REDISCOVERY OF THE DUSKY STARFRONTLET *COELIGENA ORINA*, WITH A DESCRIPTION OF THE ADULT PLUMAGES AND A REASSESSMENT OF ITS TAXONOMIC STATUS

Redescubrimiento del Inca Oscuro *Coeligena orina* con una descripción de sus plumajes adultos y una reevaluación de su rango taxonómico

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ABSTRACT

After being known only from the type specimen, an immature male, for over 50 years, the Dusky Starfrontlet *Coeligena orina* was rediscovered en 2004 at the type locality and another site 70 km to the south in the Western Andes of Colombia. Four specimens were collected, permitting the first descriptions of the adult male and female plumages. From these specimens we conclude that *C. orina* is a distinct species, probably most closely related to *C. bonapartei* and *C. lutetiae*, rather than a subspecies of the former (as it has been considered in much recent literature). It differs more in plumage colors and measurements from *C. bonapartei*, than do the races of the latter among themselves; the differences are comparable in magnitude to those between *bonapartei* and the sympatric *C. helianthea. C. orina* appears to be restricted to elfin forest and the páramo-forest ecotone between ca. 3100 and 3500 m in the northern part of the Western Andes. The type locality of Páramo Frontino is currently threatened, and effective protection measures are urgently needed. We recommend that based upon estimates of its current population size and limited available habitat, *C. orina* be classified as Critically Endangered.

Key words: *Coeligena orina*, Colombia, conservation**,** distribution**,** Dusky Starfrontlet, taxonomy**.**

RESUMEN

Después de ser conocida por 50 años apenas por el ejemplar tipo, un macho inmaduro, la Inca Oscura *Coeligena orina* fue redescubierta en 2004 en la localidad típica y en otro sitio 70 km al sur, en la Cordillera Occidental de los Andes colombianos. Se colectaron cuatro ejemplares, los cuales nos permiten realizar las primeras descripciones de los plumajes de los machos y hembras adultos. A partir de estos ejemplares podemos concluir que *C. orina* es una especie distinta, probablemente más emparentada con *C. bonapartei* y *C. lutetiae*, y no una subespecie de aquella (como la han considerado en la literatura reciente). Las diferencias entre *C. orina* y *C. bonapartei* son más grandes que las entre las subespecies de *bonapartei,* y son comparables a las entre *bonapartei* y su congénere simpátrica, *C. helianthea.* Al parecer, la especie está restringida al bosque enano y el ecotono bosque-páramo entre 3100 y 3500 m en la parte norte de la Cordillera Occidental. La localidad típica de Páramo Frontino está amenazada, y se necesitan urgentemente medidas efectivas de protección. Con base en estimativos de su tamaño poblacional y el área limitada de hábitat potencial disponible, recomendamos que *C. orina* sea clasificada como Críticamente Amenazada.

Palabras clave: *Coeligena orina*, Colombia, conservación, distribución, Inca Oscura, taxonomía.

INTRODUCTION

On 17 December 1951, Melbourne A. Carriker, Jr. collected a new hummingbird at 3200 m above the town of Urrao, on the east slope of Páramo de Frontino, Department of Antioquia, in the Western Andes of Colombia. It was described as a full species by Wetmore (1953), who believed the specimen (Fig. 1) was an adult. Bleiweiss (1988) re-examined the type specimen and discovered that it had numerous corrugations that are typical of immature hummingbirds on the maxillary ramphotheca. He noted that *C. bonapartei* attains the frontlet and black on the head with age, and concluded that the lack of a frontlet in *orina* might merely be another sign of immaturity. He added that he saw some bronzy reflections on the upper tail-coverts and belly of the type of *orina*, a feature not mentioned in the type description, and that immatures of *C. bonapartei* attain more bronzy feathers on the belly and rump with age. He suggested that the same could be the case for *orina*, and concluded that on basis of the characters that were not age-related, *orina* might be a subspecies of *C. bonapartei*, and that it was better treated as such until the adult was known. He did not compare *orina* with any other congener. All subsequent authors (e.g., Schuchmann 1999) followed the taxonomy suggested by Bleiweiss.

