Predation on bird nests results in loss of eggs or nestlings. But, just the presences of predators can have indirect effects on parental behavior that may have negative impacts on development of eggs and nestlings allowing parents to preserve energy and resources for future reproduction. In this study, I investigate whether the presence of a competitor, the house wren (Troglodytes aedon), results in similar indirect effects on reproductive behaviors of Carolina chickadees (Poecile carolinensis). House wrens compete for nesting cavities and will kill Carolina chickadee eggs and nestlings. I monitored nest boxes in Western North Carolina where exposure to house wrens varies. I surveyed house wren presence at active Carolina chickadee nests and measured clutch size and mass, incubation, provisioning rates, nestling growth rates, development, and fledging success of chickadees. House wren takeover accounted for 35% of nesting failures, more than any other cause of failure in our study. I found smaller clutch sizes in areas where house wrens were present. However, I did not detect any effects of house wren presence on chickadee egg size, incubation, provisioning, growth, or development. These results suggest that house wren presence has both direct and indirect effects on Carolina chickadee success. Reducing clutch size may be a strategy used by Carolina chickadees to decrease reproductive investment in an environment where early nest failure is probable, allowing adults to reserve energy for survival to the next breeding season.
Nest building is an important aspect of parental care in birds because nests provide protection for eggs and nestlings. One of the most important functions of nests is to provide a stable thermal environment for eggs and nestlings when females are off the nest. Thus, between species, nests vary predictably in size depending on temperature. Large nests provide a more stable thermal environment than small nests. Within species, there is usually variation but less is known about the impacts of such variation. In this study, I address the effects of nest dimensions on incubation behavior and reproductive success in female Carolina chickadees (Poecile carolinensis). In Carolina chickadees, only females build nests, incubate eggs, and brood young nestlings. Larger, well-constructed nests can reduce the negative effects of cooling on eggs and nestlings as extensive cooling can result in delayed embryonic development, hatching asynchrony, or failure to hatch. However, larger nests are more energetically demanding for females to construct. Females therefore face tradeoffs between self-maintenance and incubation. In this study, I tested the hypothesis that investment in large nest would influence incubation behavior reproductive success in Carolina chickadees. Throughout spring and summer 2016, I monitored nest boxes in Jackson and Macon counties, N.C. for reproductive activity. I quantified nest height, nest cup depth, and the amount of moss underneath the nest cup as nest dimensions. Incubation periods (on-bouts and off-bouts) were measured using iButtons (thermal data loggers. Incubation behavior was quantified as total off-bout time and mean off-bout time. Reproductive success was quantified as the number of nestlings that fledged from individual nest boxes. Larger nests resulted in higher reproductive success. But, I found no effect of nest size and incubation behavior. My results suggest that females that invest in building high quality nests benefit by fledging more young and that females that build poor quality nests do not compensate by increasing incubation behavior.