

Sound production and reproductive biology of the Highland Guan in El Salvador's Montecristo Cloud Forest

Some observations of a little-known denizen of the high elevation forests

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INTRODUCTION

THE HIGHLAND GUAN, also known as the Black Chachalaca (*Penelopina nigra*), a pheasant-sized member of the family Cracidae, is a little-known inhabitant of densely forested highland pine-oak and cloud forests of Central America. These birds range from southern Mexico (Oaxaca) to north-central Nicaragua (A.O.U., 1983) but owing to habitat destruction, they are becoming increasingly rare.

This report is based upon field observations made during 1977 and 1978 while the author worked in El Salvador's largest remaining cloud forest located at the point where El Salvador, Guatemala, and Honduras meet.

Description of the study area

THE MONTECRISTO CLOUD FOREST surrounds four mountain peaks with ele-

vations up to 2418 meters. The study was conducted in the zone between 1600 meters and the peaks of these mountains.

The area falls mostly within the subtropical lower montane wet forest life zone as defined by Holdridge (FAO 1975). Local residents refer to the forest as the "bosque nebuloso" or cloud forest due to the cloud formations that envelop the mountaintops a portion of each day. The dominant trees in this forest are evergreen oaks (*Quercus* spp.). An abundance of ferns occurs and epiphytic plants are conspicuously present throughout the area. Much of the land lying below 2100 meters has been altered radically by human activity. This land is a patchwork of pasture, agricultural land, young secondary forest and brushland, and mature forests of oak and pine (*Pinus oocarpa*). The climate of the area is cool and humid. Temperatures generally range from 12° to 18°C and precipitation is 2000-

4000 mm annually and is most abundant during the months of May through October (FAO 1975). Above 2100 meters, much water reaches the soil owing to condensation on the forest canopy that falls to the ground.

Data collection

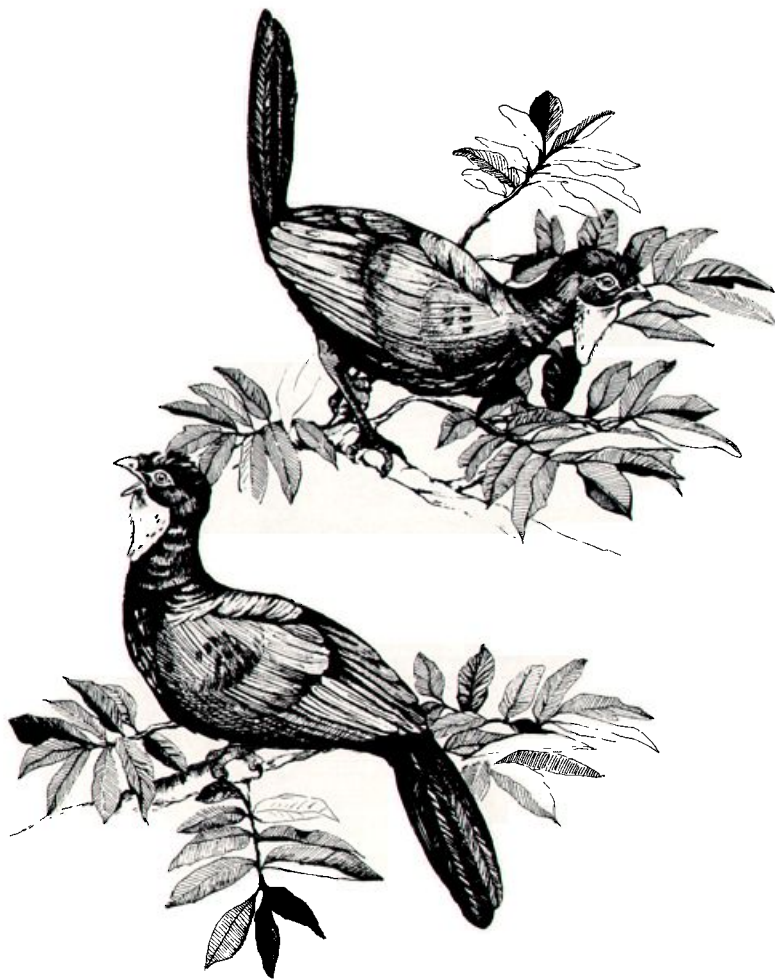
Data were collected from April 1977 through September 1978 during 5-7 day visits made at approximately monthly intervals. A total of 126 days was spent in the field. I observed guans while walking along the roads and trails located within the area. Observations were made during all hours of the day but work was more concentrated in early morning and late afternoon. I compiled data on singing, displays, male-female interactions, territoriality of male birds, and nesting and brood rearing activity of the female.



