

## AQUATIC WILD BIRDS KEPT CAPTIVE AT REMOTE COASTAL COMMUNITIES IN NORTHERN BRAZIL

### Aves acuáticas silvestres mantenidas en cautiverio en comunidades costeras remotas del norte de Brasil

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**ABSTRACT.-** The capture and maintenance of wild animals in captivity is still a problem in Brazil as it is in many other parts of the world. We surveyed the number and species of wild birds maintained in captivity at remote fishery and rural communities on the states of Pará and Maranhão, northern Brazil. A total 264 wild birds from four taxonomic orders were examined: Anseriformes (206), Charadriiformes (52), Ciconiiformes (4) and Pelecaniformes (2). None of the species recorded is considered threatened with extinction, however a few have decreasing population trends. Capture was mainly opportunistic, and birds were captured predominantly for meat consumption or maintenance as pets; American oystercatchers (*Haematopus palliatus*) were also used as ‘watchdogs’. A consistent pattern was noted in the species composition of the captive birds, with a higher frequency of Charadriiformes at coastal communities and Anseriformes at inland communities. Considering the precarious conditions in which the wild birds were found and the close proximity to synantropic and domestic animals, it is clear that opportunities exist for the transmission of infectious pathogens. **KEY-WORDS.-** Anseriformes, Charadriiformes, captivity, hunting, public health

**RESUMEN.-** La captura y el mantenimiento en cautiverio de animales silvestres todavía es un problema en Brasil así como en otras partes del mundo. Examinamos el número y las especies de aves silvestres mantenidas en cautiverio en comunidades aisladas rurales y de pesca en los estados de Pará y Maranhão, norte de Brasil. Se examinó un total de 264 aves silvestres de cuatro órdenes taxonómicos: Anseriformes (206), Charadriiformes (52), Ciconiiformes (4) y Pelecaniformes (2). La captura de las aves fue principalmente oportunista y tuvo como finalidad el consumo de la carne o su mantenimiento como mascotas. Los pilpilenes (*Haematopus palliatus*) también fueron utilizados como ‘perros de guardia’. Se observó un patrón consistente en la composición de especies de las aves cautivas, con una mayor frecuencia de Charadriiformes en las comunidades costeras y Anseriformes en las comunidades del interior. Ninguna de las especies registradas está considerada en riesgo de extinción. Teniendo en cuenta las condiciones precarias en que se observaron las aves y la proximidad con la fauna sinantrópica y doméstica, se concluye que existen oportunidades para la transmisión de patógenos infecciosos. **PALABRAS CLAVE.-** Anseriformes, Charadriiformes, cautiverio, cacería, salud pública

*Manuscrito recibido el 8 de julio de 2014, aceptado el 11 de diciembre de 2014.*

## INTRODUCTION

The consumption of bushmeat is an important source of protein for human communities around the world, especially in poorer regions such as tropical rainforests (Robinson & Bennett 2000, Davies 2002). Bushmeat consumption, however, may pose an important threat leading to the reduction and even extinction of wildlife populations, besides presenting a risk for the transmission of zoonotic pathogens (Peres 2000, Daszak & Cunningham 2002, Swift *et al.* 2007, Smith *et al.* 2012). Nearly 75% of emerging infectious diseases in humans are of zoonotic origin (Chomel *et al.* 2007), the majority of which originate in wildlife, through its extraction, consumption, and trade (Daszak & Cunningham 2002, Smith *et al.* 2012). Likewise, the maintenance of wild animals as pets also results in increased risks for the transmission of zoonotic pathogens (Chomel *et al.* 2007). Such wildlife-associated infectious pathogens may affect not only human health and agricultural production but also wildlife-based economies and wildlife conservation (Cleveland *et al.* 2001).

