

CURRENT STATUS AND CONSERVATION OF WILD AND REINTRODUCED WHITE-WINGED GUAN (*PENELOPE ALBIPENNIS*) POPULATIONS

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Resumen. – Conservación y estado actual de las poblaciones silvestres y reintroducidas de Pava Aliblanca (*Penelope albipennis*). – La Pava Aliblanca (*Penelope albipennis*) es un crácido endémico del Perú clasificado como críticamente amenazado debido a la cacería y pérdida de hábitat. Habita una angosta franja en los bosques secos del noroeste peruano, uno de los ecosistemas más amenazados del mundo. Se creyó extinta hasta su redescubrimiento en 1977. En 1978 empezó el “Proyecto de conservación de la Pava Aliblanca”. Las poblaciones silvestres han sido previamente evaluadas en 1978, 1987 y 1990, siendo estimada en 300 individuos. A pesar de que la especie está protegida por leyes nacionales, otras medidas de conservación se han tomado para asegurar su supervivencia en el largo plazo, incluyendo el conocimiento por el público, educación en escuelas locales, investigación y otras. Una de ellas es un programa de reproducción en cautiverio, que ha venido funcionando desde 1980, para proveer aves seleccionadas para dos programas de reintroducción, uno de ellos funcionando desde el 2001. En este trabajo presento resultados preliminares de un nuevo censo de la población hecho entre 2001–2005, y comparo los resultados con las tres evaluaciones previas, estableciendo una tendencia poblacional y haciendo recomendaciones para evaluaciones futuras. Además, analizo como las poblaciones reintroducidas y el sistema de áreas protegidas están contribuyendo a la conservación de las poblaciones silvestres. Además, evalúo las amenazas principales de la especie, dándoles jerarquía a las más serias y como pueden ser mitigadas. Proveo una nueva forma de evaluar el área de distribución de la Pava Aliblanca basada en investigaciones recientes, con nueva información sobre la composición del hábitat de la especie. Finalmente, hago recomendaciones para la conservación de la especie en el largo plazo.

Abstract. – The White-winged Guan (*Penelope albipennis*) is a Peruvian endemic cracid classified as critically endangered due to hunting pressure and habitat loss. It inhabits a narrow strip in the Peruvian northern dry forests, one of the world's most threatened ecosystems. It was thought to be extinct until its rediscovery in 1977. In 1978 the “White-winged Guan Conservation Project” began. The wild population has been previously evaluated in 1978, 1987 and 1990 and is estimated at 300 individuals. Although the species is protected by national laws, other conservation measures have been taken to insure its long term survival, including public awareness, education in local schools, research and other measures. One of these measures is a captive breeding program which has been in operation since 1980 to supply selected birds for two reintroduction programs, one of them running since 2001. Here I present preliminary results of a new population survey made from 2001–2005, and compare the results to the three previous evaluations, establishing a population trend and making recommendations for further surveys. I also analyze how the reintroduced populations and the protected areas system are supporting conservation of the wild populations. I also assess the main threats to the species, ranking the most serious and how they could be mitigated. I provide a new approach for assessing the White-winged Guans area of distribution based on recent

research, with new data on the species habitat composition. Finally, I make recommendations for the species long term conservation. *Accepted 24 October 2007.*

Key words: White-winged Guan, *Penelope albipennis*, Cracidae, conservation, critically endangered, reintroduction, Peru.

INTRODUCTION

The White-winged Guan (*Penelope albipennis*) is a cracid endemic to Peru. It is classified as critically endangered (BirdLife International 2000, Angulo *et al.* 2006, Brooks *et al.* 2006) and under the same category by the Peruvian legislation (Decreto Supremo N 034-2004-AG. 2004). This cracid is listed on Appendix I of CITES. Major threats for the species are hunting, habitat loss and fragmentation.

