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RELATIVE USE OF SECONDARY FORESTS BY CRACIDS IN CENTRAL AMAZONIA[1]

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INTRODUCTION

Curassows, guans, and chachalacas (family Cracidae) are large-bodied (400 g to 3500 g) galliform birds found exclusively in the Americas, with most species restricted to South America (Delacour & Amadon 1973, del Hoyo 1994). Despite their important role in forest dynamics as dispersers of seed plants, most cracid species remain poorly known (Strahl & Grajal 1991).

Populations of most cracids are threatened in South America, especially due to habitat destruction and hunting. Cracids are considered sensitive birds, disappearing or decreasing in population size in areas subject to hunting pressure (Silva & Strahl 1991). Some species (*Crax* spp., *Mitu* spp.) require specific habitats comprised mostly of undisturbed primary forest (del Hoyo 1997). Others (*Ortalis* spp.), however, are adapted to disturbed areas such as secondary growth vegetation and abandoned pastures (Hilty & Brown 1986, Schmitz-Ornes 1996).

Deforestation is increasing in the tropics, and extensive areas of primary forest in South America are being replaced by secondary forests. Evaluating how cracids respond to this type of landscape change has important implications for conservation of these birds. Here I report the results of a study on the relative use of different types of secondary forest by several species of curassows, guans, and chachalacas. This report comprises part of a more complete community study of birds in secondary forests at central Amazonian sites (Borges 1995).

STUDY SITES AND METHODS

This study was conducted at six sites located ca. 80 km north of Manaus, Amazonas, Brazil (Table 1) in the study area of the Biological Dynamics of Forest Fragments Project (Bierregaard *et al.* 1992). The landscape in the study area is composed of a mosaic of forest fragments, large blocks of primary forest, sec-

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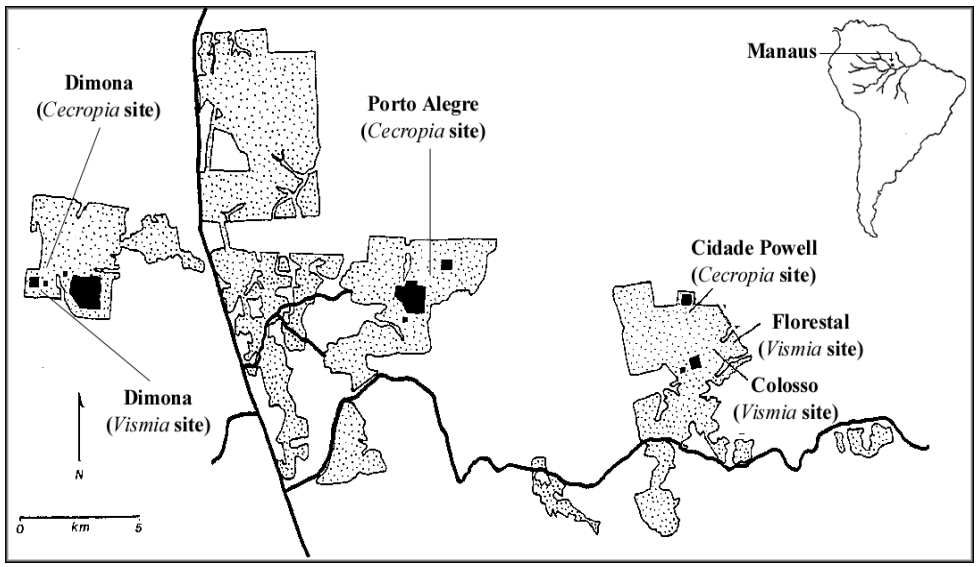

FIG. 1. Map of study sites showing forest fragments of 1-, 10-, and 100-ha (black areas), pastures or secondary forests (strippled areas), and primary forest (unstippled areas).

ondary forest, and abandoned pastures (Fig. 1). Secondary growth in the area can be classified roughly as either *Cecropia* (Moraceae) or *Vismia* (Guttiferae) dominated. *Cecropia* regrowth is generally associated with areas that were cut but not subsequent burned. These sites have a canopy height of ca. 15 m. *Vismia*-dominated study sites by contrast, are composed of old abandoned pastureland that was periodically cut and burned for more than 5 y. In this type of secondary forest the canopy averages 7 m in height. More disturbed *Vismia* sites contain large patches of grassland that are not otherwise occupied by successional vegetation. A more complete and detailed description of the study area is presented in Borges (1995).

Habitat use by cracids was estimated by calculating the relative frequency with which each species was observed. Relative frequency was calculated as the ratio of number of days a species was observed to number of days spent in field, expressed as a percentage. Though not a measurement of density, relative frequency provides a rough indication of abundance and habitat use by cracids. Observations were made by the author on 76 days from March to mid October l993, and were either vocal (*Ortalis motmot*) or visual (*Crax alector* and *Penelope* spp). Sampling effort was similar among habitat types and occurred principally between 06:00 and 15:00 hrs.

RESULTS

Five cracid species have been reported in the study area: Variable Chachalaca (*Ortalis motmot*) and Marail Guan (*Penelope marail*) are reportedly common; Spix's Guan (*P. jacquacu*) and Black Curassow (*Crax alector*) are uncommon; and Blue-throated Piping Guan (*Pipile cumanensis*) is recorded as casual (Cohn-Haft *et al.* 1997). In this study both *Crax alector* and *Ortalis motmot* were recorded in the secondary growth. Guans (*Penelope* spp.) were also recorded in secondary growth, but their

TABLE 1. Relative frequency of cracid species recorded at each study site. Numbers in parentheses are days of observation.

