

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN ON VANCOUVER ISLAND, BRITISH COLUMBIA

ANN NIGHTINGALE and RON MELCER, JR., Rocky Point Bird Observatory, Suite #170, 1581-H Hillside Avenue, Victoria, British Columbia, Canada V8T 2C1; corvid88@gmail.com

ABSTRACT: Five of the ten wren species in North America are known to destroy nests of conspecifics. These include the Cactus Wren (*Campylorhynchus brunneicapillus*), Bewick's Wren (*Thryomanes bewickii*), Sedge Wren (*Cistothorus platensis*), Marsh Wren (*Cistothorus palustris*), and House Wren (*Troglodytes aedon*). However, none of the Winter Wren complex, recently split as the Winter Wren (*Troglodytes hiemalis*), Pacific Wren (*T. pacificus*), and Eurasian Wren (*T. troglodytes*), have been documented to do so in experiments or by observation of natural behavior. Here we present a detailed chronology of a nesting of the Pacific Wren—the first report of conspecific nest aggression in the Winter Wren complex. On 15 May 2011, in Victoria, British Columbia, Canada, a Pacific Wren approached another's nest under video surveillance and removed two 9-day-old chicks. The nonparental adult returned to the nest, apparently attempting to kill and/or remove the remaining two chicks, several times over 4.75 hours but was not successful. Although our findings are limited to a single event, they are consistent with those of other wrens.

Birds are known to destroy the nests and eggs or remove the young from nests of other species, as well as conspecifics, to reduce competition for nests, food, perches, and, in polygynous species, for the male's parental care (Fox 1975, Verner 1975, Picman 1977a, Jones 1982). Within the order Passeriformes, members of the wren family (Troglodytidae) are particularly well known for nest destruction and infanticide. This behavior has been observed in both experimental and natural settings in the House Wren (*Troglodytes aedon*) (Pribil and Picman 1991), Marsh Wren (*Cistothorus palustris*) (Picman 1977a,b, Leonard and Picman 1987, Kroodsma and Verner 1997), Bewick's Wren (*Thryomanes bewickii*) (Picman 1994), Cactus Wren (*Campylorhynchus brunneicapillus*) (Simons and Simons 1990), and Sedge Wren (*Cistothorus platensis*) (Picman and Picman 1980). Nest destruction has not been reported previously in the Winter Wren complex, recently split into three species, the Pacific Wren (*Troglodytes pacificus*), Winter Wren (*T. hiemalis*), and Eurasian Wren (*T. troglodytes*). Other North American wren species that have not been documented destroying nests are the Canyon Wren (*Catherpes mexicanus*), Carolina Wren (*Thryothorus ludovicianus*), and Rock Wren (*Salpinctes obsoletus*).

The Pacific Wren breeds in forests with dense undergrowth (Campbell et al. 1997), typically nesting in cavities built by other birds, crevices among the roots of upturned trees, and other spaces with relatively small entry holes. Occasionally, it builds its nest on ledges or in other more open areas (Campbell et al. 1997). Whatever the site, the construction is similar, resulting in an orb of grass and moss lined with plant down and fur. Hence the nature of the Pacific Wren's nest sites has provided few opportunities for observation.

Here we describe in detail the first known instance of conspecific nest aggression in the Winter Wren complex.

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

STUDY AREA AND METHODS

On 1 April 2011, we observed the beginning of nest construction on a ledge in a carport adjacent to a riparian area within the Georgia Depression on southeastern Vancouver Island, British Columbia (48° 35' 27" N, 123° 25' 38" W, 60 m above sea level). The ledge was 2.9 m from the ground, and one to three Pacific Wrens had used it as a winter roost for at least 5 years. The area is a mix of suburban and rural housing, with typical lot sizes ranging from about 0.05 ha on one side of Graham Creek to 0.4–4 ha on the other. The creek is within undeveloped private property and a protected linear natural park a minimum of about 75 m wide, extending about 750 m along the creek in both directions from the nest. The riparian habitat consisted of a structurally and compositionally diverse mixed forest on the steep banks of the creek; the dominant species of trees included Douglas-fir (*Pseudotsuga menziesii*), Grand Fir (*Abies grandis*), Western Red Cedar (*Thuja plicata*), Red Alder (*Alnus rubra*), Big Leaf Maple (*Acer macrophyllum*), and Pacific Dogwood (*Cornus sericea*). A mixture of native and nonnative plants, including Sword Fern (*Polystichum munitum*), Indian Plum (*Oemleria cerasiformis*), Oregon Grape (*Mahonia aquifolium*), Vanilla Leaf (*Achlys* spp.), English Ivy (*Hedera helix*), and other herbs and forbs, contributed to a dense understory. The forest contained many downed trees with upturned roots and featured numerous natural cavities created by decay and primary cavity excavators such as woodpeckers, chickadees, and nuthatches. The Pacific Wren is a common year-round resident along this corridor.

