

TERRITORY AND LIFE HISTORY STUDIES OF THE RED-EYED TOWHEE

(Pipilo erythrophthalmus erythrophthalmus)

by

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TABLE OF CONTENTS

Introduction	Page 1
Acknowledgments	Page 1
Study Methods	Page 1
Territory	Page 3
Song	Page 4
Nesting	Page 4
Development	Page 7
Relation to other birds	Page 13
Mortality	Page 13
Summary	Page 14
Bibliography	Page 24

Territory and Life History Studies of the Red-eyed Towhee

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INTRODUCTION

Four summers (1938, 1939, 1940, 1941) of intensive study of the Red-eyed Towhee (Pipilo erythrophthalmus erythrophthalmus) have been completed at the University of Michigan Biological Station, Cheboygan, Michigan. During this period much information concerning the habits of this species has been gained.

ACKNOWLEDGMENTS

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STUDY METHODS

Tent blinds were used for nesting observations. The weights of the birds were taken in grams with Cenco scales. The metric system was used in obtaining measurements. In weighing the birds the balances were placed on a level board and balanced each time before weighing was begun and again after weighing was completed. Weights and measurements were taken at the same time each day.

Individual birds were marked by placing colored strings around the tarsus while they were young, then replaced with colored celluloid and aluminum, numbered bands when they were larger.

The adult birds were captured and banded. In trapping them, the most successful method was to place the young in the trap as a lure. When the adults entered the trap to feed the door was sprung. The most successful trap was a pull string trap made of hardware cloth of small mesh. This trap was sunk in the ground eight inches so the door was flush with surface. As the

adult birds seemed to have trouble in finding the entrance, Pteris aqualina was used to cover the top and the sides of the trap. To make exit a bit more difficult for the adult, a piece of hardware cloth was extended into the entrance four inches. As the young are very active when they leave the nest some measures had to be taken to keep them in the trap. This was accomplished by tying the young bird's leg with a string and fastening it to the bottom of the trap. As soon as the young found they could not move they would quiet down.

Since the Towhee is a ground-nesting bird the young leave the nest before they can fly well. To prevent the young from straying too far and to make further study possible they were confined to a small area by the erection of a cheese-cloth pen thirty-six inches high with a ten foot diameter. This kept them until they were about twelve days old. At this age they could support their weight enough to work their way up and over the pen.

Banding was started in 1939 with two males, one female, and six nestlings; in 1940 one male, one female, and five nestlings; in 1941, one male, two females and eight nestlings were banded. In 1941 there were two returns of 1940 nestlings, both males. They established their own territories near the place where they were raised.

It has been a prevalent idea that the general habitat of the Red-eyed Towhee is second growth or freshly burned areas where brush has just started to grow. Barrows (1912, p. 529) states "The bird is well known everywhere as a constant inhabitant of brush and open woods, being especially abundant along the margins of woodlands adjoining recently cleared areas. It is one of the common roadside birds". Todd, (page 623) states "At the present time the Towhee ranges commonly and indiscriminately throughout our region, (western Pennsylvania) in the highlands and lowlands alike. In Cheboygan Co., Michigan, the author has found it in all types of habitat, namely, in bogs, second growth and in brushy areas.

TERRITORY

The birds have always succeeded in reaching the Biological Station before it was possible for the author to do so. As a result they had their territories already set up. On May 29, 1940, the earliest date of arrival of the author, they had just started incubation.

Two methods of recognizing the birds in their territories were used. Since no two Towhees sing alike it was easy to tell which bird was singing and with a little study his territory could be outlined. Check was made by banding the adults with color and numbered bands. Then, if there was any doubt as to the singing bird, identification could be made positive by the bands.

The size and shape of the territories differ, some being long and narrow while others are about as wide as they are long. These territories were located by following the adult birds. This was not difficult because they would permit one to approach within eight or ten feet before they would flush. Location of song trees were checked as most birds had two or three favorite trees from which they would sing. These trees did not necessarily mark the boundary, but were usually near it. (See charts)

When a nest was destroyed the bird might change its territory a little. However, it did not change over one thousand feet in any direction in the nests observed. A pair which nested on the top of the hill back of camp in 1939 had two nests (no. 3 & 4 in chart) destroyed and a third (no. 5 in chart) which was successful. Here no evident change in the territory was noted. A pair nesting southeast of Hook Point, Douglas Lake, in 1940 had two nests (no. 8 & 9) destroyed and a third nest (no. 10 in chart) was successful. The second was north of the first and the territory was shifted about one thousand feet north. The third was west of the second but there was no evident change in the territory.

