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Authors: LONDOÑO, GUSTAVO A., MUÑOZ, MARCIA C., and RIOS, MARGARITA M.

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# DENSITY AND NATURAL HISTORY OF THE SICKLE-WINGED GUAN (*CHAMAEPETES GOUDOTII*) IN THE CENTRAL ANDES, COLOMBIA

GUSTAVO A. LONDOÑO,[1,2,3,5] MARCIA C. MUÑOZ,[1,4,] AND MARGARITA M. RIOS[1]

ABSTRACT.—The basic ecology of most of the Andean guans is poorly known. However, knowledge of the natural history of members of Cracidae has increased in the last decade, but most studies involve lowland species. We present basic natural history data for the Sickle-winged Guan (*Chamaepetes goudotii*) on the western slope of the Central Range of the Andes, Colombia. The density estimate for the Sickle-winged Guan in the study area was 13.7 individuals/km$^2$ and the mean ($\pm$ SD) group size was 1.5 $\pm$ 0.76 individuals. These groups used all forest strata but usually foraged in the middle stratum (8.6 $\pm$ 6.1 m). The diet consisted of fruits (84.5%), flowers (3.9%), leaves (5.8%), and invertebrates (5.8%). We observed wing-drumming displays, nests, and fledglings from January through June. We discuss the ability of the Sickle-winged Guan to colonize and establish populations in restored habitats. *Received 3 April 2006. Accepted 6 September 2006.*

The Sickle-winged Guan (*Chamaepetes goudotii*) is one of the few members of the family Cracidae present at higher elevations (Hilty and Brown 1986, Fjeldså and Krabbe 1990, del Hoyo 1994, Delacour and Amadon 2004). Members of the Cracidae are among the most threatened avian species in the Neotropics as a consequence of hunting, forest fragmentation, and low rates of population growth (Silva and Strahl 1991, Strahl et al. 1997, Renjifo 1999, Brooks and Gonzales-García 2001, Brooks et al. 2001, Mamani 2001, Delacour and Amadon 2004). These factors influence the vulnerability of members of this family to local extirpation (del Hoyo 1994, BirdLife-International 2000, Renjifo 2002). Despite its large geographic distribution, comprehensive ecological studies on the Sickle-winged Guan are not available, and only sporadic observations have been reported (Jonhson and Hilty 1976, Hilty and Brown 1986, del Hoyo 1994, Nadachowski 1994, Greenfield and Ortíz-Crespo 1997, Renjifo 1997, Salaman et al. 2001, Strewe 2001, Pulgarin-R 2004). Little is known about the diet of this guan and nothing is known about densities or population dynamics.

The genus *Chamaepetes* includes two species distributed from Costa Rica to northern Bolivia. The Black Guan (*Chamaepetes unicolor*) has a small range from Costa Rica to western Panama (Stiles and Skutch 1989), whereas the Sickle-winged Guan has a wide distribution in the northern Andes from Colombia, Ecuador, and Peru to northern Bolivia, mostly from 1,500 to 3,000 m elevation (Hilty and Brown 1986, del Hoyo 1994, Delacour and Amadon 2004). There are five described subspecies of the Sickle-winged Guan, with *C. g. goudotii* occurring on our study area. The species was considered widespread in Colombia (Hilty and Brown 1986), but extensive deforestation in the Andean region (Cavelier and Etter 1995) and continued over-hunting have resulted in the placement of this guan on a list of taxa of immediate conservation priority (Brooks and Strahl 2000).

The overall objective of our study was to provide detailed ecological data for Sickle-winged Guans. Specific objectives were to estimate local population densities, document group size, characterize the vertical foraging strata, describe the diet, and identify the timing and length of the breeding season.

## METHODS

*Study Area.*—Our study was conducted at the Santuario de Fauna y Flora Otún-Quimbaya (SFFOQ) (4° 43′ 11″ N, 75° 28′ 70″ W)

[1] Fundación EcoAndina/Wildlife Conservation Society, Colombia Program, Apartado Aereo 25527, Cali, Colombia.

[2] Florida Museum of Natural History, Dickinson Hall, University of Florida, Gainesville, FL 32611, USA.

