

## Observations on the behavior, vocalizations and distribution of the Glossy-backed Becard (*Pachyramphus surinamus*), a poorly-known canopy inhabitant of Amazonian rainforests

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**RESUMO.** Observações sobre a história natural de *Pachyramphus surinamus*, um habitante pouco conhecido da copa da floresta Amazônica. O caneleiro-de-guiana *P. surinamus* é um dos representantes menos conhecidos do gênero, possuindo uma distribuição limitada ao nordeste da América do Sul. Pouco tem sido publicado sobre esta espécie e somente alguns breves artigos versaram sobre sua nidificação e distribuição. *Pachyramphus surinamus* habita a copa e a subcopa da mata de "terra firme" na Amazônia. Nas reservas do Projeto Biológico de Fragmentos Florestais (PBDF) em Manaus, Amazonas, a maioria dos casais estudados acompanharam bandos mistos de espécies da copa. Quanto maior o bando misto, maior a probabilidade de *P. surinamus* estar presente entre as espécies que o formavam. *Lamprospiza melanoleuca* ocorreu em aproximadamente 60% dos bandos mistos de copa que continham *P. surinamus*. As observações sugerem que *P. surinamus* é principalmente insetívoro, embora possa também alimentar-se de alguns frutos. Os métodos de forrageamento mais frequentemente observados para *P. surinamus* foram "olhar e bicar" e "adejar-bicar", enquanto "voar para o ar" foi raramente registrado. Nas reservas da PBDF *P. surinamus* foi encontrado em simpatria com três outros caneleiros, *P. rufus*, *P. marginatus* e *P. minor*, sendo que os dois últimos, sintopicamente. Eu transcrevo e descrevo as vocalizações de *P. surinamus* e afirmo que o conhecimento prévio de sua vocalização aumentará a possibilidade de registrar a presença desta espécie. Também enfatizo a grande importância do uso de "playback" para, rápida e precisamente, localizar habitats preferidos, estimar número de casais e tamanho de territórios das espécies raras e pouco conhecidas. Em termos de conservação, o uso desta técnica é indispensável para a realização de um censo preciso de espécies altamente ameaçadas.

**PALAVRAS-CHAVE:** Amazônia, bandos mistos, conservação, copa, história natural, métodos de forrageamento, *Pachyramphus surinamus*.

**ABSTRACT.** *P. surinamus* is one of the least-known representatives of its genus, with a limited distribution in northeastern South America. Publications concerning *P. surinamus* are restricted to brief notes on its nesting and distribution. *Pachyramphus surinamus* inhabits the canopy and subcanopy of terra firme forest in Amazonia. In the reserves of the Biological Dynamics of Forest Fragments Project (PBDF) in Manaus, Amazonas, pairs were most often found accompanying mixed-species canopy flocks. The presence of *P. surinamus* was more frequently associated with larger than smaller flocks. *Lamprospiza melanoleuca* occurred in approximately 60% of the mixed-species canopy flocks that contained *P. surinamus*. Observations suggest that *P. surinamus* is generally insectivorous, though it also feeds on some fruits. The most frequently observed foraging techniques were "peer pick" and "hover glean", while "sally to air" was rarely registered (terminology follows Remsen and Robinson 1990). In the PBDF reserves *P. surinamus* was encountered sympatrically with three other becards, *P. rufus*, *P. marginatus* and *P. minor*, with the last two being syntopic. I describe all vocalizations of *P. surinamus* and emphasize the importance of knowing them, since this greatly increases the possibility of registering the species. I also indicate the importance of using vocalization "playbacks" in species censuses, to help locate them within their required habitat. This method is particularly effective when locating species that are difficult to observe, rare and poorly-known. In terms of conservation, "playback" is an indispensable tool enabling quick censuses and producing reliable numerical results, particularly of rare and critically endangered species.

**KEY WORDS:** Amazônia, canopy, conservation, foraging methods, mixed-species flocks, natural history, *Pachyramphus surinamus*.

