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OBSERVATIONS OF NOVEL FEEDING TACTICS IN GUIRA CUCKOO *GUIRA GUIRA* (AVES: CUCULIDAE)

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Abstract.- Two unusual feeding observations by Guira Cuckoo *Guira guira* (Cuculidae) are reported. The birds were seen to raid the closed nests of the butterfly *Brassolis sophorae* (Lepidoptera: Nymphalidae), and also to take cicadas (Auchenorrhyncha) that had become trapped in a mist-net.

Key words: *Auchenorrhyncha,* Brassolis sophorae*, foraging, Nymphalidae, Paraguay.*

Resumen.- Se reportan dos observaciones de comportamiento de forrajeo poco usual para la Piririta *Guira guira* (Cuculidae). Las aves fueron observados saqueando los nidos cerrados de la mariposa *Brassolis sophorae* (Lepidoptera: Nymphalidae), y tambien a depredar chicharras (Auchenorrhyncha) que habían quedado atrapados en redes de niebla.

Palabras clave: *Auchenorrhyncha,* Brassolis sophorae*, forrageo, Nymphalidae, Paraguay.*

The Guira Cuckoo *Guira guira* (Gmelin, 1798) is a widespread socially-breeding cuculid (Macedo, 1992, 1994; Macedo & Bianchi, 1997) found throughout eastern South America from northeastern Brazil to south-central Argentina (Payne, 2005). In Paraguay it is a common and familiar species, occurring in open areas in small, noisy flocks of 6 to 8, or exceptionally up to 20 birds (Payne, 2005). They are inquisitive, omnivorous feeders with a varied diet consisting of insects, small vertebrates and eggs (Melo & Macedo, 1997; Martins & Donatelli, 2001). Martins & Donatelli (2001) described two foraging modes for Guira Cuckoos in São Paulo, Brazil, walking and pursuing prey whilst on the ground and dropping onto terrestrial prey from a perch. In this note I describe two novel and noteworthy foraging observations for this species from southern Paraguay.

Feeding on larvae of *Brassolis sophorae* (Lepidoptera: Nymphalidae: Brassolini).

Brassolis sophorae Stichel, 1902 is a large crepuscular Brassolid butterfly that is abundant throughout tropical South America (Fruhstorfer, 1924). Adults have a vestigial, non-functional proboscis and are short lived, with females laying up to 200 eggs in a single clutch (Carvalho *et al*., 1998). The social larvae (Fig. 1) feed nocturnally on palms (Arecaceae) and are considered agricultural pests because of their tendency to completely defoliate the plants upon which they feed (Cleare, 1915; Rai, 1971). The larvae take refuge by day in large communal silk nests, interwoven within the palm leaves (Marassá, 1985), and mark their trail with a silk thread when leaving the nest to forage, returning once again when foraging is over (Zanetti *et al*., 1999). Nests are of firm construction, difficult to open and provide the larvae with protection from predators (Cleare & Squire, 1934). The larval stage lasts between 76 to 91 days (Menezes & Leme, 1954).

Figure 1. Mature larva of *Brassolis sophorae*.

Figure 2. Guira Cuckoo *Guira guira* inserting its bill into the silk nest of *Brassolis sophorae* to extract a larva.

On 11 September 2014 a flock of seven Guira Cuckoos were seen raiding the silk nest of *Brassolis sophorae* larvae in Encarnación, Itapúa department, Paraguay (27º 17´ 36.3"S, 55º 55´ 43.5"W, 124 m.a.s.l.). The nest was an estimated 30 cm long, woven within leaves and approximately 4 m from the ground in a palm tree. Feeding began around 12:30 pm and continued over the course of two hours, during which the flock maintained contact throughout with noisy rattling calls. The cuckoos were observed to pick a hole into the silky "bag" and insert the bill to remove them, the individual birds taking turns to extract a larva from the nest (Fig. 2). Upon removing a caterpillar each bird then flew to the ground to beat it against the floor or a rock, and partially masticate the body to soften it up before consuming it whole (Fig. 3). The process of softening the larva before consumption lasted as long as 90 seconds in some cases, but it was not possible to see if the head was removed before it was eaten. After swallowing its prey the individual then returned to the tree to extract another larva, waiting its turn in the noisy flock. Intact larvae found nearby were between 4.5-7 cm long. This scenario was played out repeatedly during the period that the flock fed. Once the flock had finished feeding the birds flew away together giving the flight call. The following day at approximately the same time they returned to the same nest to feed, indicating that they did not completely plunder the resource. The birds did not return on the third day and no further evidence of larval activity was observed on the palm after that point, suggesting that either the entire colony of larvae had been consumed or that the larvae had abandoned the food source as a result of the attacks.

