductive rate for *A. arausiaca* is among the highest of large Amazons in the Caribbean.

The ICBP/IUCN classified the Jaco on Dominica as “rare” [Collar et al., 1992], with the species having been listed on CITES Appendix I since 1981 [U.S. Fish and Wildlife Service, 1996]. In captivity, the Jaco is known only from the aviary at the Botanical Gardens in Roseau, Dominica, where eight birds (6.2) are maintained by the Forestry Division for research and exhibit. Captive propagation is not now considered integral to the Jaco’s conservation, and the species has yet to reproduce in captivity. The clutches observed here may help to explain the Jaco’s continuous recovery after the population crash caused by Hurricane David in 1979, and a greater intrinsic population growth rate than the sympatric, highly endangered Imperial Amazon parrot, or Sisserou (*A. imperialis*) during the same time interval [Low, 1984; Collar et al., 1992; Durand and Zamore, 1996]. We are presently searching for active, camera-accessible nesting cavities of the Sisserou, widely accepted as Dominica’s national bird, so that contemporaneous reproductive data from these potentially competing species can be evaluated and compared. Such fundamental natural history information is critical to conceiving mitigative conservation strategies to conserve both parrots in the wild. In the meantime, an international effort is underway to establish the Morne Diablotin National Park, encompassing vast expanses of critical Jaco and Sisserou habitat.

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