The genus *Pachyramphus* (becards) consists of 14 species occurring from Arizona to South America, following the merging of the genus *Platypsaris*, comprised of three species: *P. minor*, *P. homochrous* and *P. validus*, into *Pachyramphus* (Snow 1973). Two species of poorly known *Pachyramphus* becards occur in South America (Ridgely and Tudor 1994: 1) *P. spodiurus*, rare to locally uncommon; and 2) *P. surinamus*, rare and apparently locally restricted. Both species have somewhat small ranges. I present the first detailed information on the Glossy-backed Becard, *P. surinamus*, its habitat, known distribution, vocal repertoire and behavior (foraging behavior terminology follows Remsen and Robinson 1990). I also emphasize the importance of using "tape-playback" as an essential censusing method not only for studying tropical birds but

even more importantly, as a tool in the conservation of rare, endangered and poorly-known species. The use of "tape-playback" by field researchers now allows remarkably precise surveys of selected species, by quickly and efficiently locating individuals in their preferred habitats and providing accurate estimates of numbers of pairs and their territory size. I recommend that this method be made compulsory for any conservation projects involving field surveys of poorly-known, rare, threatened and endangered bird species.

### METHODS

The majority of my observations on *P. surinamus* were opportunistically made while carrying out fieldwork in the Biological Dynamics of Forest Fragments Project (PBDF).

from February 1987 to January 1989 and September 1990 to October 1991. The forest reserves of the PBDFP are located about 80 km north of Manaus, Amazonas, Brazil in *terra firme* forest (for more information see Bierregaard and Lovejoy 1988, and Lovejoy and Bierregaard 1990). Observations were also made whenever *P. surinamus* was encountered in other areas of the Amazon between November 1991 and November 1996. Birds were observed with Zeiss 10 x 40 binoculars and a Kowa 30 x telescope. When *P. surinamus* was encountered notes were made on foraging and other behavior and vocalizations were recorded using a Sony TCM-5000 tape recorder and a sennheiser ME-80 directional microphone. Tape recordings will be archived in the Library of Natural Sounds, Cornell University, Ithaca, New York. As *P. surinamus* inhabits the canopy of *terra firme* forest, two towers situated within this stratum near Manaus greatly aided observations on foraging behavior. One tower is located circa 60 km north of Manaus, and the other at Ducke Forest Reserve, 25 km east of Manaus. For more information regarding these towers see Bierregaard *et al.* (1987).

## RESULTS

**Distribution.** *Pachyramphus surinamus* is found locally in Surinam, French Guiana and in the lower Amazon in Brazil (recorded mainly north of the Amazon River and west of the lower Rio Negro in the Manaus area; and south of the Amazon River it was recorded from sightings south of Tefé on the Rio Urucu; Ridgely and Tudor 1994). The range of *P. surinamus* has been expanded, with sight records and tape recordings, both west of the Rio Negro at the Jaú National Park and Ziggylândia, near Manacapuru, Amazonas (Whittaker 1995) and at Amapá Serra Grande (J. F. Pacheco in Sick 1997). I also observed and taped birds in the latter region in 1997. Note that the correct site of the record south of the Amazon, cited by Ridgely and Tudor (1994), is Alvaraes 25km west of Tefé, and not the Rio Urucu (Whittaker 1995). Although the species' limits north of Manaus are still poorly known, I observed a pair on the north bank of the Rio Apuaú east of the Rio Negro, circa 150 km north of Manaus. I also taped a singing male at Barcelos, circa 375 km northwest of Manaus, on the west bank of the Rio Negro.

**Habitat.** *Pachyramphus surinamus* is an arboreal species inhabiting exclusively the canopy and subcanopy of virgin lowland *terra firme* forest. I have a single record at the PBDFP reserves from a 10 ha isolated forest fragment, some 250 m from virgin forest. I occasionally observed *P. surinamus* at man-made forest edges. Haverschmidt (1972) recorded *P. surinamus* in Surinam at Phedra in hilly country, both in the middle and along the edges of high forest. More surprising are his records of *P. surinamus* in "typical savanna forest" on sandy ground near Zanderij. Interestingly, the Red-billed Pied Tanager, *Lamprospiza melanoleuca*, which I often found associating with *P. surinamus*, is also known to occur occasionally in savanna woodlands in the northern part

(1987). In Brazil I found *L. melanoleuca* strictly restricted to *terra firme* forest (pers. obs.).

