ORNITOLOGIA NEOTROPICAL 11: 341–348, 2000

BREEDING AND LIFE HISTORY OBSERVATIONS OF THE GRAY-BREASTED WOODPECKER (*MELANERPES HYPOPOLIUS*)

David L. Leonard, Jr.

Department of Wildlife Ecology and Conservation, University of Florida, P.O. Box 110430, Gainesville, Florida 32611, U.S.A. *E-mail*: dleonard@gru.net

Resumen. Durante la época reproductiva en Oaxaca, México, hice observaciones de un grupo familiar no marcado de *Melanerpes hypopolius* por nueve dias, documentando el sistema social, comportamiento y vocalizaciones de esta poco conocida especie. Las observaciones fueron enfocadas en un grupo de cactus columnares que contenían nidos y cavidades habitacionales. Ocho adultos alimentaron polluelos en tres nidos localizados cerca uno del otro. Muchas de las observaciones y vocalizaciones registradas fueron similares a las de otros *Melanerpes*. Esta especie es gregaria, territorial y vocaliza bastante. La táctica de forrajeo mas empleada es atrapar insectos al vuelo; muy raramente fueron observados excavando en la corteza o buscando insectos en el follaje. Los frutos de *Opuntia* tambien fueron un alimento común. Yo observé el uso de yunques para procesar insectos y frutos. Si bien documenté almacenamiento de comida, observaciones adicionales son requeridas para determinar su importancia. Aunque mas estudios son necesarios, *Melanerpes hypopolius* parece ser mas similar en su comportamiento a los miembros de este género que no poseen el dorso rayado.

Abstract. I observed an unmarked family group of Gray-breasted Woodpeckers (*Melanerpes hypopolius*) for nine days during the breeding season in Oaxaca, Mexico, documenting the social system, behavior, and vocalizations of this little-known species. Observations were focused at a group of columnar cacti containing nesting and roosting cavities. Eight adults provisioned chicks at three nests located in close proximity to each other. Many behaviors and vocalizations were similar to other *Melanerpes* woodpeckers. This species is gregarious, territorial, and vocal. Flycatching for insects was the most common foraging technique; excavating and gleaning were rarely observed. The fruit of *Opuntia* cacti was also a common food item. I observed the use of anvils for processing insects and fruit. Although I documented food storage, additional observations are required to determine its importance. Although more study is needed, the Grey-breasted Woodpecker appears to be behaviorally similar to some of the non-zebra-backed members of the genus. *Accepted 7 June 2000*.

Key words: Centurus, *cactus, flycatching, Gray-breasted Woodpecker,* Melanerpes hypopolius, *Oaxaca, Mexico.*

INTRODUCTION

The New World genus *Melanerpes* is comprised of 22 species (Winkler *et al.* 1995). Few have been well studied (but see Cruz 1977, Koenig & Mumme 1987) but at least seven are cooperative breeders (Winkler *et al.* 1995). The Gray-breasted Woodpecker (*Melanerpes hypopolius*) is endemic to the arid interior of southwestern Mexico from northwestern Guerrero to Puebla and south to central Oaxaca (AOU 1998). Virtually all details of the species' life history are unknown (Winkler *et al.* 1995). The plumage of Gray-breasted Woodpeckers is similar to the zebra-backed members of the genus. Subtropical scrub with abundant columnar cactus appears to be the preferred habitat (Selander & Giller 1963,

Hendricks *et al.* 1990), although the species has been reported from forests bordering rivers (Winkler *et al.* 1995). Hendricks *et al.* (1990) reported winter aggregations of 26 individuals with up to four birds roosting in the same cavity, and predicted the species was a cooperative breeder.

The first objective of this paper is to confirm that the Gray-breasted Woodpecker is a cooperative breeder. The second is to provide a sketch of this species' life history during a portion of the breeding season. Last is to suggest that despite plumage color, this species appears more behaviorally similar to Lewis' (*M. lewis*), Acorn (*M. formicivorus*), and Red-headed (*M. erythrocephalus*) woodpeckers compared to the zebra-backed members of the genus (e.g., Red-bellied [*M. carolinus*], and Golden-fronted [*M. aurifrons*] woodpeckers.

