EVIDENCES OF BROOD PARASITISM OF GIANT COWBIRD
(MOLOTHRUS ORYZIVORUS) ON SPOT-BREASTED (ICTERUS
PECTORALIS) AND STREAK-BACKED (I. PUSTULATUS)
ORIOLES

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Giant Cowbirds (MoIothrus oryzivorus) are obligate brood parasites specializing on colonial
sock-nesting icterids (Orians 1985, Jaramillo & Burke 1999). Two subspecies are recog- 
nized, M. o. oryzivora and M. o. impacifica. The former occurs in South America and ranges
north into Panama and the island of Trinidad; the latter ranges from western Panama north
to the Carribean coast of Mexico and north to Veracruz (Jaramillo & Burke 1999). Apart
from a single obscure record of Giant Cowbird parasitism of nests of cooperative-breeding
Green Jays (Cyanocorax yncas) (Lehmann 1960), they are known only to place their eggs
in the nests of two species of caciques and five species of oropendolas: Yellow-rumped
Cacique (Cacicus cela), Red-rumped Cacique (C. haemorrhous), Crested Oropendola
(Psaro-
colius decumanus), Green Oropendola (P. viridis), Russet-backed Oropendola (P. angustifroni),
Chestnut-headed Oropendola (P. wagleri), and Montezuma Oropendola (P. montezuma) (Ori- 
1999).

No records to date, however, demonstrate brood parasitism of the Giant Cowbird on
any solitary territorial nesting species, and they have not been considered among candi-
date species for this event (L0wther 2006). Here we report on observations made using
field glasses indicating that solitary, territorial-nesting Spot-breasted Oriole (Icterus pectoralis)
and Streak-backed Oriole (I. pustulatus) also serve as hosts of the Giant Cowbird. Nesting
habitat was broken tropical dry forest with areas of secondary growth reaching to 15 m
alternating with yards of single-family homes in a rural area on the edge of the Chiltepe
Peninsula Nature Reserve, Nicaragua. This
preserve is located on a peninsula that penetrates Lake Managua, about 20 km north of the capital of Managua. Rainfall averages under 800 mm yearly, with almost all rainfall concentrated between May and November.

The Spot-breasted Oriole inhabits closed forest and areas with sparse tree cover in tropical dry forest from SW Mexico to NW Costa Rica. It has been documented breeding from May through July in pendulous nests woven from fine fibrous materials up to 45 cm depth, hanging from the fork of a fine branch 6 to 18 m high (Stiles & Skutch 1989). The female builds the nest and incubates the eggs (Orians 1985). The number of eggs is reported as 3–4 (Jaramillo & Burke 1999). Both sexes feed the nestlings. This species is reported double-brooded in some locales with the male caring for the first brood while the female begins incubating the second. The Streak-backed Oriole occupies a similar range and habitat to the Spot-breasted Oriole, and the two species are often found nesting in nearby trees. Nesting has been documented from 3 to 18 m in height in nests from 25 to 50 cm in depth, with 3–4 eggs, during May through June (Stiles & Skutch 1989, Corman & Monson 1995). Nest construction is accomplished only by the female and takes about 25 days. The female alone incubates. The incubation and nesting period appear similar to those of other orioles, taking 12–14 days for incubation and about 14 days for fledging (Corman & Monson 1995). Both sexes feed the nestlings. Both the Spot-breasted and the Streak-backed orioles have been reported as possible acceptors of Bronzed Cowbird (M. aeneus) parasitism (Sealy et al. 1997, Sealy & Underwood 2004).