The White-winged Guan inhabits small ravines or “quebradas” and adjacent slope forest in a strip approximately 175–190 km long and 5–40 km wide. The distribution area lies inside the equatorial dry forests of the western slope of the main Andean chain in northwest Peru, which are part of the Tumbesian Endemic Bird Area (Stattersfield *et al.* 1998). These forests are considered threatened, outstanding in light of the biological distinctiveness on a global scale, and of maximum priority for regional conservation (Dinerstein *et al.* 1995). The current published distribution of the species is from 5°25'S–79°55'W to the north and 6°39'25"S–79°22'30"W to the south, between 300–1100 m. (Diaz & del Solar 1997, Ortiz & Diaz 1997).

The White-winged Guan was described in 1877 from three skins collected between 1876 and 1877, one of them from the vicinity of Tumbes city and two from the current known distribution. After these records, no other were made until 1977, when the species was rediscovered at Quebrada San Isidro (de Macedo 1979). In 1978, the first population survey was conducted and resulted in 62 individuals (Ortiz 1980). A second survey carried

out in 1987 reported 97 birds (Ortiz & Diaz 1997), and a third one in 1990 resulted in 153 birds (Diaz & del Solar 1997). In 1978 the White-winged Guan Conservation Project began with a captive breeding program in Chiclayo city which, in 1980, moved near the town of Olmos where it now functions. This program holds 80 guans in captivity which are used for research, education and reintroduction/supplementation programs, where more than 65 guans hatched in captivity have been sent since 2000. The conservation project has been run by Asociación Cracidae Peru since 1995 which has developed, in coordination with INRENA (the Peruvian Natural Resources Agency), research on wild, released and captive populations (Angulo 2004, 2006), including diet determination, seasonal diet changes, and habitat characterization (Servan & Angulo 2006), public awareness campaigns, educational campaigns in schools in the guans range including theatre plays, public exhibitions and workshops, evaluation of local communities around the guans range (Moran *et al.* 2006), and the development of a national conservation strategy which is going to be published this year.

The White-winged Guan occurs in the Laquipampa Wildlife Refuge (LWR), a protected area created in 1982, specifically to protect this species, and holding a population of at least 22 individuals (Angulo & Aleman 2006). It is also found in the proximity of the Chaparri Private Conservation Area (CPCA) created in 2001. Both sites are located in Lambayeque department. There are unconfirmed reports of this species from the Cerros de Amotape National Park (CANP) in Piura, 200 km north of the present known distribu-