For over 50 years the specimen remained unique, but in 2004 the first five authors launched an expedition to search for it at the type locality, where they secured an adult female at an elevation of 3500 m on 9 August and observed six other individuals. Two weeks later, on an independent expedition, PP and WM collected three additional specimens of *orina*, two adult males and a female, at 3320 m on a mountain 70 km to the south, Farallones del Citará. The four new specimens differ so much from adults of *C. bonapartei*, that we do not believe it correct to consider them conspecific; in fact, it is not at all certain that they are each other's closest relatives.

Figure 1. Underparts and upperparts of the immature male type specimen of *Coeligena orina* (Wetmore 1953) at the U.S. National Museum. Note the overall dark and dingy coloration, especially the dull abdomen and upper tail-coverts and the lack of a frontlet. Photos M. Milensky.

DESCRIPTION OF *C. ORINA*

Capitalized color names and color numbers are from Smithe (1975) (see also Figs. 2-3).

Adult male: ICN 35036, collected by P. C. Pulgarín (PCPR 152) on 23 August 2004; Museo Universidad de Antioquia MUA-AVP 508 collected by P. C. Pulgarín (PCPR 149) on 22 August 2004.

Crown, sides of head, and mantle velvety black, forehead with a frontlet that is glittering blue-green to golden-green, depending on viewing angle. Back and wing coverts Peacock Green (162C), upper back heavily suffused with black that fades posteriorly, green of lower back grading into bright iridescent golden Yellow-Green (58) on rump and upper tail coverts. Tail between Parrot Green (160) and Lime Green (159). Throat and breast Dark Green (262), strongly suffused with black that fades posteriorly. Central lower throat with a large Cobalt Blue (168) spot. Belly and under tail coverts iridescent golden Yellow-Green like rump, least iridescent on the under tail coverts. Bill black, feet blackish with whitish soles.

Adult female: ICN 35016, collected by N. Krabbe *et al.* on 9 August 2004; ICN 35037, collected by P. Pulgarín (PCPR 148) on 22 August 2004.

Crown, sides of head, mantle and wing coverts Peacock Green, feathers of crown and to a lesser degree nape and mantle with blackish tips and bases, producing a scaled effect. Rump, upper tailcoverts, and tail as in adult male, but rump somewhat less brilliant, and outer rectrix with an indistinct and narrow, dull buffy-white tip. Malar area and throat bright cinnamon-buff (between 123C, Yellow Ochre and 40, Cinnamon-Rufous), sides of throat with a line of green disks that broadens posteriorly, separating the immaculate buff area below the eye from that of the throat. Breast Parrot Green (160) or slightly lighter green, the medial feathers with narrow buffy fringes, belly bright iridescent golden Yellow-Green, somewhat obscured by dusky feather bases and medial buffy bars, under tail-coverts somewhat duller and narrowly edged with buffy. Bill and feet as in male, but soles whitish to pinkish.

Table 1. Measurements of selected species of *Coeligena*. All measurements were taken by FGS on birds captured in the field, or relaxed in the laboratory, because some measurements are difficult or impossible to take on dried study skins. All weights are field weights. All linear measurements in mm, taken to 0.1 mm with dial calipers. Means and standard deviations are given except for *C. orina*, for which the range is given.

