

SHORT COMMUNICATIONS

Observations of the White-fronted Manakin (*Pipra serena*) in Suriname

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The White-fronted Manakin (*Pipra serena*) is found in the highlands of the Guianas, southeastern Venezuela, and adjacent northern Brazil (Haverschmidt 1968, Meyer de Schauensee and Phelps 1978). *Pipra serena* is a small manakin (7–8 g) of the *P. coronata* species-group (Snow 1979). Males are distinguished by their velvety black plumage with patches of white on the forecrown, light blue on the rump, and yellow on the belly. Females are bright green above and yellow below (for illustrations see Haverschmidt 1968, Meyer de Schauensee and Phelps 1978). While the courtship displays of many *Pipra* species have been documented, the behavior of *P. serena* never has been reported. I found *P. serena* to be common above 200 m in the Brownsberg Nature Preserve in central Suriname, and I observed the behavior of territorial males for over 75 h on 20 days from 25 October to 15 December 1982. The Brownsberg Nature Preserve (4°53'N, 55°13'W) is operated by the Suriname Foundation for Nature Conservation (STINASU) and contains 6,000 ha of primary rain forest on and around the Brownsberg, a 500-m table mountain.

Pipra serena was found to be the most common understory bird species in a previous banding survey (Ben de Jong pers. comm.) done on the Mazaroni Plateau (480 m) at the north end of the Brownsberg, where I made most of my observations. *P. serena* forage singly or in pairs within 1–6 m of the ground, where they take both insects and fruits. Males are easily located by their oft-repeated single-syllable "whree" call. Tape recordings were made of these calls at the study site by T. H. Davis with a Uher cassette tape recorder and a Sennheiser ME88 microphone, and spectrograms were prepared using a Kay Elemetrics Sona-Graph 6061-B on the 80–8,000-Hz setting. The spectrogram of the whree call shows two wavering main bands at 1.5 and 6 kHz, with two less intense bands at 3.5 and 4.5 kHz (Fig. 1). Males occasionally intersperse the strings of whree calls with a low, bell-like "boop" note.

Males defend territories that are 30–40 m in diameter, and they maintain them by calling incessantly from 1–5-m high perches dispersed throughout the territory. I located a group of 2 adjacent males, both of which had been previously color-banded, and mapped their territories by plotting the positions of their calling perches. I located 2 other groups of 3

and 4 calling males 150 and 250 m from the first group. I could not map their individual territories, but I observed them calling in these areas daily throughout the observation period. I made over 40 h of observations of one of the banded males, which was present on his territory on every observation day over the 7-week period. On one day I observed this individual from 0625 to 1600 in order to estimate the time he spent on his territory. He called 7,400 times during this period and was present for 72% of the time. Observation on other dates indicated that territorial attendance may have varied to over 90%. Calling activity continued throughout the day, with occasional periods of increased excitement. During one such period, the banded male averaged 37 calls/min for over 20 min. In general, the most intense calling activity developed in response to calling by neighboring males and often resulted in vigorous countersinging along territorial boundaries.

While calling on its territory a male does not assume any special display posture, but it does erect the small puff of orange-yellow feathers on its chest. This patch is present only in the nominate subspecies found in Suriname, French Guiana, and northern Brazil. Occasionally, a male will fly across his territory to another perch in a rapid, whirring flight, tracing a horizontal S-pattern about 1 m wide in the air. A male also may fly to another calling perch in a vertical S-pattern by swooping down from the first perch and rising up again, approaching the second perch from above. Several times I saw a male perform a series of erratic to-and-fro flights, lasting about 20 s, between 10 or more 3–5-m high perches separated by 1–5 m, barely stopping to land before proceeding to the next perch. These displays were characterized by their distinctive whirring flight more than by their stereotyped form and differed markedly from foraging behaviors.

During calling, males performed an intermittent stereotyped display at "courts" near the forest floor. This display was performed either by a single male or by a pair of coordinated males. The coordinated form of the display usually was performed during a bout of countersinging, when one male flew into another's territory. Both males gave a descending, abrupt, and emphatic "puuu" call, which was extended into a rolling "purrr" lasting for up to 1 s. The calls were similar in character to the typical whree call. The repetition of the purrr usually marked the beginning of the display, when both males dropped to within 0.5–1 m of the ground. They then flew back

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and forth between 5–10 small vertical saplings that formed a loose “court” about 1 m in diameter. Two different types of flight were used during the display. Males sometimes flew rapidly and directly across the court, assuming a rigid, horizontal posture perpendicular to the perch as they landed facing the center of the court. While perched in this way they occasionally flicked their wings open and closed to expose the bright blue rump patch before flying to the next perch. In the other type of flight males flew in a buzzy, hummingbird-like flight, holding their bodies nearly vertical and beating their wings rapidly. In this way, they hovered back and forth in shallow arcs across the court, barely landing on a perch before proceeding to the next. Both types of flight sometimes were performed in the same display, but they always were performed by the two males at the same time. The display also was coordinated in that the two males landed and took off simultaneously, crossing each other in flight, often replacing each other alternately on a pair of perches, and sometimes giving the impression of chasing one another around the court. Once the display began it was performed silently. The solo form of the display was identical, except that it was not preceded by the puuu and purrr calls.

