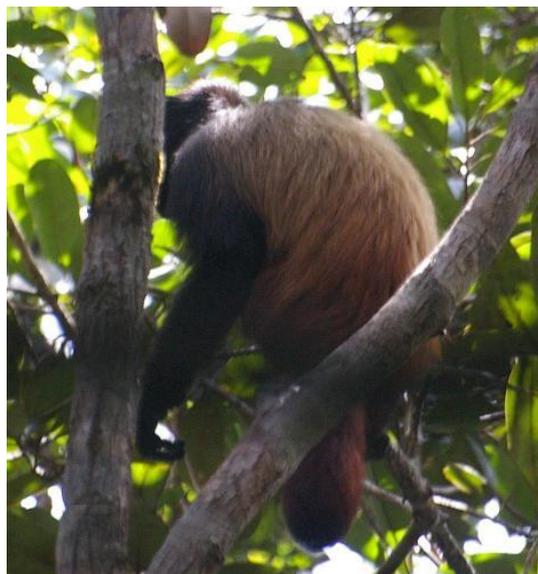


Social ecology of wild golden backed uacari in the National Park of Jaú (PNJ), Amazônia, Brazil: a contribution to the management plan of the PNJ



(Fieldwork Report)

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**Manaus, Brazil
2008.**

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contribution to the management plan of the PNJ.**

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Introduction

Short Background

Cacajao ouakary, also known as the golden backed uacari, (Cunha & Barnett, 1990) is a Neotropical primate from the family Pitheciidae (Groves, 2001). Golden backed uacari is one of 3 species of black uacaris, which were taxonomic reviewed recently by Boubli et al (in press). The golden backed uacari has a reddish-brown body and thighs, with black head, arms, chest and legs and golden mid-back (Fontaine, 1981; Napier & Napier, 1996; Hershkovitz, 1987; Auricchio, 1995; Kinzey, 1997). Uacaris (genus *Cacajao*), differ morphologically from other Pitheciinae with (i) a relatively shorter tail, which is approximately 1/3 of the length of the head and body combined; and (ii) a larger body size - they are the largest of the Pitheciinae and the largest of the nonprehensile-tailed platyrrhines (Fontaine, 1981; Hershkovitz, 1987; Rowe, 1996, Fleagle, 1999).

Previous studies have claimed seeing single groups of golden backed uacari of up to 100 individuals (e.g. Barnett & Brandon-Jones, 1997; Barnett et al., 2005). The social structure varies between groups, with groups having either one male and many females, or many males and females (Rowe, 1996). In general, the diet of uacaris is composed of hard, unripe seeds (e.g. fruits of *Mabea* cf. *nitida* and *Macrolobium acaciifolium*) and sometimes leaves (e.g. *Buchenavia oxycarpa*) (Barnett et al., 2005). However, they also occasionally ingest insect larvae living in the fruits and actively search for invertebrates to some degree depending on age, sex and individual preference (Fontaine, 1981).

Golden backed uacaris are diurnal, arboreal animals, distributed between the River Negro, River Japurá and River Solimões, in Amazônia State, North Brazil. Their distribution also extends to east of Colombia and southeast of Venezuela (Fontaine, 1981; Auricchio, 1995; Fleagle, 1999). They are typically found inhabiting seasonally inundated black-water flooded forests, Igapós (Fontaine, 1981; Napier & Napier, 1996; Kinzey, 1997; Barnett & Brandon-Jones, 1997; Barnett 2005), and leave this forest type during the dry season, going to *terra firme* forest (Barnett & Cunha, 1991).

We report here the fieldwork done for the project “Social ecology of wild golden backed uacari in the National Park of Jaú (PNJ), Amazonia, Brazil: a contribution to the management plan of

the PNJ". The project started in October 2006, with a one-month pilot study during the dry season at the PNJ. The following expeditions were conducted during the wet season in 2007 and 2008 (the latter is still on-going).

Aims of the project

Overall aim

The overall objective of the project is to describe the vocal repertoire of wild golden backed uacari, in the Jaú National Park (PNJ), Amazônia, Brazil and relate this repertoire to their behaviours, both social and individual.

