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WESTERN WOOD-PEWEES ACCEPT COWBIRD EGGS

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Key words: Western Wood-Pewee, *Contopus sordidulus*, brood parasitism, Brown-headed Cowbird, *Molothrus ater*, acceptor.

The Western Wood-Pewee (*Contopus sordidulus*) is an infrequently recorded host of the brood parasitic Brown-headed Cowbird (Friedmann et al. 1977, Friedmann and Kiff 1985), as are the majority of tyrannid flycatchers (Petit in press). A minority of cowbird host species, termed rejecters (Rothstein 1975), reject cowbird eggs by ejecting them from the nest, burying them in the nest bottom, or deserting the parasitized nest. Hosts that do not exhibit this response to parasitism are called accepters. Hosts tend to either accept or reject in a consistent manner (Rothstein 1975; but see Petit 1988, Goguen and Mathews 1996). A species can be assumed to be an accepter if parasitism is noted in more than 20% of its nests (Friedmann et al. 1977). Studies may underestimate the frequency of parasitism of rarely used hosts, if these hosts are rejecters, because cowbird eggs may be ejected before being observed. The status of these hosts can be ascertained correctly only by experimentation.

Relatively few tyrannid flycatcher species have been tested in this regard. Eastern Kingbirds (*Tyrannus tyrannus*) and Western Kingbirds (*T. verticalis*) are rejecters (Rothstein 1975), while Eastern Phoebe (*Sayornis phoebe*) and Least Flycatchers (*Empidonax minimus*) are accepters (Rothstein 1986, Briskie and Sealy 1987). We report experiments that demonstrate the Western Wood-Pewee is an accepter species.

The study site is in pinyon pine–one-seed juniper (*Pinus edulis*–*Juniperus monosperma*) woodlands in Colfax County, northeastern New Mexico. Between 1992 and 1996 we located and monitored nests of Western Wood-Pewee as part of a study of the nesting dynamics of

the pinyon-juniper avian community. We experimentally parasitized 10 nests during 1995 and 1996 to determine the accepter status of Western Wood-Pewees at this site. A single fresh Brown-headed Cowbird egg was added to each nest, and no host eggs were removed. Eggs were added during daylight hours at the following stages of the nest cycle: nest-building (3 nests), egg-laying (4 nests), or early in incubation (3 nests). Some nests were observed for 30 min after the egg was added to record the adult pewee's response to the introduced egg. We considered the egg accepted if it remained in the nest, with adult pewees attending, for 4 d.

At unmanipulated Western Wood-Pewee nests we recorded a parasitism frequency of 16% (16 of 101 nests). Two nests were parasitized multiply, each with 2 cowbird eggs. Cowbird eggs were accepted for at least 4 d in 13 nests, hatched in 7 nests, and fledged in 3 nests. No nest fledged both a cowbird and a pewee or more than a single cowbird. At 1 nest pewees accepted a cowbird egg after an adult had physically attacked the female cowbird when it first removed a pewee egg and when it parasitized the nest 2 min later. We noted 2 cases of possible cowbird egg rejection, 1 involving ejection and the other desertion. In the former case the cowbird egg was laid in an empty nest and disappeared before the 1st pewee egg was laid. In the latter case a nest was deserted during incubation, following parasitism and clutch reduction from 3 pewee eggs to 1 pewee egg and 1 cowbird egg.

Pewees accepted the cowbird egg at 8 of 10 (80%) experimentally parasitized nests. Eggs accepted by pewees remained in nests between 4 and 19 d prior to being depredated

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along with the pewee's clutch, being removed by a human observer, or hatching (1 nest). At the nest where the cowbird hatched, the nestling fledged successfully. The immediate response of a pewee returning to a freshly "parasitized" nest, during incubation, was noted at 1 nest. This bird perched on the nest rim, looked briefly into the nest, and settled down to incubate, showing no sign of having noticed any change in its nest.

Cowbird eggs disappeared within 4 d at 2 experimentally parasitized nests. At a nest tested near the end of nest-building, the cowbird egg disappeared within 2 d and the pewee's clutch was initiated 4 d later. At another nest, tested during egg-laying, we found the cowbird egg beneath the nest when we next visited it 4 d later; the pewee clutch had increased from 2 to 3 eggs. A 2nd cowbird egg, added upon discovery of this ejection, was found under the nest after 3 d, while the pewee clutch remained intact.

The acceptance of experimentally added cowbird eggs at 8 of 10 nests demonstrates that the Western Wood-Pewee, like other small tyrannids tested so far, is a cowbird egg acceptor (Rothstein 1975). The observed desertion of an unmanipulated nest may have resulted from partial clutch reduction rather than parasitism, and thus probably does not represent true cowbird egg rejection. Experiments have shown at least 2 other acceptor species, Eastern Phoebe (Rothstein 1986) and Clay-colored Sparrow (*Spizella pallida*; Hill and Sealy 1994), to desert nests in response to partial clutch reduction but not parasitism per se.

The disappearance of the experimental cowbird egg from a nest tested during the building stage may have simply represented a generalized response to any object found in the nest prior to the host's egg-laying rather than a response specific to brood parasitism (Rothstein 1975). The Least Flycatcher, an acceptor, rejected cowbird eggs that were experimentally introduced to 2 nests at the building stage, but did so by nest desertion (Briskie and Sealy 1987). Furthermore, nest predation, or removal of the egg by a cowbird, cannot be ruled out.

However, the experiments did elicit an instance of true cowbird egg rejection. The repeated ejection of a cowbird egg from a nest containing a host clutch provides circumstantial evidence that pewees possess the behavioral and physical traits required to reject.

Considering the obvious selective advantage of such behavior, it is surprising that cowbird egg ejection is not more widespread, or even fixed, in the pewee population.

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