

**Adaptive significance of re-nesting following nest abandonment in the
Blue-gray Gnatcatcher (*Poliioptila caerulea*)**

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Abstract

We studied the adaptive significance of nest abandonment and re-nesting in the Blue-gray Gnatcatcher (*Poliioptila caerulea*) in east-central Illinois from 1995 through 1997. This Neotropical migrant is widely distributed and highly persistent in re-nesting following nest abandonment. Nest abandonment may be a response to brood parasitism, predation or other nest disturbances. We studied the nesting behavior of gnatcatchers and investigated the cues which elicit nest abandonment. We monitored 57 pairs of gnatcatchers which built a total of 98 nests. Twenty pairs successfully fledged a total of 63 young and overall nest success was only 8.5%. Daily mortality rates for these 98 nests showed a marked peak during the egg-laying stage. Nest mortality during this stage was 2.5-9 x greater than at other stages ($P < 0.05$). Of the 98 nests, we could directly observe 36 (the others were only observed from the ground with binoculars) of which 56% were parasitized. Of the parasitized nests, 80% were abandoned during the egg-laying stage and first three days of incubation whereas only 6% of the unparasitized nests were abandoned during these stages ($P < 0.001$). Nest success for parasitized nests (0%) was significantly lower than unparasitized nests (61.1%) ($P = 0.001$). Predation accounted for 19% of nest failure and was relatively uncommon compared to the frequency of parasitism. Our data did not indicate any marked differences in habitat characteristics between parasitized and unparasitized nests, however, unparasitized nests did tend to be located further from the trunk of the nest tree than parasitized nests ($P = 0.066$). In addition, nest height, distance of the nest from the trunk of the nest tree and distance of the nest from a habitat edge were

significantly greater for successful nests than unsuccessful nests ($P < 0.05$). Pairs which re-nested after being parasitized moved farther than pairs which re-nested for other reasons ($P = 0.034$). Our results suggest that gnatcatchers are frequently parasitized by Brown-headed Cowbirds, reducing nest success to nearly 0%; nests which accepted cowbird eggs did not fledge any gnatcatcher young. Furthermore, gnatcatchers in east-central Illinois typically respond to parasitism by nest abandonment during the egg laying stage and the first 3 days of incubation to increase the time and energy needed to re-nest and terminate a nest that would ultimately fledge only cowbirds. In addition, the abandonment rate for parasitized nests (80%) in east-central Illinois was significantly higher than a New Mexico population of gnatcatchers (45%) (Goguen and Matthews 1996). This regional difference may exist because gnatcatchers in this area have been sympatric with cowbirds longer than in New Mexico, therefore, gnatcatcher populations in Illinois may be further along in the transition from becoming an accepter to a rejecter species. Nevertheless, gnatcatchers should always abandon parasitized nests as long as they have some chance of gaining fitness in a future nest.