Adult males **Species**	***helianthea***	***lutetiae***	***bonapartei***	***orina***
Sample size	13	10	18	2
Body mass - g	6.96 ±0.30	7.58 ± 0.59	6.81 ± 0.15	7.05 (6.9-7.2)
Exposed culmen	28.39 ± 1.32	30.89 ± 1.57	29.01 ± 0.73	32.15 (31.7-32.6)
Total culmen	32.29 ± 0.98	35.59 ± 1.90	31.74 ± 0.84	35.75 (35.7-35.8)
Wing (closed)	73.29 ± 1.60	75.49 ± 2.06	75.59 ± 1.60	74.90 (74.7-75.1)
Wing (extended)	81.94 ± 2.02	83.79 ± 1.86	84.31 ± 2.26	86.65 (86.5-86.8)
Tail length	45.67 ± 1.87	47.30 ± 1.51	44.79 ± 1.15	44.15 (43.9-44.4)
Tarsus length	6.11 ± 0.26	6.09 ± 0.27	5.84 ± 0.23	6.30 (6.2-6.4)

Adult females **Species**	***helianthea***	***lutetiae***	***bonapartei***	***orina***
Sample size	17	12	20	2
Body mass - g	6.31 ± 0.29	6.98 ± 0.49	6.42 ± 0.21	6.85 (6.7-7.0)
Exposed culmen	31.84 ± 0.72	32.74 ± 1.33	30.66 ± 0.99	35.60 (34.5-36.7)
Total culmen	36.36 ± 1.14	37.12 ±1.32	33.93 ± 1.11	40.05 (38.9-41.2)
Wing (closed)	69.57 ± 1.37	71.31 ± 1.91	70.69 ± 0.99	69.50 (69.4-69.6)
Wing (extended)	76.24 ± 1.47	78.52 ± 1.74	79.11 ± 1.74	77.30 (76.1-78.5)
Tail length	41.18 ± 1.91	41.76 ± 1.39	41.23 ± 1.20	42.80 (42.2-43.4)
Tarsus length	5.88 ± 0.33	6.01 ± 0.27	5.68 ± 0.23	6.15 (6.1-6.2)

The immature male type specimen (USNM 436219, see Fig. 1) differs from the adult males in several respects. It lacks the brilliant frontlet and resembles an adult female on the upperparts except that it is suffused with black and with more distinct scaling anteriorly. Below it resembles the adult male, but is less heavily suffused with black, the abdomen is less brilliant, and the blue throat patch is smaller and more irregular in shape (one feather growing in).

STATUS AND AFFINITIES OF *C. ORINA*

The four new specimens are all adults and none shows bronzy on the rump or belly, which are shining golden green. This suggests that the bronzy reflections reported in the type specimen of *C. orina* by Bleiweiss (1988), and which led him to believe that the adult might resemble *C. bonapartei* in rump and belly color, were the result of the feathers drying for over 35 years rather than being a feature overlooked by Wetmore. The new specimens of *orina* were compared with series of similarly-patterned Colombian congeners: *bonapartei*, *helianthea*, and *lutetiae* (see Table 1 and Figures 2-7). These four species probably form a clade, but it remains possible that *Coeligena violifer* of Peru and Bolivia also belongs here (Fjeldså & Krabbe 1990). They have allopatric distributions except for *C. helianthea* and *C. bonapartei*, which are partly sympatric in the Eastern Andes of Colombia.

The four species are similar in most aspects of their overall pattern, including blue throat patch and brilliant green frontlet in males, rufous throat in females, and dark tail. In overall pattern *orina* does resemble *bonapartei* quite closely, but there are definite differences that show more approach to the other two species, especially *C. lutetiae*.

The black on the head and mantle of male *orina* is much more strongly developed than in *C. bonapartei*, rather resembling that of male *C. lutetiae*, although extending less far posteriorly on the back. The black on the head and mantle in *bonapartei* is dark bronze green with a black suffusion confined to the crown and especially the nape, looking black from certain angles, dark green from others, and without dark scaling, rather than solid black as in *lutetiae* and *orina*, and the feathers of the throat and breast are glittering green without the black suffusion. The overall extent of black in male *orina* also resembles that seen in *C. helianthea.* All subspecies of *bonapartei* have the belly much more golden in hue than *orina*; nominate *bonapartei* is greenish-gold laterally to reddish-gold medially on the abdomen, the upper tail-coverts are still more reddish-gold, in both cases very different from the lime-green color of *orina* and the tail is a lighter, brighter golden-bronze. The frontlet is similar in extent and color in the two (but also in *lutetiae* and *helianthea*); the throat patch is notably bluer in *orina* than the violet hue of *bonapartei, lutetiae* and *helianthea*.