Video and Audio Recording

We installed an Airlink 500W IP camera (Airlink101, Inc., Fremont, CA) 0.7 m from the nest, and the camera recorded video from a half hour before sunrise to approximately a half hour after sunset during nest building, courtship, egg laying, and rearing of the young (1 April–23 May 2011). The device recorded audio sporadically through the cycle. We reduced video recording during incubation, then resumed the pre-dawn to post-dusk schedule when the chicks hatched.

RESULTS

Nest Construction

The male (as determined by nest-building behavior) constructed the globular nest, apparently alone, for 7 days. During most of the construction, he was silent. As early as day 2, he produced vocalizations, including a chatter (<http://youtu.be/z3dWt-6z5NU>) that varied in syntax and quality from his typical song. He sang both adjacent to and from within the nest. When a female arrived, the male left the nest but could be heard chattering from nearby while the female inspected the nest. The number of females that visited the nest during this stage is unknown. During nest construction, visiting birds approached by flying to the wires at the same level as the nest or landed on the wooden siding of the house and approached the nest from below. On day

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

8 of construction, a female arrived at the partially completed nest carrying nest-lining material, indicating acceptance of the nest (Hejl et al. 2002). At this point, the nest was an open cup. When the female approached, the male left the nest but displayed nearby for about 1 minute. The female made two visits to the nest on this day with lining material, after which the male continued to work on the nest. Day 9 (9 April) was the last day that the male brought nesting material, but the female continued to line the nest and eventually to enclose the nest. The female first roosted in the nest on 14 April. During the night, she lost or plucked several feathers, some of which came out of the entry hole and rested on the outside of the nest. In the morning, the female retrieved the feathers and added them to the nest lining.

Egg Laying

Between 6:24 and 6:34 of 16, 17, and 18 April (4–16 minutes after sunrise), a presumed female arrived at the nest and stayed inside for approximately 30 to 60 minutes. A wren returned to the nest on the evenings of 18–22 April and stayed throughout the night but did not remain at the nest through the entire day. At night, it often ejected feathers through the nest opening. Each morning, the presumed female recovered the feathers and returned them to the nest. The length of time she stayed at the nest increased each day, from 28 minutes on 16 April to 5 hours and 7 minutes on 22 April. We checked the nest on 21 April, observing three eggs, after this, we left the nest undisturbed for the remainder of the cycle. Pacific Wrens are believed to lay an egg a day, although in Britain the Eurasian Wren may skip a day (Hejl et al. 2002). If the eggs were laid every 1 or 2 days, the earliest date for the first egg was April 16 (the date that behavior suggested the first egg was laid) and the latest April 19.

Incubation

The female began incubating on 23 April, before the clutch was complete. She was in the nest for a total of between 7 and 8 hours during the day and stayed on the nest through the night. During daylight hours, she left the nest frequently, typically after 11 to 33 minutes of incubating. Between 18 April and 24 May, the female roosted in the nest each night except for the night of 22 May. The male visited the nest periodically, displaying and singing during incubation.

While brooding the eggs, the female lost her tail and did not regrow it during the nestling period. The lack of a tail allowed the us to distinguish the parental female from the other wrens seen at the nest.

Hatching and Rearing

All nestlings hatched in this final clutch of four eggs. The female began removing fecal sacs on 10 May.

In the Winter Wren complex, males generally feed nestlings less than the female does, although the male's contribution increases as the nestlings age (Hejl et al. 2002). The male of this pair returned to visit the nest several times during incubation and nestling rearing, bringing food on only three occasions and successfully delivering it only twice, all on 11 May. The male

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

returned to the nest occasionally during the rearing period and could be observed looking into the nest. At no time did he attempt to enter the nest.

Veiga (1990) found that in the House Sparrow (*Passer domesticus*), bigamous males assist only the primary female in rearing of their young. The minimal paternal feeding of the young in the nest we video-recorded suggests that the parental male may have had another nest nearby.

