

## PHEASANT CUCKOO FORAGING BEHAVIOR, WITH NOTES ON HABITS AND POSSIBLE SOCIAL ORGANIZATION IN PANAMA

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**Abstract.**—I describe the terrestrial foraging maneuver of Pheasant Cuckoos (*Dromococcyx phasianellus*) for the first time from 2.5 h of observation on two foraging individuals in central Panama. Rattling sounds, apparently produced by feather and bill vibrations, accompany the first two (of three) phases of the basic foraging maneuver. These noises, together with body and flight feather movements, may flush organisms from cover in the forest litter, thereby enhancing prey capture rates during the final phase of the maneuver. Pheasant Cuckoos were encountered 44 times on a 30 ha census grid in lowland second growth forest during 1987 and 1988. Forty percent were observed on the ground and 60% were perched or flying in the sub-canopy. My observations, accounts from the literature, and morphological comparisons with other members of the Cuculidae indicate Pheasant Cuckoos are semi-terrestrial. Three intraspecific interactions suggest one of two likely mating systems involving intrasexual dominance; male control of mating and singing areas, or female control of laying territories containing host nests.

### COMPORTAMIENTO DE FORRAJEO EN *DROMOCOCCYX PHASIANELLUS* Y NOTAS SOBRE HÁBITOS Y POSIBLE ORGANIZACIÓN SOCIAL DEL AVE EN PANAMÁ

**Sinopsis.**—Describo la conducta de forrajeo terrestre de *Dromococcyx phasianellus* de la observación de dos aves por un período de 2.5 horas en Panamá. Sonidos aparentemente producidos por la vibración de plumas y el pico, acompañan las primeras dos fases (de un total de tres) de las maniobras de forrajeo. Los sonidos en unión al movimiento del cuerpo y las plumas del ave, muy bien podrían hacer moverse a los organismos que se encuentran en la hojarasca, facilitando la captura de presuntas presas por parte del ave en la fase final de las maniobras de forrajeo. Durante 1987 y 1988 se contaron 44 aves en un área de 30 ha. caracterizada como bosque bajo de crecimiento secundario. El 40% de las aves se observaron en los suelos y el 60% restante posadas en la vegetación o volando en la parte inferior de la vegetación (sub-docel). Mis observaciones, informes en la literatura y comparaciones morfológicas con otros miembros de la familia Cuculidae, indican que *D. phasianellus* es semi-terrestre. La observación de tres interacciones intraespecíficas sugiere uno de los siguientes sistemas de apareamiento: (a) control por parte del macho de áreas en donde canta o se aparea, o (b) control por parte de la hembra de áreas en donde aova y que contengan nidos.

The Pheasant Cuckoo (*Dromococcyx phasianellus*, subfamily Neomorphae, Cuculidae) is a brood parasite ranging from southern Mexico to parts of Bolivia, Argentina, and Brazil (Hilty and Brown 1986). Though the species is not particularly rare, its localized distribution and cryptic habits have limited study of its natural history. Based on analyses of stomach contents, Sick (1953) suggested that Pheasant Cuckoos obtain arthropod and small vertebrate prey from leaf litter on the forest floor. Sick also noted that Pheasant Cuckoo foraging behavior had never been

described. I confirm Sick's speculation with a detailed account of the foraging technique used by *D. phasianellus* while searching for prey on the ground. The basic maneuver is of particular interest as it involves both sounds and feather movements that may flush prey from cover, thereby increasing feeding efficiency. I also discuss additional observations made from Panama, and accounts from the literature, in an effort to summarize what is currently known (or indicated) of Pheasant Cuckoo natural history, including general habits and social organization.

#### STUDY AREA AND METHODS

I observed Pheasant Cuckoos in mature second growth forest (80 to 100 yr old) of Parque Nacional Soberanía along the east side of the Panama Canal, especially in moist seepage areas where a generally open understory is interspersed with dense tangles of vines and bamboo. Dominant understory plants in these areas include oil palm (*Elaeis oleifera*), smaller members of the Palmae, wild pineapple (*Aechmea magdalena*), and various *Heliconia* species. Other descriptions of *D. phasianellus* habitat broadly concur (Smithe 1966, Land 1970, Hilty and Brown 1986).

I encountered Pheasant Cuckoos while walking forest trails on and near a 30 ha grid (50 × 50 m blocks), which enabled me to estimate distances relevant to observations of focal animals. I recorded location and time of day for singing and/or perched cuckoos. If individuals encountered on the ground did not flush when approached, I followed them for as long as visual contact could be maintained, and made observations through 8 × 40 power binoculars from 10 to 15 m distance. I tape recorded one focal individual using a Marantz cassette recorder with a Sony directional microphone.