In females, *orina* also differs from *bonapartei* in several respects. The dark scaling on the crown of *orina* is absent in *bonapartei*. The buffy throat is more sharply defined, whereas females of *bonapartei* typically have more green speckling around the borders, and the line of green spots

Figure 2. The four specimens of *Coeligena orina* taken in this study. Left two birds: males. Note the flashing green abdomen and blue "stickpin", brighter green upper tail coverts and the extensive black "veiling" of the head to upper back, and sides of the throat and chest (the green frontlet is not visible in this view). Right two birds: females. Note the nearly solid green chest sharply set off from the buff of the throat, sootyscaling on the head and nape, brighter green rump. Photo PCP.

through the malar area is broader and more diffuse with much less tendency for an immaculate buff area below the eye. The feathers of the breast of *bonapartei* also have more extensive buffy fringes, giving this area a more mottled (buffy, heavily spotted with green) appearance in contrast to the relatively clean-cut appearance (nearly solid green breast sharply set off from the buffy throat) of *orina.* In this respect, females of *orina* resemble more closely those of *lutetiae* (save that in the latter, the green speckling of the sides of the throat and malar area is heavier with no buffy area below the eye). Female *lutetiae* are more uniform green below, without the flashing pale green on the abdomen of female *orina*.

In external morphology *C. orina* is decidedly longer-billed, sex for sex, than *bonapartei, lutetiae*, or *helianthea,* especially in females. Wing and tail lengths are fairly similar to those of *bonapartei, lutetiae* and *helianthea*; body mass appears slightly greater in *orina* than in *bonapartei* or *helianthea* but less than that of *lutetiae*. Apparently *orina* has slightly longer tarsi than the others. However, the small sample of *orina* precludes statistical analysis (Table 1). It is noteworthy that the bill of the type specimen appears shorter than those of the adult males, not unexpected given its immaturity and bill corrugations (which tend to disappear as the bill attains its definitive length).

One measure of species status for an allopatric form suggested by Johnson et al. (2000) is that the differences from its supposed closest relative (*C. bonapartei*) be comparable to those between the latter and any sympatric congener(s). Of the species considered here, only *helianthea* is sympatric with *bonapartei*, thus differences between *orina* and *bonapartei* should be similar in magnitude to differences these two. In bill and possibly tarsus lengths, both sexes of *C. orina* differ more from *C. bonapartei* than does *C. helianthea.* The same is true of the hue of the blue throat-patch (males) and the sharply defined throat set off from the nearly solid green chest with no buff, and the darker back feathers that can give a spotty appearance to this area (females). In the overall extent of black in the head, back and chest of the males, *C. orina* differs from *bonapartei* at least as much as does *helianthea. C. orina* is less different from *C. bonapartei* than is *C. helianthea* in the color of the rump, upper tail-coverts and tail, although the differences are equally clear-cut. Overall, the level of difference is comparable, suggesting that *C. orina* and *C. bonapartei* might coexist without interbreeding, were they to co-occur. In most characters, the differences between *C. orina* and *C. lutetiae* are as great or greater; only in the throat-chest pattern of the females are these two more similar than *C. orina* is to *C. bonapartei* or *C. helianthea*. Males of *C. lutetiae* have more black dorsally than any other species, but the black does not extend laterally onto the breast, and the abdomen, while green, is not glittering. *C.*

Figure 3. Front view of the four recent specimens of *Coeligena orina*. Left two birds: females. Note the bright rump and abdo men, sharply demarcated buffy throat, malar line of dusky-green spots separating immaculate buff suborbital and gular areas. Right two birds: males. Note the flashing green frontlet and blue stickpin of the males; both sexes have flashing lime-green abdomens and upper tail-coverts, brighter in males. Photo PCP

Table 2. Areas known to contain and possibly containing populations of *Coeligena orina* in the Western Andes of Colombia.

