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### NEST AND FLEDGLING OF THE HELMETED WOODPECKER (*DRYOCOPUS GALEATUS*)

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**Nido y volantón de carpintero de cara canela (*Dryocopus galeatus*).**

**Key words:** Helmeted Woodpecker, *Dryocopus galeatus*, Picidae, nest, fledgling, Atlantic Forest, Argentina.

#### INTRODUCTION

The Helmeted Woodpecker (*Dryocopus galeatus*) is one of the rarest Neotropical woodpeckers with an estimated global population of 400–8900 individuals and with IUCN status ‘vulnerable’ (BirdLife International 2012, Lammertink *et al.* 2012). It is endemic to the southern Atlantic Forest in eastern Paraguay, northeast Argentina, and southern Brazil. It reaches relatively high densities in old-growth forest, of which very little remains in its range, but is scarce in or absent from secondary and heavily logged forests (Bodrati & Cockle 2006, Lammertink *et al.* 2012). Its association with old-growth is poorly understood and may be related to foraging, to the availability of nest hole substrates and roost holes, or to competitive interactions with other large woodpeckers (Birdlife International 2012, Cockle 2010; Lammertink *et al.*

2011, 2012). Little is known of the species’ reproductive biology, with only four nests described in various degrees of detail until 2010 (summarized in Lammertink *et al.* 2012). None of these nests were followed through fledgling.

We here describe features of a nest cavity and nest tree, and plumage, vocalizations, and behavior of a nestling and fledgling of the Helmeted Woodpecker observed in November 2011 in Misiones Province, Argentina, and compare findings with those reported from other nests.

#### METHODS

Our study area was Cruce Caballero Provincial Park, in central-eastern Misiones Province, northeast Argentina (26°31’S, 54°00’W, ca. 610 m a.s.l.), a park of 600 ha of which 400 ha consist of old-growth mixed semi-decidu-

ous/coniferous Atlantic Forest. We spent most of the Austral spring of 2011 (August through mid-December) in the park either specifically looking for Helmeted Woodpeckers (ML) or searching for and monitoring nests of cavity-nesting birds (JK). When we found the Helmeted Woodpecker nest, we placed a pop-up blind covered with fresh fern leaves at 11 m from the nest tree for observations and for photographic purposes. In addition, we video-taped the fledgling woodpecker; this video was subsequently archived in the Macaulay Library of Cornell University (catalogue number 70309). After the nestling fledged, JK climbed with ropes to the nest for measurements and took photos of the cavity entrance. Cavity dimensions were measured with a measuring tape and cavity height above the ground with a rope. Description of calls follows Lammertink *et al.* (2012). The number of notes per call were counted in the field or from video; means are given  $\pm$  SD.

## RESULTS

On 26 November 2011, ML revisited a spot in Cruce Caballero National Park where we had heard or seen one or two Helmeted Woodpeckers earlier in the year on five occasions, between 12 September and 15 October. Between 11:54 and 11:58 h, ML heard at least 30 *kwee-kwee-kwee* calls, with three or four notes, that seemed to be Helmeted Woodpecker long calls but were unusually persistent and were somewhat different from adult Helmeted Woodpecker calls. Two *tu-du-du-du* calls, a less common call of adult Helmeted Woodpecker, alternated the long calls. The calls stopped, then resumed at 12:22–12:25 h. ML followed the direction of the sound to an irregularly shaped cavity in a dead part of a tree. When he scratched the base of the tree, a Helmeted Woodpecker nestling stuck its head out of the cavity.

We set up a pop-up blind near the nest, and ML made observations from 13:55 to 19:25 h. At 14:05 h, the nestling climbed from the inside of the cavity to the nest opening and called there almost constantly until the end of the day, except for two breaks of 4 min, inside the cavity. Vocalizations were identical to those heard earlier that day. During 12 min, 86 *kwee-kwee-kwee* calls and 2 *tu-du-du* calls were counted. The nestling was fed only once, at 17:11 h, by an adult female Helmeted Woodpecker. The adult did not carry food in the bill but fed either by regurgitation or from a food crop. It did not enter the cavity. Between 18:31 h and 18:42 h, the nestling vocalized less frequently and spent more time inside the cavity. It last called at 18:55 h, shortly before sunset at 19:10 h. No adult spent the night in the nest cavity.