The more than 30 court displays observed varied from 0.5–10 min in duration. The frequency of court display appears to vary with the intensity of calling, as displaying almost always followed bouts of countersinging with another male. During the 9.5-h observation, the banded male performed at least 8 coordinated displays and 3 solo displays in 2 h. Overall, I observed the coordinated display about 3 times as often as the solo performance.

Males displayed at a limited number of discrete courts within a territory. No apparent effort had been made to clear these areas of leaves or vegetation, and they appeared to be indistinguishable from other patches of the forest floor that had suitable perches. However, the repeated use of particular sites indicates that the males recognized and returned to these courts. Indeed, visiting male partners sometimes dropped directly to previously observed display courts before the resident male left his perch, showing that they already were familiar with the positions of the resident male's courts. The main banded male performed over 20 court displays at 5 different courts in his territory. Males sometimes abandoned a court in the middle of the display and began to display loosely throughout the entire territory. Pairs of males also were seen leap-frogging each other from branch to branch through the understory, while whree-calling excitedly. This behavior appeared to be a rudimentary form of the coordinated display, and it was the most common way in which males were encountered off their calling territories.

Males are not obligately bound to display with only a single other male. A male may switch partners im-

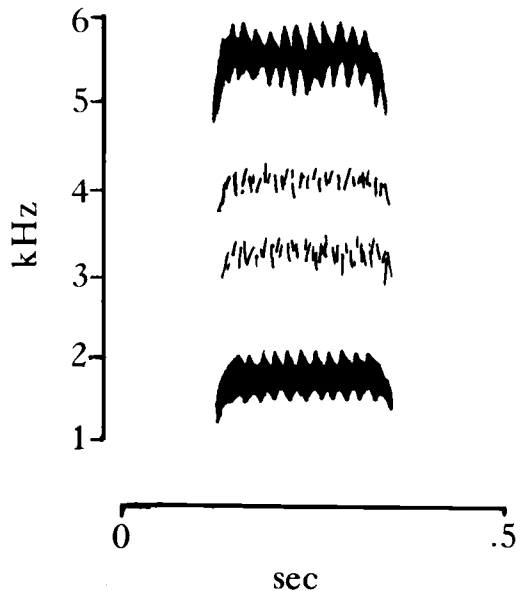


Fig. 1. Tracing of the spectrogram of the whree call.

mediately following a display. The main banded male displayed with at least 4 different partners during my observations, including at least 2 adult males and 2 immature males that could be identified by their distinctive transitional plumages. This male's most common partner was its neighbor, which defended the adjacent territory. The other partners were unbanded males whose territories were unknown. The main banded male also displayed in his neighbor's territory and possibly in the territories of other more distant males.

I observed only one likely visit by a female. In this instance, a pair of males displayed vigorously to a female-plumaged bird for over 10 min. The presumed female perched motionless on a branch about 0.5 m high, while the two males performed both the direct and the buzzy court displays around her. The group finally disbanded, and copulation was not observed. Unfortunately, both of these males were unbanded and their territories were unknown.

Skutch (1969) observed the closely related Blue-crowned Manakin (*P. coronata*) in Costa Rica and described display behaviors very similar to those of *P. serena*. Male *P. coronata* defended 6–9-m diameter territories by calling frequently throughout the day, and they displayed with various zig-zag flights around the territory. Skutch also observed a similar coordinated “dance” display performed near the ground by 2–4 males. However, the coordinated display rarely was performed during the months when the females were nesting. Females visited only single males, and copulation took place on a perch near the ground.

The best-known manakins vary in breeding system

organization from classical lek species [e.g. *Manacus manacus* (Snow 1962a; Lill 1974a, b) and *Pipra erythrocephala* (Snow 1962b, Lill 1976)], in which males defend small, adjacent, tightly grouped territories and compete for visits from females, to the *Chiroxiphia* species (Gilliard 1959; Snow 1963b; Foster 1977, 1981), in which groups of 2 or more males perform cooperative solicitation displays that are followed by a solo precopulatory display and copulation by the dominant member of the display group. Several other manakin species also are known to perform coordinated male displays. Two species of *Machaeropterus* apparently perform some type of joint display (Sick 1967). All three species of the *P. aureola* species-group perform coordinated male displays in an exploded lek system (Snow 1963a, Schwartz and Snow 1978, Robbins 1983). In *P. filicauda* and *P. fasciicauda* these cooperative displays are performed by a dominant territorial male and a subordinate male, who may either occupy the same territory or be nonterritorial (Schwartz and Snow 1978, Robbins 1983). Although the function of the coordinated display is not completely known for any of these species, it appears that in at least *P. fasciicauda* the coordinated display may assist in the attraction and excitation of females and that subordinate males inherit the territories of their dominant partners (Robbins 1983: specifically, see the description of the observed copulation).