[3] Current address: Department of Zoology, 223 Bartram Hall, University of Florida, P. O. Box 118525, Gainesville, FL 32611, USA.

[4] Current address: Department of Biology, University of Puerto Rico, San Juan, PR 00931, USA.

[5] Corresponding author; e-mail: galondo@ufl.edu

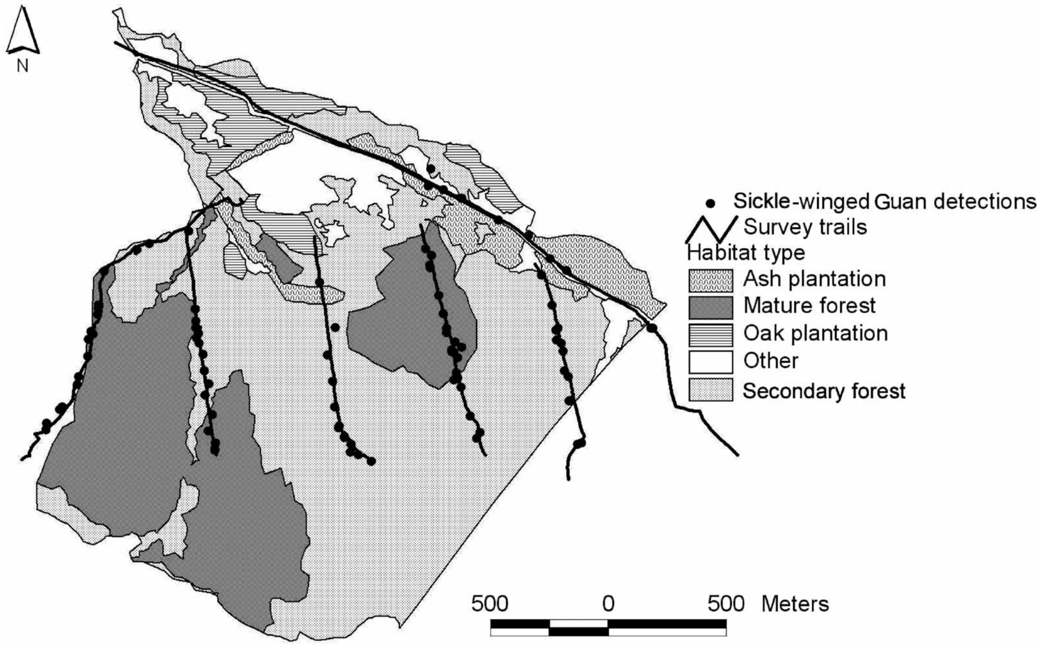


FIG. 1. Sickle-winged Guan detections by habitat types in the Santuario de Fauna y Flora Otún Quimbaya, Colombia, October 2002–September 2003. The vegetation map was modified from Garcia-Robledo and Murcia (2005).

on the western slope of the Central Range of the Andes, east of Pereira, Department of Risaralda, Colombia. The area studied was between 1,900 and 2,100 m elevation. Mean maximum and minimum annual temperatures are 20 and 11° C, respectively. The mean annual rainfall is 270 cm which is bimodally distributed, with dry seasons of <10 cm of rainfall per month occurring during December–January and June–August (Ríos et al. 2005).

The SFFOQ encompasses 489 ha most of which was clear-cut to create pastures for livestock grazing in the early 1900's. The sanctuary has been protected from logging since 1960 (Londoño 1994) and a reforestation strategy was established to restore forests by planting Chinese ash (*Fraxinus chinensis*) and Andean oak (*Quercus humboldtii*), or by allowing natural regeneration. This strategy resulted in the creation of a variety of habitats (Fig. 1). The mature forest that remains occurs as forest patches that were not logged.

*Density Estimation and Habitat Use.*—We surveyed Sickle-winged Guans from trails that passed through all forested habitat types and most plantations within the study area (Fig. 1). The distance of survey trail in each forest habitat was similar to habitat availability (Table 1). We conducted monthly surveys on six 1-km trails from October 2002 to September 2003.