Location	Dept.	Elevation	Latitude	Longitude	Notes
Páramos de Paramillo	Antioquia	3 400 m	07°04'N	76°00'W	Probably occurs
Páramo de Frontino	Antioquia	4 080 m	06°28'N 7	6°06'W	**Type-locality**
Farallones de Citará	Chocó/ Risaralda/Antioquia	3 900 m	05°45' N	76°05'W	**Confirmed**
Cerro Tatamá	Risaralda/ Chocó	3 950 m	05°00'N	76°05'W	Possible occurrence
Serranía de Los Paraguas	Chocó	3 670 m	04°49'N	76°26'W	Possible occurrence
Farallones de Cali	Valle	3 750 m	03°26'N	76°45'W	Possible occurrence
Páramo de Argelia	Cauca	3 500 m	02°10'N	77°15'W	Unlikely to occur (southernmost páramo)

lutetiae has striking buffy secondaries, in pattern not unlike some races of *C. bonapartei*. *Coeligena helianthea*, which *C. orina* and *C. bonapartei* resemble in pattern but not in color, shows no pale on the secondaries.

A second criterion of Johnson et al. (2000) is that the allopatric form differ more from its relatives than do races of the latter among themselves. *C. lutetiae* is monotypic, but geographical variation has been described for *C. helianthea* and *C. bonapartei*. In *C. helianthea* geographical variation is slight, involving only a somewhat duller plumage and bluer belly and vent in males from Páramo de Tamá (*C. h. tamae*). Geographical variation in *C. bonapartei* is more pronounced, involving three races that differ from each other in the amount of rufous in wings and tail. Nominate *C. b. bonapartei* has no rufous in the tail. It is often described as also lacking rufous in the secondaries (e.g., Hilty & Brown 1986, Fjeldså & Krabbe 1990), but it does have some, though usually more or less concealed, in a majority of specimens of both sexes (Wetmore & Phelps 1952, FGS unpublished data). The secondaries are entirely rufous in the Venezuelan *C. b. eos*., which also has a rufous tail. The form *C. b. consita* of the Perijá mountains is intermediate in the amount of rufous in wings and tail. Both sexes of *orina* are longer-billed than any race of *C. bonapartei*, and have no rufous on the secondaries. Males have much more black dorsally and around to the chest. The most immediately striking difference of both sexes of *orina* from all races of *C. bonapartei* is the color of the abdomen and upper tail-coverts: lime-green vs. golden to reddish-gold. Because the areas of brilliant iridescence are arguably the most important in mate choice, in this critical feature *orina* is clearly set apart from all races of *C. bonapartei*, which are relatively uniform in this respect.

Figure 4. Dorsal views of males of four species of *Coeligena* of the Colombian Andes. Left to right: *lutetiae, orina, bonapartei, heli anthea*. Note the differences in rump and tail colors and extent of black above, as well as buffy secondaries of *lutetiae*. Photo PCP.

Because the differences between *orina* and its closest relatives are comparable to the differences between these relatives, including both sympatric and allopatric forms, and because *orina* differs much more from all three races of *C. bonapartei* than these races differ from each other, we recommend that *orina* is best considered a separate species rather than a subspecies of *bonapartei*. Without genetic evidence, we are hesitant to include it even in a superspecies with *bonapartei*, since it might prove to be more closely related to the geographically adjacent *lutetiae*.