Study sites	Types of regrowth	Cracid species		
		Crax alector	*Ortalis motmot*	*Penelope* spp.
Dimona (14)	*Cecropia*-dominated	28.6 (4)	7.1 (1)	7.1 (1)
Porto Alegre (14)	*Cecropia*-dominated	0	14.3 (2)	7.1 (1)
Cidade Powell (12)	*Cecropia*-dominated	0	16.6 (2)	8.3 (1)
Dimona (13)	*Vismia*-dominated	15.4 (2)	23.1 (3)	15.4 (2)
Florestal (10)	*Vismia*-dominated	30.0 (3)	80.0 (8)	10.0 (1)
Colosso (13)	*Vismia*-dominated	46.1 (6)	30.8 (4)	0

secretive behavior did not permit species-level identification.

At least one cracid species was recorded on each of 41, or 54%, of the days spent in the field. *Ortalis motmot* was the most common species (relative frequency 26.3%), followed by *Crax alector* (19.7%) and *Penelope* spp. (7.9%). On the few occasions when direct observations were possible, *Crax alector* was observed in groups of 3 individuals, and *Ortalis motmot* in pairs. All direct observations of *Penelope* spp. were of solitary birds. *Ortalis motmot* and *Crax alector* were significantly more frequent in *Vismia*-dominated sites (Table 1; *G*-test with William's correction, df =1, $P < 0{,}01$). For *Crax alector*, this difference may be spurious because relatively open vegetation in this habitat facilitates observation of this species. A pair of *Crax alector* with a dependent chick was observed in an abandoned pasture area within a *Vismia*-dominated site (Colosso). It is further possible that a group of *Crax alector* is resident at the *Vismia*-dominated Florestal and Colosso sites. An abandoned nest, probably from *Ortalis motmot*, was also found at a *Vismia* site (Florestal). Guans (*Penelope* spp.) were observed feeding on pioneer plants including *Cecropia* spp. and *Bellucia* sp (Melastomataceae).

DISCUSSION

The use of secondary forest by *Ortalis* species is well known (Hilty & Brown 1986). Schmitz-Ornes (1996) found *Ortalis ruficauda* (Rufous-vented Chachalaca) nesting in secondary habitats, including agricultural fields, in Venezuela. Also in Venezuela, *Penelope argyrotis* (Band-tailed Guan) was found to increase in density in a partly secondary habitat that was free of hunting (Silva & Strahl 1991). The latter study suggests that hunting may have a greater impact on cracid populations than does quality of the habitat. At the sites I studied, hunting occurred at an unknown frequency, usually by weekend hunters from Manaus and by local farmers. Although the frequency of hunting at study sites is unknown, cracids still appear to be common locally.

The present study and others show that some cracid species can use secondary forests and may even breed in these habitats. Clearly, large areas of primary forest that are free of hunting are necessary for cracid conservation. However, the importance of secondary habitats should not be underestimated in planning strategies to protect these birds.

The ability to colonize secondary habitats probably varies among cracid species. It is

therefore important to extend studies on the use of secondary habitats to other cracid species at other localities in the Neotropics in order to more accurately assess the sensitivity of these species to habitat modification.

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REFERENCES

Bierregaard, R. O., V. Kapos, A. Santos & R. Hutchings.1992. The biological dynamics of tropical rainforest fragments. Bioscience 42: 859-866.

Borges, S. H. 1995. Comunidade de aves em dois tipos de vegetação secundária da Amazônia Central. M.Sc. thesis, Instituto Nacional de Pesquisas da Amazônia, Manaus.

Cohn-Haft, M., A. Whittaker, & P. C. Stouffer. 1997. A new look at the "species-poor" central Amazon: the avifauna north of Manaus, Brazil. Ornithol. Monogr. 48: 205-235.

del Hoyo, J. 1994. Family Cracidae (chachalacas, guans and curassows). Pp. 310-363 *in* del Hoyo, J., A. Elliot, & J. Sargatal (eds.). Handbook of the birds of the world, Vol. 2: New world vultures to guineafowl. Lynx Edicions, Barcelona.

Delacour, J., & D. Amadon. 1973. Curassows and related birds. Amer. Mus. Nat. Hist., New York.

Hilty, S. L. & W. L. Brown. 1986. A guide to the birds of Colombia. Princeton, New Jersey.

Schmitz-Ornes, A. 1996. Ecology of the Rufous-vented Chachalaca *Ortalis ruficauda* and its sensitivity to human perturbances. Pp. 63-66 *in* Vielliard, J. M. E., M. L. da Silva, & W. R. Silva (eds.). Anais V Congr. Bras. Ornitol. Unicamp, Campinas, Brasil.

Silva, J. L., & S. Strahl. 1991. Human impacts on populations of chachalacas, guans, and curassows (Galliformes: Cracidae) in Venezuela. Pp. 37-52 *in* Robinson, J. G., & K. Redford (eds.). Neotropical wildlife use and conservation. Univ. of Chicago Press, Chicago.

Strahl, S. D., & A. Grajal. 1991. Conservation of large avian frugivores and the management of Neotropical protected areas. Oryx 25: 50-55.

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