Beginning on 14 August 2002, we observed a Giant Cowbird fledgling being fed by two adult Streak-backed Orioles on the Chiltepe Peninsula (12°12.868'N, 86°18.889'W; 72 m a.s.l.). The vegetation structure was similar to that in the prior, nearby sighting. As in the prior case, the Giant Cowbird fledgling made begging calls ceaselessly and was continuously fed by two adult orioles. Residents of the yard next to this sighting claimed that the fledgling had fledged about 1 week earlier from a nest in their yard, a pendulous sock about 1 m in length placed approximately 10 m in height, and had remained in the vicinity, associated with the adult orioles, during the entire time. We made another observation at the same site on 19 August 2002, when both adult orioles fed the fledgling for 3 h. On this date, the fledgling occasionally dropped to the ground to eat fruits of Chlorophora tinctoria (Moraceae).
Giant Cowbirds have also been reported to eat the fruit of two other moraceous species, *Ficus trigona* and *Coussapoa* (Robinson 1988). We observed the fledgling and orioles again on 20 August for >1 h. As the orioles moved from tree to tree, the cowbird fledgling followed them while being fed. The orioles moved >100 m on each foray to retrieve food for the fledgling, and we repeatedly lost contact with the pair. We did not find any evidence of care by the adults for oriole fledglings during this period of sightings. Skutch (1996) speculated that this common observation was likely due to 1) the observer missing the host feeding its own young, 2) cowbird fledglings being more conspicuous, or 3) cowbird fledglings quickly outcompeting host young after fledging. We believe that the latter is the best explanation for our observations. Our last observation of the Giant Cowbird fledgling was on 23 August 2002 during which time the oriole adults did not appear after more than 1 h, in spite of repeated calling by the fledgling, which made locating it easy. The fledgling moved from tree to tree within a radius of 40 m and on several occasions, dropped to the ground to feed. We did not observe any oriole fledglings in the area (100 m radius) during the entire period of these observations.

Giant Cowbird fledglings were much larger than the orioles and were distinguishable from them and from other cowbirds by their reddish feet, ivory bill, and easily discernible whitish margins on black flight feathers. We considered it very unlikely that these fledglings were hatched in a known host nest and were being fed by a species that did not rear the cowbird in its nest, as none of the previously documented hosts of Giant Cowbirds were found in the area (Sealy *et al.* 1997, Lowther 2006). Furthermore, most auxiliary feedings of fledgling brood parasites have been reported in the cuckoos and the Brown-headed Cowbird (*M. ater*) (Sealy & Lorenzana 1997). Although the natural range of Montezuma Oropendola, the most typical host species in the region, included the Chiltepe Peninsula, they were not present within at least 10 km of this location (JKM unpubl.), possibly due to habitat alterations from clearing pasture land and cutting fuelwood. Giant Cowbirds commonly parasitized Montezuma Oropendola nests in Laguna de Apoyo, some 60 km southeast of Chiltepe Peninsula, where nesting begins at the start of the dry season in December (JKM unpublished data); the parasitism of oriole broods, where nesting occurs later in the year, would permit more reproductive cycles by Giant Cowbirds and potentially higher productivity. Giant Cowbirds are strong flyers and can easily move between the Chiltepe Peninsula and Laguna de Apoyo, or other sites, to deposit eggs for breeding in alternate seasons.

The question has been raised whether Giant Cowbird brood parasitism of oropendolas is parasitism or mutualism (Webster 1994). In studies of their parasitism of oropendola nests, elaborate hypotheses of hyper-parasitism and a blurring of the boundary between parasitism and mutualism (Smith 1968, 1983) have been developed regarding the complex associations between the Giant Cowbird, its brood host species, wasps and bees, and parasitic botflies (*Philornis* spp.). In the smaller, solitary territorial *Icterus* spp., our observations suggest that parasitism by the Giant Cowbird may profoundly affect oriole brood success and fitness, given the observed concentrated efforts at feeding cowbird fledglings and the absence of host species fledglings in both our observations. In addition to the Spot-breasted and the Streak-backed Orioles, the Altamira Oriole (*I. gularis*), which is slightly larger, also nests in the Chiltepe Peninsula, and two Neotropical migrants, the Baltimore Oriole (*I. galbula*) and the Orchard Oriole (*I. spurius*), overwinter in this area. The Altamira Oriole has similar nesting habits to...
the other two orioles; its nest is similar but intermediate in form between the other two orioles and the oropendolas. The high feeding rate of Giant Cowbird fledglings by the orioles and the lack of oriole fledglings in our observation suggest that Giant Cowbirds may be extremely detrimental to the fitness of nesting oriole species.

It has been noted that conservation efforts should focus on those species most vulnerable to parasitism, i.e., species that accept parasitism (Sealy & Underwood 2004). The distribution, ecology, and conservation status of the resident orioles in Nicaragua are little known, although the Spot-breasted Oriole has been previously identified as in need of conservation due to its low abundance and limited overall geographic range (Gillespie 2000). Based on our reported evidence of brood parasitism of these species by Giant Cowbirds, increased attention to their conservation status may be warranted on the Pacific slope of Nicaragua.

The evidence we present demonstrates that Giant Cowbirds parasitize solitary territorial nesting species where colonial socknesting birds are not present, and suggests that oriole nests may be parasitized and that surrogate parental orioles may spend considerable quantities of energy in chick feeding. These results have implications in potential Giant Cowbird habitat and in oriole conservation.

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