October 1973

LOCAL FALL MOVEMENTS OF THE RED-WINGED BLACKBIRD IN CENTRAL NEW YORK

Noel J. Cutright
Cornell University

LOCAL FALL MOVEMENTS OF THE RED-WINGED BLACKBIRD IN CENTRAL NEW YORK

Noel J. Cutright
Department of Natural Resources, Cornell University
and
Texas Instruments, R.4-Ulster Landing Road, Saugerties, N.Y. 12477

Introduction

Studies into the post-breeding season activities of the Red-winged Blackbird (*Agelaius phoeniceus*) recently have received greater attention. The United States Fish and Wildlife Service began a massive study involving the finding of winter concentrations of blackbirds and the marking of individuals. Meanley (1965, 1971), the most conspicuous name in the literature involved in this work, has recently published observations on the roosting behavior of the Redwing in southern United States.

This wave of interest in blackbirds also is present in New York. Growers in the Finger Lakes Region have become quite concerned with the extent of damage to their corn. In the vicinity of the Montezuma National Wildlife Refuge (M.N.W.R.) in central New York, corn growers have become particularly vociferous. They have claimed that this federal Refuge harbors tremendous numbers of Redwings, and that these birds are flying out from the Refuge and causing extensive damage to corn in the area.

This paper reports on studies employed to determine local movements of Redwings during the summer-fall communal roostinq season and these birds' role in the corn damage problem in the vicinity of M.N.W.R. (Cutright, 1973).

Study Area

The principal study area is situated in central New York State about halfway between Rochester and Syracuse (Figure 1). It consists of a 25 mile square lying in the Erie-Ontario Plain within the countes of Cayuga, Seneca, and Wayne. The M.N.W.R. located at the northern end of Cayuga Lake is near the center of the study area. A major blackbird roost was located on the M.N.W.R. in an area of cattails (*Typha sp.*) growinq in standing water. A narrow strip of drier land runs along the eastern edge of the cattails while open water surrounds the roosting area on the three remaining sides.

A second major roost, also in cattails, is located about two miles south of the Refuge roost along the western and northern shorea of Cayuga Lake in Seneca County.

Two additional large roosts, Canoga located south of the Cayuqa roost and Savannah located north of the Refuge roost, were within the study area. While no color marking was conducted in either roost, these certainly were a factor in the corn damage pattern in the area.