TABLE 1. Scale of habitat availability (ha) and habitat used (survey distance = m) by Sickle-winged Guans in the Santuario de Fauna y Flora Otún Quimbaya, Colombia, October 2002–September 2003.

| Habitat type | Habitat availability (%) | Survey distance (%) | Habitat used (df = 2) |
|---|---|---|---|
| Secondary forest | 253.8 (51.9) | 3,175 (50.7) | $\chi^2 = 0.08$, $P = 0.77$ |
| Mature forest | 138.9 (28.4) | 1,650 (26.3) | $\chi^2 = 1.29$, $P = 0.26$ |
| Oak plantation | 14.6 (3.0) | 75 (1.2) | |
| Ash plantation | 33.7 (6.9) | 1,300 (21.9) | $\chi^2 = 2.01$, $P = 0.16$ |
| Others | 48 (9.8) | | |

Each trail was surveyed eight times per month, four times in the morning (0630–0830 hrs EST) and four in the afternoon (1530–1730 hrs). We conducted 48 surveys per month for a total of 576 during the year. We used visual detections for estimating densities. We recorded wing-drumming displays during the breeding period but did not include these in density estimates because birds appear to move constantly during the wing-drumming display creating a potential bias in perpendicular distance estimations. We estimated the perpendicular and vertical distances from the trail to each guan detected. We quantified the length of the survey trails that covered each habitat type to estimate habitat use. We estimated the number of guans according to availability of each habitat based on the total guans detected on surveys.

*Statistical Analyses.*—We estimated guan density using the distance sampling approach in program DISTANCE v 4.1 (Buckland et al. 2001). This program diminishes bias created by environmental conditions and differences among observers (Thompson 2002). Guan density estimates were obtained by selecting the best model included in the program based on Akaike's Information Criterion (AIC). The model also considers the probability of detection, encounter rate, and cluster size. The probability of detection in our study was higher in the forest compared to the ash plantation but encounter rate and cluster size were higher in the ash plantation. We used a one-way analysis of variance (ANOVA) to examine whether there was variation in monthly densities. We used a Chi-square test to examine if guans were using different habitats according to their availability. Observation time and number of surveys per trail were standardized; thus, survey effort was considered in habitat-use estimation.

*Fruit Availability.*—Quantification of fruit available on the study site was measured by randomly placing three $50 \times 4$ m plots along each of the six trails where guan surveys were conducted (Fig. 1) for a total of 18 plots. Trees with $>3$ cm DBH were marked with uniquely numbered aluminum tags. We made direct observations every 15 days for each tree when trees where fruiting. We counted the total fruits available on at least two branches and then counted the number of branches with fruits to obtain the total fruit available on each tree (Blake et al. 1990). We estimated total fruit available on each tree by multiplying the average number of fruits from the two or more branches with direct fruit counts by the total branches with fruit. Species identifications were made using field guides (Vargas 2002) and by comparing samples from the study area with specimens in the botanical museums of Colombia.

*Natural History.*—We collected natural history data during our 576 surveys and observations from June 2002 to December 2003 during continuous searches on the SFFOQ trail system. These searches occurred from 0600 to 1800 hrs for 10 days each month. We followed guans continuously after finding them as long as individuals and topography allowed. Natural history data collected included: food items eaten, evidence of reproduction, number of sun or dust baths taken, and group size. We recorded only one event per group encounter in the case of the different behaviors, (e.g., if two individuals where feeding on a *Dendropanax* tree, this event was counted as one observation).

We categorized non-adult Sickle-winged Guans as: (1) fledglings—individuals that did not have a tail or had their body covered with down and one-third of adult size, (2) juveniles—individuals with body feathers and a tail, but wing feathers were not fully grown and measured two-thirds of adult size, and (3) subadults—with more adult-like plumage, but less colorful and somewhat smaller than adults.

Observations by German Corredor of captive Sickle-winged Guans in the Cali Zoological Park suggested that males and females can be differentiated by morphological characters. Our field data support this observation. We differentiated male and female Sickle-winged Guans based on both morphology and behavior. Males gave wing-drumming displays and had bright blue skin around the eye, whereas females incubated eggs and had blackish skin around the eye. This has not been previously reported. However, future molecular studies between and within subspecies are needed to see if this is true and applies to the different subspecies.

