

Brotogeris versicolorus (Statius Müller, 1776) (Aves: Psittacidae): Introduced established population in Ecuador

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ABSTRACT: We report the first confirmed evidence of a feral introduced population of *Brotogeris versicolorus* (Statius Müller, 1776) in Guayaquil city, Ecuador, as part of the World Parrot Count led by City Parrots. A total of 216 individuals were counted, at two places within the city, but no direct evidence of breeding was found. A previously unpublished photograph suggesting nesting activity is also presented, along with brief comments on previous and additional observations and the conservation implications of this recently established feral species.

By 2001, Canary-winged Parakeet *Brotogeris versicolorus* (Statius Müller, 1776) was not yet reported for Ecuador (Ridgely and Greenfield 2001) even though previous authors suggested that it might occur in the far eastern Amazon lowlands, and it was ascribed to the Ecuadorian avifauna by Meyer de Schauensee (1970) apparently based on observations by Goodfellow (1902) in what is currently Peruvian territory (see also Parker *et al.* 1996, Ridgely and Greenfield 2001, UNEP WCMC 2004, BirdLife International 2011b). Early reports of Canary-winged Parakeet as likely occurring as an introduced species in Guayaquil city, southwest Ecuador, come from December 2005 when J. Navarrete (pers. comm.) noticed at least four birds at Los Ceibos urban park. In 2007, the species was seen by RN in a large flock of about 100 individuals in Barrio Centenario, Guayaquil city, feeding in *Ficus* Merr. (Moraceae) fruits and *Samanea saman* (Jacq.) Merr. (Fabaceae) flowers. The species was subsequently reported by N. Hilgert, C. Vinueza, J. Naranjo, and A. Ágreda (pers. comm.) at Guayaquil parks and the nearby Isla Santay National Recreation Area and Cerro Blanco Protected Forest, but no formal surveys have been performed, and no supporting evidence of the establishment of feral populations has been published to date.

Here we report results of parakeet population counts performed in eight sectors of Guayaquil city (22, 26 and 28 January 2011) as part of the World Parrot Count led by City Parrots. Counts were made in urban parks, streets and gardens with numerous trees. Four observers searching one in each cardinal direction and using 8 x 42 binoculars undertook censuses simultaneously, counting all parrot and parakeet species. Canary-winged Parakeets were noted at two sites (Barrio Centenario and Parque Forestal), totaling 216 individuals. Of them, only seven were observed at Parque Forestal, the remaining 209 at Barrio Centenario. Photographs of several individuals were taken (Figure 1), which constitute the first published evidence of a feral introduced population in Ecuador.

An additional observation by JAS on 22 December 2009 included four birds feeding on flowers of African tulip (*Spathodea campanulata* P. Beauv.: Bignoniaceae) tree at Parque Forestal.

Birds were identified as Canary-winged Parakeet based on variable, but extensive amounts of white on their inner remiges and pale bills (Forshaw 2010), even though birds depicted in Figure 1c show little white in wings. We follow Ribas *et al.* (2009) in considering this species separate from Yellow-chevroned Parakeet [*Brotogeris chiriri* (Vieillot, 1818)].