Specific aims:

1. Record the vocalizations of *C. ouakary* to categorise them and produce sonograms of the different types.
2. Investigate the relationships between age, gender and behavioural activity and the vocalizations of *C. ouakary*.
3. Study the response of the animals to certain vocalisations through playback experiments.
4. Produce a short film about the general behaviour of the golden-backed uacari and the study area, which we aim to present in scientific meetings, schools and zoos.

Objectives for year 1(November 2006 to November 2007)

Objectives for year 1 were to:

- Conduct a literature review;
- Obtain the required licences to conduct first field season in Brazilian Amazon;
- Obtain complementary funding for the fieldwork and university fees;
- Conduct the first field season in order to achieve completely and/or partially aims 1 and 2 of the project;
- Compile and start analysing data from the first field season;
- Attend scientific meetings;
- Write reports and papers to be submitted to peer-reviewed journals and funding bodies.

Progress made toward achieving objects of year 1 (November 2006 to November 2007)

- Conducting literature review: the literature review is continually updated. For instance, last year I co-wrote a book chapter “Vocal communication in *Cacajao*, *Chiropotes* and *Pithecia*: current knowledge and future directions” submitted for publication in the book “Evolutionary Biology and Conservation of titis, sakis and uacaris”, edited by Barnett AA, Veiga L, Ferrari SF and Norconk MA. Cambridge: Cambridge University Press.
- Obtaining licence to conduct first field season in Brazilian Amazon: licence obtained (n°01/1007-PARNA-JAÚ).
- Obtaining complementary funding for the fieldwork and my university fees: I was initially funded only by the Alban Programme (the European Union Programme of High Level Scholarships for Latin America – grant number E06D103405BR) and the School of Biological Sciences. These grants covered around 60% of my PhD (including fees and living expenses). During the first year of the project I applied for complementary funding and I was successful with the following applications:
 1. **ORS award** (Overseas Research Students award Scheme), Faculty of Sciences, School of Biological Sciences - University of Bristol. This grant will cover all the University fees for my PhD (£ 12.100 for academic 2007/2008) and living expenses (£ 9000 per academic year).
 2. **Rufford Small Conservation Grant**. This grant has been used to cover fieldwork expenses (e.g. fieldguide, cook, travel tickets, food, etc) (total amount of the grant £ 5000).
 3. **IDEA WILD grant**. Provided equipment used during the field seasons and also to be used in future research.
 4. **Amazon Ecopark Lodge**: This is a jungle hotel near Manaus, Amazonas, Brazil. It provided me with free accommodation between visits to Jaú National Park. During the time I was in the Amazon Ecopark Lodge I conducted preliminary observations of the semi-captive *Cacajao calvus rubicandus* (English monkey, a congener of *Cacajao ouakary*), and *Lagothrix lagothricha* (wooly monkeys) that lived around the hotel.
- Conducting the first field season in order to achieve aims 1 and 2: fieldwork was conducted between March and July 2007 at Jaú National Park (PNJ), Amazônia, Brazil (01° 53.568”S 61° 41.842”W). We studied this rare monkey in the blackwater swamp forests of the upper Amazon, Igapó forest. We moved around the forests in wooden

canoes. We obtained recordings of the vocalisations and general behaviours of *C. ouakary* in this first field season.

We were attempting to habituate the animals by following them through the flooded forest. To help us to identify the animals and register their behaviours, we used binoculars (Tasco 10 x 25 mm), a digital video camera (Sony DCR-PC100E), a voice recorder (Panasonic RN-305) and field notebooks. During the first field season, identification of all the animals was not possible due to their persistently shy behaviour. Only two adult females and two infants could be individually identified at this time. We rarely succeeded in getting unperturbed observations at a distance of less than 10m. Nevertheless, observations and recordings from animals of known age and sex could be made most of the time.

- Compiling and starting analyse of data: we conducted preliminary compiling and analysing of the sonograms of vocalizations by *C. ouakary* and also the complimentary video footage of their behaviours.

