

OBSERVATIONS ON THE NESTING
OF THE BLACK-THROATED BLUE WARBLER
(DENDROICA CAERULESCENS CAERULESCENS)

by

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A report of an original field study conducted
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WARBLER

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This nesting study of the Black-throated Blue Warbler (*Dendroica caerulescens caerulescens*) was made at the University of Michigan Biological Station, Cheboygan County, Michigan. The observation period began with the laying of the first of three eggs on July 10, and continued for three weeks at the end of which time the female deserted the nest on July 31. Total hours of observation numbered 47. In 1924 Jean M. Linsdale (1936:162) reported the Black-throated Blue Warbler as rare in the vicinity of the Biological Station. In 1924, and again in 1927, a nest was recorded. The nest, located in 1924, was found at Big Stone Bay on July 20, and contained three eggs which the female was incubating. The nest recorded for July 10, 1927 was found at Ingleside with two cowbird eggs in it. Nesting studies were not made of either of these two. The most extensive study of this species has been made by Harding (1926:65) and Nice (1930:338).

The present nest of the Black-throated Blue Warbler was located on July 9 when the male was heard singing in the vicinity and the female was heard

giving an alarm note . For eight days observations were made from a distance of 14 feet without a blind . When first set up the blind was placed seven feet from the nest . After five days more , that is , on the tenth day of incubation , the blind was moved to within two feet of the nest . During this process the incubating female remained upon the nest without displaying any visible signs of alarm . Throughout the entire observation period she did not flush from the nest when I entered the blind , although often aware of my arrival .

According to the information obtained by other observers , it seems probable that this nest just completed on July 9 was a second attempt . J. A. Farley in Rowe , Massachusetts (1919:580) writes of young Black-throated Blue Warblers leaving the nest on June 21 . Available literature gives no information stating that the Black-throated Blue Warbler raises more than brood in a season .

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Nest Site and Structure

The nest site was an open woodland area , consisting of White Birch (Betula papyrifera) , Sugar Maple (Acer saccharum) , Hard Maple (Acer pennsylvanicum) , Large-toothed Aspen (Populus grandidentata) , and Pincherry (Prunus pennsylvanicum) . The ground vegetation was Honeysuckle (Diervilla lonicera) , Blackberry (Rubus allegheniensis) , and bracken-fern (Pteris aquilina) . The nest itself was two feet from the ground in the bracken-fern , directly beneath a Sugar Maple . From the nest to the road was a distance of 10 feet , and to the lake 25 yards . Details of the measurement and composition of the nest are given in Table 1.

The outer structure of the nest had been woven about two separate bracken-fern plants and was well supported between these . The rim of the nest was free. On the sides the nest was anchored to the Bracken by numerous strands of cobwebs matted together . Just below the nest the bracken forked to make a convenient landing perch for the female when returning to the nest . From above the nest was well concealed by the bracken .

Other avifauna seen or heard in the vicinity of the nest were Flicker (Colaptes auratus) , Crested Flycatcher (Myiarchus crinitus) , Red-eyed Vireo (Vireo olivaceus) , Black-throated Green Warbler (Dendroica virens) , Oven-bird (Seiurus aurocapillus) ,

and American Red-start (Setophaga ruticilla) .

Egg Laying and Incubation

During incubation the male was not seen to approach the nest at any period of observation . Occasionally it was heard singing in the vicinity , usually at a distance of approximately 30 yards to the west of the nest . The male was heard last on the morning of the thirteenth day of incubation . The eggs , laid on three consecutive days , were dull white with numerous blotches of olive-brown scattered over the entire surface and smaller spots of brown forming a circle around the larger end .

The first egg was observed in the nest on the morning of July 10 , the day after the nest was located . On July 11 and 12 the second and third eggs were present . On July 12 the female was on the nest for the first time when I approached . Harding (1931: 515) found that the eggs are laid 24 hours apart , usually in the early morning . She also learned that incubation begins with the laying of the last egg of the clutch .

On the day following the first day of incubation , observation of the contents of the nest revealed only one egg in it . Further inspection dis-

closed two eggs on the ground below the nest , one completely crushed , the other with a small piece of shell gone from one side . Presumably the storm of the night before which had been accompanied by a high wind , was the cause of this loss . The partially intact egg I replaced in the nest . A period of observation later in the day disclosed this egg once more upon the ground with the shell crushed . Inspection of the remaining egg showed no damage to the shell .