ECOLOGY

On Páramo de Frontino *Coeligena orina* was uncommon in both elfin forest (Fig. 10) and tall humid forest at 3150 to 3500 m. From 6 to 15 August 6 individuals of both sexes were observed at 3150-3500 m, and none was seen at 2600 m from 15 to 18 August. At 3500 m it was seen feeding on insects in the Ericaceae-clad canopy of elfin forest. The stomach of the female netted at the edge of the forest contained remains of tiny parasitic wasps (Ichneumonidae and Chalcidoideae) and what appears to be a Psocopteran. One stomach of a specimen collected in Farallones de Citará con-

Figure 5. Ventral views of four species of *Coeligena.* Left to right: *lutetiae, orina, bonapartei, helianthea*. Note the more extensive black of the throat and chest , the more blue (less violet) throat-patch of *orina* and the different colors of the abdomen among the four species. Photo PCP.

tained remains of spiders (Araneae) and dipterans. In tall humid forest on Páramo de Frontino *orina* co-occurred with, and was outnumbered by, *C. torquata*. Both species visited the same flowers, a catkin-mistletoe *Aetanthus* sp. (Loranthaceae), which appeared to be the only plant flowering at the time with a corolla matching the bill of a *Coeligena*. Between 21 and 24 August *orina* was observed twice on Farallones del Citará in the canopy and middle strata of Ericaceae-dominated elfin forest at 3320 m. The specimens from Farallones de Citará were captured in mistnets on a grassy ridge close to the forest. None of the four adult specimens of *C. orina* had enlarged gonads. Three of them, including both females, were molting.

DISTRIBUTION

C. orina is known from two localities roughly 70 km apart, both in the northern end of the Western Andes: Páramo de Frontino (6° 26' N, 76° 5' W, 3150-3500 m), Depto. Antioquia, and Farallones de Citará (5° 45' N, 76° 5'W, 3320 m) on the border of Deptos. Antioquia and Chocó. The Western Andes is the lowest of the three major ranges in Colombia, being typically composed of Upper Cretaceous oceanic volcano-sedimentary sequences (MiningLife 2004). Its average ridgeline is 2,000 m and average width at the 1000 m contour is 40 km, and it has no snow-capped peaks and little páramo (Hilty and Brown 1986). As with several other high-elevation outcrops in the Cordillera, Páramo de Frontino is

Figure 6. Front view of four species of *Coeligena.* Left to right: *lutetiae, orina, bonapartei, helianthea.* Note the similarity in color of the frontlet, compared to the differences in colors of the rump and upper tail coverts (only *lutetiae* lacks flashing colors on these latter areas). Photo PCP.

underlain by a partially eroded caldera complex (c.30 km^2) (MiningLife 2004).

The known occurrence of *C. orina* is associated with the highest elevation peaks that contain páramo with associated elfin forest, a habitat absent at other well collected and thoroughly studied lower peaks in the Western Andes (e.g. Cerro Munchique), where the species appears to be absent. *Coeligena orina* seems to be tied to elfin forest-timberline-páramo habitats (and adjacent tall humid forest), which are restricted to only a further five localities in the entire Western Andes (see **Table 2**). We recommend searches for the species in those areas.

Whereas *C. orina* is confined to the Western Andes, the two similar and partly sympatric species, *C. bonapartei* and *C. helianthea*, are both confined to the Eastern Andes in Colombia. *C. lutetiae* is only found in the Central Andes and is thus geographically closest to *orina*. The ranking of *orina* as a subspecies of *bonapartei* would result in an extraordinary distribution, unlike any other species of upper montane forest and subpáramo in Colombia, none of which occur in the Eastern and Western Andes without also occurring in the Central Andes. Bleiweiss (1988) compared the distribution of *C. orina* to those of two hummingbirds with distinct races in the Western Andes, *Eriocnemis vestitus* and *Metallura williami*, but failed to mention that both these species are also represented in the Central Andes.