We are currently describing the observed behaviours of the *C. ouakary*. The ethogram is based on *ad libitum* observations conducted during the pilot study (self-funded), from October to November 2006 (130 hours of fieldwork), and during the first field season, from March to July 2007 (358 hours of fieldwork). Data on the time budget of each behaviour were collected via group scans at five-minute intervals every time we encountered a *C. ouakary* group, from May to July 2007. Additional data on the activity budget of the species are currently being collected as part of the second field season. We obtained video footage and still-images of most of the behavioural patterns exhibited by the species (e.g. Figure 1). Thus we will use video clips, pictures and drawings of the behaviours as part of a manuscript to be submitted soon. Furthermore, the images obtained during the expeditions will be used to produce a short film about the general behaviour of the golden-backed uacari.

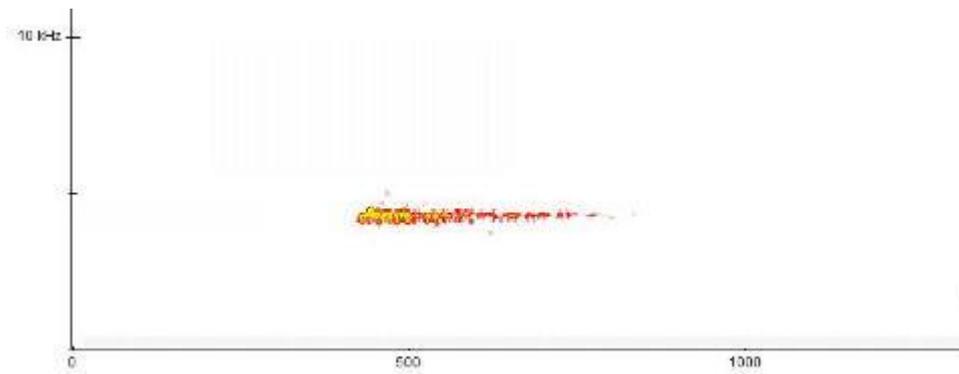


Figure 1. Female golden-backed uacari nursing old infant.

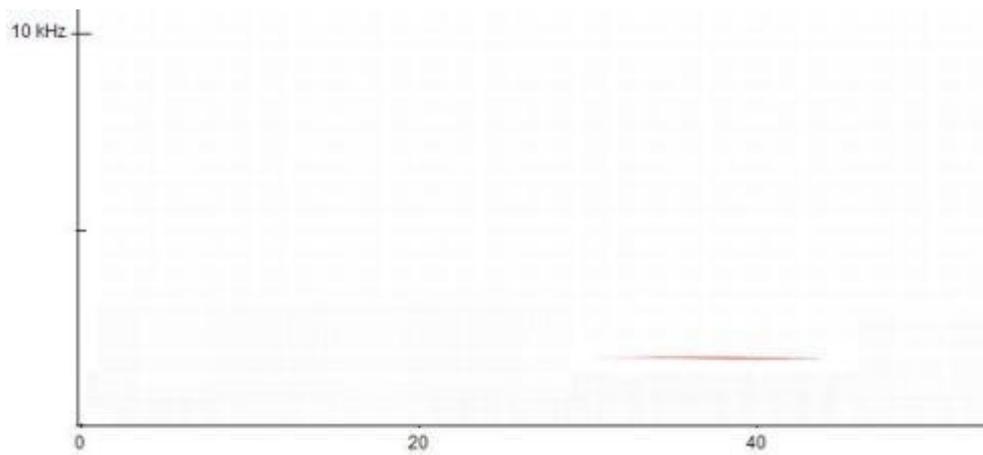
Recordings of the vocalizations of three different social groups of *Cacajao ouakary* will be used to describe the vocal repertoire of the species as well as recordings made on a captive females at the Centro de Primatologia do Rio de Janeiro (CPRJ) in Brazil. We are presently able to distinguish more than 6 different calls. However, during the first field season we only managed to obtain good sonograms (i.e. without too much background noise) from four of those calls (e.g. see figure 2a, b and c). In the second field season, we are obtaining better samples of the other calls. In order to differentiate one call from another we will conduct discriminant analyses using the measurements of the physical features of the calls (i.e. call duration, the highest and the lowest frequency of the vocalization, the range of frequencies, the start and end frequencies, the duration from the start of the vocalization to the highest frequency, the duration from the time of the highest frequency to the end of the vocalization, the number of harmonics in the vocalization (up to 20 kHz), the interval between harmonics and the power spectrum). Furthermore, by using a Mann-Whitney U test for comparisons of two independent samples, we will be able to conduct inter-age and inter-group comparisons of the physical characteristics of the vocalisations. We will use data from the first and the second field season to carry out such analyses. I will test the hypotheses that a) the three social groups have distinctive vocalisations within particular call types; b) specific call types are associated with particular behaviours, which will then inform playback experiments where I will validate my ability to predict behavioural responses to playbacks of specific calls.