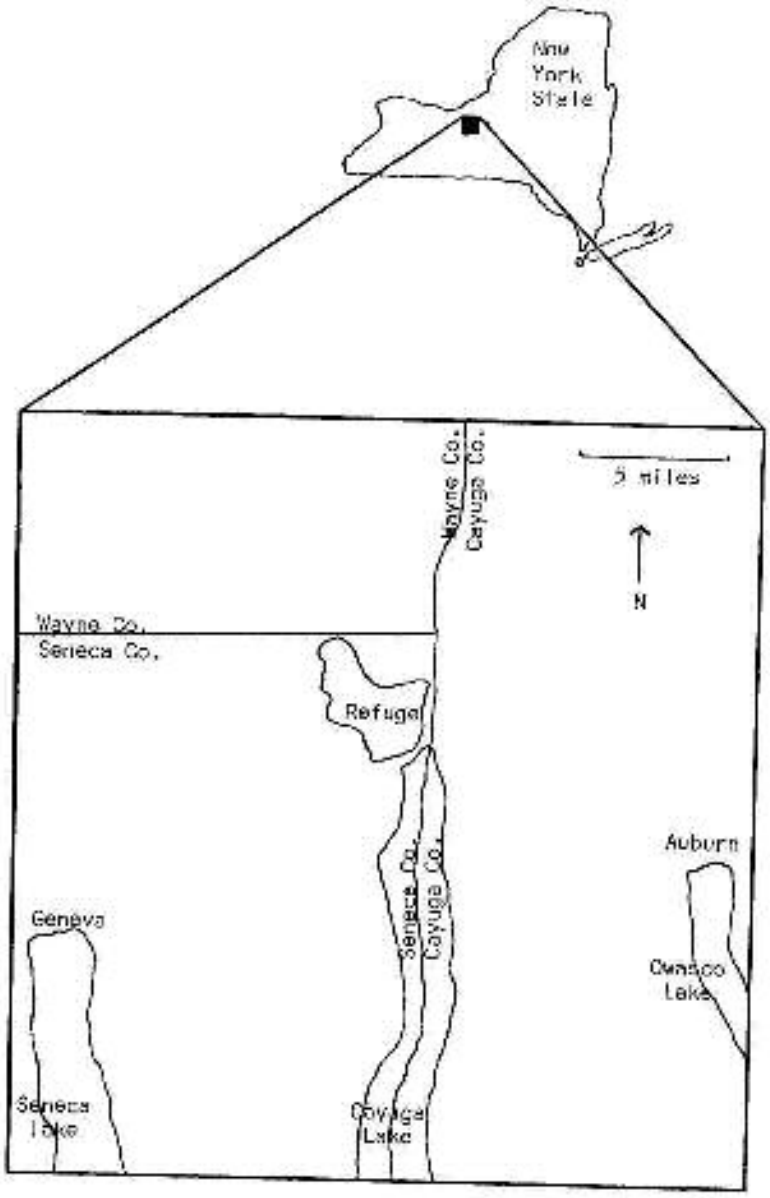


Figure 1. Primary study area.

Methods - Capture and Mark

The procurement of large numbers of Redwings over a short time period was of prime importance. It had been noticed in previous years that an adequate amount of water was present in the roosting area in the Main Pool of the Refuge to permit an airboat to maneuver effectively. An unsuccessful attempt was made during the fall of 1969 to catch roosting birds from a moving airboat with a long handled net. This method proved to be somewhat dangerous to both the netter and driver. It was thought that an airboat equipped with lights and a catching device might be a means whereby birds could be gleaned while roosting at night in the cattails. During June, 1970, a funnel-shaped scoop was constructed that could be fastened to an airboat. Figure 2 is a photograph of the airboat with attached funnel-scoop. For further details of the airboat scooping technique, see Cutright (1973).

A description of a typical night's operation follows. After the arrival of darkness, the catching or holding box was placed in the airboat, and the generator used to power the two 110 volt, 500 watt, Stonco, quartz-iodine lights was bolted into place under the driver's seat. I usually took along a helper who weighed approximately 100 pounds. He crouched on the floor of the airboat behind the left side of the scoop. The airboat was operated at full throttle during catching runs. Speeds varyinq between 10 and 35 mph were most common, although at times the airboat was barely moving through the very dense stands of cattail. At speeds of over 20 mph, perched birds were captured as well as birds that were on the wing. As would be expected, more birds were caught at higher speeds. Birds that landed inside the airboat were captured by hand and deposited in cloth holding-bags. When the scoop's holding box was full with approximately 100-125 birds, the airboat was returned to shore. The birds were usually immediately banded and color-marked. If additional catching was to be attempted, the birds were transferred to another cage and held for later processing. Because of drier conditions in the Cayuga roost, mist nets were operated in this roost during late afternoon and early morning hours.

Brightly colored, durable plastic or plastic-coated materials have provided excellent markers which have been made in many configurations and attached by various methods. Markers should be durable, yet not cause any bird injury or unnatural behavior to occur. I was seeking a tag that could be easily attached to the bird by one person.

The material selected for the tags is a fluorescent plastic-coated nylon fabric that was used by Hewitt and Austin-Smith (1966) to field-mark birds. It is available from the Safety Flag Company, P.O. Box 1005, Pawtucket, Rhode Island, under the trade name of “Saflag.” The color “Blaze Orange” was used on those birds marked on the Refuge. Another brillant color, “Aurora Pink,” was employed at Cayuga.

The wing tag design that was decided upon is self-fastening and requires neither staples nor rivets. It is illustrated in Figure 3. It is 4” in length and weighs about 0.5 gram. The dorsal tab is 1” wide and the humerus strap is 1.5” long. The tag is attached by passing the strap around the base of the humerus, proximal to the innermost tertial feather. The ventral tab, which is arrow-shaped, is passed through a small slit in the humerus