My limited observations of *P. serena* indicate that its breeding system is distinct from both the classical lek and cooperative arena systems. *P. serena's* display sites appear to be dispersed in an exploded lek, and male *P. serena* perform a coordinated display with various other territorial and nonterritorial males on their own and other males' territories. *P. serena* seems to differ from the *P. aureola* species-group in that the display pairs are not made up of two males from the same territory but of combinations of males that may defend separate territories.

Without observing any copulations, it is not possible to determine the role of the coordinated display in *P. serena's* breeding system or to elucidate the relations between the males, but it is possible to evaluate the alternatives based on the present information. Coordinated displays may be aggressive interactions that establish a hierarchy among competing males or cooperative interactions between males (Avery 1984). My observation of a probable female visit to a pair of displaying males indicates that *P. serena's* coordinated display may function as a solicitation to females and is therefore cooperative. However, the coordinated display usually is performed during aggressive countersinging between males in the absence of females and seems to be clearly associated with territorial competition. The apparent flexibility of the display pairs and sites in *P. serena* further supports the competitive role of the display. Male *P. serena* perform coordinated displays in both their own and other males' territories, in a

manner unlike *Chiroxiphia* or the *P. aureola* group. This behavior seems inconsistent with a previous explanation for the maintenance of cooperative display that presumes that subordinate males participate in cooperative displays in order to improve their future chances of becoming the dominant member of a display group (Foster 1981). It seems unlikely that male *P. serena* are establishing firm partnerships that would offer future gains in fitness through succession in rank. Lastly, it is possible that the cooperative display in *P. serena* generally is performed before the mating season begins, as in *P. coronata*, and is not a solicitation display. I made my observations just before the short rainy season, when nesting generally is at its peak (Haverschmidt 1968). *P. serena* may not have been breeding at this time, although *P. pipra* were fledging young by the end of the observation period.

From my observations, *P. serena's* coordinated display appears to be more competitive than cooperative in nature. However, Avery (1984) has discussed the problems in defining and distinguishing between competitive and cooperative coordinated displays, and Foster (1981) has noted that these "functions need not be mutually exclusive." It is possible that a coordinated display may serve simultaneously as an excitation to females and as a competitive interaction between rival males (Foster 1981). Furthermore, a coordinated display could have a dual purpose of establishing a hierarchy among males and functioning as a cooperative solicitation display between males in the presence of a visiting female, depending on the context. Either of these alternatives could resolve the apparent conflict in function between the coordinated display performed as a competitive interaction between territorial males, and the apparent use of the same display as an excitatory or solicitation display in the presence of a female.

Although much remains to be learned about the organization of these intermediate manakin breeding systems, these species illustrate that the distinction between the competitive lek system and cooperative arena system is not rigid. Some form of coordinated display has now been described for 5 species of *Pipra* and 2 of *Machaeropterus*, indicating that this behavior is more the rule than the exception. Further research on these breeding systems should help us to understand the conditions for the evolution of competitive and cooperative courtship behavior and the role of female choice in shaping these systems.

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Starvation of a Flock of Chimney Swifts on a Very Small Caribbean Island

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Islas del Cisne (the Swan Islands) are two adjacent islands totaling less than 4 km² in area, located about 180 km north of Honduras, the closest land. The islands are not suitable for large flocks of aerial foragers such as swifts and swallows, because they are so small and distant from other land. Thus, it is surprising that a southward-migrating flock of Chimney Swifts (*Chaetura pelagica*) landed on the islands and stayed there for approximately one week, during which time hundreds of birds, perhaps the entire flock, died of starvation.

In mid-October of the fall migration of 1979, a flock of Chimney Swifts arrived on Islas del Cisne. The swifts spent the daytime foraging over the islands and roosted at night on the trunks of two palm trees just outside the dormitory of the former U.S. Weather Service station on the island. Birds in the roost clustered tightly in contact with each other, but not in multiple layers as described by Stager (1965) for an open roost of Vaux's Swift (*C. vauxi*). Nighttime temperatures on Islas del Cisne averaged 25°C, compared

to a low of 3°C for the roost described by Stager. On 19 October, a few days after the arrival of the flock, 11 swifts were found dead under the roosting trees, and many swifts were noticed to be roosting during the daytime. The bulk of the swift population died over the next 2 days, and not a single swift was seen alive after 24 October. It is not known if any swifts left the island during this period. Weather service custodians disposed of many of the swift bodies before any count was made, but a rough estimate of the number of bodies encountered and the number of swifts present near the beginning of the die-off indicates that most or all of the 200-300 swifts that were present at the beginning of the week died.

Forty of the swifts were salvaged for the University of Washington Burke Museum and eventually preserved as skeletons or skins (specimen numbers 32433-32443 and 32445-32473). By gonad inspection, there were 20 females, 16 males, and 4 unsexable specimens. The sample apparently included a mix of age classes. Five of the females had smooth or nearly