On the next morning of 27 November at 05:55 h, ML resumed observations from the blind. The nestling was already calling in the nest opening. At 06:20 h it fledged, without warning and without an adult noticeably present. It jumped from the cavity and made a flight of ca. 25 m with audible and irregular wing beats. By 07:12 h, it had flown between at least 6 different perch trees and was ca. 150 m from the nest tree, and kept calling constantly with *kwee-kwee-kwee* calls. At 08:20 h, the fledgling was several hundred meters away and moved out of hearing range. It was heard again at 08:50 h at ca. 300 m northwest of the nest, and was heard and found at 11:20 h ca. 170 m south of the nest when a video was made of it calling (<http://macaulaylibrary.org/video/70309>). It was also heard at 14:50 h at 160 m southwest of the nest, and lastly at 15:30 h at 260 m west of the nest where it was photographed (Figs 1b–c). No adult was seen or heard at any of the occasions the fledgling was heard or seen this day.

On 29 November, a juvenile female Helmeted Woodpecker was seen foraging on

dead bamboo 570 m north of the former nest (A. Bodrati pers. com.). On 29 December, a juvenile female and adult male Helmeted Woodpecker were seen foraging together 1060 m northwest of the former nest in hardwood trees, and the juvenile was fed once by the adult (G. Cox pers. com.). It is unknown whether our observations were of the same juvenile female Helmeted Woodpecker.

The fledgling resembled an adult female Helmeted Woodpecker in most respects. It had a brown iris and cinnamon face with fine black bars and without a red malar. However, there were a few small red spots in the malar area that are not seen in an adult female (Fig. 1a). It also differed from an adult by having a shorter crest, shorter tail, shorter bill, and an ivory-white rather than grey bill base. Vocalizations were similar to that of an adult but far more frequent and persistent. The number of *kwee* notes per *kwee-kwee-kwee* call increased from  $3.8 \pm 0.6$  ( $N = 34$ ) during 14:31–14:37 h on 26 November, to  $4.4 \pm 1.0$  ( $N = 52$ ) during 17:28–17:34 h on 26 November (pre-fledging), to  $5.7 \pm 1.4$  ( $N = 15$ ) during 09:43–09:47 h on 27 November (post-fledging), and finally to  $6.2 \pm 0.7$  ( $N = 44$ ) during 11:25–11:33 h on 27 November.

The nest was in primary mixed semi-deciduous/coniferous forest, at an elevation of 630 m a.s.l. on a broad flat ridge top. It was in a patch of forest with some of the largest trees in the park, including a 90 cm diameter at breast height (DBH) *Nectandra* sp. tree 15 m from the nest tree and with several large emergent, live and dead *Araucaria* pines (*Araucaria angustifolia*) within 60 m of the nest tree. The nest cavity was at a height of 9.47 m in a laurel tree *Nectandra lanceolata* with DBH = 55 cm and ca. 22 m in total height. The cavity was in a nearly vertical section of one of the first main branches that had a diameter of 31.5 cm at the cavity. The branch was dead with bark missing in a section of 2.0 m long below and above the cavity. The nest tree was

alive but ailing with most of the crown foliage crowded out by lianas. We collected a fungal conk from the trunk; it was deposited in the Herbarium of the Universidad Nacional de Córdoba and identified as *Inonotus patouillardii*, a wood-decaying fungus (G. Robledo *in litt.*). Left under the cavity was a bare area of 6 cm wide and 10 cm tall in the trunk surface, probably an old-rupture scar, with a smooth, hard black surface (Fig. 2). The latter may result from a fungus, although it was not related to the *I. patouillardii* on the trunk of the tree (G. Robledo *in litt.*). The inside cavity walls were to a large extent covered in a black, humid, and sticky fungus or mold. To the right of the cavity entrance was a small, shallow, conical hole, either a cavity start or a foraging hole (Fig. 2). The outer rim of the cavity entrance was irregular with a teardrop point in the left under corner (Fig. 1a), but from 1 cm in the entrance tunnel was regular and nearly round (Fig. 2). The cavity entrance measured 7.5 cm tall by 7.0 cm wide. The depth of the tunnel, to the back wall of the cavity, was 24.5 cm, and from the entrance to the bottom the cavity was 27.0 cm deep. The cavity was recently excavated or re-excavated with fresh wood chips of ca. 1.0 to 1.5 cm long at the foot of the tree. Some lianas with green leaves grew on the branch surface near the cavity but overall this section of the tree was fairly clean. The cavity entrance was rather hidden by the foliage from a neighboring tree; in an imaginary sphere of 3 m diameter around the cavity ca. 40% was closed by dense foliage. The cavity faced a compass heading of 359°.