At Barrio Centenario we obtained seven independent counts as follows: Group 1: a flock of eight birds at Parque Trujillo; of them, one pair was feeding at *Ficus* sp. Merr. (Moraceae) tree of 18 m height; Group 2: 18 birds at Calle O'Connor; two of them perching and feeding on fruits of an introduced palm (possibly *Washingtonia* sp. H. Wendl.; Arecaceae); twelve perching and feeding on mango trees (*Mangifera indica* L.; Anacardiaceae); four feeding on flowers of an introduced palm (possibly also *Washingtonia* sp. H. Wendl.); Group 3: a total of 55 perching in two saman trees (*Samanea saman*; Fabaceae) at Calle Avilés, very vocal and active, allopreening pairs and trios; Group 4: a separate flock of 10 birds at Calle Avilés perching and feeding on a mango tree; Group 5: a flock of 30 birds in flight, at Calles Argüelles and Maracaibo; Group 6: three flocks joining in flight, totally c. 75 individuals, flying separately from groups 5 and 7; Group 7: another flock of 18 individuals two blocks ahead, flying in a different direction. Further, JAS observed another group (eight birds) in 30 April 2011 at Ciudadela Las Acacias, feeding in saman trees; Carlos Vinueza (*in litt.*, October 2011) observed a single individual feeding in a kapok tree (*Ceiba trichistandra* (A. Gray) Bakh.; Bignoniaceae) at Canoa trail, inside Cerro Blanco Protection Forest; and JAS observed another pair at Cerro El Carmen (3 November 2011). All observation sites are summarized in Table 1 and Figure 2.

We failed to detect breeding evidences in our January

2011 surveys or to recognize immature birds within the flocks, as differences from adult plumage are subtle (Schulenberg *et al.* 2007). However, a photograph taken in December 2005 by J. Navarrete (Figure 1c) shows a pair perched alongside a hole excavated in a termite nest that suggests breeding. Obvious increases in numbers observed since 2005 support the establishment of a feral breeding population.

The introduction of this species into the country can be explained in two possible ways: 1) illegal pet trade individuals from the Pacific coast, arriving from the Tumbes-Chiclayo region, Peru; or 2) illegal pet trade individuals from the Amazonian region of Ecuador, arriving from Iquitos, Peru. According to Gastañaga *et al.* (2010) a total of 31,000 White-winged Parakeets are likely traded annually in Peru, but it is not known if they are trafficked to – or within – Ecuador. Since at least 2007 the species has been noted in pet shops in Guayaquil (JAS, pers. obs.), but no formal counts of captive birds exist.