## RESULTS

*Density and Habitat Use.*—The density estimate for Sickle-winged Guans in the study

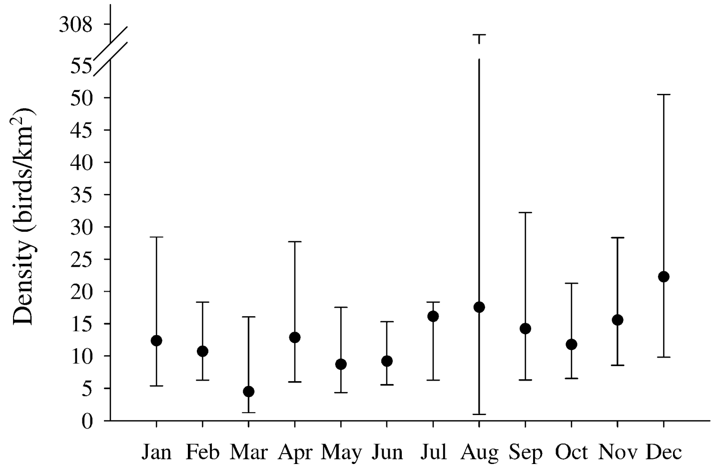


FIG. 2. Density variation of Sickle-winged Guans in the Santuario de Fauna y Flora Otún Quimbaya, Colombia between October 2002 and September 2003. Bars represent 95% confidence intervals, dots = means.

area was 13.7 individuals/km$^2$ (95% CI = 9.95–17.12). Monthly mean density estimates varied between 4.5 and 22.3 individuals/km$^2$ (Fig. 2), but there were no differences among months due to high within-month variation ($F$ = 3.078, $P$ = 0.419). Fruit availability did not explain guan density variation when the species' specific fruit preference was considered ($r^2$ = 0.389, $P$ = 0.211) or when compared to fruit preferences of other cracids in the study area ($r^2$ = 0.155, $P$ = 0.631). We estimated expected habitat use detections ($n$ = 141) of guans during the surveys based upon the availability of each habitat on the survey trails. The observed habitat use of the Sickle-winged Guan did not differ from that expected based on habitat availability (Table 1).

*Group Size and Foraging Height.*—Group size ranged from one to four individuals and mean (± SD) group size was 1.5 individuals (± 0.76). Mean group size was similar between months (Fig. 3A). Sickle-winged Guans traveled mainly in the middle vertical stratum of the forest (8.6 ± 6.1 m), but used all vertical strata over the course of the year (Fig. 3B). Guans detected on the forest floor were taking a dust bath, following army ants (*Labidus praedator*), or with fledglings.

*Diet.*—We observed Sickle-winged Guans consuming a variety of foods including fruits, flowers, leaves, and invertebrates (Table 2). Fruit was the most common item (83.8%) eaten, followed by leaves (7.4%), invertebrates (5.9%), and flowers (3.0%) during 68 different foraging observations. Analysis of 25 fecal samples yielded similar results (88% contained fruit with 4% for each of the other three categories). All seeds (ranging in size from 0.1 to 28.3 mm) in fecal samples appeared undamaged, indicating that guans facilitate seed dispersal. Forty-four percent of the fruit in the diet consisted of *Oreopanax* aff. *floribundum* (Araliaceae; recorded only during Dec) and *Aniba muca* (Lauraceae; consumed from Mar to Oct). Consumption of invertebrates occurred only while guans were following army ants during September, October, and November. We had only five observations of guans following army ants and four involved a single individual; the other observation was of a group of two individuals.

*Reproduction.*—We recorded evidence of reproductive activity from January to June. Wing-drumming displays were heard 39 times during this period with 84.6% occurring from March through May. Most (56.4%) of the wing-drumming detections occurred between sunrise and 0800 hrs EST. A pair was observed closely on 29 May 2003 as the male performed a wing-drumming display. The male repeatedly flew from high to low trees with the tail open and was followed by the female. We observed the male give wing-drumming displays over a period of 5 min separated by intervals of about 1 min within an area of about 100 m. Similar wing-drum-

TABLE 2. Foods consumed by the Sickle-winged Guan in the Santuario de Fauna y Flora Otún Quimbaya, Colombia. October 2002–September 2003.