STUDY SITE AND METHODS

Observations took place at Yagul (elev. 1700 m), a small, protected archeological site located near the town of Mitla (16° 55'N, 96° 21'W), approximately 30 km SE of Oaxaca City, Oaxaca, Mexico. This site is surrounded by a small patch (~100 ha) of native vegetation embedded in a matrix of agricultural lands with varying degrees of human disturbance. The vegetation at Yagul is arid subtropical scrub as described by Binford (1989), dominated by *Opuntia* sp., several species of columnar cactus, and *Acacia* sp.

I observed Gray-breasted Woodpeckers for 29.5 h over nine days between 30 April and 26 May 1999. Observation times were mostly restricted to hours of public access to the site (between 08:00 and 17:00 CST). All birds were unmarked, and observations were made using 10x40 binoculars from distances of 75 to 125 m. I measured cavity height and cactus height at cacti containing nest cavities.

RESULTS

The focal point of the woodpeckers' activities was the only group of columnar cacti (*Pachycereus marginatus*) in the protected area, hereafter referred to as the cluster. The cluster consisted of 45 cacti greater than 2 m in height distributed over a linear distance of approximately 50 m. I documented 25 cavities, most facing south to west, with some cacti having multiple cavities. The cluster was surrounded on three sides by cliffs ranging in height from 7 to 20 m. Although no other clusters were found within the vicinity, individual Gray-breasted Woodpeckers were infrequently observed throughout the area.

Eight resident birds, five males and three females occupied the cluster. At least one additional bird (sex unknown) was infrequently observed. Woodpeckers left their cavities before 07:15 (sunrise 06:50), and individuals spent much of the early morning perched motionless or preening on the top of cacti. Direct sunlight did not reach the cluster until approximately 07:45, at which time their activity increased, but flycatching and feeding of nestlings did not begin in earnest until 09:00. The birds were active throughout the day and fed nestlings until at least 19:15 (sunset 20:20).

Reproductive and provisioning behavior. On 2 May, I heard nestling vocalizations from a cavity (Nest 1). On 7 May, I observed feeding at a second nest (Nest 2). On 15 May, I observed feeding at a third nest (Nest 3). Nest 1 was approximately 40 m west of nests 2 and 3, which were 7 m apart. Heights of nesting cavities and cacti with nests ranged from 3 m to 6 m and from 3.75 m to 7.25 m, respectively. I was unable to determine the number of eggs or nestlings at any nest.

During all observation periods, adults spent long periods perched on cacti preening and scanning for aerial insects; at least one

TABLE. 1. Feeding rates at three Grey-breasted Woodpecker (*Melanerpes hypopolius*) nests in Oaxaca, Mexico. Total feeding trips, numbers in parenthesis indicate trips by males, females and unknown. Asterisks (*) indicate half hour observation periods.

Date	Time	First nest	Second nest	Third nest
8 May	09:20-10:20		12 (12, 0, 0)	
	10:30-11:30		22 (19, 2, 1)	
	11:30-12:00		12 (7, 5, 0)*	
	12:50-13:50	33 (28, 5, 0)		
	13:50-14:20	17 (9, 7, 1)*		
	15:10-16:10	09 (6, 3, 0)		
14 May	13:08-14:08		29	40
	14:10-15:10	25 (20, 5, 0)*		
16 May	09:10-09:40		19*	15*
	09:40-10:40	11 (9, 2, 0)		
	10:13-10:43		21	19
23 May	14:40-15:10		05 (3, 0, 2)*	25 (17, 5, 3)*
24 May	18:10-17:10			21 (5, 6, 10)*
26 May	08:30-09:00			10 (8, 1, 1)*

bird was always present in the cluster. I never observed overt aggression among adults related to their position near a nest. Although unmarked, it appeared that a female and male usually provisioned Nest 1, a single male usually provisioned Nest 2, and multiple males and at least one female provisioned Nest 3.