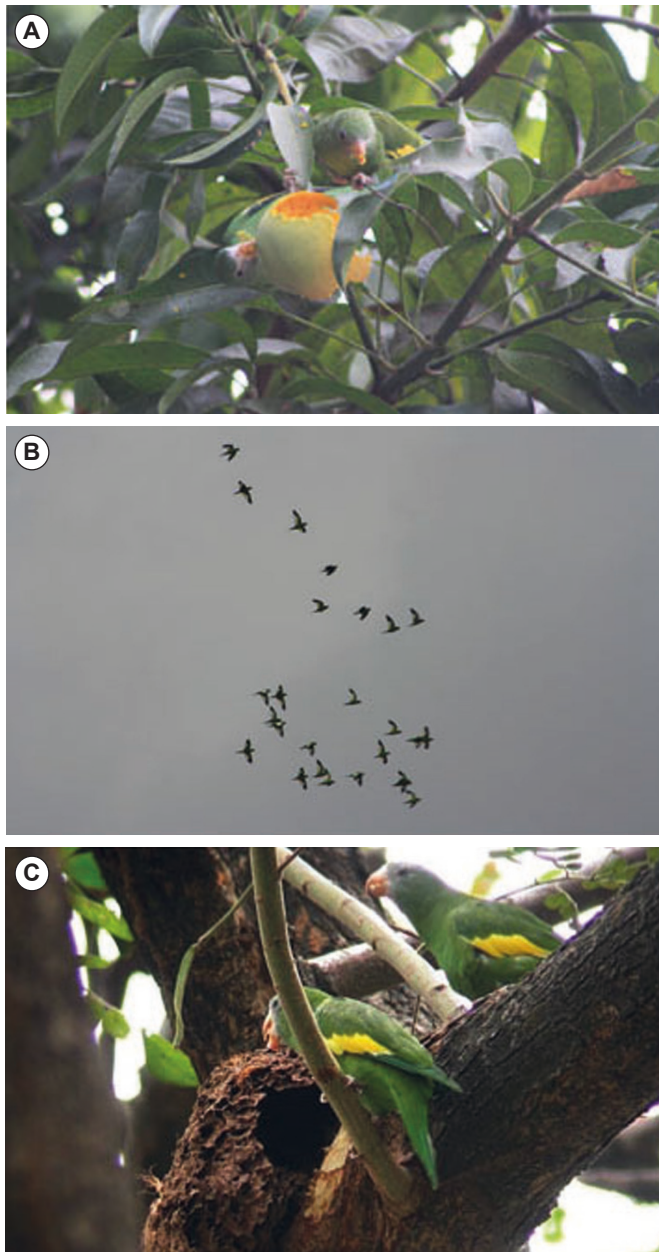


FIGURE 1. A) Canary-winged Parakeet *Brotogeris versicolorus* (Statius Müller, 1776) feeding on a mango fruit (JAS); B) a numerous flock (JAS); C) potential nest hole in an urban park of Guayaquil city (J. Navarrete).

Interestingly, to date the urban population of Canary-winged Parakeet is largely confined to Barrio Centenario, where large fruiting trees, including mango, palms, figs, and guava exist, but is likely spreading rapidly into other areas. Even though sampling was limited to few surveying days, the resident Grey-cheeked Parakeet *Brotogeris pyrrhoptera* (Latham, 1812) was largely outnumbered by its introduced congener. A total of 72 individuals of this nearly endemic and endangered parakeet were observed, but only 14 of them within Barrio Centenario, in the same streets and parks where Canary-winged Parakeet was numerous. A substantial decline in numbers of *B. pyrrhoptera* in Guayaquil has been noted, apparently due to decline in amount of natural vegetation within the city (RN and JAS, unpubl. data). These two factors (habitat loss and introduced potential competitor) might have serious effects on this species' populations, at least in Guayaquil and immediate surroundings, and this introduced potential competitor might become a new threat to this Endangered species (Best *et al.* 1995; BirdLife International 2011a).

At Isla Santay, populations are already established (first found by RN in 2008, feeding on *Erythrina* L. flowers) or at least occur there seasonally, following *Erythrina* flowering season. It has been suggested (N. Hilgert, *in litt.*, January 2009) that confiscated individuals were released by environmental officers, but personnel working at this protected area inform of no authorized releases in the area (A. Jaramillo, *in litt.*, September 2011).

A more thorough survey is needed in order to elucidate if these two parakeets are competing for resources. Additionally, a well-designed plan to control the invasive species is needed as to prevent further colonization of wild areas around Guayaquil city where populations of Grey-cheeked Parakeet are healthier (*e.g.*, Cerro Blanco Protection Forest, where few individuals of Canary-winged Parakeet have been seen and apparently were first released by environmental officers; RN pers. obs; or Manglares-Churute Ecological Reserve, where apparently it is not found yet).

TABLE 1. Surveyed localities in Guayaquil city during January 2011 counts and localities in Guayaquil and surroundings where Canary-winged Parakeet *Brotogeris versicolorus* (Statius Müller, 1776) has been recorded to date. Left column corresponds to numbers in Figure 2.

LOCALITIES		COORDINATES (UTM)	
No records			
1	Salado del Norte Protection Forest	02°09'27" S	79°54'8" W
2	University of Guayaquil-Medicine	02°10'51" S	79°53'57" W
3	University of Guayaquil-Philosophy	02°11'2" S	79°53'51" W
4	Sendero del Palo Santo Protection Forest	02°09'26" S	79°54'30" W
6	Parque Centenario	02°11'24" S	79°53'14" W
8	Estero Salado	02°11'9" S	79°53'51" W
9	Parque Rodolfo Baquerizo	02°53'10" S	79°53'45" W
10	Malecón Simón Bolívar	02°11'48" S	79°52'50" W
11	La Rotonda, at Malecón Simón Bolívar	02°11'34" S	79°52'46" W
Positive records			
5	Parque Forestal	02°12'45" S	79°53'40" W
7	Barrio Centenario	02°13'1" S	79°53'30" W
12	Las Acacias	02°13'33" S	79°54'4" W
13	Cerro Blanco Protection Forest	02°09'56" S	79°59'45" W
14	Isla Santay National Recreation Area	02°13'8" S	79°51'57" W
15	Cerro El Carmen	02°10'40" S	79°52'46" W