Very few vertebrates have been reported to feed on larvae of *Brassolis sophorae*. Yellow-headed Caracara *Milvago chimachima* have been observed to predate late larval instars of *Brassolis sophorae* but only when the nests were clearly visible due to the complete defoliation of the host plant (Contreras Peña, 2012). In the case reported here however the cuckoos located and predated the nest when the palm was still densely foliated, exhibiting considerable cognition in locating the nest and recognising it as containing a potential prey source. Furthermore the dexterity and persistence shown by the birds in opening the nest to extract the larvae shows some level of cooperation as well as appreciation of the potential rewards within.

The observation here confirms that arboreal foraging is a tactic that is more widely employed by this species, and that the species is capable of considerable ingenuity and flexibility in its feeding methods. However it must be noted that an affiliation for feeding on the ground was shown by all observed birds once they had extracted a

Figure 3. After extracting a larva the cuckoos descended to the ground to soften it up before consumption.

larva from the nest, dropping to the floor to first triturate and then consume their prey.

Feeding on cicadas (Auchenorrhyncha: Cicadidae) trapped in mist-nets.

A mist-netting campaign in Encarnación, Departamento Itapúa in December 2004 took place during an emergence of Cicadas, principally of the species *Fidicina torresi* Boulard & Martinelli, 1996 and *Quesada gigas* (Olivier, 1790). Considerable difficulties were encountered with the cicadas crashing into nets and becoming very rapidly entangled. The violent wing beats and calls made by the trapped insects alerted birds to the presence of the net and had a negative effect on capture rates. Attempts to remove the cicadas by hand without damaging the nets proved impossible without first killing the insect and breaking it into pieces.

Guira Cuckoos feed heavily on cicadas during such emergences (Payne, 2005; Sazima, 2009), and the presence of calling insects in the net attracted the attention of a small flock. One bird was observed to fly up to the net, clasp onto the wider draw strings and remove a cicada without becoming entangled itself. On a second occasion an attempt was made to try to rush another individual into the net when it alighted on the net, with the surprising result that the bird flew towards the observer to safety and not directly into the net as intended. This encounter sufficed to scare away the flock from further attempts to remove cicadas from the net.

Such behavior shows noteworthy innovation and innate intelligence in order to exploit this novel and rare feeding opportunity. Though the birds may have been initially attracted by the distress calls of the cicadas, a remarkable level of dexterity and spatial awareness is required to land on a mist net and remove the insect. Furthermore the risk assessment shown by the bird flying towards the onrushing observer and away from the net requires considerable cognitive function. The novelty of the scenario (it is unlikely that this flock had had any prior encounters with mist nets) indicates that a series of cost-benefit factors were rapidly and successfully weighed up by the waiting birds which were then able to take advantage of the easy prey without avoid falling victim to the nets themselves.

Sazima (2009) observed Guira Cuckoos to take cicadas from vegetation during an outbreak, but suspected that success rate was likely to be low. He also observed the species pursuing flushed cicadas, but enjoying success typically only when the cicada fell to the ground.

Despite being a common bird across much of its range, much still remains to be learned about the feeding tactics of Guira Cuckoos. The observations reported here and that by Sazima (2009) suggests that this species may be an adaptable and flexible forager able to quickly modify its usual foraging methods to take advantage of a locally and suddenly abundant prey. This, coupled with the expansion of the agricultural frontier and opening up of previously forested areas into ranchlands may be key factors in their success.

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