The habit of maintaining wild animals in captivity in Brazil dates back to the first years of colonization, as a symbol of richness, power and nobility (RENTAS 2001). The maintenance of wildlife in captivity is permitted only to those with specific government authorizations (Federal Law 9.605, 12th February 1998), however this culture persists across virtually all social classes and regions of the country (Alves *et al.* 2012). Every year as many as 38 million wild animals are taken from the wild

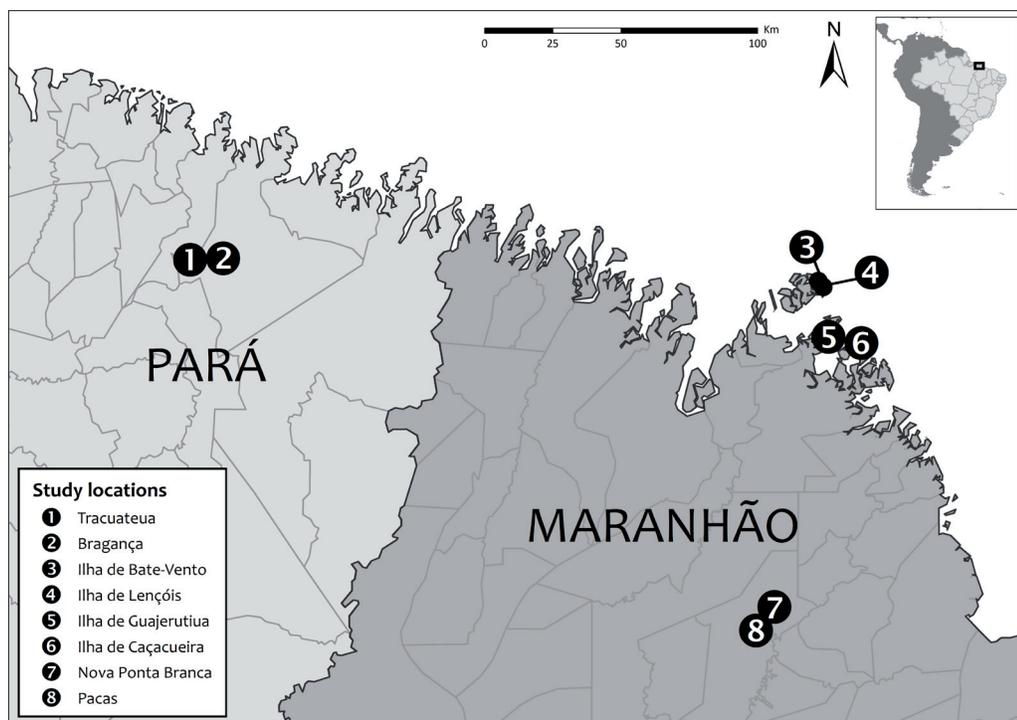
in Brazil, of which the vast majority are birds (RENTAS 2001). Wild birds are captured in Brazil for a variety of reasons, including medicine and folk magic purposes, meat consumption, crafting of jewels and clothing, among others, but the most frequent motivation is to serve as pets (RENTAS 2001, Alves *et al.* 2012).

In this study, we surveyed the number and species of wild birds maintained in captivity at remote fishery and rural communities on the states of Pará and Maranhão, northern Brazil.

## MATERIALS AND METHODS

Field expeditions were made to eight coastal communities known to have a history in capturing wild birds in the Brazilian states of Pará and Maranhão, at the municipalities of Tracuateua (location 1), Bragança (location 2), Serrano do Maranhão (locations 3 to 6), and Pinheiro (locations 7 and 8) (Figure 1). Locations 1 and 2 were visited in April and October 2009, locations 3 to 8 were visited only in May 2010. The study locations were small remote communities, in which the population depends largely on coastal resources (particularly fisheries) and subsistence farming. Human population density in the region is remarkably low (0.0018 – 0.034 inhabitants per km<sup>2</sup>, comparable to that of Greenland), and so is the Human Development Index (0.561 – 0.662, comparable to that of Botswana or Nicaragua) (PNUD 2003, 2013).

Community members were approached in an informal manner, to avoid producing mistrust or concern that they



