

Yellow-throated and Solitary Vireos in Ontario:

4. Egg Laying, Incubation and Cowbird Parasitism

by
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The lives of the Yellow-throated (*Vireo flavifrons*) and Solitary Vireos (*V. solitarius*) are again similar through egg laying and incubation stages of the nesting cycle, unless otherwise noted.

Egg Laying

Eggs were almost invariably laid one per day, until the clutch was complete (usually four days – Peck and James 1987). I once observed a delay of one day in the start of laying, apparently because of wet cold weather, but as soon as laying had started in any nest, weather did not stop them from completing the clutch. Eggs were laid in the morning between sunrise and about 0900 h, varying somewhat with the bird. Early morning laying is typical of most species, as it reduces the energetic demand of carrying an egg during an active daytime period, and reduces the risk of breakage at the same time.

A female I watched, returned from feeding, and sat low in the nest for 5 to 10 minutes. Then she moved a bit, placing her breast up on the nest rim and her posterior down into the bottom of the nest (see Figure 1). She could be seen moving up and down slightly as if breathing heavily, at a rate of about 90 per minute. This movement was punctuated by pauses of 5 to 10 seconds, when she remained almost motionless. She occasionally closed her eyes when

motionless. After about 15 minutes, she settled down on the nest to rest for another 5 to 10 minutes before departing from a newly laid egg.

Incubation did not appear to start until the clutch was complete, as is typical of most birds. But, as soon as even one egg was present, one or other parent would be on the nest most of the time. Until the clutch was complete, they sat rather high in the nest and appeared restless, looking all about themselves. The males were on the nest about double the time the females were there during the day, and eggs would frequently be left unattended for short periods (about 1 to 6 or 8 minutes at a time). The extra sitting time by the males allows the females maximum foraging time, that may be essential for egg production.

Incubation

Once the clutch was complete, the eggs were virtually never left unattended other than in exceptional circumstances. The females now did more (or at least as much) of the sitting. Although I do not have sufficient data, it appeared that the females did more of the sitting when the temperature was cooler early in the day, and the males did as much during the heat of the day. The females incubated at night. They would settle down for the night about sundown or slightly earlier

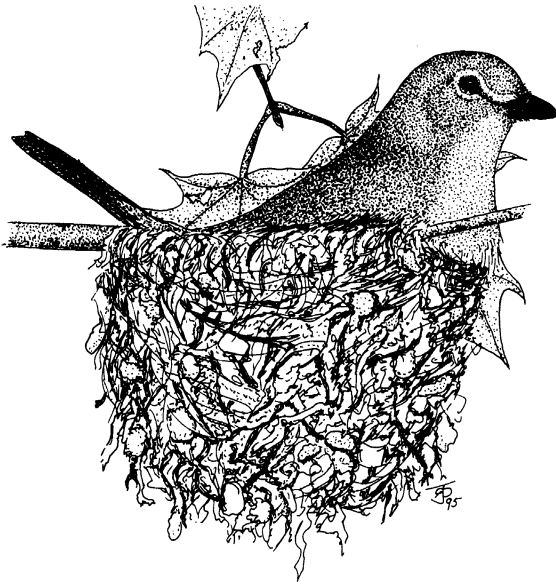


Figure 1: Redrawn from field sketches of a Yellow-throated Vireo, this illustrates the position assumed by the female during egg laying. Drawing by Ross D. James.

and remain there until about half an hour after sunrise.

While incubating, the females ordinarily sat quite motionless on the nest and sat very low so that they were scarcely visible there. However, they were awake and well aware of their surroundings. The males, however, invariably were more active, looking around the whole time. I even saw one hop off the nest to grab a nearby insect and return immediately to resume sitting. Both sexes occasionally rose off the eggs and reached under themselves before settling back on. They may have been turning the eggs at such times, as they must be turned frequently to remain viable.