During incubation the male sang infrequently but was not seen at any time to approach the nest. Harding (1931:516) writes to the contrary "The male sings constantly in the vicinity of the nest and sometimes alights on the rim and feeds her " . Many factors in the environment kept the female on the alert . Picking mites from the nest , and turning the egg were her chief sources of preoccupation . Insects near the nest never escaped her attention , and chipmunks (Tamias striatus) foraging on the ground beneath the nest often would cause the female to stretch her neck to see over the side . Ordinarily she was quiet on the nest and not alarmed by the presence of other birds ; however , when a Blue Jay (Cyanocitta cristata) flew over giving its call she gave several alarm notes . When leaving the nest the usual line of flight of the female was toward the lake

in a direction opposite to the singing perch of the male bird .

According to Harding (1931: 516) " The period of incubation is usually from twelve to thirteen days " . In this connection an event of interest occurred on the twelfth day of incubation . After a period of absence of approximately five minutes , the female returned bringing food to the nest in her beak . While holding the Treehopper (Membracidae) , and before settling down on the nest , she stood on a branch by the nest and chattered quite loudly . This performance she repeated a second time when after a period of 28 minutes on the nest , she flew off to return in eight minutes with the same type of insect , once more chattering before settling on the nest . Not at any previous time had she behaved in this manner , nor did she do so again after the twelfth day , although she continued incubating for eight more days before deserting . The male was last heard singing on the thirteenth day of incubation .

Out of 40 hours total time the female was attentive for 30 hours (73 per cent) and inattentive for 10 hours (24 per cent) . The longest continuous period of attentiveness was 49.5 minutes , and the shortest period was 3.5 minutes . Of inattentiveness

the longest period was 39 minutes , and the shortest period was 0.5 minutes .

SUMMARY

1. At the University of Michigan Biological Station a nest of the Black-throated Blue Warbler was located on July 9 . Presumably it was a second attempt at nesting.
2. The nest was located in an open area of hardwoods with bracken-fern the predominant ground vegetation, and in this the nest was placed two feet from the ground .
3. Three eggs were laid on July 10 , 11 , and 12 . On July 13 only one of the three eggs was still in the nest . The other two were found on the ground below the nest .
4. Only the female incubated . The male did not approach the nest during any period of observation .
5. On the twelfth day of incubation , which is the usual hatching time , the female twice brought food to the nest , although hatching had not occurred .
6. The period of attentiveness of the female continued throughout incubation without excessive variation until she finally deserted on July 31 . Data on incubation are presented in Table 2 .
7. The male was last heard singing on July 24 , the thirteenth day of incubation .

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Table 1**Location and Structure of Nest**

Habitat	Roadside area with aspen , maple , and birch .
Nest site	Bracken-fern beneath Sugar maple
Height from ground	2 feet
Lining of nest	Fine grasses
Bulk	Heavy fibrous grasses
Trimming	Curls of birch bark and matted cobwebs
Inside diameter	5.0 cm.
Outside diameter	6.5
Inside depth	3.0
Outside depth	5.2

Table 2

Data on the Attentive and Inattentive Periods of the female Black-throated Blue Warbler during Incubation

Date	July 14	July 15	July 17	July 18	July 20
Stage of incubation	Third day	Fourth day	Sixth day	Seventh day	Ninth day
Start of observation period	12:55 p.m.	9:00 a.m.	1:22 p.m.	8:22 a.m.	7:22 a.m.
Close of observation period	2:48 p.m.	10:53 a.m.	4:05 p.m.	9:49 a.m.	8:05 a.m.
Length of observation period	1 hour 53 minutes	1 hour 53 minutes	2 hours 43 minutes	1 hour 27 minutes	43 minutes
Temperature	69	65	69	70	75
Wind velocity	0-5	0-5	0-5	0-5	0-5
Weather conditions	Cloudy	Clear	Cloudy	Clear	Clear
ATTENTIVE PERIODS					
Total time of attentiveness in minutes	87	76	82	50.5	30.5
Number of periods	6	7	6	5	2
Extremes	10-19	7-21	6-24	3.5-20	13.5-17
Average length of time	14	10.5	13	10	15
Percentage of total time	77 %	75%	50%	58%	71%
INATTENTIVE PERIODS					
Total time of inattentiveness in minutes	26	24.5	81	36.5	12.5
Number of periods	7	8	7	6	2
Extremes	2-5	.5-6	2.5-39	1.5-19	3.5-9
Average length of time	3.7	3.1	11	6	6
Percentage of total time	23%	25%	50%	42%	29%