| Species | Categories | Diet (%) | Fruit size (mm) length | Fruit size (mm) width | Month |
|---|---|---|---|---|---|
| Araliaceae | | | | | |
| *Dendropanax macrophyllum* | Fruit | 3.8 | 7.6–12.5 | 9.2–13.8 | May, Jun |
| *Oreopanax* aff. *floribundum* | Fruit | 18.0 | 4.8–8.9 | 7–8.3 | Dec |
| Arecaceae | | | | | |
| *Prestoea acuminata* | Fruit | 2.8 | 10–12.5 | 8.8–12.1 | Oct |
| *Wettinia kalbreyeri* | Flower | 0.9 | | | Oct |
| Asteraceae | | | | | |
| Unknown | Fruit | 0.9 | | | Nov |
| Clusiaceae | | | | | |
| *Chrysochlamis colombiana* | Flower | 1.9 | | | Apr |
| Euphorbiaceae | | | | | |
| *Alchornea grandiflora* | Fruit | 3.8 | 5.3–9.3 | 4.2–10.1 | Feb, Mar |
| *Allophylus mollis* | Fruit | 1.9 | 8–10.5 | 7.7–12.1 | Aug |
| Lauraceae | | | | | |
| *Aniba muca* | Fruit | 17.0 | 14.1–33.6 | 15.5–18.4 | Mar, Apr, Sep, Oct |
| *Lycaria* sp. | Fruit | 0.9 | | | Aug |
| *Nectandra lineatifolia* | Fruit | 0.9 | 10.8–17.5 | 7–12.6 | Aug |
| Melastomataceae | | | | | |
| *Henriettella trachyphyla* | Fruit | 0.9 | | | Apr |
| *Miconia acuminifera* | Fruit | 4.7 | 5.9–9.5 | 5.8–10.4 | Sep, Oct, Nov |
| *Miconia theaezens* | Fruit | 1.9 | 3–6.2 | 3.6–6.8 | Oct |
| *Miconia* aff. *resima* | Fruit | 1.9 | 4.3–8.1 | 6.5–8.8 | Oct, Nov |
| Moraceae | | | | | |
| *Cecropia telealba* | Fruit | 4.7 | 126.6–270 | 13–31.6 | Mar, Apr, Oct |
| *Ficus andicola* | Fruit | 1.9 | 7–9.1 | 9–20.5 | Oct |
| *Ficus mutisii* | Fruit | 0.9 | 19.2–24.4 | 20.3–28.5 | Jan |
| *Ficus* sp. # 1 | Fruit | 0.9 | | | Dec |
| *Ficus* sp. # 2 | Fruit | 0.9 | | | Sep |
| Oleaceae | | | | | |
| *Fraxinus chinensis* | Leaf | 4.7 | | | Nov, Dec |
| *Chionanthus* sp. | Fruit | 5.7 | | | Oct |
| Rubiaceae | | | | | |
| *Palicourea angustifolia* | Fruit | 3.8 | 5–10 | 5.2–11.7 | Mar, May, Jun |
| *Palicourea ovalis* | Fruit | 0.9 | 10.5–13.5 | 10.1–13 | Jul |
| *Coussarea* sp. | Fruit | 0.9 | 6.6–10.5 | 7.8–12.7 | Jul |
| Solanaceae | | | | | |
| *Lycianthes radiata* | Fruit | 0.9 | | | May |
| *Solanum sycophanta* | Flower | 0.9 | | | Oct |
| Symplocaceae | | | | | |
| *Symplocos quinduensis* | Fruit | 3.8 | 9–14.2 | 5.6–9.6 | Apr, May |
| Unknown | | | | | |
| Unknown sp. # 1 | Leaf | 0.9 | | | Jun |
| Unknown sp. # 2 | Invertebrate | 5.7 | | | Sep, Oct, Nov |