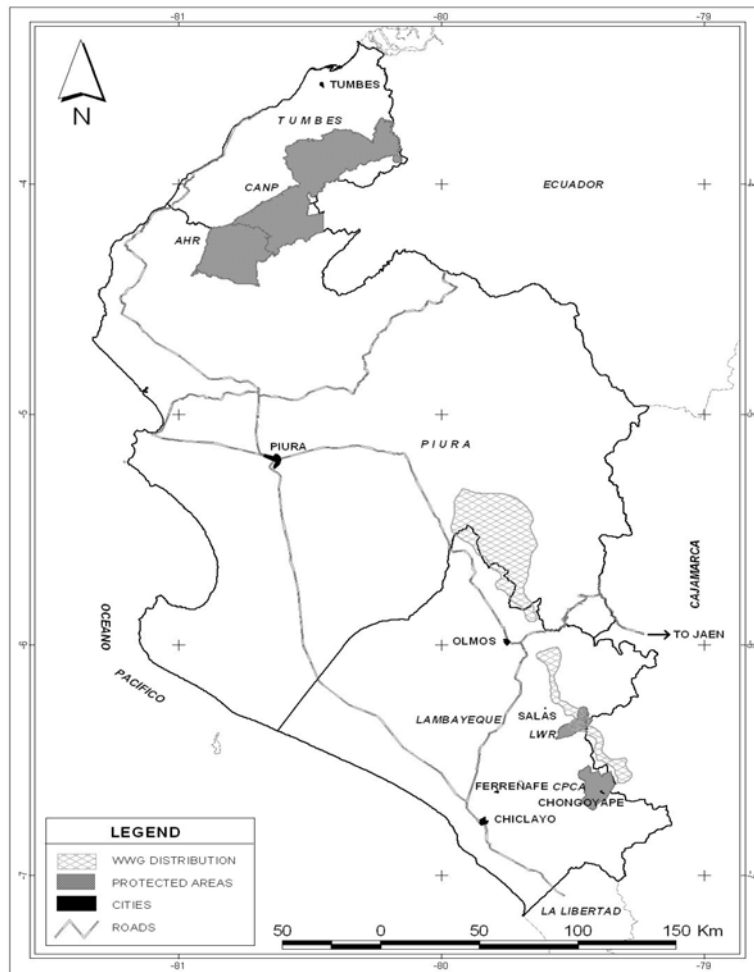


FIG. 1. Map showing the geographic distribution of the two (northern and southern) Peruvian metapopulations of the White-winged Guan (*Penelope albipennis*), the protected areas in the equatorial dry forests, and relevant cities and towns.

tion of the species. Both Laquipampa and Chaparri hold reintroduced individuals. The White-winged Guan reintroduction program began in CPCA in 2001 when 16 guans were released (Angulo 2004), and in LWR in 2007 when eight guans were released, after a reinforcement feasibility study specific for this protected area (Angulo & Beck 2004). The El Angulo Hunting Reserve (AHR), a protected

area 160 km north of the species current range, has been surveyed for feasibility of releasing guans, and is considered suitable (Angulo & Barrio 2004) (Fig. 1).

METHODS

Since 2001 I have been undertaking a new population survey, using methods similar to

Ortiz & Diaz (1997), but differing in the fact that I am using known localities (through interviews conducted in towns around the guans distribution) to determine sites to evaluate. Once the sites were determined, they were visited beginning at 05:00 h using auditory contacts. Once the birds were heard, they were sought for visual counting. This methodology incorporates both previously reported and unreported sites. Habitat use, elevation, diet and real and potential threats were recorded at the evaluated sites.

Characterizing and determining floristic composition of the arboreal-shrub stratum of guan habitat was evaluated using the Gentry Transects of 0.1 ha for rapid inventories (Gentry 1982). Sixteen plots were established stratifying the distribution in eight hydrographic basins, with two plots/basin (Servan & Angulo 2006).

RESULTS

Hunting still occurs despite public awareness and educational campaigns developed over the last 30 years. Hunters are both local people living within the guans distribution and foreign hunters from nearby towns and cities such as Salas, Ferreñafe, Chongoyape, Chiclayo and Piura. During research on wild and reintroduced populations over the last 5 years, evidence of poached guans (both reintroduced and wild) has been found (Angulo 2004). In both situations, when hunters were local people, they expressed that they did not know anything about the conservation of the species. Recent research on the human populations around the guans area of distribution demonstrates that hunting is not a regular practice but only opportunistic, with 15% of the population hunting sporadically (Moran *et al.* 2006). There is not a single family that bases its income on the hunting and selling of this

species, probably due to its small size (1.6 kg) compared to a white-tailed deer (*Odocoileus virginianus*) (30–50 kg) or collared peccary (*Tayassu tajacu*) (17–30 kg).

Habitat loss occurs throughout the guans distribution and is caused principally by agriculture and cattle ranching. Most of the agriculture is seasonal, during the rainy season (December–April) and only during years with rainfall. The most abundant crop is maize (*Zea mays*), and plantations occur on flattened areas on ridgetops with low slopes (≤ 45). There is also irrigated agriculture in the guans range but that occurs only in limited areas since water availability is very poor. Livestock ranching occurs mainly with cows, goats, and in lower proportions donkeys, horses and sheep. This practice damages scarce water sources in the dry forest and also reduces natural regeneration of tree seedlings, much of them forming part of the guans diet. Wood extraction is also a threat but is lower impact than hunting, since it is selective and on a small scale. Timber extraction is mainly for flooring (*Tabebuia guayacan* and *Loxopterygium huasango*), fruit boxes (*Bursera graveolens* and *Eriotheca Ruizii*), construction (*Muntingia calabura* and *Cordia lutea*), religious uses (*Bursera graveolens*) and others.