Feeding rates varied throughout the day. Rates were lowest in the morning and peaked in the afternoon with up to 40 visits per hour (Table 1). Combining feeding observations from all nests, males provisioned young more than expected compared to females ($\chi^2_1 = 17.7$, $P < 0.05$). I only observed males removing fecal sacs. I observed arthropods, captured mostly by flycatching, and fruit, predominately from *Opuntia* sp., being fed to nestlings.

On 23 May, I observed a single fledgling near Nest 1 and no adults were visiting the nest cavity. On 24 May, another fledgling was observed, presumably from Nest 2 as no adults were visiting that cavity. On the last day of observations (26 May), the nestling from Nest 3 had not fledged, however, its behavior and size (sitting at the cavity entrance) suggested it would within 24 h.

Fledgling behavior. Fledglings occasionally remained in the open for up to 30 min but spent most of their time hidden within cacti; like adults they avoided woody vegetation (see below). They did not follow or beg from their parents as do some other *Melanerpes* (pers. observ.). I observed one instance of aggression between the assumed Nest 1 fledgling and an adult female, apparently involving a conflict over a perch. Feeding rates appeared low; however, they were difficult to quantify because fledglings were often mobile or hidden. The same adults (based on their use of specific perchs) provisioning spe-

cific nests appeared to provision the corresponding fledglings. Fledglings remained separate, one near Nest 1 and the other near Nests 2 and 3.

Fledgling plumage. Fledgling plumage was distinct from that of adults. The neck and breast of fledglings were darker than adults. The back of the head and neck were charcoal gray in fledglings and a lighter gray in adults. The crown patch of fledglings was darker (crimson) than the red on adult males, and their white eye crescents (Howell & Webb 1995) were brighter than those of the adults. The difference in crown patch coloration was sufficient to separate fledglings from adults. The tail feathers of fledglings were visibly shorter than adults and they had difficulty climbing up cacti.

Adult behaviors and vocalizations

Intraspecific interactions. As reported by Hendricks *et al.* (1990), this is a social species. Although adult group members were frequently in close proximity to one another, I observed only two aggressive interactions. One appeared to be related to conflicts over a perch (adult male-male) and one to a conflict over food (adult male-female). On three occasions an apparent non-resident Gray-breasted Woodpecker (sex undet.) was observed. As many as four residents participated in chasing the intruder. Although vocalizations, displaying, and drumming were frequent, interactions were brief (< 2 min). I did not observe any physical contact and the aggression ended when the non-resident flew approximately 200 m from the cluster.

Interspecific interactions. I observed interspecific interactions between Gray-breasted Woodpeckers and several other birds: White-winged Dove (*Zenaida asiatica*), Ash-throated Flycatcher (*Myiarchus cinerascens*), Canyon Wren (*Catherpes mexicanus*), and Black-vented Oriole (*Icterus wagleri*). Interactions with the dove and oriole were brief and involved aerial chases near a Gray-breasted Woodpecker nest and the woodpecker was the aggressor. In interactions between Ash-throated Flycatchers and Gray-breasted Woodpeckers, flycatchers aggressively chased woodpeckers in flight. Gray-breasted Woodpeckers were the aggressors in interactions with wrens. In each case, woodpeckers chased wrens that were inspecting cavities in the cluster. I observed no reactions from Gray-breasted Woodpeckers in response to Turkey Vultures (*Cathartes aura*), Crested Caracaras (*Polyborus plancus*), Peregrine Falcons (*Falco peregrinus*), or Common Ravens (*Corvus corax*) flying over (~ 7–15 m) the cluster.

Vocalizations and drumming. I documented three distinct vocalizations. The first was a harsh, pulsating rattle and has been reported as *chi-i-i-ir*, *chi-i-i-ir* (Winkler *et al.* 1995). It was usually repeated four times in rapid succession, with emphasis on the beginning of the call. This vocalization always accompanied a wing-raising display (see below). The second was a nasal "chuck" repeated 2 to 4 times, with a pause between additional notes, this call was often given by females, especially when I approached a nest. The third call was distinctive in its degree of inflection. It has been reported by authors as *yek-a*, *yek-a* (Winkler *et al.* 1995) or *ke-hek'*, *ke-hek'*, *ke-hek'* (Hendricks et al 1990). During interactions with the intruding Gray-breasted Woodpecker this call was frequent.