#### RESULTS AND DISCUSSION

*Foraging behavior.*—On 14 May 1987 from 1700 to 1720 EST and on 31 Jan. 1988 from 1300 to 1515 h I observed solitary Pheasant Cuckoos on the forest floor engaged in stylized and repetitive foraging sequences. On both occasions my attention was drawn by a low, "fluttery," rattle, apparently produced by a combination of wing and tail feather vibration and bill-clapping. Fluttering noises accompanied the first two of three distinct phases to the foraging maneuver (see below). I tape recorded 77 maneuvers while following the second foraging cuckoo encountered.

During the first phase, or "bob" (see Fig. 1), a foraging cuckoo stands in one place with its body, wings, and tail bobbing up and down; the movements synchronized on the downbeat with pulses of rattling noise. Pulses and bobs occur once or twice per second, up to four times. The bird's head is level with its back and the neck is contracted. Its white-tipped tail is fanned and infrequently brushes the litter surface. Then, for one second, the bird pauses; sound and movement subside briefly before the second phase ("rush").

During the "rush," the cuckoo runs straight forward for 4–12 short, quick steps; its head outstretched and low. The primaries, partially ex-

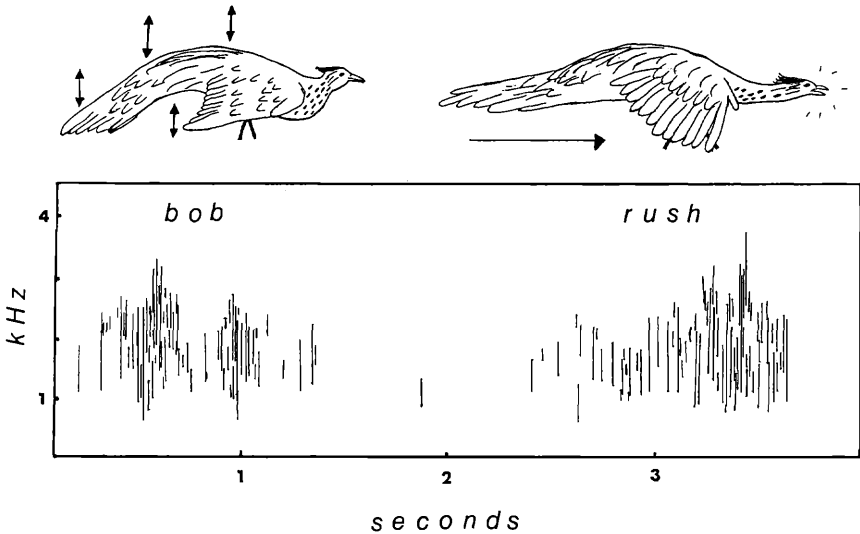


FIGURE 1. Sonogram of the first two phases of a Pheasant Cuckoo foraging maneuver with field sketches (above) indicating general postures and movements during each phase.

tended out and downward from the body, show small white patches (otherwise concealed) and flick forward intermittently. The alula is distinctly visible in front of the primaries. The lower mandible claps against the upper very rapidly, more visibly than during the “bob.” The fluttery rattle noise increases in intensity throughout the “rush,” without pulsing, as shown by a sonogram (Fig. 1). After 0.5–2 s the bird abruptly halts, all noise and movements cease, and the final phase is initiated.

In phase three (“peck”), foraging Pheasant Cuckoos may peck in the litter, capture prey items, or just look at the ground while walking. This stage may last 2–15 s, occasionally longer if prey require excessive handling, before another “bob-rush-peck” sequence commences. The average “peck” period of the tape recorded animal was 6.8 s ( $n = 77$ ,  $SD = 2.8$  s). Approximately half of this individual’s “peck” phases involved an actual peck, or attempted prey capture. In low-light forest conditions I was able to identify only the following prey items taken; one small *Anolis limifrons* (or gecko) and 17 unknown arthropods.

Experiments would help determine whether the feather movements and rattle sounds immediately preceding the “peck” actually facilitate predation by flushing prey. The cuckoo’s maneuver does, however, share elements of techniques used by other species to flush prey. American Redstarts (*Setophaga ruticilla*) and Sulfur-rumped Flycatchers (*Myiobius sulphureipygius*) wing-flick and tail-fan while walking along branches in search of arboreal insects (Ehrlich et al. 1988, Ficken and Ficken 1962, Hilty and Brown 1986, Robinson and Holmes 1982). Similarly, Greater Roadrunners (*Geococcyx californianus*) often splay their flight feathers

explosively to startle intended insect or lizard prey from cover (Bent 1964). (Closely related Striped Cuckoos [*Tapera naevia*] spread their primaries and alula-flick when displaying from branches (Wetmore 1968), but to my knowledge not while foraging.) With respect to sound production, Rufous-vented Ground-cuckoos (*Neomorphus geoffroyi*) bill-snap loudly as they feed at army ant swarms (Hilty and Brown 1986), but whether this enhances capture efficiency is unknown. To establish if non-vocal sound production I observed is used to flush prey, playback tape recordings of Pheasant Cuckoo sounds to litter organisms, and measurement of feeding success of cuckoos silenced in some way might be instructive.