Long-term threats include habitat fragmentation with the wild population fragmented into two metapopulations (north and south), separated by the Chiclayo-Jaen-Tarapoto road and associated human colonization which act as a physical barrier (Angulo *et al.* 2006) (Fig. 1). This road climbs up to cross the Andean mountain ridge through the Olmos river drainage. Heavy human settlement on both sides of the road has cleared large areas of dry forest, where there are currently no guans. The implementation of an irrigation project on the lower areas west of Olmos town includes the construction of a tunnel to bring water from the Chamaya River on the east side of the Andes to the west side.

The tunnel construction, which is close and parallel to the Chiclayo-Jaen road is also clearing forests and keeping human settlements in the same area.

Results of the survey show guans as high as 1385 m a.s.l. in the Quebrada Shambo of the Laquipampa Wildlife refuge (Angulo & Alemán 2006), sharing at least 100 m elevation of habitat with the Bearded Guan (*Penelope barbata*), which is also found in this ravine from 1300 m a.s.l. up. The lower elevation at which the guans were found is at 500 m a.s.l. in several quebradas. The number of surveyed sites (that can include 1–8 quebradas) is 22, i.e., 14 at sites assessed in previous years and eight new sites. The total guan population found to date is 135 individuals, and the population estimation in these sites to date is 200, based on observations made in the field that include size and quality of surveyed ravines. The number of guans found in the northern population is 95 birds (70% of the total wild population), with 45 birds in the southern population. Of the total population, 22 wild birds were in a protected area (LWR) located in the southern part of the distribution. The distribution area extends over some 1553 km² (155,300 ha), i.e., 1206 km² (78%) in the northern part of the distribution, and 347 km² (22%) in the southern part. Using the number of guans (n = 153) resulting from the third survey (Diaz & del Solar 1997), the resulting density is of 1 guan/10 km².

Results of the floristic habitat characterization revealed 105 different species from 90 genera and 49 families, with a mean value of 258 ind./0.1 ha. The families with the highest species richness were Fabaceae (13), Solanaceae (11), Celastraceae (6), Boraginaceae and Capparidaceae (4 each). The most abundant families in terms of individuals were Fabaceae (29%), Bombacaceae (21%) and Celastraceae (7%). The most abundant four genera were *Erytheca* (Bombacaceae), *Pithecellobium* (Fabaceae), *Erythrina* (Fabaceae), *Maytenus*

and *Leucaena* (Fabaceae). The most abundant species were *Erytheca ruizii* (Bombacaceae), *Erythrina smithiana*, *Pithecellobium excelsum*, *Leucaena trichodes* (all Fabaceae), *Maytenus* sp. (Celastraceae) and *Celtis iguanea* (Ulmaceae) (Servan & Angulo 2006).

DISCUSSION

The results of the population survey presented here are partial (80% of the guans distribution) and are the result of the visits to both previous and new sites. New sites arise all along the guans range because 1) there are more people using the forests around quebradas, and therefore reporting guans existence, and 2) there is now no secretiveness to declare the guans presence since there is no fear of land expropriations for protected areas (before this fear existed).

The number of guans found to date (135 birds) is 88% of the 153 birds previously reported by Diaz & del Solar (1997); the difference in these two population estimates is not significant (χ^2 test, $P \leq 1.0$). The current area of distribution in the north can barely support more individuals, but in the southern part there are some areas that can be colonized both by released (or chicks from released birds) or wild individuals. Further surveys must focus on the list of quebradas surveyed, evaluating how the number of guans varies with time. A complete list of these data is being prepared (Angulo en prep.). New sites must be sought, especially at the northern and southern regions of the known distribution.

The northern White-winged Guan population supports the highest number of birds, 70% of the distribution range, and the most pristine habitat for the species. Habitat continuity in this part of the range is due to the lower elevation of the mountains, which limits water sources and makes watered agriculture difficult, keeping large areas of dry forest

intact. However, there is no established protected area in this part of the range. Establishing a protected area here is highly recommended. The Peruvian government will not create a state protected area in this part of the range since LWR exists, but there are private initiatives in Quebrada Frejolillo (Luis Alban pers. com.) to create regional protected areas to conserve White-winged Guan forests in the northern part of the species range. Further surveys in the Amotape National Park are recommended to determine if the species is present there. If so, a new protected population would exist that could be genetically “refreshed” with birds released at AHR.