Drumming was loud and variable in daily frequency; I documented as many as 20 bouts in 2.5 hours. Drumming only occurred on days when the non-resident interacted with the group. The dead flower stalk of a single agave (*Agave* sp.) was used for all drumming.

Display behaviors. I observed a single display

behavior, a wing-raising display, during all observation periods. This display was always given when a resident bird landed near another resident or in interactions with the non-resident woodpecker. Both wings were extended fully and held in this position for one to several seconds. This display was always accompanied by the *chi-i-i-ir* vocalization. Between residents, this display did not appear to denote aggression, as it was not accompanied by chasing, lunging, or pecking. I saw none of the bowing, head-bobbing, bill-pointing, or tail-spreading displays common in other *Melanerpes* woodpeckers (Short 1982).

Substrate use. At Yagul, Gray-breasted Woodpeckers predominately used cacti for perching, spending most of their time perched on the tops of *Opuntia* sp. and several species of columnar cactus. The use of woody vegetation for perching was very infrequent. The birds' use of cacti was ritualized; individuals often used the same cactus. I also observed the use of particular rock outcroppings and small columnar cacti, especially when birds were flying up the cliff walls to forage or to reach cacti on the hilltop.

Anting. I observed one instance of apparent anting. A female flew to the ground, stretched her wings, and remained in this position for approximately 4 min. Returning to the top of a cactus she preened for several minutes. I found a colony of leaf-cutter ants when I inspected the area where she had been observed.

Sunning. I observed individuals sunning in the morning. Birds extended their wings approximately half-way and rested them on the top of the cactus on which they were perched. They remained in this position, motionless with their backs to the sun, for several minutes. Preening usually followed.

Foraging

Flycatching was the most frequent foraging method used, although frugivory was also important. Excavation of woody vegetation (Mesquite; *Prosopis* sp.) was noted only once. Probing of bromeliads growing on cliff walls was also infrequent. I observed woodpeckers using the cliff walls to trap insects. Gray-breasted Woodpeckers frequently flew to the ground, and although I was unable to determine what they were foraging on, they often flew to an anvil (see below) from the ground.

Flycatching. I observed frequent and proficient flycatching by Gray-breasted Woodpeckers. Frequency of flycatching was associated with time of day and weather conditions. Flycatching usually began after 09:00, increased in frequency until approximately 12:00, and then continued throughout the day at the same rate. On windy days, flycatching was not as frequent. Females appeared to flycatch more than males, but individuals seemed to vary in the amount of flycatching attempts. During several days, one male did little but perch on a single cactus top, scan the air, and make repeated sallies. Insects of various sizes were taken, from large cicadas (~ 3 x 1.5 cm) to winged termites (~ 1 mm in length). Most attempts were upward flights, however, downward swoops were also seen and usually involved skilled chasing maneuvers. On 7 May, I observed a termite flight and documented > 5 and >1.4 flycatching attempts per minute by a female and male, respectively.

Frugivory. I observed Gray-breasted Woodpeckers foraging on the fruit of one species of *Opuntia* and at least one species of columnar cactus; most fruit on the cacti within the area had evidence of foraging. Foraging on cacti fruit was most common on windy days. Few individual *Opuntia* were in fruit during my observations and woodpeckers mostly foraged on a single, large cactus.

Flowers. I observed infrequent visits to and probing of the flowers of *Opuntia* and other cactus species. These visits were brief and their significance undetermined.

Anvil use and food processing/storing. Anvil use was a conspicuous activity. Anvils were typically dead portions of *Pachycereus marginatus*, however, *Opuntia* sp. were also used. I observed woodpeckers carrying insects or fruit to specific cacti tops and branches. Dead portions of the columnar cacti were hard and cracked. Food items were inserted into cracks, pre-excavated holes, or depressions, and then broken with blows from the bill. It also appeared that some food items were stored in cacti. I infrequently observed woodpeckers placing food items into holes. Many cacti contained rows of partially healed holes.