**Figure 1.** Sampling locations along the coast of Pará and Maranhão states, Brazil.

**Table 1.** Wild birds kept in captivity at remote coastal communities in Northern and Northeastern Brazil.

|                                | Tracuateua | Bragança | Bate-Vento | Lençóis | Guajerutua | Caçacueira | Nova Ponta Branca | Pacas | Total |
|--------------------------------|------------|----------|------------|---------|------------|------------|-------------------|-------|-------|
| <b>Anseriformes</b>            |            |          |            |         |            |            |                   |       |       |
| <i>Amazonetta brasiliensis</i> | 1          | 1        | 4          | -       | -          | 1          | -                 | -     | 7     |
| <i>Dendrocygna autumnalis</i>  | 68         | 18       | -          | -       | -          | -          | 65                | 1     | 152   |
| <i>Dendrocygna viduata</i>     | 3          | 3        | 2          | -       | -          | 2          | 34                | 3     | 47    |
| <b>Charadriiformes</b>         |            |          |            |         |            |            |                   |       |       |
| <i>Aramides cajanea</i>        | -          | -        | 1          | -       | -          | -          | -                 | -     | 1     |
| <i>Eudocimus ruber</i>         | 1          | -        | -          | -       | -          | -          | -                 | -     | 1     |
| <i>Haematopus palliatus</i>    | -          | -        | -          | 2       | 1          | 2          | -                 | -     | 5     |
| <i>Himantopus mexicanus</i>    | -          | -        | 20         | 2       | 3          | -          | -                 | -     | 25    |
| <i>Jacana jacana</i>           | -          | -        | 2          | -       | -          | -          | -                 | -     | 2     |
| <i>Leucophaeus atricilla</i>   | -          | -        | 2          | -       | 2          | 1          | -                 | -     | 5     |

would be punished or arrested for maintaining native wild birds in captivity (which, without the appropriate permit, would be illegal in Brazil). Local households were visited and inhabitants were also encouraged to bring their birds for close examination in communal areas. Birds were examined and photographed for species identification (Sick 2001, Sigrist 2009), and then returned to their “owners”. A Chi-Square test was used to compare the distribution of the number of specimens in different taxonomic Orders among study municipalities. Non-metric multidimensional scaling was used to illustrate the differences and similarities of the different study locations in relation to the captured species composition; for this purpose, a plot of the two first principal components was used, as obtained through Principal Component Analysis.

**RESULTS**

A total 264 wild birds from four taxonomic orders were examined (Table 1): Anseriformes (206), Charadriiformes (52), Ciconiiformes (4) and Pelecaniformes (2). Anseriformes and Charadriiformes were unevenly distributed among the four studied municipalities ( $\chi^2=198.533$ ,  $df=3$ ,  $P<0.001$ ), with a considerably lower number of Anseriformes (9) and higher number of Charadriiformes (50) being captured at Serrano do Maranhão (locations 3-6) when compared to the remaining municipalities (range: 22 to 103 captured Anseriformes and 0 to 1 Charadriiformes).

Figure 2 illustrates the relative similarity of

the different study locations in relation to their species composition, demonstrating that with the exception of Caçacueira all communities could be grouped in two clus-



**Figure 2.** Non-metric multidimensional scaling of the species composition among study locations. Study locations plotted closer have more similar species composition than those plotted further from each other (scale is omitted for the X and Y axis, which respectively represent PC1 and PC2 ranging from -1 to +1).

ters (inland communities vs. coastal communities). Coastal communities (locations 3-6) captured a higher number of waders (Charadriiformes) and a lower number of ducks and teals (Anseriformes), whereas an opposite pattern was observed in the inland communities (locations 1-2 and 7-8), even though they are adjacent to freshwater marshes. Caçacueira (6) did not fit the same pattern as other coastal communities, possibly due to the fact that *Ardea alba* accounted for an unusually large proportion of the relatively small sample size at that location.

The most common species (ten or more individuals) were: Black-bellied Whistling Duck *Dendrocygna autumnalis*, White-faced Whistling Duck *Dendrocygna viduata*, Black-necked Stilt *Himantopus mexicanus*, and Southern Lapwing *Vanellus chilensis*. Figure 3 exemplifies and illustrates the captive conditions in which such wild birds were maintained. One bird was banded: an

adult female Laughing Gull *Leucophaeus atricilla* maintained as a pet for six months at Guajerutiua (location 5), which had been banded at the French Guiana (4°49' N and 51°56' W) in 04/07/2008 (Figure 3d).