View of the Montecristo mountain range showing the cloud formations that typically envelope the mountaintops each morning.



Agricultural clearing in the cloud forest — a primary cause of habitat loss. All photos/T. Pullen, Jr.



Upper: posture of the adult male prior to beginning a "drumming" display glide. Lower: posture of the male while producing the whistle vocalization.

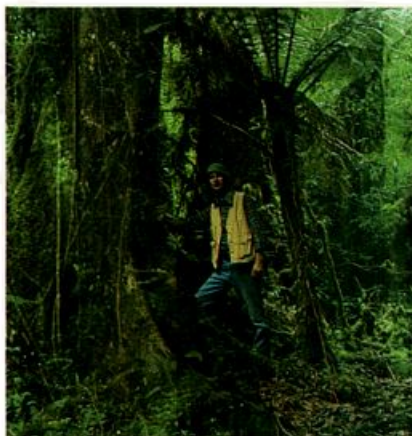
RESULTS AND DISCUSSION

THERE WAS A TOTAL of 121 sightings of guans. Birds usually occurred either singly, in pairs (not necessarily of the opposite sex), or in small groups of from three to five individuals. Males and females were seen together during all months except May, and sightings were most frequent during the month of March. Most birds sighted were males.

Vocalization and other sound production

Sound production was conspicuous only during the spring months and then only in the male. Two distinctive sounds were produced. One, clearly a vocalization, has been described by Land (1970) as being a "long whistle steady in volume but rising in pitch over about a two-

octave range". It appears to function primarily as the territorial song of the male and was commonly heard during the months of January through May but most often during March. Males were ob-



Typical forest habitat where guans live.

served whistling while on the ground and in trees.