When the males were not on the nest they were foraging or preening. They may wander quite far again at

this time; I have had the impression that some even went out of hearing range (to me at least). A few were virtually silent; most sang very slowly, even sporadically, but a few were rather persistent although slow singers when not sitting. There was considerable variation among birds.

Then they flew back and suddenly sang a few times near the nest before exchanging places with the female. The female usually gave contact notes, a trill or a *chee* call when returning to the nest area. The sitting bird would give a contact note in response to the incoming bird's call, or hop up to the nest rim, to indicate its readiness to exchange. However, if the bird on the nest was aware of a predator, or perceived that I was too close, it just sat quiet and motionless, and the

incoming bird did not come to the nest. Since one could always feed while the other sat, I never saw one bring food to the other on the nest.

Once on the nest, the males usually sang a few notes, then were silent. If they sat for a prolonged period (usually more than 30 minutes), they might begin to sing very slowly until the female returned. Fifteen to 20 minutes was a more usual exchange time, but that could be extended to as long as 45 minutes on occasion.

When a returning bird called, the other might immediately spring up off the nest, but would remain at the nest. Almost invariably, only when the incoming bird was approaching the nest did the leaving bird fly off. Thus, if you were not aware of the nest, it appeared as if one bird flew into and back out of the nest tree. Before settling on the eggs, a returning bird usually stood on the nest rim briefly peering into the nest.

Incubation period

Incubation periods are variously defined as the interval from the laying of the last egg to the beginning of hatching (Peck and James 1987), or from the laying of the last egg to the hatching of that egg (Drent 1975). Whatever way it is defined, it is somewhat variable depending upon such factors as the attentiveness of the parent birds, the number of eggs in the nest, and the ambient temperature during incubation.

Defined the first way, the incubation period for the Yellow-throated Vireo is at least 12 days (Peck and James 1987). Defined the second way it is probably closer to 13 days (Rodewald and James, 1996). However, because of cowbird interference,

it was very difficult to get a good incubation period from the nests that were accessible. In the few nests available, one young vireo typically hatched prior to the others, but all young seemed to hatch within a 24 hour period at least (probably within about 12 hours) and were much the same size through the nestling period.

The Solitary Vireo nests in a cooler climate in Ontario. At least early in the season, nighttime temperatures were often near freezing, and the shady humid environment certainly felt cooler all the time. This environmental difference may be responsible for a slightly longer incubation. Incubation periods were about 13 to 14 days to the beginning of hatching. In nests observed early in the morning on the first day young were present, there were from one to three young hatched over night and the rest of the eggs hatched within the next 24 hours. In two nests with single eggs unhatched in the morning, they hatched within the next 12 hours.

Renests

If eggs have been removed from a nest, a bird returning to the nest usually remained silent and looked about, or even sat on the nest for a short period. If older nestlings were taken, the adults would fly about searching for them, singing, giving contact calls, trills and *chee* calls, as they would do in searching for recently fledged young. They may search for a couple of hours with gradually diminishing intensity.

If a first clutch or brood was taken by predators, these birds typically renested. I had one pair of Yellow-throated Vireos that was working on its third attempt. They may be renesting

into early July, still trying to get a single brood off. In only one instance I was aware of did a female desert as a result of a nest loss (a Yellow-throated Vireo). The only second clutch that I have observed had 4 eggs as did the first (Yellow-throated Vireo). Usually the pair would be actively rebuilding within a day or two of a loss, and often within 100 m of the previous nest (rarely as far as 400 m away).

Cowbird Parasitism

Over the years when I studied Yellow-throated Vireos, I became rather frustrated with the activities of Brown-headed Cowbirds (*Molothrus ater*). Many nests were rather inaccessible, and of those that I could get to (although with difficulty), more than half were parasitized, making it hard to get accurate information on laying, incubation, and hatching.