Where shifting was noted the nest had been parasitized by a Cowbird after the second Towhee egg had been deposited and the Towhees promptly deserted. The second nest was abandoned when the young were two days old. The author wished to photograph the young and rearranged some of the foliage. They then left the young to starve.

SONG

The song of the Red-eyed Towhee is quite variable but it usually has some variation of "Whit-tow-hee" in it. Most bird songs are difficult to translate into English and the Towhee's is no exception. At times he would put a "Chewink" before the "Whit-tow-hee". Again he would omit the "Whit" and call "Tow-hee". Another song might be translated as "Dit-diddle-diddle" or perhaps he would say "Dirt-dirt". His alarm call was a loud "Chewink", "Wink", or a sparrow-like "Cheep", somewhat like the "Cheep" of the song sparrow. When he is with the female, or feeding the young, he gives a soft note. It sounds as if he were saying "Squee-squee" or "Sqirr-sqirr". The alarm notes and this call are given by the female also.

Three nestlings were raised during the last part of August 1939, and kept in captivity over the winter. These were all females. It was observed that they had a great variety of calls, twitters, and cheeps.

NESTING

In nesting, the Red-eyed Towhee seems to prefer a more or less open woods with plenty of ground cover. All nests found by the author have been on the ground, well hidden by Pteris aquilina, or other low growing plants. One nest found in 1940 demanded special attention. It was located under a cone-shaped mass of dead Pteris aquilina. A small tree had fallen across a depression and the Pteris aquilina of the preceding year had blown across the log in such a manner as to form a cone. Here the bird decided to build. The nest was similar

to that of the ovenbird's in that it was roofed over and had to be entered from a small opening in the side.

In building, a slight depression is made either at the base of a small shrub or in a clump of Eubatus sp. surrounded by Pteris aqualina or other low growing plants. Most of the material used is found near the nesting site. Coarse leaves, bark, and twigs are used in starting the nest. The bulk of the material used coarse grass, rootlets, and small twigs. They are usually lined with fine grass and rootlets. The color pattern of the female bird blends very well with such an arrangement.

The locations of the nests varied considerably. Two of them were found at the bases of Rhus sp. and were surrounded by Pteris aqualina and Eubatus sp.; two were built at the bases of Eubatus sp. and were surrounded by Pteris aqualina; two were under fallen limbs covered by Pteris aqualina, and another under a cone of Pteris aqualina.

The earliest date on which a nest was located was June 5, 1940. This nest contained five eggs at the time of discovery. The last one to be found was July 21, 1939.

The measurements taken in centimeters and the contents were as follows:

Nest No.	Date Found	Location	Inside Diam.	Outside Diam.	Inside Depth	Outside Depth	NO. Eggs	
1	July 21, 1937	Hill above camp	8.0 cm.	14.5 cm.	3.5 cm.	1.6 cm.	4	
2	July 5, 1938	Hill above camp	7.5 cm.	14.3 cm.	4.5 cm.	4.6 cm.	4*	
3	July 13, 1938	Hill above camp	7.7 cm.	14.6 cm.	4.5 cm.	3.4 cm.	3	
4	June 7, 1939	Hill above camp	7.5 cm.	14.5 cm.	4.5 cm.,	3.5 cm.	4*	
5	July 3, 1939	Hill above camp	7.3 cm.	13.5 cm.	4.2 cm.	6.3 cm.	2	
6	July 6, 1939	Sedge Point	7.3 cm.	15.0 cm.	4.4 cm.	4.1 cm.	4	
7	June 7, 1940	Swamp Pine Point	7.9 cm.	14.7 cm.	4.5 cm.	2.0 cm.	5	
8	June 11, 1940	Hardwoods SE of East Point	7.8 cm.	14.2 cm.	4.3 cm.	3.2 cm.	2	
9	June 17, 1940	Hardwoods SE of East Point	7.9 cm.	13.7 cm.	4.4 cm.	1.2 cm.	4	
10	July 6, 1940	Hardwoods SE of East Point	Two young just out of nest					
11	June 5, 1941	West side of road Pine Pt.	7.8 cm.	15.5 cm.	3.4 cm.	2.5 cm.	4	
12	June 6, 1941	Hardwoods SE of East Point	7.5 cm.	15.6 cm.	5.5 cm.	3.5 cm.	4	
13	July 13, 1941	West side of road Pine Pt.	One young just out of nest, caught and banded					

* These were young birds in the nest when found.