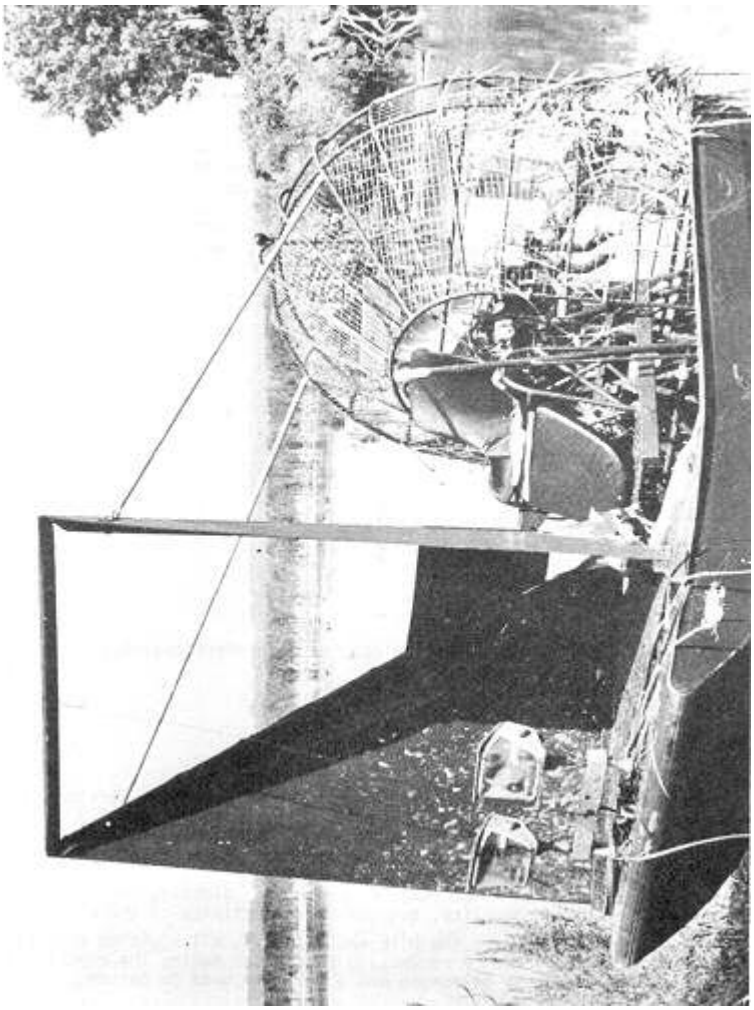


Figure 2. Side view of airboat with plywood and plexiglass funne-scoop attached.

strap near the dorsal tab. Small cuts into the humerus strap at the base of the arrow prevents the ventral tab from pulling back through the slit. Although fastening is easier with two persons, with practice one investigator can easily attach the tag. Teeth are useful in pulling the arrow through the slit while the hands are occupied holding the bird and tag.

A possible danger when any type of foreign material is fastened to a bird is that this addition will adversely affect the bird. The normal movement of the bird may be hindered, or actual physical harm may result. The addition may affect the behavior of the bird so that it is not accepted by its fellows or is unable to fulfill possible behavioral activities critical to its survival. I observed no obvious behavioral deviations during the study. I detected no unnatural movements nor did I observe any instances of non-acceptance of tagged birds by other flock members. No sighting reports that I received mentioned any abnormal activity.

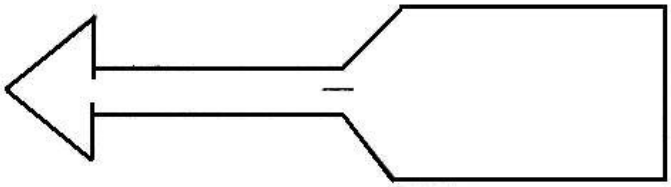


Figure 3. Diagram of “Saflag” wing tag used to color-mark Red-winged Blackbirds.

Methods - Sighting

A letter was sent through the area's Cooperative Extension Service to each corn grower in the two study areas explaining the project. A request for information on color-marked Redwings sighted was included in the letter. Newspaper articles and radio announcements were employed to further disseminate the project's intent and to request that observations of Redwings bearing colored winged tags be reported. Sighting information sought included the date, locality, tag color, and activity of the bird.

To accurately locate where the bird was observed, all sighting reports received by mail were checked by contacting the person making the report. Several reports were made by telephone and a few were made in person. I

also made an effort throughout the period of study to sight tagged Redwings and follow their movements once sighted. I made no attempts to regulate my movements to particular corn fields or regions within the study areas.

Methods - Corn Damage Assessment

Reports of damage to field crops are often subjective and estimates by growers are often relied upon. For example, in 1969 a questionnaire was mailed to corn growers near the M.N.W.R.. Included were questions concerning corn acreages, damage estimates, control methods employed, and whether birds had become more troublesome. Acreages and damage estimates from 35 returns are summarized in Table 1. The returns showed an estimated 19 percent corn crop loss to birds in 1968. Twenty-nine or 83 percent used some means, including gas exploders, firecrackers, and shooting, to keep blackbirds out of their corn. In addition, 25 indicated an increased bird problem over the past five years. Nine indicated no change in the situation and only one noted a decrease.

Table 1. Summary of returned corn damage questionnaires within six miles of the Montezuma National Wildlife Refuge, 1969.