Figure 2. Spectrograms of the four different calls present in the vocal repertoire of *Cacajao ouakary*. (a) sharp whistle; (b) mild twitter; (c) tcho call (left) and a series of twitter calls (right). Frequency in 'kHz' and time in 'ms'.

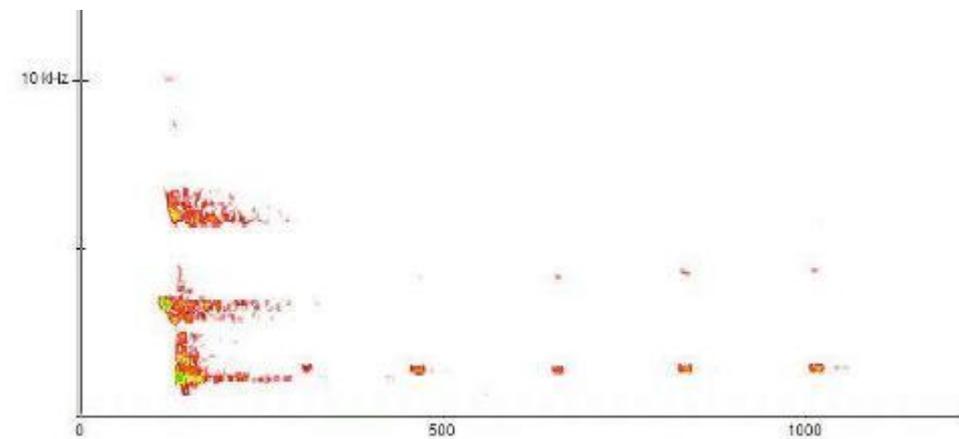
(a)



(b)



(c)



- Attending scientific meetings: In July 2007, I attended the XII Brazilian Primatological Conference. See below the list of relevant publications as conference abstracts related to this particular project:
 1. **Bezerra, B. M.;** Barnett, A. A.; Souto, A. S. & Jones, G. (2007). Preliminary recordings on the vocalisations of golden-backed uacari (*Cacajao melanocephalus ouakary*), in Jaú National Park, Amazon, Brazil. *12th Brazilian Primatological Conference*, Belo Horizonte, Sociedade Brasileira de Primatologia. (Poster)
 2. Barnett A. A.; **Bezerra B. M.** & Spironello, W. (2007). Diet flexibility and diet item treatment in the golden-backed uacari, *Cacajao melanocephalus ouakary*. In: The Program of the annual Meeting of the Association of Tropical Biology and Conservation. 'Linking Tropical Biology with the Human Dimension'. June 15-19, 2007: Moreleis, Mexico. (Poster)
- Writing reports to funding bodies and papers to be submitted to peer-reviewed journals: I am currently writing reports to my funding bodies (e.g. present report). See below the list of other relevant works published and in press.
 1. **Bezerra, B. M.;** Barnett, A. A.; Souto, A. S. & Jones, G. (2008). Predation by the tayra on the common marmoset, *Callithrix jacchus* and the pale-throated three-toed sloth. *Journal of Ethology*.
 2. **Bezerra, B. M.;** Barnett, A. A.; Souto, A. S. & Jones, G. (*in press*) Vocal communication in *Cacajao*, *Chiropotes* and *Pithecia*: current knowledge and future directions. Chapter to be published as part of the book: “Evolutionary Biology and Conservation of Titis, Sakis and uacaris” Edited by Barnett AA, Veiga L, Ferrari SF and Norconk MA. Cambridge: Cambridge University Press.