## DISCUSSION

Nestlings and fledglings of all other *Dryocopus* species *javensis*, *martius*, *pileatus*, *lineatus*, and *schulzi* can be sexed by head patterns that match those of adults (Winkler *et al.* 1995), but whether Helmeted Woodpeckers can be



FIG. 1. Young Helmeted Woodpecker (*Dryocopus galeatus*) in the opening of the nest cavity the day before fledging (a), perched on a tree trunk after fledging (b), and vocalizing (c). Photos by M. Lammertink.

similarly sexed remains undescribed (Lammertink *et al.* 2012). The nestling and fledgling Helmeted Woodpecker we observed resembled an adult female, and hence we believe its sex was female. A larger sample will be required to determine whether juveniles with both male and female head markings occur. Short (1982), without referring to specific skin specimens, reported that juveniles have less red on the crown and grey ear coverts, but these features were not evident on the juvenile we observed.

We found a nest with one nestling 18 h before it fledged. More nestlings could have fledged from this nest prior to our observations, considering that *Dryocopus* species typically raise two or three fledglings (Winkler *et al.* 1995) that can fledge up to three days apart (Bull & Jackson 1995, Gorman 2004). However, we did not hear vocalizations of another fledgling around the nest, and there may have been only one fledgling. The persistent calling of the nestling and fledgling we observed was in strong contrast with the calling pattern of adult Helmeted Woodpeckers that are very

silent throughout the year and rarely vocalize more than a few times per day (Lammertink *et al.* 2012).

In comparison to previously described nests of the Helmeted Woodpecker (summarized in Lammertink *et al.* 2012; Forner 2012), with 55 cm DBH the nest tree was smaller than in other nests that were in 66 cm and 65 cm DBH trees, respectively. The nest had a smaller diameter trunk or branch diameter at cavity height (31.5 cm) than previous nests (35 cm, 47 cm, and 53 cm). It was at 9.47 m height, higher than other nests that were at 2.3 m, 4.4 m, 5.0 m, 5.52 m, and ca. 5 m height. The cavity entrance dimensions were similar to other nests. It was in a dead branch of a live tree whereas three other active nests were in entirely dead trees. No bark remained around the cavity whereas in four other nests there was bark on the tree at the cavity location. Other nest sites were covered with lianas and mosses, and in two nests the entrance was rather hidden by leaves of epiphytes. The nest we described was free of epiphytes near the cavity entrance, but it was



FIG. 2. Front view of the nest cavity of the Helmeted Woodpecker. Photo by J. Klavins.

nevertheless rather hidden by foliage from a neighboring tree.

One strikingly consistent feature of known Helmeted Woodpecker nest cavities is that they are made in trees of the genus *Nectandra*. Three nests (including the one described here) were in *N. lanceolata*, one in *N. angustifolia*, and one in *N. megapotamica* (Lammertink *et al.* 2012, Forner 2012). Although *Nectandra* trees are common in Atlantic Forest habitats (UNESCO 2011), they are not commonly used by cavity-nesting birds, with only 9% of 98 nest cavities in Misiones being found in *Nectandra* (Cockle *et al.* 2012, K. Cockle pers. com.). The Helmeted Woodpecker is a weak excavator with a bill that is narrow at its base compared to congeners, and it often excavates in decayed wood when foraging (Lammertink *et al.* 2012). A particular

wood structure of *Nectandra*, perhaps in combination with wood-decaying fungi (Jackson & Jackson 2004), may attract Helmeted Woodpeckers to these trees for nest cavity excavation.

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