Conspecific Nest Aggression

On 15 May, when the nestlings were 9 days old, they were attacked at length by a nonparental Pacific Wren. The three wrens visiting the nest could be distinguished by visible physical characteristics: the parental female had lost her tail and had no visible rectrices; the male had a normal tail; the intruding wren had a shortened fourth rectrix (R4) on the right side of the tail. Over 4.75 hours, the intruder attacked the nestlings seven times, the longest attack lasting 9 minutes. During the attacks, it removed two nestlings from the nest. There were several contacts between the intruder and the parental female during this period as well. The parental male was in the area and visited the nest on several occasions during and after the attacks. The chronology of the attacks was as follows:

- 6:19 A Pacific Wren other than the parents visited the nest. The parental female was at the nest feeding the young as the second bird approached. There was a physical altercation between the birds, after which both left the nest area.
- 6:24 The parental female returned with food and continued feeding the young.
- 6:28 The parental female returned with food but immediately left in the direction of the carport floor, possibly to chase the intruder.
- 6:31 The intruder returned to the nest. The young, sensing an adult at the nest, began begging for food. The intruder approached the nest opening slowly, then grabbed the nearest nestling with its foot, attempting to pull the chicks from the nest. The first nestling was able to retreat into the nest. The intruder then partially entered the nest, apparently pecking at the nestlings. Within 50 seconds, using its bill to grab the skin on the head of a nestling, the intruder was able to pull it through the opening (Figure 1). The nestling struggled and attempted to hang onto the nest with its feet as the adult pulled it away from the nest. Eventually, the nestling was supporting the full weight of the



Figure 1. An intruding Pacific Wren successfully pulled a nestling from the nest by grasping the nestling's skin in its bill.

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

- adult, clinging to the nest while the adult pulled away. After a few seconds, both dropped out of view of the camera. Video of this event can be viewed at <http://youtu.be/tuHcGaa4FZ4>.
- 6:37 The parental female returned to the nest without food and immediately left. She then quickly returned with food and began feeding the nestlings again every 3 to 5 minutes.
- 6:47 A Pacific Wren with an intact tail, presumably the parental male, visited the nest and looked inside. The parental female arrived while it was there and did not interact with the visitor, supporting the idea that this wren was the parental male, which then flew off while the female fed the young.
- 6:56 The intruder returned and entered the nest. Motion in the nest suggested that the adult was pecking the young. The parental female returned within 1 minute and fought with the intruder for 30 seconds before both fell out of view of the camera (Figure 2).
- 6:59 The intruder returned and began removing material from the top of the nest. When the parental female returned, the intruder chased her away (Figure 3).
- 7:01 The intruder returned, entered the nest, and attacked the young again for about 8 minutes. Nest lining material was ejected during this attack. The intruder left the nest at 7:09.
- 7:10 The parental female resumed feeding the young and retrieved the ejected nest lining material on subsequent visits.
- 7:48 The intruder returned, entered the nest again, and attacked the young.
- 7:50 When the parental female returned, the intruder again chased her away and immediately returned to the nest to continue the attack.
- 7:54 The intruder returned and removed a second nestling from the nest (Figure 4), then departed. We found the two removed nestlings dead on the ground, one immediately below the nest and the other about 1 meter away.
- 7:58 The parental female returned but left without feeding the remaining young.
- 8:01 The parental female returned with food. While the female removed a fecal sac, the intruder was approaching the nest.
- 8:04 The intruder entered the nest and attacked the young.
- 8:07 The parental female returned and was chased off by the intruder, which also left the area.
- 8:10 The parental female returned with food but left immediately in the direction of the carport floor, possibly to interact with the intruder.



Figure 2. The parental female (lower) pecked at the intruder's wing when she found the intruder in the nest. The intruder and parent fought before leaving the view of the camera.

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN



Figure 3. As well as attacking the young, the intruder (upper right) also began removing nest material. When the parental female returned, the intruder chased her from the nest.



Figure 4. After a considerable struggle, the intruder removed a second nestling.

- 8:11 The intruder returned to the top of the nest. When the parental female arrived a few seconds later, the intruder once again chased her away and left the area.
- 8:14 The female returned, fed the young and settled into the nest for about 7 minutes, then resumed a schedule of feeding and brooding the young. She was absent from the nest for periods of up to 15 minutes.
- 8:41 A wren with a full tail, we presume the male, came to the nest, looked inside, and left.
- 9:12 The intruder returned to the nest and began a new attack, which continued uninterrupted for 9 minutes. Toward the end of this attack, the intruder began retrieving some of the nesting material that had been ejected and placed it in the nest. The intruder left at 9:21
- 9:23 The parental female returned, fed the young and stayed on the nestlings for 6 minutes.
- 9:29 Normal parental care (feeding forays and brooding) by the female resumed over the next hour and a half, the female staying in the nest with the young for up to 10 minutes at a time. During this period, the female left the nest 15 times, returning 1.5 to 16 minutes after leaving.
- 10:56 The intruder returned. The parental female was in the nest and hunkered down over the remaining nestlings. The intruder left.
- 10:57 The intruder returned, started climbing around the outside of the nest, then departed.
- 11:00 The female left the nest and within a minute the intruder returned and entered the nest for a final brief attack of about 1 minute, then left.
- 11:04 The parental female returned with food.
- 11:22 The parental male came to the nest and looked into the opening before leaving.
- 11:43 The parental female came to the nest with food, but left without delivering it. She returned 2 minutes later and entered the nest with the food. Feeding by the female continued throughout the day, interspersed with periods in which she remained in the nest, brooding the two remaining nestlings.
- 18:22 The male visited the nest, looking into the entry hole at the young.