Objectives year 2 (November 2007 to November 2008)

The objectives for year 2 were to:

- Renew research licence.
- Make recordings of the vocalization and behaviours of captive *Cacajao melanocephalus* in the “Centro de Primatologia do Rio de Janeiro (Brazil)”.
- Conduct the second field season in Jaú National Park, in order to achieve the remaining specific aims of the project.

- When I return to Bristol in July 2008, I will (i) compile and start the analysis of the data from the second field season and the remaining data from the first field season; (ii) write reports to funding bodies and papers to be submitted to peer-reviewed journals.
- Attend scientific meetings

Progress made towards achieving objectives of year 2 (November 2007 to November 2008)

Further quantitative analysis of the data needs to be conducted but it is presently possible to state that the observations of the vocal repertoire and behaviours of golden-backed uacari at Jaú National Park will increase our knowledge of this shy and rare species. The objectives for year 2 were to:

- Renew research licence: Licence renewed (Number 13618-1 – SISBIO).
- Make recordings of the vocalization and behaviours of captive *Cacajao melanocephalus* in the “Centro de Primatologia do Rio de Janeiro (Brazil)”. Data on the behaviours and vocalisations of captive *Cacajao melanocephalus* were collected between 8th and 23th January 2008.
- Conduct the second field season in Jaú National Park to achieve the remaining aims of the project. I am currently conducting the second field season with a total of 485 hours of work undertaken thus far. More recordings of the types of vocalisations and data on the time budget of various behaviours were conducted mainly from 26th January to 31st March 2008. Playback experiments are currently being conducted, having started in April, and will be continued until June 2008 to investigate how *C. ouakary* act in response to playback of specific calls and also to evaluate vocal signal degradation in the different habitats used by the golden-backed uacari.
- When I return to Bristol in July 2008, I will (i) compile and start the analysis of the data from the second field season and remaining data from the first field-season; (ii) write reports to funding bodies and papers to be submitted to peer-reviewed journals: (To be done soon).
- Attend scientific meetings: I am going to attend the XXII International Primatological Society Congress in 3 – 8 August 2008, EICC, in Edinburgh. I am an organizer for the symposium “Primate ecology and conservation: the lessons from central Amazônia” and I will be presenting the following papers:

1. **Bezerra, B. M.**, Barnett A., Silva Junior. J. S., Souto A., Jones, G. (accepted). Sounding out species: holes in our distributional knowledge of Amazonian primates, and the potential for call playback as a survey technique (Symposium Presentation).
2. Morris, N., Richardson, A., **Bezerra, B.**; Schwitzer, C & Jones, G. (accepted) Behavioural and vocal repertoires of captive grey-legged night monkeys *Aotus lemurinus griseimembra* (Elliot, 1912). XXII International Primatological Society Congress. To be held in 3 - 8 August 2008. (Poster Presentation).

I am also a co-author on the following papers for this conference:

1. Barnett, B.; **Bezerra B.**; Ross, C. & MacLarnon A. (accepted) Hard fruits and black waters: the conservation ecology of the golden-backed uacari, *Cacajao melanocephalus ouakary*, an extreme diet- and habitat-specialist. XXII International Primatological Society Congress. To be held in 3 - 8 August 2008. (Symposium Presentation).
2. Spironello, W.; Gordo, M.; Noronha, M.; Boyle, S.; de Freitas, C.; **Bezerra, B.** & Barnett, A. (*accepted*). Priorities, applications and monitoring: learning from the Amazonian primate research experience. XXII International Primatological Society Congress. To be held in 3 - 8 August 2008. (Symposium Presentation).

Main fieldwork expenses

Given that the second field season is presently on-going, it is important to consider that further costs will be incurred for fieldguides, cooks, food, petrol, etc. Additional funding from the University of Bristol was acquired to help support the second field season. The table below shows the main costs of the fieldwork to date.

	£ (For first and second field season)
Field-guide (native)	660
Cook and field assistant (natives)	560
Travel expenses	2470
Food while in the field	350
Petrol for the boat from the mouth of Jaú river to field station	655
Expenses while in Manaus (e.g. bus, equipments transport, etc)	600
Unexpected expenses (e.g. broken equipment)	660
Total	5955

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