**Behavior in flocks.** Pairs of *P. surinamus* spent about 80% of the time following mixed-species canopy flocks and only about 20% of the time as solitary pairs. The size of mixed-species flocks containing *P. surinamus* varied from large canopy flocks, containing 20 to 30 species or more, to much smaller flocks consisting of 3 to 5 species. During my observations I never recorded more than a single pair of *P. surinamus* in any of these large mixed-species flocks.

While foraging with large mixed flocks the pair most often remained well separated, regularly up to 50 m to 100 m apart, while calling to each other. In the PBDFP reserves and other areas of Amazonian Brazil, the Yellow-throated Flycatcher, *Conopias parva*, is the main nuclear species of canopy mixed-species flocks (pers. obs.). *Conopias parva*, with its constant rallying calls, forms the canopy flock in the early morning and keeps the flock together as it moves during the day through the forest canopy. At 06:30 h on 29 December 1993, from a 40 m observation tower at the Ducke Forest Reserve, I observed a pair of *C. parva* perched on the top-most leaves of an emergent tree, constantly issuing rallying calls. Within a few minutes several birds had congregated, beginning with a pair of *Dacnis cayana*, then a boreal migrant warbler *Dendroica striata*, then a pair of *P. surinamus*. I watched the becard pair flying in from 300 m to 400 m away to join this small assembling canopy flock.

These large mixed-species canopy flocks consisted mostly of insectivorous species, with some frugivorous and omnivorous species as well. The main families represented in these flocks were Cuculidae, Trogonidae, Galbulidae, Bucconidae, Picidae, Dendrocolaptidae, Formicariidae, Cotingidae, Pipridae, Tyrannidae, Vireonidae and Thraupidae. Smaller flocks containing *P. surinamus* normally contained between 3 to 5 species. The two species encountered most often in these flocks were, in order of occurrence, *L. melanoleuca* and *Caryothraustes canadensis*, both found in monotypic flocks. Often associated with small flocks containing the two species above was a single pair of either *C. parva* or *Sirystes sibilator*. About 60% of the time the occurrence of *L. melanoleuca*, in all sizes of mixed-species flocks, coincided with the presence of *P. surinamus*. *Lamprospiza melanoleuca* was always found travelling in monotypic flocks of 3 to 7 birds.

My experience with observing these canopy mixed-species flocks alerted me to the possibility of confusion in the correct identification of *P. surinamus*, which can be easily confused with *L. melanoleuca*. These two species are regularly found together in the same canopy flocks, are almost the same size, and are both white, seen from below. Obviously, the black and white color pattern of males of both species makes them more likely to be confused than is the case for the females.

*Pachyramphus surinamus* was most often located in single pairs accompanying flocks. Only on two occasions did I observe single birds, both males and away from flocks.

of cattle pasture to an isolated 10 ha PBDFP plot. The bird was giving the contact call in flight and began vocalizing upon landing at the edge of the forest plot. The other male was observed feeding and heard calling in the canopy at the edge of a small forest clearing.

*Relations with other becards.* Three other *Pachyramphus* becards were found sympatric with *P. surinamus* in the *terra firme* forest of the PBDFP reserves. These were the Black-capped Becard *P. marginatus*, the Pink-throated Becard *P. minor* and the Cinereous Becard *P. rufus*. *Pachyramphus marginatus* and *P. minor* were always found syntopically with *P. surinamus*, and *P. rufus* was found non-syntopically on one occasion in a disturbed forest border. *Pachyramphus marginatus* was the most common becard in the PBDFP reserves (highest density 3 pairs per 100 ha; pers. obs.), and *P. minor* was recorded as uncommon (1 to 2 pairs per 100 ha; pers. obs.) (Stotz and Bierregaard 1989, Cohn-Haft *et al.* 1997). *Pachyramphus rufus* is a recent colonizer (since 1989) at the PBDFP reserves (Cohn-Haft *et al.* 1997), and is not a true primary-forest species, its preferred habitat being secondary-growth forest.