DISCUSSION

My observations provide the first documentation that the Gray-breasted Woodpecker is a cooperative and potentially a communal nesting species. Despite the fact that observations were of unmarked birds, provisioning of nests by more than two birds was frequent and obvious at one nest. The response of resident group members to a conspecific intruder was similar to other cooperatively breeding woodpeckers (Jackson 1994, Koenig *et al.* 1995) and served to illustrate the territorial behavior of this species. At least seven *Melanerpes* are cooperative breeders, however, the Gray-breasted and Hispaniolan (*M. striatus*) woodpeckers appear to be the only cooperative, zebra-backed *Melanerpes*, although both are poorly known (Short 1982).

The size of the group and possibly the ratio of males to females was smaller compared to the group observed by Hendricks *et al.* (1990). This may be the result of natural variation in group size due to habitat differences or differences in winter versus breeding season social behavior. Group size in the Hispaniolan Woodpecker has been reported to vary (Short 1974), as does group size in other cooperative picids (Stacey & Koenig 1990).

The Gray-breasted Woodpecker resembles other species of *Melanerpes* in many life-history characteristics, specifically its omnivorous diet and vocalizations. Shadowing the cavity entrance of nests containing nestlings elicited begging calls similar to other young *Melanerpes* nestlings (Kilham 1961, MacRoberts & MacRoberts 1976). In contrast to some *Melanerpes* species [e.g., Red-bellied (*M. carolinus*)], nestling Gray-breasted Woodpeckers did not vocalize late in the nestling period. The harsh, pulsating rattle of adults was similar to, but harsher than, the "chur" or "quirr" calls of Red-headed Woodpeckers (pers. observ.). The nasal "chuck" was very similar to that given by Red-bellied Woodpeckers (pers. observ.). The *ke-hek'* call was similar to the "wuck-ah" call of the Red-bellied Woodpecker (Winkler *et al.* 1995).

Display behaviors in the Gray-breasted Woodpecker were restricted to a wing-raising display, however this could have been an artifact of the brevity of this study. The wing-raising display of this species is comparable to that of Acorn, Red-headed, and Yellow-tufted (*M. cruentatus*) woodpeckers; other zebra-backed *Melanerpes* do not display in this manner (Short 1982).

The Gray-breasted Woodpecker, like the Acorn, Lewis', and Red-headed woodpeckers, frequently flycatches. The formers' specific flights to catch a single insect, the vertical nature of the flight, and the frequency of attempts are similar to those of the Acorn Woodpecker (Koenig *et al.* 1995). The constant scanning for insects and some flight characteristics are similar to those of the Lewis' Woodpeckers (Bock 1970). All four species process food using anvils, and storage of food items by the Gray-breasted Woodpecker, like the other species (Short 1982,

Koenig *et al.* 1995, Tobalske 1997) was observed. Although most zebra-backed *Melanerpes* flycatch, it is not an important foraging method (Breitwisch 1977, Cruz 1977, Short 1982, Martindale 1983, Husak & Maxwell 1998).

The flycatching behavior of Gray-breasted Woodpeckers elicited attacks from tyrannid flycatchers. Roth (1978) reported aggressive interactions between tyrannids and flycatching Red-headed Woodpeckers and suggested that this aggression may reduce competition with flycatching woodpeckers. The interactions between Gray-breasted Woodpeckers and Ash-throated flycatchers were similar to aerial chases between Red-cockaded Woodpeckers (*Picoides borealis*) and Great-crested Flycatchers (*M. crinitus*) and Eastern Kingbirds (*Tyrannus tyrannus*), observed in south-central Florida (Bowman *et al.* 1999).

The Gray-breasted Woodpecker has been placed in the genus *Centurus* (Selander & Giller 1963). Since little is known of the species, this was likely influenced by its plumage, which resembles that of other zebra-backed *Melanerpes*. The life history characters (breeding system, display behavior, and foraging technique) described here, along with data from better known *Melanerpes*, suggest that the Gray-breasted Woodpecker is more similar to Acorn, Lewis', and Red-headed woodpeckers than to other zebra-backed *Melanerpes*. Further study is necessary to confirm this relationship and to determine if these similarities have a taxonomic or ecological basis.