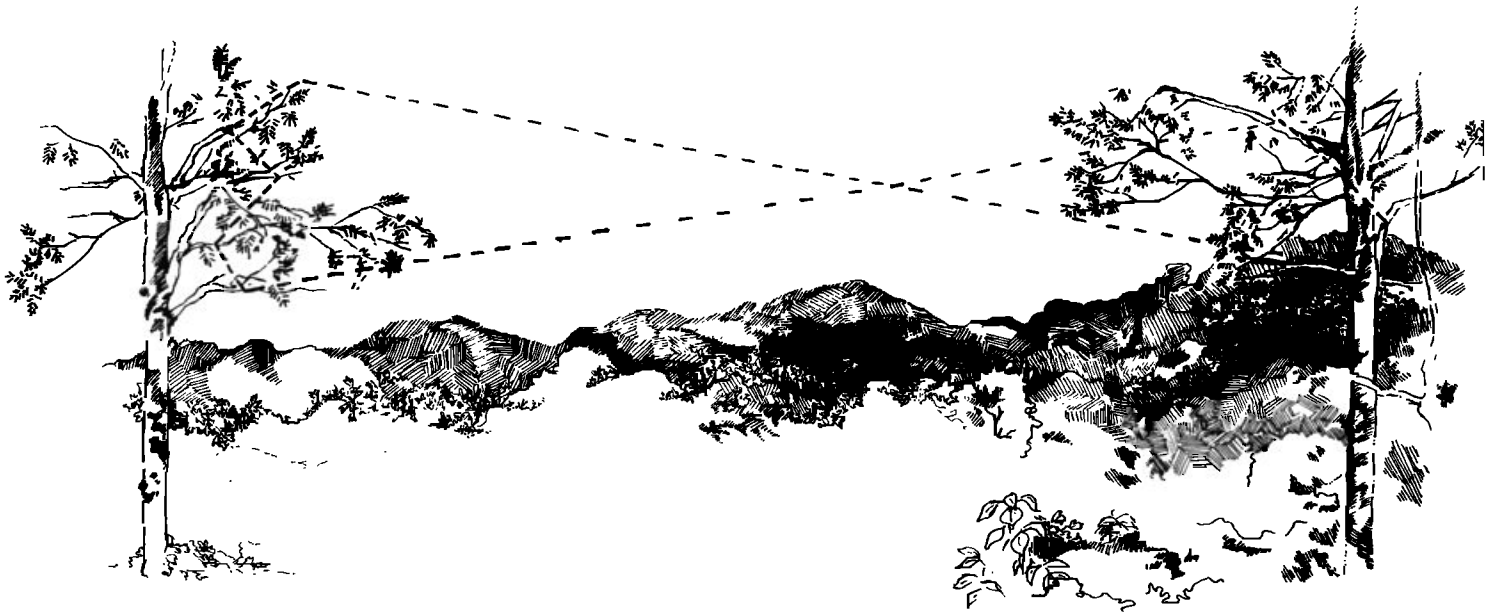
The second sound can best be described as a ripping or drumming sound. It is very similar to the sound of a piece of cloth being forcefully torn. This sound is probably the same as the "loud crack followed by a cascade of descending notes" described by Land (1970). These sounds were heard during the same period as the whistle vocalizations. They were produced by males gliding downward toward the ground from tree tops or as birds glided from tree to tree. The drumming sounds appear to be produced by the wings. I observed closely the production of these sounds on three occasions. It seems obvious that the "loud crack" described by Land was produced by a slapping together of the wings either above or below the body, and that the "cascade of descending notes" following was due to vibration of the primary wing feathers as the bird glided with wings outstretched. On two occasions, I clearly saw the vibration of feathers as a bird glided directly overhead. A similar means of sound production in the Black Guan (*Chamaepetes unicolor*), a related cloud forest species found in Costa Rica and Panama, has been described by Skutch (Skutch, ms. cited by Delacour and Amadon 1973).

Display behavior

Both whistling and drumming were part of a display ritual occurring in small forest clearings. In such areas, a male would glide or climb to the top or near the top of a tree on one side of the clearing, and then, glide downward and across the clearing to a second tree, producing the drumming sound as he flew. He would then hop from branch to branch until



Female guan incubating egg in nest in the crown of a giant tree fern.



Typical glide path of the adult male between trees during the "drumming" display. Drawings/T. Pullen, Jr.

reaching the top of this second tree and then glide downward and in the direction from which he originally came. Often this flight pattern would be repeated several times with the drumming sound being produced during each glide. Between glides, the bird whistled at intervals as he hopped upward in the trees in preparation for a new flight. I never observed a male producing the whistle vocalization while in flight, although such has been reported by Rowley (Rowley, cited by Delacour and Amadon 1973). Males were seen utilizing the same display area day after day but no females were observed in the area while the displays were being conducted. On several occasions, playback of a tape recording of the whistle vocalization in the vicinity of a displaying male elicited its immediate approach, perhaps indicating that this display functions in territorial advertisement.

Nesting and brood-rearing behavior

Only one active nest was found. I observed a female incubating a single egg in this nest May 8, 1978. The nest was located in a virgin cloud forest area at an elevation of about 2050 meters. It was situated about 5 meters above the ground in the crown of a giant tree fern (*Dicksonia gigantea*) growing on a southwest facing slope. I observed the incubating

female for about 15 minutes before she flushed. I returned to this nest again May 23 and found it abandoned. The single egg was still present and unbroken.

Eight observations of young in varying stages of maturity were made during April, May, June, July, and November. No more than two were seen with each female and in only one case was a male sighted nearby. Two of the sightings (in April) were of females with recent hatchlings that probably were less than one week old.

Nesting season

Dickey and van Rossem (1938) reported the collection of a female in laying condition in the Montecristo area on February 26. Their observation plus my observations of singing males and of females nesting or accompanying newly hatched young lead me to conclude that the probable peak period of incubation and hatching is from late February through April. This period coincides with the period of peak activity of singing males and is the height of the dry season (FAO 1975).

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