Although *Pachyramphus marginatus* was found to be the most abundant becard in the PBDFP reserves, it inhabits solely the forest midstory (pers. obs.). This height segregation alone separates *P. marginatus* from any contact with *P. surinamus*, the latter being found higher up in the forest strata. However, *P. minor* did reach the upper forest stratum and was recorded in about 30% of the large canopy mixed-species flocks containing *P. surinamus*.

*Territory size and agonistic behavior.* Observations in the PBDFP reserves suggest that *P. surinamus* requires a territory greater than 100 ha. On several occasions I observed birds flying long distances over the forest canopy to sing from well-separated song perches. "Tape-playback" experiments from the two towers strengthened this idea, with birds flying in from up to 500 m to 700 m through the canopy in response to "playbacks". Also, a male was observed singing from two separate canopy song perches 800 m to 1000 m apart during the same morning.

*Pachyramphus surinamus* interacted agonistically with a male *Tityra cayana*, when the male becard was displaced from a perch while foraging within a large mixed-species canopy flock. Agonistic behavior was observed between two male becards after playing a tape of *P. surinamus* vocalizations. Two males landed above me in the canopy; one bird opened its wings and quivered them while vocalizing quietly and then flew at the other male, chasing it off. In response to "tape-playback" experiments from the towers in the canopy, males landed nearby and called energetically. Movements included head bobbing with raised crown feathers and quick wing flicking to expose the striking (and normally concealed) white shoulder patches. Displaying the concealed white shoulder patches seems to be a unique behavior among becards. However, this behavior is common in many species of Formicariidae (antbirds) during agonistic displays. Head bobbing with raised crown feathers has been

Brown 1986, Ridgely and Tudor 1994). Interestingly, *P. surinamus* crown feathers are rather unique among passerines, being distinctly glossy and curled. To my knowledge the only other species with similar looking but even more strikingly glossy crown feathers is the Curl-crested Aracari *Pteroglossus beauharnaesii*.

*Foraging behavior and diet.* *Pachyramphus surinamus* forages mostly within the tree crowns for insect prey at the end of the branches where the foliage is concentrated, or along bare horizontal boughs. Pairs often remain up to 100 m apart, moving independently through different tree crowns while following the roving mixed-species canopy flocks. While foraging *P. surinamus* moves deliberately, either by short hops or flights ranging from 0.5 m to 10 m between perches. Hopping quickly along larger branches or huge boughs also was observed commonly.

The main foraging technique observed was the "peer and pick" method during which the bird's body was held at circa 45 to 60 degrees from the horizontal. While foraging using this method they hopped along large, almost horizontal branches and boughs where they turned from side to side searching for prey. They often stopped and tilted their heads while searching, looking for prey either above or below their perch. They paid particular attention to thick leaf clusters. Less often, birds were seen on smaller branches, where they held down their tails almost vertically and with the wings often held slightly away from the body. This position presumably helped them keep their balance. Prey was caught either in short flights or in hops to another perch, or by stretching from the perch to glean invertebrate prey. The second most frequently observed foraging method was "hover-pick". Perched birds, after locating prey, executed a rapid, short flutter ranging from 0.5 m to 3.0 m to glean invertebrates from a substrate. All prey items were gleaned either from branches or from foliage surfaces. After gleaning prey they would either return to the same perch or use another. On only one occasion did I observe "sally to the air" which I suggest is rarely used as a foraging method by *P. surinamus*. On 8 June 1994 in the PBDFP reserves I watched a male sallying off the top of a large emergent tree to pursue and catch swarming flying ants or termites. As the swarming insects flew past he would sally off the tree to catch the flying insects from 5 m to 20 m away. Sometimes the catch terminated with a short vertical flutter chase. Having successfully caught the insects in his beak he would eat them in flight before returning to another perch. Upon landing he would wipe his bill several times on the branch before another sally. During a period of 26 minutes I counted nine successful sallies. This observation illustrates a probable opportunistic foraging method for the capture of these temporarily abundant prey items. This method is a common foraging method used opportunistically by many neotropical bird species (pers. obs.) not usually seen sallying but using it frequently during insect swarmings.