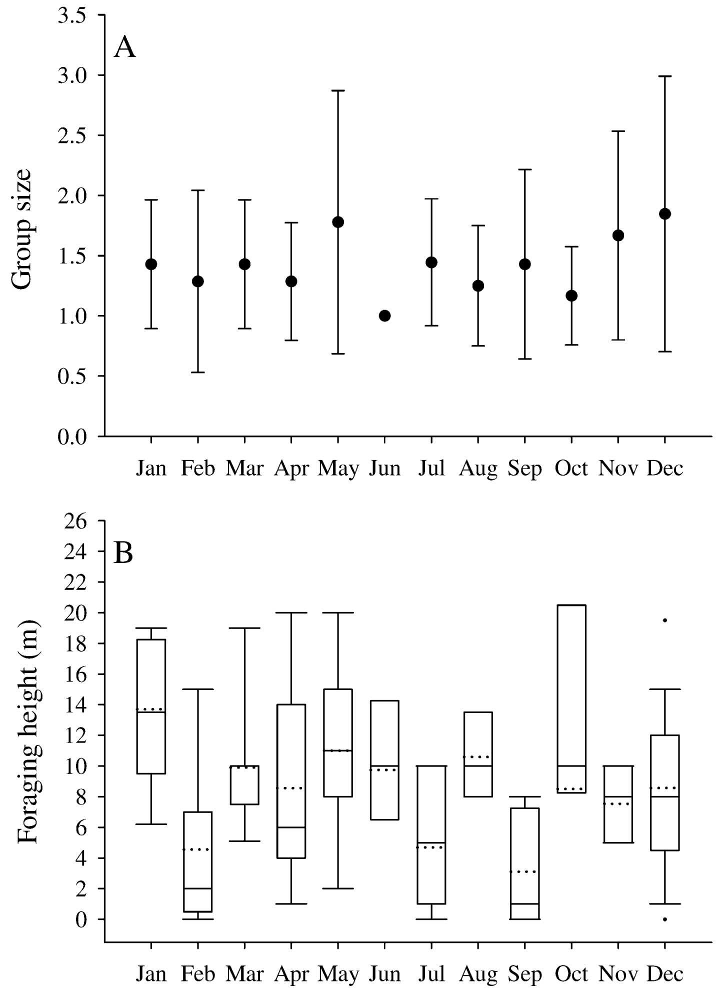


FIG. 3. Vertical foraging stratum and group size of Sickle-winged Guans in the Santuario de Fauna y Flora Otún Quimbaya, Colombia between June 2002 and December 2003. (A) Group size variation; dots represent the mean and bars the standard deviation. (B) Foraging stratum used; the box plots represent the 95% confidence intervals from the number of individuals observed in each month. The number of guans observed per month is shown by the solid line (median) and the dotted line (mean).

ming behaviors were observed on five additional occasions for shorter periods of time.

We found two nests each positioned on epiphytic plants and constructed using materials found on the epiphytic plant. We found the first nest on 29 June 2002 when a female flew from a bromeliad 4 m above the ground. This nest contained a recently hatched white egg shell, with fresh egg membranes. The female flew in circles around the nest making alarm calls during our presence indicating a chick was probably close to the nest. The second nest was 6 m above ground on an epiphyte (*Anthurium glaucospadix*, Araceae) and was found on 6 May 2003 when a female flew from the epiphyte, exposing two white eggs among its branches and leaves (Fig. 4A). The nest was visited 3 days later, and one of the eggs was broken and contained a dead well-developed embryo covered with natal down. The unbroken egg measured 73.7 × 51.8 mm and weighed 96.8 g (Fig. 4B). Due to the absence of the female from the nest prior to finding of the broken egg, we assume the nest was abandoned. We do not believe that predation was the cause as none of the eggs was missing.

The unbroken egg was artificially incubated and hatched 7 days later. The fledgling weighed 68.3 g and was totally covered with rufous down except for the wings, which had black feathers with two rufous bars. Three black lines extended through the upper part of the body. Two lines were narrow extending from the bill along the sides of the head through the flanks to the end of the body. The other was a wider line running dorsally from the upper head to the tail. The bill was completely black, the eyes brown, and the legs pink. It had a dark patch of bare skin around the eye and did not have a tail. We fed the fledgling with worms and fruits, and its weight increased 74.8 g in 7 days (Fig. 4C).

We encountered fledglings six times, three in April, one in June, and two in July. Both adults were seen with the chick on one of these occasions, whereas the other observations involved only the female. During these encounters, females accompanying fledglings produced constant alarm calls and flew in circles around the area where the fledglings were hidden. This behavior lasted as long as observers were present in the area. When the male was present, he performed the wing-drumming display. We observed juveniles on three occasions, one in September and two in June. One subadult was observed in December 2002 with both parents; this individual was smaller than the adults but had adult-like plumage.