Table 2 (continued)

Data on the Attentive and Inattentive Periods of the female Black-throated Blue Warbler during incubation

Date	July 21	July 22	July 23	July 24
Stage of incubation	Tenth day	Eleventh day	Twelfth day	Thirteenth day
Start of observation period	10:16 1/2 a.m.	9:00 a.m. (Interval) 3:47 p.m.	7:37 1/2 a.m. (Interval) 3:46 p.m.	7:59 a.m. (Interval) 3:12 p.m.
Close of observation period	10:51 a.m.	11:12 1/2 a. m. (Interval) 5:23 p.m.	11:14 a.m. (Interval) 5:42 p.m.	10:47 a.m. (Interval) 5:29 p.m.
Length of observation period	34.5 minutes	3 hours 48.5 minutes	5 hours 22.5 minutes	5 hours 5 minutes
Temperature	70	75-80	75-90	80-96
Wind velocity	0-5	0-5	0-5	0-5
Weather conditions	Rain	Clear	Clear	Clear
ATTENTIVE PERIODS				
Total time of attentiveness in minutes	22	138.5	213	253
Number of periods	1	9	11	8
Extremes	----	12-34	13.5 - 35	18-46
Average length of time	22	15	22	31
Percentage of total time	64%	60%	73%	83%
INATTENTIVE PERIODS				
Total time of inattentiveness in minutes	12.5	90	84	52
Number of periods	2	9	11	9
Extremes	5-7.5	4-16	4-15	3-9
Average length of time	6	10	8	6
Percentage of total time	36%	40%	27%	17%

Table 2 (continued)

Data on the Attentive and Inattentive Periods of the female Black-throated Blue Warbler during Incubation

Date	July 25	July 26	July 27	July 28
Stage of incubation	Fourteenth day	Fifteenth day	Sixteenth day	Seventeenth day
Start of observation period	8:32 a.m. (Interval) 4:15 p.m.	8:20 a.m.	8:16 a.m. (Interval) 4:34 p.m.	8:23 a.m.
Close of observation period	11:12 1/2 a.m. (Interval) 4:53 p.m.	11:30 a.m.	11:50 a.m. (Interval) 5:30 p.m.	10:24 a.m.
Length of observation period	3 hours 22.5 minutes	3 hours 10 minutes	4 hours 30 minutes	2 hours 1 minute
Temperature	70-83	65	70-76	70
Wind Velocity	0-5	0-10	10	8
Weather conditions	Clear	Clear	Cloudy	Cloudy
ATTENTIVE PERIODS				
Total time of attentiveness in minutes	148.5	151	214	98.5
Number of periods	5	9	17	5
Extremes	19-49.5	12.5-23	5-23	13-26
Average length of time	29.6	16.7	10.1	19.7
Percentage of total time	74%	80%	76%	81%
INATTENTIVE PERIODS				
Total time of inattentiveness in minutes	54	39	56	22.5
Number of periods	7	10	16	6
Extremes	4-16.5	1-11	.5-14	2-5.5
Average length of time	7.7	3.9	3.9	3.75
Percentage of total time	26%	20%	24%	19%

Table 2 (continued)

Data on the Attentive and Inattentive Periods of the female Black-throated Blue Warbler during Incubation

Date	July 29	July 31	TOTALS
Stage of incubation	Eighteenth day	Twentieth day	
Start of observation period	8:06 a.m. (Interval) 8:14 p.m.	7:37 1/2 a.m.	
Close of observation period	10:25 a.m. (Interval) 8:26 p.m.	8:44 a.m.	
Length of observation period	2 hours 32 minutes	1 hour 6.5 minutes	2400
Temperature	75	75	
Wind velocity	0-5	2-5	
Weather conditions	Clear	Cloudy	
ATTENTIVE PERIODS			
Total time of attentiveness in minutes	128.5	50.5	1800
Number of periods	7	5	103
Extremes	16-31	11-13	3.5-49.5
Average length of time	18.3	10	17.4
Percentage of total time	84%	76%	73%
INATTENTIVE PERIODS			
Total time of inattentiveness in minutes	23.5	16	600
Number of periods	8	6	114
Extremes	1-5	2-4	.5-39
Average length of time	2.9	2.6	.087
Percentage of total time	16%	24%	25%