Invertebrates constitute this species' main food source.

canopy being taken by "hover-gleaning". There are two published records of fruit consumption by *P. surinamus*. Haverschmidt (1972) reported finding small kernels in gizzards of specimens taken in Guiana and a second observation in Brokopondo, Surinam, where three birds were observed feeding at a fruiting tree (Ridgely and Tudor 1994). Therefore, I conclude that *P. surinamus*, although being mostly insectivorous, is in fact omnivorous, also consuming small quantities of fruit.

**Description of vocalization.** *Pachyramphus surinamus*' primary vocalization (song) consists of a repeated series of high-pitched mellow notes "Weé-weét, weét-weét-weét-weeh". The first note is more emphatic (as seen in fig 1 A), then accelerating and finally dropping off slightly in pitch and volume. The song normally consists of six to eight notes (range five to nine) in each phrase. Phrases are repeated every seven to eight seconds, with seven to nine phrases forming the song. I have recorded the song infrequently and mostly during the first few hours after dawn. From the 42 m observation tower I watched a male becard in the canopy using the same song perch on two consecutive mornings. The song perch was located in the highest dead snag of a tree about 35 m to 40 m high situated just below a thick clump of leaves. On one morning this particular male was observed moving and singing from two canopy perches about 800 m to 1000 m apart.

The most commonly heard vocalization was what I describe as the "contact call": a single "Kweeé" (see fig 1

B) with the single first note longer and more emphatic, followed by a series of three to five shorter notes, which fall in pitch toward the end, becoming shorter and faster. This call was used at irregular intervals by both members of the pair as they moved through the canopy to keep in contact with each other. This call may be confused with the louder, more emphatic call notes of *S. sibilator*. However, I noted several variations of this basic contact call. At closer range I have recorded a "Kweeéé, Kweé kwe-kwe-kwe", this time the first two notes being emphasized with the last three notes being shorter and speeded up (running slightly together) and descending in pitch and volume. I have also heard and taped excited response vocalizations from both sexes after "tape play-back", either a variation of the regular contact call or the normal song. The excited contact call is speeded up into a very fast tremulous series of various types of "kwe" notes, repeated irregularly some 5 or 6 times. This can vary greatly, with the series of "kweeé" notes being longer in length (up to about 3.5 seconds) or as short as 1.5 seconds. The longer length series can have as many as 20 notes. In shorter variations these notes decrease in length as well as in number, to as few as nine notes.

**Importance of vocalizations in study of neotropical species.** Increasing our knowledge and understanding of many threatened neotropical bird species today is an essential step in securing their conservation. This is especially relevant given that deforestation is increasing at an alarming rate in species-rich tropical regions worldwide. My observations