*General habits.*—Eighteen (40%) of 44 individuals I observed during May 1987 and January–June 1988 were either foraging on the ground (as noted), running away from me through the undergrowth, or in the act of flushing from the litter to horizontal perches 2–15 m high. Twenty-four singing and two silent individuals were seen flying or perched in the sub-canopy. Previous authors agreed that Pheasant Cuckoos are somewhat terrestrial (Sturgis 1928, Wetmore 1968). My observations indicate the bird is habitually so, foraging for hours each day in the leaf litter.

Morphological characteristics of *D. phasianellus* generally support observational indications of terrestrial habits. Compared to cuckoos that run fast and far on open ground (*Geococcyx*) or that climb through dense vegetation with much gripping and vertical pulling by legs and feet (*Morococcyx*, *Piaya*), *D. phasianellus* has a very large sternum, heavy breast and uropygial musculature, but markedly underdeveloped leg muscles (Bent 1964, Dickey and van Rossem 1938, Wetmore 1968). Neither literature accounts nor my observations indicate that Pheasant Cuckoos ever climb, walk, or feed in vegetation above the ground. They perch on horizontal limbs and vines, fly rapidly, or move along flat ground. Furthermore, next to the highly cursorial movements of Roadrunners, the “rush” of a foraging Pheasant Cuckoo is best described as a short, quick “scurry” (4–12 steps in 1–2 s over 0.3–1 m). Near-constant manipulation of flight feathers during hours of repeated “bob-rush” sequences would appear to require significantly greater muscular support than the relatively limited forward propulsion I observed. Thus, morphological attributes of Pheasant Cuckoos appear to be consistent with physical demands of its terrestrial foraging habits.

In Central Panama, 3- and 4-note whistles of *D. phasianellus* (Willis and Eisenmann 1979, Hilty and Brown 1986) can be heard throughout the year, but most frequently from mid-April to July. This peak of vocal activity coincides with the onset of wet season rains and a flush of breeding in understory forest birds (pers. obs.). The Slaty Antshrike (*Thamnophilus punctatus*) is one likely host (Sick 1953), which builds an open cup type nest usually parasitized by Pheasant Cuckoos (Carriker 1910, Wetmore 1968).

*Indications of spacing and mating system.*—I observed Pheasant Cuckoos in aggressive territorial confrontation on two occasions, and possibly engaged in courtship on a third. On 24 May 1987 at 0835 EST I began mimicking the 3-note calls of an individual I could hear singing. It flew

directly to a perch over my head and began calling faster and louder. A second individual, which had been singing ca. 100 m away, flew in while whistling loudly from successive perches. The first bird flew quickly and silently into dense palm sub-canopy upon arrival of the second.

I observed a similar approach to a singing cuckoo (bird A) by a challenging bird (B), which did not result in displacement, on 27 Apr. 1988 at 1345 h. Following 3 min. of vigorous countersinging between the two birds (A & B), a third (C) flew in low, called once, and was attacked from above by B. Bird A continued to sing from its original perch while B and C flew to the ground 20 m away and began a silent, parallel strutting display. With heads and crests raised, speckled breast feathers puffed out, alulas and outer primaries partially extended showing white spots, and upper tail coverts strongly arched, B and C paralleled each other, walking 0.5 to 1 m apart. They paced slowly with frequent pauses to preen and stand on logs or tree buttresses, briefly gaining height over one another. After 15 min., A had flown to the ground to forage and B and C flew out of the vicinity.

For 1 h prior to the 3-way encounter described above, bird A (identified throughout by frequent singing and erect crest) foraged within 2–3 m of a fourth individual (D). D was silent, except for “bob-rush” noises, and had a flattened crest. (D was still foraging when B and C appeared later, thus all 4 birds remained distinct.) At one point, A and D approached each other with heads outstretched, wings partly splayed and I could hear soft rattling sounds. They circled once, head to tail, while arching the plumelike upper tail coverts above their backs. The two birds then separated and continued foraging as before, A intermittently singing from the ground, then from the perch where it later confronted B and C. A and D’s interaction was strongly suggestive of intersexual display.

Pheasant Cuckoos respond aggressively to playback tape recordings and attack cuckoo models placed near singing perches (N. G. Smith, pers. comm.). Thus, to the extent that individuals seek to control singing perches, Pheasant Cuckoos appear to exhibit territorial behavior. Monomorphic plumage in *D. phasianellus* renders assignment of sexual roles in the above three encounters speculative. I venture, however, that male A was dominant over males B and C who sought to establish their own order through parallel display, and female D had come to feed, perhaps also mate, on A’s successfully defended area. Alternatively, A could have been a female defending host nests from other females. The first interpretation seems more likely since it assumes that *Dromococcyx* social organization is more like that of confamilial Common Cuckoos (*Cuculus canorus*; Wyllie 1981) than that of taxonomically distant Brown-headed Cowbirds (*Molothrus ater*), in which females defend territories for egg-laying (Ankney and Scott 1982; A. Raim, pers. comm.).

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