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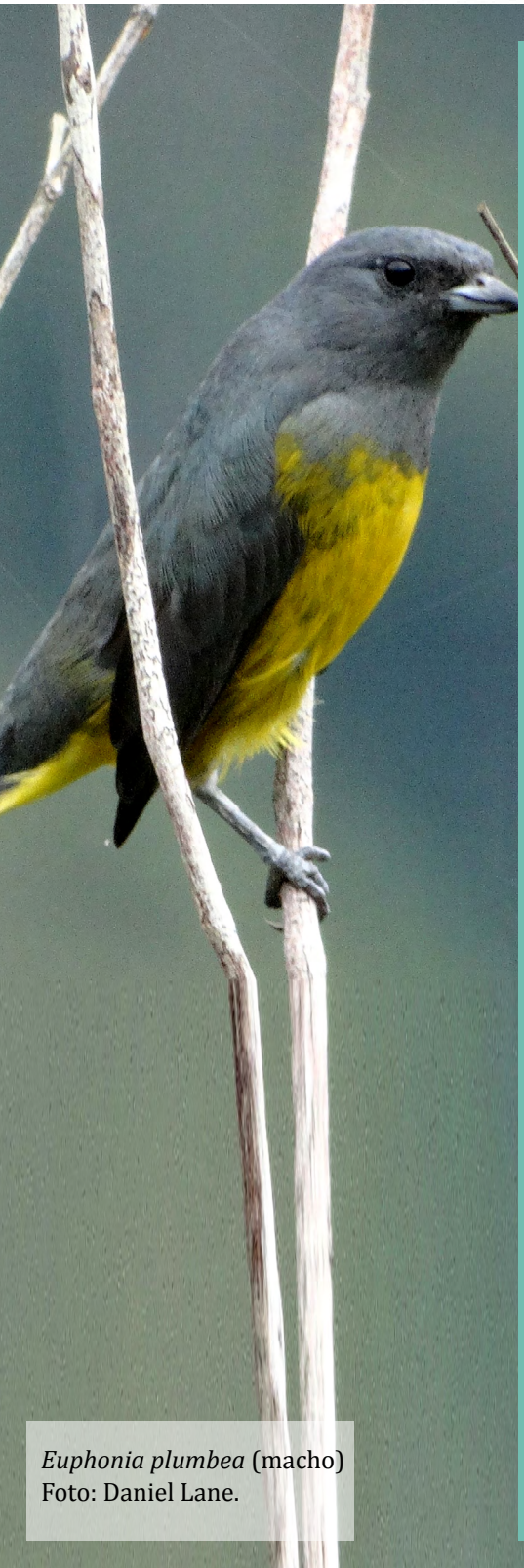

Euphonia plumbea (macho)
Foto: Daniel Lane.

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First documentation of a foraging association between the Rufous-vented Ground-cuckoo (*Neomorphus geoffroyi*) and the Collared Peccary (*Pecari tajacu*) in southeastern Peru

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ABSTRACT

The Rufous-vented Ground-cuckoo (*Neomorphus geoffroyi*) inhabits the forested regions of Central and South America from Nicaragua to Southeastern Brazil. In Peru, this species occurs in two distinct populations: one in the northern part of Loreto; and the other in the central area of Ucayali till the border with Bolivia below 1600 m (Schulenberg *et al*. 2007, BirdLife International 2014). *N. geoffroyi* is rare throughout its distributional range, thus little is known about its population size, behavior and natural history (Stotz *et al.* 1996, Sick 1997). This species is considered to be vulnerable due to the increase deforestation in Amazonia, and highly susceptible due to habitat fragmentation (BirdLife International 2014).

N. geoffroyi feeds on insects, small vertebrates, and fruits, and is often found associated with other species such as army ants (*Eciton spp.*), White-lipped Peccaries (*Tayassu tajacu*) and primates of the genera *Saimiri*, *Cebus*, and *Saguinus* (Sick 1949, Willis & Oniki 1978, Willis 1982, Terborgh 1983, Siegel *et al*. 1989, Sick 1997, Silveira 2008). In these interactions, the cuckoos have been observed either: feeding from fruit remains that fall from trees when primates are feeding, as well as seeds contained in the primate excrements (Siegel *et al.* 1989); or feeding on insects that are revealed by *Saimiri* and *Cebus* monkeys foraging activities (Terborgh 1983). According to reports by López-Lanús *et al.* (1999), *N. radiolosus*, a Ground-cuckoo species found in Colombia and Ecuador, has been observed following groups of Collared Peccary (*Pecari tajacu*) and the species is commonly called "Peccary's Bird" by the region's indigenous population. The fact that Ground-cuckoos are able to synchronize their feeding, resting, and traveling with some species of primates, ants, and Collared Peccaries, suggest plasticity in their use of natural resources and in their occupation of diverse forest habitats (Siegel *et al.* 1989).