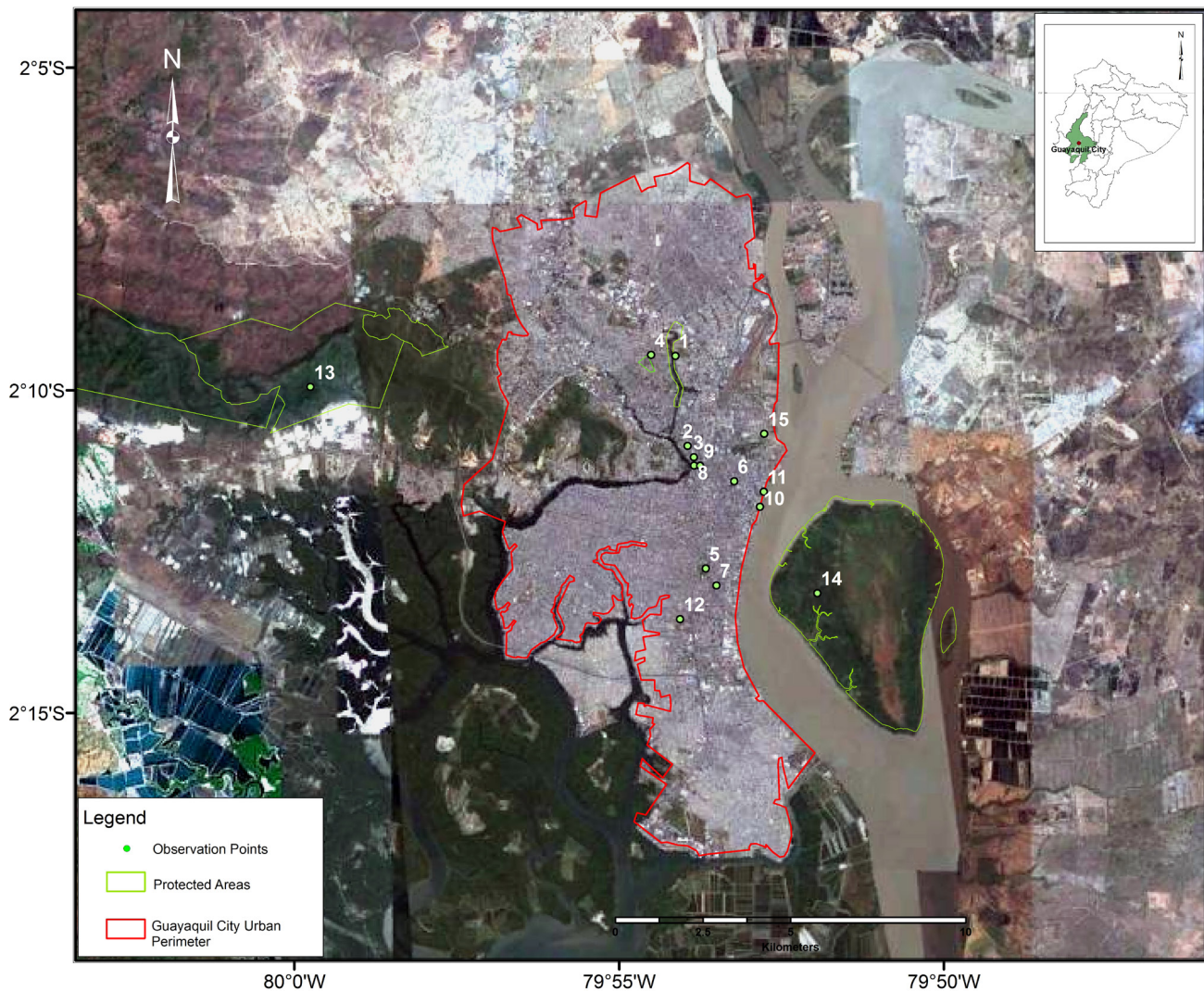


FIGURE 2. Map of Guayaquil city with localities where feral populations of Canary-winged Parakeet *Brotogeris versicolorus* (Statius Müller, 1776) have been observed (JAS).

ACKNOWLEDGMENTS: Our census was part of the World Parrot Count, promoted by R. Jonker and M. Braun, of City Parrots. Thanks to A. Ágreda, N. Hilgert, J. Naranjo, J. Navarrete, A. Jaramillo, and C. Vinuesa for sharing information on the species in Guayaquil. Thanks also to J. Navarrete for letting us publish his photograph, to S. Córdoba and L. Ratty for references provided, to Harold F. Greeney for grammatical corrections, and to R.S. Ridgely and an anonymous referee for their insightful comments.

LITERATURE CITED

Best, B.J., N. Krabbe, C.T. Clarke and A.L. Best. 1995. Red-masked Parakeet *Aratinga erythrogenys* and Grey-cheeked Parakeet *Brotogeris pyrrhopterus*: two threatened parrots from Tumbesian Ecuador and Peru? *Bird Conservation International* 5(2-3): 233-250.

BirdLife International. 2011a. *Species factsheet: Brotogeris pyrrhoptera*. Electronic database accessible at <http://www.birdlife.org>. Captured on 26 October 2011.

BirdLife International. 2011b. *Species factsheet: Brotogeris versicolorus*. Electronic database accessible at <http://www.birdlife.org>. Captured on 26 October 2011.

Forshaw, J.M. 2010. *Parrots of the world*. London. Christopher Helm. 584 p.