ACKNOWLEDGMENTS

This note benefited from the careful reviews and insightful comments of R. DeLotelle, H. Freifeld, D. Ingold, W. Koenig, L. Short, E. Stolen, and D. Swan. Maria Ines Barreto kindly translated the abstract.

REFERENCES

American Ornithologists' Union. 1998. Check-list of North American Birds, 7th ed. American Ornithologists' Union, Washington, D.C.

Binford, L. C. 1989. Distributional survey of the birds of the Mexican state of Oaxaca. Ornithol. Monogr. 43: 1–418.

Bock, C. E. 1970. The ecology and behavior of the Lewis' Woodpecker (*Asyndesmus lewis*). Univ. Calif. Publ. Zool. Vol. 92: 1–100.

Bowman, R, D. L. Leonard, Jr., L. K. Backus, & A. R. Maines. 1999. Interspecific interactions with foraging Red-cockaded Woodpeckers in south-central Florida. Wilson Bull. 111: 346–353.

Breitwisch, R. J. 1977. The ecology and behavior of the Red-bellied Woodpecker, *Centurus carolinus* (Linnaeus) (Aves:Picidae), in south Florida. M.Sc. thesis, Univ. of Miami, Miami, Florida.

Cruz, A. 1977. Ecology and behavior of the Jamaican Woodpecker. Bull. Florida State Mus., Biol. Sciences 32: 149–204.

Hendricks, P., J. R. McAuliffe, & A. Valiente-Banuet. 1990. On communal roosting and associated winter social behavior of Gray-breasted Woodpeckers. Condor 92: 254–255.

Howell, S. N. G. & S. Webb 1995. A guide to the birds of Mexico and northern Central America. Oxford Univ. Press, New York, New York.

Husak, M. S., & T. C. Maxwell. 1998. Golden-fronted Woodpecker (*Melanerpes aurifrons*). *In* Poole, A., & F. Gill (eds.). The birds of North America, no. 373. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Jackson, J. A. 1994. Red-cockaded Woodpecker (*Picoides borealis*). *In* Poole, A., & F. Gill (eds.). The birds of North America, no. 85. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, D.C.

Kilham, L. 1961. Reproductive behavior of Red-bellied Woodpeckers. Wilson Bull. 73: 237–254.

Koenig, W. D., & R. L. Mumme. 1987. Population ecology of the cooperatively breeding Acorn Woodpecker. Princeton Univ. Press, Princeton, New Jersey.

Koenig, W. D., P. B. Stacey, M. T. Stanback, & R. L.

Mumme. 1995. Acorn Woodpecker (*Melanerpes formicivorus*). *In* Poole, A., & F. Gill (eds.). The birds of North America, no. 194. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

MacRoberts, M. H., & B. R. MacRoberts, 1976. Social organization and behavior of the Acorn Woodpecker in central coastal California. Ornithol. Monogr. 21: 1–115.

Martindale, S. 1983. Foraging patterns of nesting Gila Woodpeckers. Ecology 64: 888–898.

Roth, R. 1978. Attacks on Red-headed Woodpeckers by flycatchers. Wilson Bull. 90: 450–451.

Selander, R. K., & D. R. Giller. 1963. Species limits in the woodpecker genus *Centurus* (Aves). Bull. Am. Mus. Nat. Hist. 124: 217–273.

Short, L. L. 1974. Habitat of three endemic West Indian woodpeckers (Aves, Picidae). Am. Mus. Novitates 2549: 1–44.

Short, L. L. 1982. Woodpeckers of the world. Delaware Museum of Natural History, Greenville, Delaware.

Stacey, P. B., & W. D. Koenig. 1990. Cooperative breeding in birds: long-term studies of ecology and behavior. Cambridge Univ. Press, Cambridge, Massachusetts.

Tobalske, B. W. 1997. Lewis' Woodpecker (*Melanerpes lewis*). *In* Poole, A., & F. Gill (eds.). The birds of North America, no. 284. The Academy of Natural Sciences, Philadelphia, and The American Ornithologists' Union, Washington, D.C.

Winkler, H., D. A. Christie, & D. Nurney. 1995. Woodpeckers: An identification guide to the woodpeckers of the world. Houghton Mifflin Company, Boston, Massachusetts.