Camera trapping is a non-invasive method of biological monitoring used in the study of wildlife. This method is particularly useful in the study of species that are naturally fearful, rare and/or difficult to detect in

their natural habitat. The use of camera traps allows for remote and continuous data collection of one or many species. This method is frequently used to obtain data on habitat use, species distribution, and wildlife abundance in tropical regions (Karanth 1994, McKenzie *et al*. 2005). Here we use camera traps to document the foraging association of Rufous-vented Ground-cuckoos and Collared Peccaries in an Amazonian forest of Southearstern Peru.

The study site was located at the Biological Station Los Amigos (EBLA) where a permanent program of terrestrial wildlife monitoring using camera traps is implemented. EBLA (12°24´S / 70°09´W, average elevation 260 m) is located at the confluence of the Madre de Dios River and Los Amigos River in the Region of Madre de Dios, Southwestern Peru. The biological station neighbors a conservation concession of approximately 145,000 ha located between the Manu National Park and the Madre de Dios Territorial Reserve for indigenous peoples in voluntary isolation. The station has a trail network that includes a total length of 35 km and crosses many habitat types. The area in general has very high bird, mammals, and reptile diversity due to been located in one of the most biodiverse areas of the world (von May *et al.* 2009, Tobler *et al.* 2013).

Sampling locations for the terrestrial wildlife monitoring program are distributed along the EBLA trail network. Two camera traps are deployed per sampling location, one located at the trail and the other camera located 50 m apart within the forest. Both cameras are positioned parallel to the ground and approximately 45 cm from the ground.

Here we report from images captured at a sampling station approximately 920 m from EBLA by two RECONYX PC900 cameras over a period of 21 days. The cameras were set up to maximize the number of small and large terrestrial animals photographed at a distance no larger than 50 m from the front of the camera and were configured to their maximum sensitivity and velocity (ten photos per event at one second intervals).

Between October 2th, 2014 and November 28th, 2014, fourteen sampling stations were monitored. In three of them, a total of eight peccary sightings were recorded. Only one sighting included a recording of interactions between cuckoo and peccaries, which is described below.

On November 19th 2014 between 06:36 h EST and 06:39 h the camera trap located at "Trocha Perro" trail (12°33'38"S / 70°05'58"W, 282 m) took 90 photos of a group of Collared Peccaries that were moving along the trail. Forty two of those show that during 139 seconds (from 06:36:24 h to 06:38:43 h) a Rufous-vented Ground-cuckoo followed at least two adult Collared Peccaries. The Ground-cuckoo is seen running and moving towards both sides of the trail until it left the camera's field of view while following a Collared Peccary (see Fig. 1 for images from 06:38:15 h to 06:38:34 h). The individual bird was identified as *N. geoffroyi* by its long and partially upright tail, its mode of walking on the ground, the black chest band and forehead brown scales (Schulenberg *et al*. 2007).

Foraging associations between Rufous-vented Ground-cuckoos and other animal species (including army ants [*Eciton spp*.], different species of primates, and White-lipped Peccaries [*T. tajacu*]) have been previously reported and may constitute some kind of symbiotic interactions (Sick 1949, Willis & Oniki 1978, Siegel *et al.* 1989, Schulenberg *et al.* 2007, Silveira 2008). However, this is the first time that a foraging association between Ground-cuckoos and Collared Peccaries has been observed and documented.


PC900 PROFESSIONAL
2014-11-19 6:38:03 AM M 8/10
PC900 PROFESSIONAL
2014-11-19 6:38:05 AM M 10/10
PC900 PROFESSIONAL
2014-11-19 6:38:07 AM M 2/10
PC900 PROFESSIONAL
2014-11-19 6:38:09 AM M 4/10
PC900 PROFESSIONAL
2014-11-19 6:38:12 AM M 7/10
PC900 PROFESSIONAL
2014-11-19 6:38:15 AM M 10/10
PC900 PROFESSIONAL
2014-11-19 6:38:34 AM M 1/10
PC900 PROFESSIONAL
2014-11-19 6:38:35 AM M 2/10

Figure 1. An individual of *Neomorphus geoffroyi* following at least one adult individual of *Pecari tajacu* at the Los Amigos Biological Station, in Madre de Dios, Peru.

Although it is difficult from the photos to establish the precise type of symbiosis that exists between these two species, it is likely that the Ground-cuckoo benefits from the higher chances of foraging on insect larvae, fruits, and seeds exposed when the Collared Peccaries dig in the ground in search of roots and fruits (Siegel *et al.* 1989, Karubian & Carrasco 2008); or from insects that are chased away by the peccaries moving through the forest-similar to the effect caused by the army ants (Willis & Oiniki 1978). Likewise, peccaries may benefit by Ground-cuckoos alert call against the presence of potential predators. Unfortunately, our photographic record does not allow us to evaluate all these possibilities. In addition, as mentioned by Siegel *et al.* (1989) when referring to the relationship between the Ground-cuckoo and primates of the genus *Saguinus*, this could also be a type commensal interaction

in which only Ground-cuckoos benefit from the interaction.

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