County	Farms	Field Corn 1968	Acreage 1969	Percent Damage 1968
Wayne	5	423	541	19.1
Seneca	13	814	783	19.4
Cayuga	17	1258	1438	18.7
Total	35	2495	2763	--
Average	--	71.3	78.9	19.0

My 1970 and 1971 sampling design employed two 100-foot row plots per field. Test fields were selected throughout the primary study area although the center of the area near Cayuga Lake received the most attention. A table of random numbers was used to select the two rows that were to contain plots and the number of paces to the point in the row where each plot began. The selected starting point in a feild was the most accessible corner. No fields were appraised until after all kernels had matured to the hardened “dent” stage. No significant bird damage occurs after this stage of maturation. The number of undamaged and damaged ears and the amount of loss on the latter were recorded for each plot on a field damage appraisal form. The amount of bird damage or loss was obtained by stripping back the husks from the damaged ears and measuring with a ruler the total length of cob that had borne developed kernels and the length of the damaged portion to the nearest 0.5 inch. When ears were damaged unevenly, the average length

of damage was estimated. Those ears with less than 0.25 inch damage were recorded as having “trace” damage and were not measured. Bird damage is easily distinguished, and other types of both primary and secondary damage were ignored.

Before the first field was appraised on September 2, 1970, all corn growers in the primary study area had received a letter explaining the project. The final appraisal was made on October 18. In 1971, appraisals began eight days later and terminated on October 17.

A length-weight table based on average cumulative weight of 0.5 inch sections of corn ears was constructed in 1970. During September, 50 corn ears representing each 0.5-inch size class from four to ten inches in length were selected from several fields in the study area and color-marked for later identification. Fields were selected near the periphery of the study area where damage would hopefully be light so that complete ears could be obtained at a later date. Due to the scarcity of short and long ears, only 25 ears were selected and marked for the 3, 3.5, 10.5, 11, and 11.5 inch size classes and only 10 ears for those measuring 12 and 12.5 inches. A total of 795 ears were thus measured and marked. In late October, these hard and ripe ears of corn were picked, sorted by half inch lengths into classes, placed in mesh bags, and allowed to air dry to a moisture level normally present in stored corn (12-13%). The kernels were shelled from each half inch section from each sample ear and weighed to the nearest 0.1 gram. The weights for each half inch section from ears of each class were averaged. These were listed to form the length-weight table shown in Table 2.

With this table, knowing the length of an ear and the length of the damaged portion, the estimated weight of the amount of corn lost was easily obtained. “Trace” damage was calculated as half the average weight of the tip half inch section of all classes, or 2.2 grams.

During the 1971 season 200 ears were collected to determine whether the relationship in the 1970 table held. These ears were selected and treated as before.

DeGrazio, *et al.* (1969) noted that dented ears collected in the field shrank when they were dried further in storage. They noted an average loss of 8.9 percent (range of 5.5 to 12.7 percent for different size classes) in total length. I utilized the same ears used to generate the length-weight table to collect shrinkage data.

To obtain the number of bushels of corn per acre lost to birds, the total grams lost per plot was divided by 174.2. This factor was obtained by dividing the plot size in acres (1/145.8, for plots 100 feet long by three feet wide) by the fraction that one gram is of the number of grams in a bushel of shelled corn (1/25,401.6).

Results - Airboat Operation

The airboat-scoop method was demonstrated to be a rapid means of capturing large numbers of birds in a short amount of time. However, three special circumstances are needed for this method to be successfully employed. The population of roosting birds must be great enought to make the operation feasible. Water has to be present over the entire catching area

Table 2. Length-weight table, giving average cumulative weight In grams of 0.5” sections of corn ears 3 to 10” long.