Weights of the young were taken at 5 P. M. each day. The increase in weights is quite rapid, averaging about four grams per day. When they leave the nest they weigh about 30 gm. When they were taken the first time the smallest bird weighed 3.95 gm., the largest 5.75 gm.

DEVELOPMENT

Since the young birds develop so rapidly, daily changes in the average weights and appearances were recorded. The average weight for the first day was 4.64 gm. They were naked except for a small bit of down on the head, dorsal tract and wings. Their eyes were closed. Reflex actions were evident as the young responded to tactile stimulus by opening the mouth. If the young was placed on the back it would try to turn over on the stomach.

On the second day there was an increase in weight to an average of 7.78 gm. with a very small change in appearance, except for a slight growth of all parts of the birds.

There was a decided change in the birds on the third day. Weights were increased to an average of 11.35 gm. Pin feathers were plainly visible in all tracts, the primary pins having broken through the skin. The natal down was fastened to the end of the pin feathers.

On the fourth day there were still greater changes. The average weights had increased to 14.75 gm. All pin feathers were broken through the main tracts, with longest ones on the wings, backs, head, and breast. Tail feathers are the slowest to develop. The eye-lids showed a small opening. The birds chirped quite loudly. They seemed quite strong, for they were able to lift their bodies to an upright position on their tarsi when the adults came with food.

The fifth day saw weight increased to an average of 19.85 gms. The feathers had broken through their sheathes. The appearance of the birds was very ugly. Their tail feathers were still undeveloped, with only small pins. Their eyes were opened and the birds showed fear when the adults gave the alarm call

by trying to make their bodies as small as possible. When they were removed from the nest, they protested by giving a fright call. The tarsi were enlarged enough to permit banding.

On the sixth day the young in one nest disappeared. Pens were then erected around other nests to prevent the young from leaving prematurely. The average weights increased to 24.67 gr. Feathers nearly covered the young birds at this age. The bases of the feathers were still enclosed by their sheathes. The young spent considerable time in picking and preening their feathers. The feather sheathes came off as scales and resembled dandruff. Natal down was removed by preening. They exercised often by stretching their legs and wings. When they were removed for weighing, they would not remain in the nest upon being returned to it. They could not fly but would hop along the ground. The adults tried to coax them over the pen by flying over it with food and tried to get them to follow. The young would try to get over but were unsuccessful. After the adults had made several futile attempts, they would finally give up and feed the young.

Observations on the seventh day disclosed further facts. The average weights increased to 26.34 gm. Some young from nests which were not disturbed for weighing fledged naturally at this age. Feathers completely covered the bodies of the young birds. Tail feathers which seemed so slow in coming through had now broken through the sheathes and were about one centimeter long. Primaries were not fully developed and the birds could only hop when they left the nest. Their tarsi had nearly reached their full growth. At this age the young exercised continuously by stretching their wings and legs on alternate sides, preening constantly and rising up in the nest to their fullest height. If one approached they would compress themselves, and would fledge upon tactile stimulation. When once frightened by the author they could not discriminate between human touch and that of another young bird. If one happened to contact another, the second would give the fright call and attempt to get away. Young birds did not return to the nest for brooding nor were they covered off the nest after fledging.

The eggs were laid between 7 A. M. and 10 A. M. in the two nests (no. 3 & 8) where egg laying was observed. One was laid at 7:00 A. M. , one at 8:16 A. M. one at 8:35 A. M. , the last one at 10:00 A. M. This time was determined by observation of the bird at half hour intervals, also by continued observation of one nest from 4:30 A. M. until the bird had laid each day. The eggs were laid one each day until the clutch was completed. The bird that laid at 10:00 A. M. was flushed at 9:30 A. M. and probably would have laid sooner if she had not been disturbed. Of the nests observed two had two eggs, one had three, seven had four, and one had five, the average being four.

The incubation period has not been checked. Two nests were under observation before the first egg was deposited, but they did not survive, one being destroyed by a predator, and the other by the interference of a cowbird. The only record found of incubation period is that of A. H. Bergtold (p. 104) which gives it as "12-13 days".