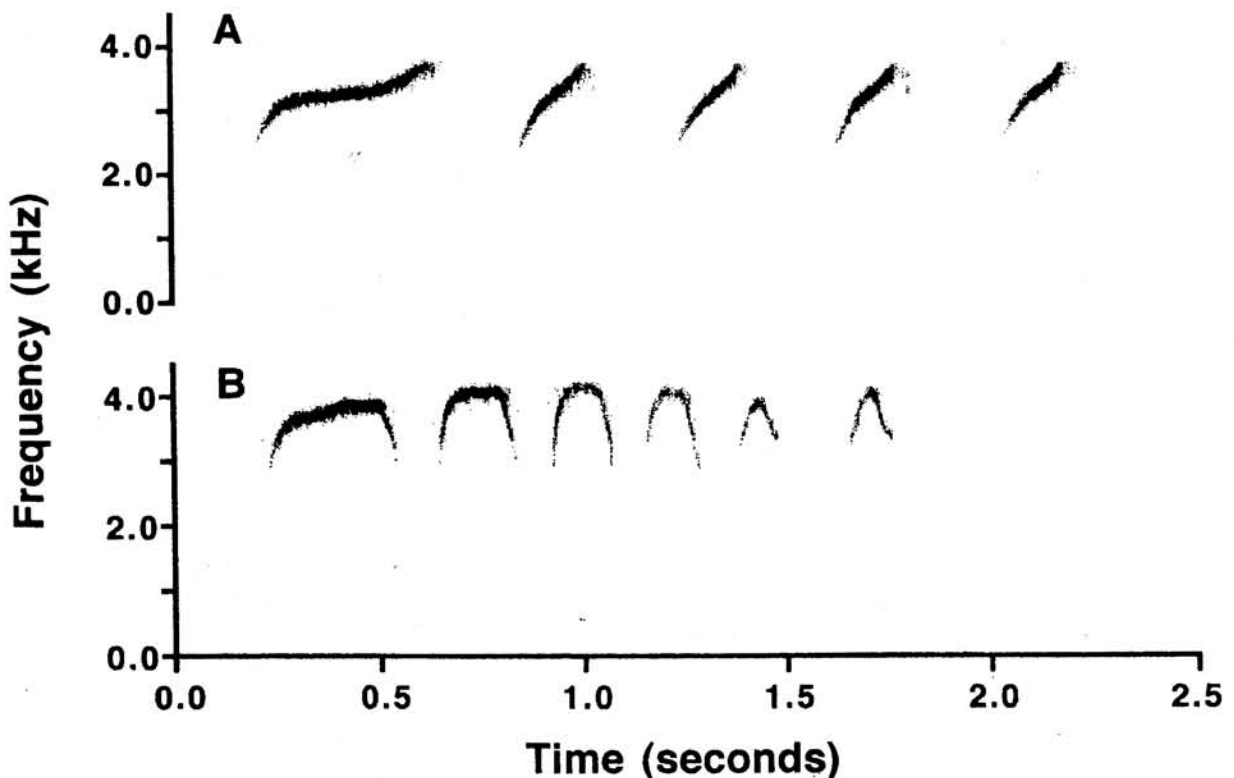


Figure 1. Vocalizations of *Pachyramphus surinamus*: (A) Dawn song (Ducke Forest Reserve, munic. Manaus, Amazonas; AW 29 December 1993); (B) Contact call (ZF-2 road, ca. 60 km north of Manaus, Amazonas; AW 18 June 1993). Spectrograms were produced on a Macintosh computer using Canary software (Cornell Laboratory of Ornithology Bioacoustics Department, Ithaca, New York) at following settings: frame size 256 points. FFT size 256 points, 50% overlap, Hamming window function.

of *P. surinamus* clearly emphasized how essential it is, in the neotropics, to first identify and then learn the vocalizations of the species to be studied. This is particularly so for those species inhabiting rainforests (especially the canopy and subcanopy), where dense vegetation combined with the height above the ground render them exceedingly difficult to locate. Furthermore, many species are either skulking, shy or retiring by nature, making it nearly impossible to conclude any detailed field studies. Conventional methods used by many ornithologists to study birds in temperate regions are completely inadequate for researching many neotropical species. Being familiar with the voice of a species not only greatly helps to locate individuals but, with the use of tape "playbacks", also allows the evaluation of the species' abundance and territory sizes more accurately than by any other method. Thus, it is an essential tool to use in population studies of neotropical species. The greater significance of "tape-playback", however, is in the field of conservation biology, enabling rapid and much more effective and accurate field surveys for rare, poorly-known and endangered bird species.

The great importance of first identifying and learning particular species' vocalizations to enable studies of many poorly-known neotropical species (especially canopy birds), would come as no surprise to the late Theodore A. Parker III. This well-known ornithologist was a pioneer in identifying and learning the voices of countless little-known and rarely-seen neotropical birds and disseminating this information throughout the academic world (Parker 1991). Once I learned the voice of *P. surinamus*, I found the species to be fairly common at the PBDF reserves, encountering the species at least once every other day in continuous forest. *Pachyramphus surinamus* was reported as a rare species by Stotz and Bierregaard (1989) in the PBDF reserves due to the fact that its voice was unknown to them and to many other ornithologists after 10 intensive years of fieldwork. Recently Cohn-Haft *et al.* (1997) up-graded its abundance status in the reserves to common, entirely due to our recent familiarity with the species' vocal repertoire. Interestingly, Haverschmidt (1972) lists *P. surinamus* in Surinam as, probably, not a rare bird at all, concluding that it may escape notice by the casual observer.

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