The birds used for release are carefully selected from the breeding center, using only the first and second generation of birds, and principally parent-raised birds (Angulo 2006). The reintroduced/supplemented guan population is of at least 50 released or born-from-released guans occurring in two protected areas, both in the southern part of the species distribution. The birds released in CPCA do not appear to be dispersing outwards at present, probably because their food is being supplemented; since 2001 there have been 50 wild White-winged Guan chicks born from reintroduced birds at CPCA (Javier Vallejos pers. com) due to food availability. Along the southern part of the guans distribution, the remaining habitat and guan populations are highly fragmented, with populations being separated by up to 30 km. This fact makes further supplementation in the LWR strongly necessary, since this protected area is strategically located in the center of the southern metapopulation, and is also effectively protected. These conditions permit using this refuge as an effective release area that can supplement individuals in both directions (north and south). In the next two years we plan to release 16 birds there to help connect isolated populations, complementing this

with public awareness campaigns and habitat protection.

The major threats that the species faces have been exposed. Of them, fragmentation seems to have an effect that will not be appropriately mitigated. In this case, it is recommended to insure the survival of the two existing subpopulations. This must be done first by insuring the genetic viability of the populations through release of captive hatched individuals, and second by mitigating hunting and habitat loss in both subpopulations. Of these two threats, hunting is more deleterious to wild populations; the killing of an even low number of birds (8–10) can cause major effects on population stability and connectivity. Large areas with suitable habitat for guans have been found where the guans occurred many years ago, but in recent years have been locally extirpated due to hunting. This has caused a 30 km separation of two populations in the southern part of the distribution; if hunting persists, these two populations will remain isolated forever and experience genetic bottlenecks and other associated deleterious effects. On the other side, there are areas with a relatively high degree of habitat removal and disturbance due to agricultural development, but local people are respectful of the guans and a population of six birds survives with success. Since agriculture uses mostly slopes and not gallery forest adjacent to water courses, the impact of this is less damaging to the guans than hunting.

Long-term conservation of the White-winged Guan must first insure conservation of the two subpopulations using reintroduction/reinforcement and creation of protected areas. The most urgent action involves public awareness campaigns that convey the message about the guans conservation; its endemic and threatened status and, most importantly, successfully banning hunting. This must be

complemented with educational campaigns for school children.

With regard to the of the floristic characterization of the White-winged Guan habitat, it is interesting to note that the three most abundant genera, and the three most abundant species are important dietary items for the White-winged Guan (Ortiz & Díaz 1997, Serván & Angulo 2006). It is therefore necessary to focus further research on quantitatively determining the diet of this species and how it changes throughout the year, and between seasons.

ACKNOWLEDGMENTS

To Gustavo del Solar, who is a pioneer in the conservation work with this emblematic Peruvian species. To the personnel of the Asociación Cracidae Peru, especially to Luis Palomino for his invaluable help with the logistics in the field. To the Lincoln Park Zoo, Idea Wild, American Zoo and Aquarium Association, American Bird Conservancy, BirdLife International, and especially to Fundación Backus, the UNDP Small Grants Program and Cleveland Metroparks Zoo for financial support to this project. To INRENA for the technical and financial support, and for permitting research and liberation of White-winged Guans in Laquipampa. Special thanks to Anibal Calderon, Dante Aleman de Lama, Rosario Acero, Napoleón Duran and Violeta Valdivieso at INRENA. Thanks to the community of San Antonio de Laquipampa and Santa Catalina de Chongoyape, Asociación Naymlap, and Nature and Culture International for allowing many parts of this project to become a reality. Thanks to Pablo Venegas, Javier Barrio, Laura Cancino, Lino Rico, Emilia Bustamante, Arnold Servan, Jeremy Flanagan, and all field guides for help in field trips, and to Oscar Uchofen for producing the map. Finally, thanks to Dan Brooks

for the support from the Cracid Specialist Group.

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