In all cases observed the female has done all of the incubating. The male was never seen near the nest during that period. During the hotter part of the day the female would be off the nest but when the sun shone directly on the eggs, incubation or shading the eggs would follow. This information was gained by careful watching during various hours of the day on every nest under observation.

As the young hatched the female carried away the shells. Drying of the shells down is a rapid process and takes not more than five or ten minutes. The young in one nest were fed within half an hour after hatching.

When the nests were approached the females would hop off and fly to a low tree or bush, giving the "Chewink" or alarm call. This usually brought the male who, upon arriving, also gave the alarm calls. When undisturbed the female usually hopped off and fed in the vicinity of the nest. In four of the nests the females were called from the nest by the males giving the "Squee-squee".

There was only a slight gain in weight on the eighth day, the average being 27.4 gm. At this age the feathers were growing rapidly and on the dorsal and ventral tracts had reached their full growth. Wing feathers were a little slower in developing. The tail feathers were slowest of all, there being but a slight change in length. Probably body cover is more essential, for the young have not been observed to remain in the nest more than eight days.

On the ninth day the average weight was lower, being 27.33 gm. Some of the young lost more weight than others, a fact which may have been due to the amount of food they received. Adults were observed to return to the nest with food many times after the young had left it. The young bird which gave a food call nearest the nest was fed before the others. During one observation period three out of a clutch of five were perched on a small branch. These were fed before the two that remained on the ground. Since the three did not move for two hours, the adults formed a habit of feeding there. When two of the young did leave, the third was fed by both adults for several feedings before the others were given food. After the third one had left the perch, the adults still came to the spot even though the young were no longer there. This feeding habit seems to be quite fixed as this reaction has been noted in several individuals. Occasionally the young will succeed in getting over the pen on the ninth day.

The average weight increased to 29.51 gm. on the tenth day. The wing feathers had developed enough to permit the young to flutter over the pen. Their tails were still undeveloped there being only a slight increase in length. Some birds lost considerable weight at this age. It might have been due to the number of feedings. Others show considerable gain. The young birds were located by the author remaining quiet until they gave the food call.

The young were still in the territory on the fourteenth day. They were still being fed by the adults. Tail feathers were elongated enough to show the color pattern of white. A loud chirp was given as a food call. These young seemed to be very curious and if the observer would remain quiet they would approach to

within five or six feet. They stretched their necks out from behind a limb or around the trunk of a tree to get a better look without exposing their own bodies.

Observations on the twenty-second day showed a complete juvenal plumage. The tail feathers were full grown. Sex could be distinguished by the color of the tail and wing feathers, the male birds having very dark plumage, the female having light brown. The underparts of both sexes were buff or white, heavily spotted with brown or black. The wing and tail patterns were the same as those found in the adults. Dr. Chapman (Vol. XIV, p. 290) states that "the male and female juvenals can be separated by wing and tail colorations". Upon checking specimen in the Museum at the University of Michigan this color difference was very noticeable.

Moulting was noticed on the twenty-eighth day. Buff feathers on the sides and flanks were plainly visible. They were no longer fed by the adults but were feeding on Amelanchier sp. and Vaccinium sp. which were very abundant. The Amelanchier sp. were their favorite food. At this age they could usually be found in these bushes.

The "chewink" alarm note was given by both young and adult birds when they were approached. If the observer remained quiet the juvenals would show their curiosity by coming quite near. However it took only a slight movement to cause them to flee.

They were still in the area on the thirty-third day. Buff feathers on the flanks and sides of the breast had greatly increased in number, and the spotted feathers on the breast were being replaced by the brown or black of the adults.

The dorsal tracts were much darker.

Forty-one days after hatching the young were still in the area. Molting had progressed until there were but few spotted feathers on the breast. Dorsal and flank feathers seemed to be the same color as the adults.

Observations were completed at the end of fifty days. The young birds were still in the territory. Other young had joined them. These could be determined because they had no bands, while all the young under observation were banded with

the colored and numbered bands. Very few had spotted feathers. The males seemed to have completed their molt before the females.

Further facts regarding feeding and care of the young were observed. The young of one nest were fed within a half hour after hatching. There was an average of 18.3 minutes between feedings the first three days after which the length of time between feedings to 20.7 minutes for the rest of the nestling period. The size of the food and the amount fed the first three days was smaller than for the rest of the period. On cloudy days feeding averaged about the same all day, the time between feedings being 16.7 minutes, while on hot clear days the feedings during the warmest hours averaged one every hour and forty-five minutes. In the morning feedings were observed from five to fifteen minutes apart. The earliest feeding ever observed was at 4:47 A. M. on the fifth day after the young had hatched. The latest evening feeding observed was at 7:53 P. M.