This vireo is a frequent host to cowbirds, with overall rates as high as 50 percent in Ontario (Peck and James 1987). Although they have been known to bury cowbird eggs in the nest bottom (Jacobs 1903) or abandon a nest on occasion (Savage 1894), they typically accept cowbird eggs, and are unlikely to desert or bury if there are vireo eggs in the nest (Friedmann 1929). The cowbirds would lay even in vireo renesting attempts.

Of the parasitized Yellow-throated Vireo nests I observed, vireo eggs were invariably removed by cowbirds. I found as many as three cowbird eggs in one nest. Cowbirds would begin to lay as soon as a vireo started, but eggs might be removed even after incubation had started. With one pair in 1970, a clutch of four vireo eggs was present on 28 May, with one cowbird egg. By 8 June, three vireo eggs had been

removed and another cowbird egg laid. The last vireo egg was removed before the first and only cowbird hatched.

While the normal incubation period of Yellow-throated Vireo eggs is about 12 to 13 days, with cowbird eggs in the nest, the incubation period could be lengthened to 15 to 16 days. The larger cowbird eggs seem to prevent efficient heating of the smaller vireo eggs. In general, either because of egg removal, or a larger cowbird physically outcompeting and squashing young vireos, any vireo young that did hatch seldom survived unless first hatched.

While Solitary Vireos are subject to cowbird parasitism, it happens to very few nests in Ontario (less than 5% – Peck and James 1987). The majority of the population nests in extensively forested areas where cowbirds are fewer or absent. I saw only one nest parasitized and that one was near a roadway where cowbirds were likely to be found. Solitary Vireos have been known to bury cowbird eggs in the nest bottom also (Friedman 1929). However, that is not an expected response; they typically also accept cowbird eggs.

Discussion

As with passerine birds in general, only the females of these species have a brood patch, to apply heat directly to the eggs and maintain proper incubation temperatures. It is appropriate then that females should incubate through the night and a greater proportion of time during cooler periods of the day. Male Solitary Vireos may develop a partial brood patch (Pyle et al. 1987). But, even without an incubation patch, a male can certainly insulate eggs to help maintain their heat. During warm weather, he may even be able to

provide enough heat to maintain proper incubation temperatures (see Ball 1983). The fact that males tend to sit high and actively look about all the time they are on the nest, however, suggests that they are unlikely to be very efficient at heating the eggs.

The nest exchange behaviour, where one bird leaves only as the other arrives, is no doubt a well developed means of deceiving predators. The outgoing bird is usually ready to depart the moment it hears an incoming bird, but delays departure until replaced. With similar looking birds, unless the exchange can be seen, the presence of a nest remains unknown. I have been fooled several times by this behaviour when looking for nests. There is a high probability that an unseen predator would also be fooled by a quick exchange, improving the vireos' chances of successful nesting (Another well developed deceptive behaviour is used when feeding young – more later).

Given the very close attentiveness to eggs once a clutch is complete, I am uncertain how a cowbird could lay more eggs or remove additional vireo eggs during the incubation period. While it is a larger bird, and might be able to just ignore the aggressions of a pair of vireos, this seems a dangerous strategy, as it could cause the vireos to abandon the nest. But, it seems more unlikely cowbirds would wait for many hours, until the vireos might happen to be distracted by a jay, for example, and then sneak in. The vireos are probably unlikely to desert once they have begun incubation, and tolerate a rather quick intrusion. They do recognize cowbirds as undesirable

and would likely leave a nest chasing one, allowing the cowbirds quick access to the nest.

Other than becoming alarmed by the presence of cowbirds, reacting as they might to a jay, I have not detected any behaviour specifically directed at cowbirds that might evolve to increase the chances of successfully thwarting this nest parasite. There is no doubt a great deal of loss in Yellow-throated Vireo nests in Ontario and elsewhere, as a result of Brown-headed Cowbird parasitism. However, it is pertinent to remember that it is human induced habitat changes that have allowed cowbirds to proliferate in eastern North America.

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