## DISCUSSION

*Density and Habitat Use.*—The Sickle-winged Guans on our study area occurred at higher densities compared to other cracids (Terborgh et al. 1990, Galetti et al. 1997, Strahl et al. 1997, Brooks and Gonzáles-García 2001). This is surprising given the relatively large amount of successional forest in the SFFOQ. The importance of habitat heterogeneity for food availability, nesting sites, and movement has been documented for other cracids (Strahl et al. 1997, Santamaria and Franco 2000, Brooks and Gonzales-García 2001, Parra et al. 2001). Habitat heterogeneity also created temporal variation in fruit availability both between and within habitats, and influenced movements of Salvin's Curassows (*Mitu salvini*) (Santamaria and Franco 2000, Parra et al. 2001). A factor potentially influencing the density of guans on our study area was the connection of the SFFOQ to the heavily forested Ucumari Natural Reserve. This large (3,980 ha) reserve could be an important source region for Sickle-winged Guans.

We observed Sickle-winged Guans in all forest types available within our study site and one of the ash plantations. This guan seems to be a habitat generalist, as all habitats were used in proportion to their availability. The use of secondary forest and plantations is important for population growth and colonization of restored areas within a fragmented landscape.

*Group Size and Foraging Height.*—Guans were mostly observed alone or in pairs traveling in the middle strata of the forest. We observed few family groups in contrast to reports from other sites where groups of up to eight individuals have been detected in fruiting trees (Salaman et al. 2001). Our observations agree with most of the previous group sizes observed for members of this family (Delacour and Amadon 2004).

Delacour and Amadon (2004) suggested that *C. goudotii* is mainly terrestrial, but most of our detections were of individuals in trees supporting the idea this guan is mainly arboreal (Johnson and Hilty 1976, Hilty and Brown 1986, Remsen and Cardiff 1990). Sickle-winged Guans were detected on the forest floor but most of these records corresponded to individuals capturing invertebrates while following army ants. Sickle-winged Guans are large and heavy, which may reduce maneuverability in trees and their ability to capture invertebrates or other animals. Use of the forest floor can be important for acquisition of protein-rich invertebrates (Robert et al. 1995, Klasing 1998). Cracids have been reported as rare army ant followers (Willis and Oniki 1978). Guans were among the birds most frequently detected at army ant swarms at our study site, where ''professional'' ant-following species are absent. There are no previous records of Sickle-winged Guans and few records of other cracids, as ant followers in highland habitat (Vallely 2001); one exception is the Cauca Guan (*Penelope perspicax*) within our study area (Rios et al. 2006).

*Diet.*—Previous reports of the diet of Sickle-winged Guans have concluded that fruits,


FIG. 4. Reproductive evidence of Sickle-winged Guans in the SFFOQ during June 2002 to December 2003. (A) Nest in an epiphyte (*Anthurium* sp.) on 6 May 2003. (B) Eggs in Sickle-winged Guan nest on 6 May 2003. (C) One-week-old Sickle-winged Guan chick hatched from egg found on 6 May 2003.

leaves, and flowers are the most important food items (Johnson and Hilty 1976, Ridgely and Gaulin 1980, Cardiff and Remsen 1981, Remsen and Cardiff 1990, Nadachowski 1994, Renjifo 1997). We also observed the diet of Sickle-winged Guans mainly consists of fruits, similar to what has been reported for other members of the Cracidae family (Galetti et al. 1997, Strahl et al. 1997, Santamaría and Franco 2000, Brooks and Gonzales-García 2001). Sickle-winged Guans ate a variety of fruit (24 species) but fed mostly on *A. muca* (Lauraceae) and *O.* aff. *floribundum* (Araliaceae). The lipid content of *A. muca* is low (2.8%). In contrast, *O.* aff. *floribundum* has a high lipid content (27.2%) compared with other items in the diet (Muñoz 2003) and other neotropical fruits (Moermond and Denslow 1985). The large difference in lipid content between the two major fruits eaten by Sickle-winged Guans suggests that other factors are also important in fruit selection (e.g., availability of other items, physiological requirements). Although these two trees are not abundant in the area (M. M. Rios et al., unpubl. data), they provided an important food resource during a low fruit production period in our study (Muñoz 2003).