The male brought more food than the female. When he arrived at the nest with a large mouthful of food, she aided him in feeding, but she brought very little food to the nest herself.

Sanitation was conducted by both birds. The female was observed to eat many of the fecal sacs, but the male carried them away. In one nest observed in 1941, the male ate most of the fecal sacs.

It was observed that in nesting activity display must be an important behavior. It was noticed several times. The male bird would fly to a low limb and sing. If the female was near and came to the tree, the male would arch his back, spread his wings and open his tail so the white patches would show. The feathers on the head and breast were erected so that the bird appeared to be one and a half times as large as he really was. The "Squee" call was given during the display. This particular behavior was noticed during incubation but not after the eggs had hatched. This display was quite similar to that of the Red-winged Blackbird.

RELATION TO OTHER BIRDS

Of all the other birds in the territory, the Red-eyed Towhee seemed to resent only one species, the Brown Thrasher. Since their feeding habits are similar this may be the reason for the opposition. Both the male and female Towhees have been observed to attack this species. Occasionally the parasitic Cowbird would also annoy the Red-eyed Towhee.

Only one nest under observation was parasitized. This nest was promptly deserted. Two Cowbird eggs had been laid in it, but the Towhee eggs were removed, probably by the Cowbird itself.

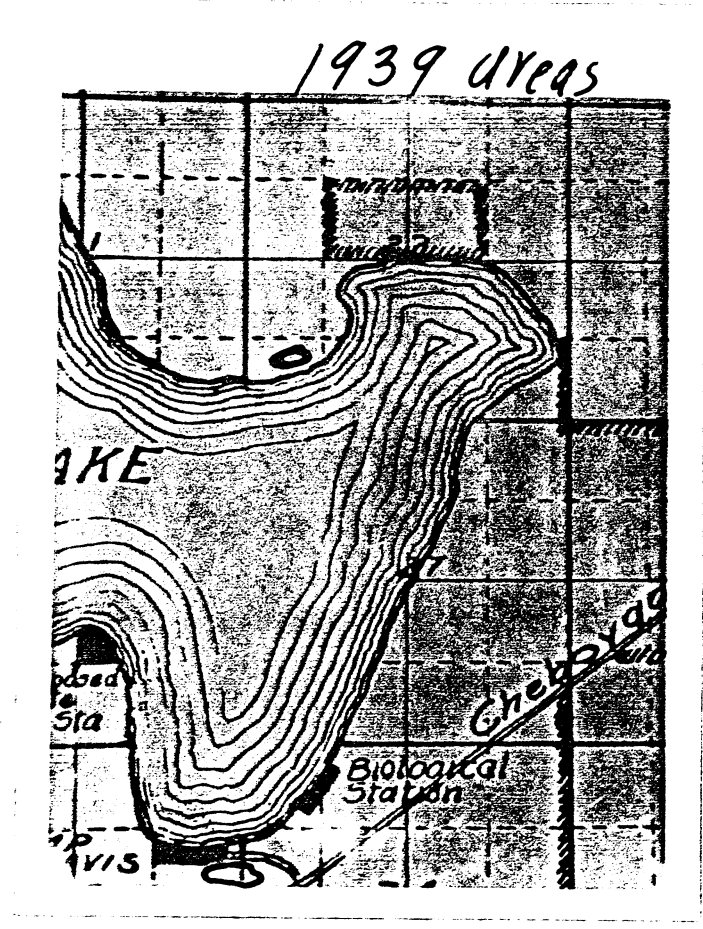