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

Fledging of Remaining Nestlings

The intruder made its final visit at 11:00 on 15 May. The nest was damaged during the attacks, with the entry hole significantly enlarged. There was no attempt by either parent to repair the nest. The parental female continued to attend to the remaining young, which successfully fledged on 23 May. The parental male visited the nest on several occasions between the attack and fledging. The parental female roosted in the nest on 23 May although there were no nestlings in it. The nestlings did not return.

Once the nest was empty, the male returned and renovated the nest, adding more material to the exterior, including repairing and building up the edge of the opening and partially obscuring it with moss and grasses. Although he courted from the nest for several days, he did not attract a female for a second brood.

We left the nest in place, and in early November two wrens began roosting on the top of it. They typically arrived within 1 minute of each other, sometimes virtually simultaneously. They used the site as a roost sporadically over the winter.

DISCUSSION

Using both video and audio recording devices, we have detailed conspecific aggression at a Pacific Wren nest on southern Vancouver Island, including the loss of two nestlings. Birds are known to destroy the eggs and nestlings of others, both heterospecific and conspecific. Infanticide by conspecific females is considered a form of resource competition (Hrdy 1979) or interference competition (Quinn and Holroyd 1989). The attackers do not typically receive nutrition from these attacks.

Good nest sites are critical for successful breeding. In polygynous species, secondary females may attempt to displace the primary female, or vice versa, through infanticide (Hansson et al. 1997, Veiga 1990). The displacement of competitors through such behavior may increase the aggressor's access to parental investment by the male, food resources, and nest sites by causing the parental female to abandon the unsafe nest (Hansson et al. 1997). Polygynous males face a logical trade-off between a potential increase in reproductive output and exposure to nest failure through such nest destruction.

Within its range, the Pacific Wren is most abundant in western Washington and southwestern British Columbia. During the breeding season, coastal habitats adjacent to the Georgia Depression support the densest populations on Vancouver Island (Wolf and Howe 1990, Campbell et al. 1997). At our study site (~1.5 hectares), Pacific Wrens were abundant, with generally two, sometimes three, singing males defending adjacent territories. Habitat quality and the density of the local Pacific Wren population could influence both the mating system (i.e., polygyny) and level of competition for optimal nest sites and food resources. Although the Pacific Wren is usually monogamous, it may be polygynous in optimal habitats (Hejl et al. 2002). The scant attention the nestlings received from the parental male suggests that he probably had another nest nearby, possibly with the intruder.

Both population density and competition for resources can influence the prevalence of infanticide (Hrdy 1979). Freed (1987) found that Rufous-and-

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

White Wrens (*Thryophilus rufalbus*) remove nestlings from House Wren nests, and Alworth and Scheiber (1999) observed a female House Wren, in response to food shortage, usurp the territory of another House Wren during the nest-building stage. Food shortages can be caused by poor weather or by dense populations of birds competing for the same resources. Pacific Wrens forage on the forest floor, seeking food among leaf litter, decaying logs, and standing plants, and eat a wide variety of invertebrates including soft-bodied insects, insect larvae, and spiders (Hejl et al. 2002). At the nest we video-recorded, the female returned with food frequently, often several times within 5 minutes, suggesting that food was abundant in the area. We do not believe that the observed nest aggression was due to competition for food. As food was abundant, the need for additional support from the parental male also seems an unlikely reason for competition.

The Pacific Wren's flexibility in using a variety of natural and artificial nest sites should reduce competition for suitable locations. Under normal environmental conditions, there should be multiple nest sites appropriate for the Pacific Wren in the observed male's territory. The spring of 2011, however, was uncharacteristically cool and wet in Victoria. There were several extended periods of heavy rain. On the day of the nest attack, the area was receiving a downpour. The observed nest was inside a carport, sheltered from rain and wind. If the intruder's nest had failed because of the weather or depredation, she may have been seeking a more protected and secure nest site. If she removed the young from the sheltered nest, the parental female might abandon the site, making it available for the intruder to use. In this case, though, only two of four young were removed, and the parental female retained the nest.