Fruits are generally low in protein and lipids in contrast to seeds and invertebrates (Klasing 1998). The Sickle-winged Guan does not eat seeds and must consume invertebrates to gain the protein lacking in fruits. Invertebrates accounted for a small percentage (5.4%) of the diet, but likely contained sufficient protein to meet nutrition requirements (Morton 1973, Moermond and Denslow 1985, Karasov 1990). Invertebrates are regularly reported in the diet of terrestrial cracid species (Sermeño 1997, Santamaría and Franco 2000, Jiménez et al. 2001), but there are few reports of invertebrate consumption by arboreal guans

(Strahl et al. 1997, Brooks and Gonzales-García 2001, Muñoz 2003). This could be a result of the short time period over which feeding observations are usually gathered or the difficulty in detecting consumption of invertebrates.

*Reproduction.*—Reproductive information on cracids is scarce (del Hoyo 1994, Strahl et al. 1997, Brooks and Gonzales-García 2001, Delacour and Amadon 2004). Most reported nests of *Chamaepetes* have been built on and with epiphytic plants (Hilty and Brown 1986, Stiles and Skutch 1989, Greeney 2005, this study) in contrast with lowland cracids that use small branches and vines as nesting material (González-García 1997, Santamaria and Franco 2000, Delacour and Amadon 2004). Nests of other highland guans were also found in places where epiphytes are concentrated (González-García 1997). Previous observations suggest that cracids do not transport materials to build their nests (del Hoyo 1994, Nadachowski 1994, Silva 1996, González-García 1997, Santamaria and Franco 2000, Mamani 2001, Delacour and Amadon 2004). Epiphytic plants may have an important role in habitat selection by highland cracids by providing nesting sites because availability of locations with thick vines and lianas that lowland species use for nesting is reduced in the highlands (GAL, pers. obs.). However, there are reports of some highland guan species building nests with vines and branches (Salaman et al. 2001, Rios et al. 2006). If epiphytic plants have an important role in reproduction of highland cracids, this may suggest that old-growth habitat and well established secondary growth habitats are important for reproduction, as younger habitats and ash plantations are unlikely to have many epiphytic plants. During our study we did not record a male performing the wing drumming display in younger habitats or ash plantations, suggesting that Sicklewing Guans may not use these habitats for nesting. More information is needed to evaluate the importance of epiphytic plants for nesting of highland guan species.

Our observations suggest that incubation in *C. goudotii* is only by the female as reported previously for other cracids (Mamani 1997, Sermeño 1997, Santamaría and Franco 2000). The eggs we found were different in color and pattern than those reported by Salaman et al. (2001) which were covered with fine pale brown speckles, but similar to those reported by Hilty and Brown (1986), Nadachowski (1994), Strewe (2001), and Delacour and Amadon (2004). Our data suggest the breeding season of *C. goudotii* occurs from January to July in the SFFOQ, as has been reported elsewhere for Sickle-winged Guans in the northern Andes (Hilty and Brown 1986, Fjeldså and Krabbe 1990, del Hoyo 1994, Salaman et al. 2001, Strewe 2001, Pulgarin-R 2004), and overlapping with the peak in reproduction of the entire bird community in the area (Naranjo 1994).

The information on appearance of Sicklewinged Guan fledglings available in the literature is ambiguous. Our observations are concordant with the description by Fjeldså and Krabbe (1990) but contrast with the account of Salaman et al. (2001) and Greeney (2005), who described fledglings as being sooty black, except for the head, which is glossy black with a buff lateral crown stripe that extends to the edge of the mantle, but does not merge. Most of the fledglings and juveniles we observed were accompanied by females and only occasionally by males, suggesting that females have a greater role than males during incubation and fledgling periods.

Future studies of this species should focus on nesting requirements, diet, and movements to better understand how current and future fragmentation events (or habitat restoration) may affect population density and movements (Latta et al. 2005). Comparative studies on reproductive success between Sickle-winged Guan populations in restored and mature continuous forest are also needed.

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