CONSERVATION

Coeligena orina is presently known from only two sites and additionally might occur only at the 4 sites along the Western Andes that hold páramos (see Table 2). The partially eroded caldera complex underlining Páramo de Frontino features

Figure 7. Underparts of females of four species of *Coeligena*. Left to right: *helianthea*, *bonapartei*, *orina* and *lutetiae*. Note the rel atively clear-cut posterior margin of the buffy throat in *orina* and *lutetiae* with the chest nearly solid green instead of largely buff spotted with green in *bonapartei* and *helianthea*, and the differently colored abdomens. The longer bill of *orina* is also evident. Photo FGS.

high-level, volcanic-hosted heavy metal mineralization from Upper Tertiary intrusions (Aspden et al. 1987, MiningLife 2004). Although not a historic mining district, dense high-grade gold, zinc and copper deposits hosted within the Páramo de Frontino Volcanic Complex have attracted the attention of mining companies. Fortunately, political instability in the region has deterred serious mining activities thus far. However, Páramo de Frontino is wholly unprotected and privately owned and has recently suffered considerable deforestation. The area of potentially suitable habitat for *C. orina* now may encompass no more than 25 km^2, although Frontino is by far the largest expanse of páramo in the Western Andes and the sole locality for the dominant plant *Espeletia frontinoensis.*

Farallones de Citará encompasses 17,390 ha of land above 2400 m under "Special Management" by the regional environmental agency CorAntioquia (Anonymous 1998). The range is an important watershed for the Municipalities of Andes, Ciudad Bolívar, Betania, Hispania, and others. The Farallones contains several prominent sharp peaks, including Cerro San Nicolás (05°40'N, 76°05'W; 3780 m), Cerro San Fernando (05°35'N, 76°03'W; 3810 m), and Cerro Caramanta (05°45'N, 76°05'W; 3900 m). This extreme topography effectively protects the area, although the extent of potentially suitable habitat above 3,150 m for *C. orina* may encompass no more than 50 km^2, with páramo being particularly sparse and largely restricted to the peak of Cerro Caramanta.

Figure 8. Treeline habitat of *Coeligena orina* on Páramo de Frontino. Photo JC.

Action proposed: *Coeligena orina* is considered to be facing a very high risk of extinction and therefore recommended for IUCN Red List status as **Critically Endangered** based on the following criteria: **B1a,b**: range size estimated at less than 100 km^2 [Critically Endangered]; and **C2a**: Population size estimated to number <250 mature individuals and declining [Critically Endangered].

We strongly support a recent (September 2004) proposal by the National Parks Administration (UAESPNN) and Municipality of Urrao to extend Las Orquídeas National Park to encompass adjacent Páramo de Frontino. This would expand the National Park from 32,000 ha (presently) to 61,000 ha and include an elevational gradient from 400 to 4,000 m. However, we are not sure just how effective this intervention would be, as Las Orquídeas National Park has been poorly protected and is presently under great pressure from illegal colonists who are cutting down the forest in several sectors. To be effective, any extension of this park would have to be accompanied by considerable financing to ensure its protection. For conservation to be successful in the area we recommend that alliances be established with local communities, including a strategy that considers private nature reserves, as well as research (the fauna of the area is largely unknown), environmental education, and sustainable alternatives to habitat destruction.

Land acquisition is highly recommended in the immediate short-term to ensure protection of the core Páramo Frontino population of *C. orina*. Such actions would also ensure the survival of other threatened species of birds such as the Rusty-faced Parrot *Hapalopsittaca amazonina* (Endangered) and the Moustached Antpitta *Grallaria alleni* (Vulnerable) (see Renjifo *et al.* 2002), both discovered at the same site (Krabbe *et al.* unpublished data). Further studies to determine the distribution and population size of *C. orina* are a high priority for the species' conservation, and would be of great importance in the development of a management plan

for the Páramo de Frontino area. Furthermore, we encourage 'rapid assessment' ornithological surveys to explore other páramos in the Western Cordillera to determine the species' presence and also to gain a greater understanding of this region's avifauna, which remains surprisingly little known (Flórez *et al.* 2004).

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