Although Pacific Wrens may rear more than one brood during a breeding season, neither the intruder nor the known parental female returned to use the subject nest after the two remaining young fledged. This could be because the parental female had lost young to an attacker, making it a higher-risk site for a second clutch. Interference competition may have successfully driven the parental female from the territory. Hejl et al. (2002) estimated re-nesting to begin within 4 to 6 days of a nest's failing. Since a week had passed between the attack and the nest becoming available, the intruder may have already started another clutch, eliminating her interest in the site.

On the basis of this single observation we can only speculate about the factors responsible for the attacks, but they are consistent with those of other species—in this case, competition for an optimal nest site.

Video technology affords researchers the opportunity to observe behaviors that have previously been difficult to document. The use of non-invasive techniques such as video monitoring will likely continue to provide new insight into the behavior and life history of species that have previously been challenging to observe. The technology has its limitations, though, and it should be seen as an adjunct to, not a replacement for, more traditional observational methods.

LITERATURE CITED

- Alworth, T., and Scheiber, I. B. R. 1999. An incident of female–female aggression in the House Wren. *Wilson Bull.* 111:130–132.
Campbell, W. R., Dawe, N., McTaggart-Cowan, I., Cooper, J. M., Kaiser, G. W.,

CONSPECIFIC NEST AGGRESSION OF THE PACIFIC WREN

- McNall, M. C. E., and Smith, G. E. J. 1997. The Birds of British Columbia, vol. 3. Univ. Br. Columbia Press, Vancouver.
- Fox, L. R. 1975. Cannibalism in natural populations. *Annu. Rev. Ecol. Evol. Syst.* 6:87–106.
- Freed, L. A. 1987. Rufous-and-white Wrens kill House Wren nestlings during a food shortage. *Condor* 89:195–197
- Hansson, B., Bensch, S., and Hasselquist, D. 1997. Infanticide in Great Reed Warblers: secondary females destroy eggs of primary females. *Animal Behavior* 54:297–304.
- Hejl, S. J., Holmes, J. A., and Kroodsmma, D. E. 2002. Winter Wren (*Troglodytes hiemalis*), in *The Birds of North America* (A. Poole and F. Gill, eds.), no. 623. Birds N. Am., Inc., Philadelphia.
- Hrdy, S. B. 1979. Infanticide among animals: A review, classification, and examination of the implications for the reproductive strategies of females. *Ethol. Sociobiol.* 1:13–40.
- Jones, J. S. 1982. Of cannibals and kin. *Nature* 299:202–203.
- Kroodsmma, D. E., and Verner, J. 1997. Marsh Wren (*Cistothorus palustris*), in *The Birds of North America* (A. Poole and F. Gill, eds.), no. 308. Acad. Nat. Sci., Philadelphia.
- Leonard, M. L., and Picman, J. 1987. Nesting mortality and habitat selection by Marsh Wrens. *Auk* 104:491–495.
- Picman, J. 1977a. Intraspecific nest destruction in the Long-billed Marsh Wren, *Telmatodytes palustris palustris*. *Can. J. Zool.* 55:1997–2003.
- Picman, J. 1977b. Destruction of eggs by the Long-billed Marsh Wren (*Telmatodytes palustris palustris*). *Can. J. Zool.* 55:1914–1920.
- Picman, J. 1994. Evidence for interspecific egg destruction by Bewick's Wrens. *J. Field Ornithol.* 65:479–481.
- Picman, J., and Picman, A. K. 1980. Destruction of nests by the Short-billed Marsh Wren. *Condor* 82:176–179.
- Pribil, S., and Picman, J. 1991. Why House Wrens destroy clutches of other birds: A support for the nest site competition hypothesis. *Condor* 93:184–185.
- Quinn, M. S., and Holroyd, G. L. 1989. Nestling and egg destruction by House Wrens. *Condor* 91:206–207.
- Veiga, J. P. 1990. Infanticide by male and female House Sparrows. *Anim. Behav.* 39:496–502
- Verner, J. 1975. Interspecific aggression between Yellow-headed Blackbirds and Long-billed Marsh Wrens. *Condor* 77:328–331.
- Simons, L. S., and Simons, L. H. 1990. Experimental studies of nest-destroying behavior by Cactus Wrens. *Condor* 92:855–860.
- Wolf, A. T., and Howe, R. W. 1990. The Winter Wren in Wisconsin. *Passenger Pigeon* 52:103–112.

Accepted 4 July 2012