Gastañaga, M., R. Macleod, B. Hennessey, J. Ugarte-Nuñez, E. Puse, A. Arrascue, J. Hoyos, W. Maldonado-Chambi, J. Vásquez and G. Engblom. 2010. A study of the parrot trade in Peru and the potential importance of internal trade for threatened species. *Bird Conservation International* 21(1): 76-85.

Goodfellow, W. 1902. Results of an ornithological journey through Colombia and Ecuador. *Ibis* 8(2): 207-233.

Meyer de Schauensee, R. 1970. *A guide to the birds of South America*. Wynnewood: Livingston Publishing. 577 p.

Parker, T.A., D.F. Stotz and J.W. Fitzpatrick. 1996. Ecological and distributional databases. Pp. 115-436. In D.F. Stotz, J.W. Fitzpatrick, T.A. Parker and D.K. Moskovitz (ed.), *Neotropical birds, ecology and conservation*. Chicago: University of Chicago.

Ribas, C.C., C.Y. Miyaki and J. Cracraft. 2009. Phylogenetic relationships, diversification and biogeography in Neotropical *Brotogeris* parakeets. *Journal of Biogeography* 36(9): 1712-1729.

Ridgely, R.S. and P.J. Greenfield. 2001. *The birds of Ecuador*. Ithaca: Cornell University Press. 848 p.

Schulenberg, T.S., D.F. Stotz, D.F. Lane, J.P. O'Neill and T.A. Parker. 2007. *Birds of Peru*. London: Helm Field Guides. 656 p.

UNEP WCMC. 2004. *Review of significant trade. Analysis of trade trends, with notes on the conservation status of selected species. Volume 2. Animals*. Geneva. CITES. 160 p.

RECEIVED: December 2011

ACCEPTED: May 2012

PUBLISHED ONLINE: June 2012

EDITORIAL RESPONSIBILITY: Leandro Bugoni