MORTALITY

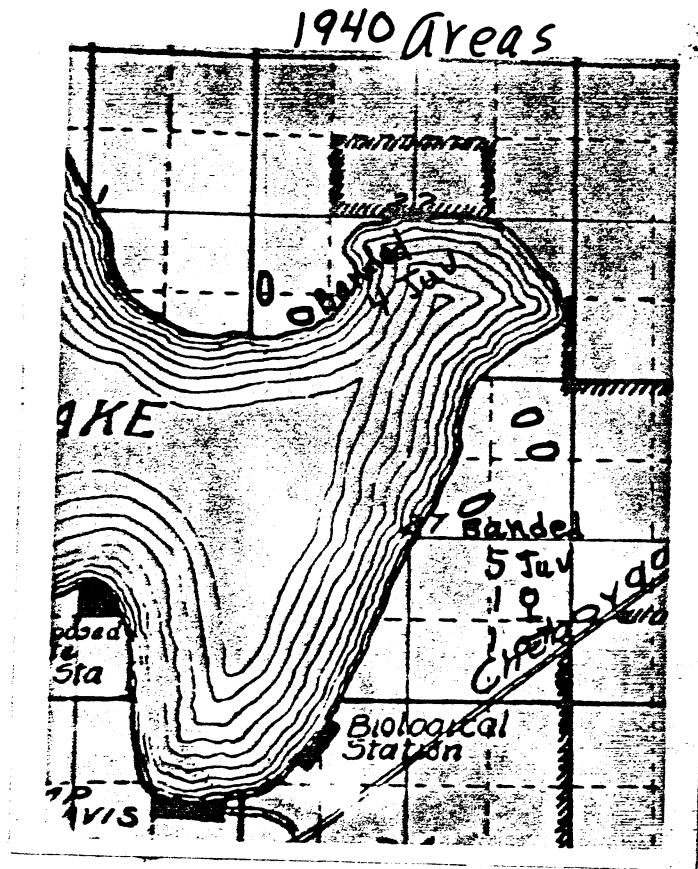
Of the thirteen nests under observation, one was deserted when it was parasitized, one was deserted because of the activities of the writer, three were destroyed by unknown predators. In the others young left the nest and actual records of mortality from this point could not be determined.

SUMMARY

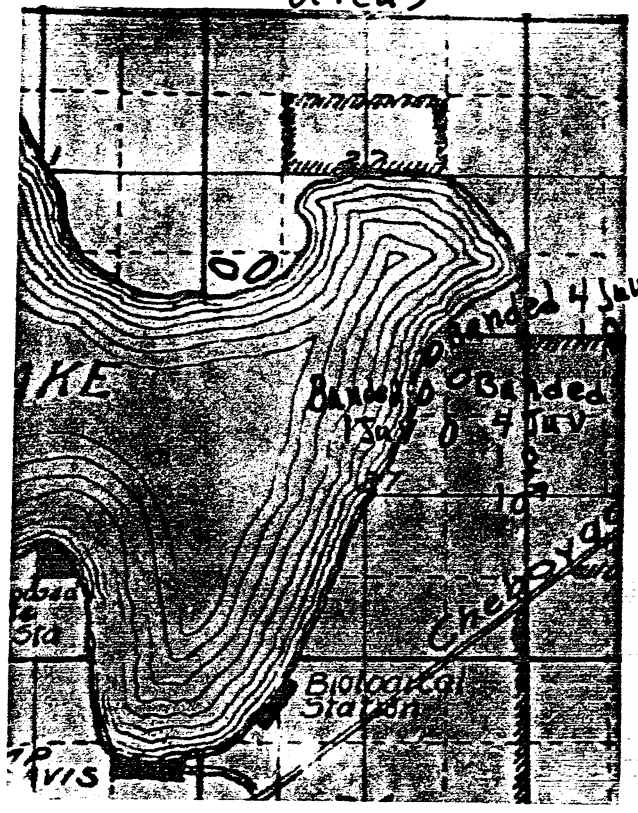
Observations over a period of four summers revealed the following facts:

1. Thirteen nests of the Red-eyed Towhee have been studied.
2. The eggs are deposited in the nest before 10 A. M.
3. The number of eggs vary from two to five, the average being four.
4. The female bird apparently does all the incubating.
5. The male bird has a definite display during the incubation period.
6. The male bird brings most of the food to the nest, but both birds take part in the actual feeding.
7. The male carried most of the fecal sacs away, while the female was observed to eat many.
8. There seems to be a definite territory set up from which the adults nor young stray.
9. The Cowbird parasitized one nest which was immediately deserted by the Towhees.
10. The Towhees seemed to resent only one species, the Brown Thrasher.
11. 62% of the nests were successful while 38% had the eggs or young destroyed.





1941 areas



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Nest of Red-eyed Towhee



Nest of Red-eyed Tanager



Young of Red-eyed Towhee



Young Red-eyed towhees



Juvenal Plumage

Photo by Maxine Smith (Miles)



Juvenal towhee

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