## DISCUSSION

Our findings illustrate how remote fishery or rural communities will often capture wild birds for their private use and/or consumption. This difference in the species captured probably reflects the fact that capture is largely opportunistic, and as a result the species captured will often mirror the avian species richness and abundance of the region (see Peres 2000). Because such fishery communities are isolated from large human populations and intermingled with areas of confluence of migratory birds, they provide an important interface for interactions between humans and wild birds (Nunes *et al.* 2006). Moreover, it is



**Figure 3.** Examples of the conditions in which wild birds are maintained captive in remote coastal communities in North and Northeast Brazil: (a) *Haematopus palliatus* kept as a “watchdog” near a domestic dog at Caçacueira (location 6); (b) *Ardea alba* captive within close proximity of domestic fowl at Caçacueira (location 6); (c) Small pen for the maintenance of *Dendrocygna autumnalis* and *Dendrocygna viduata* at Tracuateua (location 1); (d) Banded *Leucophaeus atricilla* maintained as a pet at Guajerutiua (location 5). Photos: R. Hurtado

not uncommon that fishermen will come into contact and/or capture seabirds during their offshore fishing activities, as has been shown for *Stercorarius antarcticus* (Hurtado *et al.* 2013), *Leucophaeus atricilla* and *Thalasseus sandvicensis* (Wickliffe & Jodice 2010).

The ease with which some of these birds may be captured probably represents the greatest factor in motivating their capture. Some species, such as *Himantopus mexicanus*, are said to be relatively easy and effortless to maintain in captivity. An additional factor is that these communities often consider maintaining wild animals captive at home as part of the regional culture and tradition, and the presence of captive birds in a house tends to encourage neighbours to capture other birds as well. In some cases, “owners” reported that they had wild birds because they were good alarms or “watchdogs”, especially American oystercatchers (*Haematopus palliatus*). The fact that many species were captured in relatively small numbers (<10) corroborates that these species were not specifically targeted and that capture was largely opportunistic. On the other hand, Anseriformes (particularly *Dendrocygna* sp.) seem to have been actively targeted by inland communities with the primary motivation of meat consumption. As a result, these communities developed a number of complex artisanal capture techniques involving nets, live baits, springs and remote activation systems. Moreover, previously captured ducks were also kept captive for a few weeks before consumption to be employed as live decoys to facilitate capturing other ducks.

None of the wild bird species recorded in this study is considered threatened with extinction (IUCN 2012). *Egretta caerulea* has decreasing population trends, however it is remarkably adaptable to human impacted environments and is broadly distributed in Brazil (Sick 2001, IUCN 2012). Similarly, even though *Eudocimus ruber* has decreasing population trends it is considered regionally abundant in the Caribbean coast (Ramo & Busto 1988, IUCN 2012). While the capture of these wild birds may be a contributing factor to their population decreases and should be reduced to protect these species, the numbers of birds captured seems relatively small to produce dramatic demographic impacts in the regional populations.

Perhaps the most concerning aspect of this interaction is the potential for pathogen dissemination from birds to humans and vice-versa. A large number of microorganisms present in wild Anseriformes, Charadriiformes, Ciconiiformes and Pelecaniformes are potentially zoonotic pathogens, i.e. may be transmitted to humans and produce disease (Alexander 2000, Fowler & Cubas 2001, Thomas *et al.* 2007, Atkinson 2008). The poor conditions of hygiene herein witnessed, along with the proximity to synanthropic and/or domestic animals, provide plentiful

opportunities for disease transmission from and to aquatic birds (Quinn *et al.* 2005). An additional factor to be considered is that the jagged coastline of Northwestern Maranhão state and the Amazon forest are one of the most important resting areas for migratory birds along the Atlantic America Flyway, being regularly visited by several thousand birds from North America and southernmost South America (Boere & Stroud 2006, Nunes *et al.* 2006). As a result, these areas become an important gateway for the introduction of novel pathogens, and these remote communities would be one of the first communities to become exposed.

**ACKNOWLEDGEMENTS.-** We are thankful to the communities participating in this study and to Elivan Souza, Manuella Souza, Ari Honesto, Aílton Oliveira and Antônio Emanuel de Sousa from CEMAVE, Leonardo Bonfim, Arlinéia Rodrigues and Daniele Galindo from ADEPARÁ, Marina Seixas, Roberta Rodrigues and Marcelo Holderbaum. We are also grateful to the EcoHealth Alliance, Wildlife Conservation Society and São Paulo Research Foundation (FAPESP 2009/10695-0, 2009/53956-9).

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