Length of Corn on Ear (Inches)		Length of Damage (Inches) on the Stalk																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5,5	5.5	6	6.5	7	7.5,8	8.5	9	9.5	10	10.5,11	11.5
On the Stalk	Dried	Length of Damage (Inches) Dried																			
		0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
3	3	2.2	8.4	16.9	26.9	37.4	45.7														
3.5	3.5	3.6	10.3	19.6	29.2	40.9	51.0	59.6													
4	4	3.4	10.3	19.9	30.2	41.8	53.0	65.2	74.6												
4.5,5	4.5	4.2	11.6	20.9	31.8	43.3	55.1	67.5	78.0	89.5											
5.5	5	4.5	12.1	22.0	32.6	44.0	55.9	67.9	81.6	92.9	103.1										
6	5.5	4.2	11.7	20.9	31.5	43.0	54.5	66.7	79.0	92.1	103.8	115.0									
6.5	6	3.9	11.4	20.7	31.5	43.0	54.5	66.8	79.5	92.2	104.1	116.7	130.2								
7	6.5	4.5	12.7	22.8	33.9	45.7	58.3	71.3	84.9	97.9	111.7	125.7	139.1	151.1							
7.5,8	7	4.5	12.4	22.3	33.3	44.5	57.0	69.6	82.6	95.8	109.5	123.1	137.3	151.2	163.4						
8.5	7.5	5.2	13.6	24.1	35.7	48.0	60.9	74.2	88.1	102.2	116.5	130.8	145.3	160.9	175.4	187.2					
9	8	4.1	11.8	21.8	33.1	44.9	58.2	71.7	85.9	99.7	113.7	128.5	143.1	157.9	173.9	187.3	204.7				
9.5	8.5	4.2	11.0	19.9	30.0	43.1	56.8	69.6	81.8	95.5	109.0	122.9	137.3	150.0	164.7	180.7	193.3	207.2			
10	9	4.9	12.1	23.2	36.2	48.1	59.4	73.1	88.5	103.0	117.4	130.9	146.2	161.1	176.0	189.9	209.7	216.7	229.5		
10.5,11	9.5	4.7	12.3	22.9	36.0	47.1	59.4	73.0	87.9	102.8	117.0	131.0	145.1	162.1	176.2	190.1	210.5	218.0	229.9	244.7	
11.5	10	4.3	11.9	21.9	35.2	46.6	58.2	72.4	86.9	101.8	116.1	130.1	144.7	161.9	175.8	190.0	208.9	217.7	230.4	245.2	260.1

to allow for satisfactory airboat operation. Thirdly, the vegetation in the roosting area must allow airboat operation, and the area should be free of such dangerous obstacles as brush, trees, stumps, fences, and islands. Data for August 3 and for the other 11 operating dates are shown in Table 3.

The maximum number of birds scooped during one niqht's operation was 313 on September 1. On three different nights 290 birds were caught. Rain, wind, and mechanical problems were responsible for the low count of 102 on August 19. A total of 2697 birds were caught. Starlings accounted for over 50 percent of this total. Redwings and Brown-headed Cowbirds were captured in about equal numbers, each accounting for about one fifth of the total.

The airboat could not be operated during 1971 because of the low water level in the roosting area on the Refuge.

Table 3. Number of bird species caught by airboat scooping in the Refuge roost during 1970.

Date	Bird Species						
	Red-winged* Blackbird	Starling	Brown-headed Cowbird	Common Grackle	Common Gallinule	Barn Swallow	Total
8/03	21	45	42	15	3	0	126
8/04	2/	75	43	20	2	0	167
8/06	44	170	58	17	1	0	290
8/10	62	121	49	15	1	1	249
8/11	40	120	36	15	1	0	212
8/18	52	106	23	12	3	4	200
8/19	23	56	10	5	2	6	102
8/24	105	150	30	4	1	0	290
8/25	82	92	65	6	3	0	248
8/26	50	73	71	11	4	1	210
9/01	31	234	44	4	0	0	313
9/03	19	211	57	2	1	0	290
Total	556	1453	528	126	22	12	2697
Average	46	121	44	11	2	1	225

*All Red-winged Blackbirds color-marked with orange wing tags.

Results - Mist Net Operation

Of the 795 birds captured in the Cayuga roost on 21 dates in 1970, 644 were Redwings. In 1971, 660 Redwings were mist netted and color marked.

Results - Sightings 1970

A total of 39 sightings of color-marked Redwings were received; 21 of which indicated that the tag color was pink (Cayuga roost). Most sightings occurred in the month of September (13), followed by August with 10.

Excluding Redwings sighted after the middle of November, the longest distance recorded during this period was 41 miles to the east near Chittenango, New York. Seven sightings were within two miles of either the Refuge or Cayuga roost. The average distance from point of release for 15 sightings of orange-tagged Redwings was 9.7 miles (median 8 miles). When the Chittenango sighting is excluded, the average drops to 7.5 miles. The average for 17 pink tag sightings during this same period was 6.8 miles (median 5 miles).

Sightings prior to November 15, 1970 were separated according to wing tag color and sorted into 45 degree sectors to show directional movement from the banding location. With one centimeter egualling two miles, the result was drawn as a vector at the middle of the appropriate sector such as 22.5°, 67.5°, and 112.5°. Figure 4 illustrates the plotted results of each orange-tagged (Refuge) Redwing sighting per sector. Eleven of the sightings were to the east and nine were western. There was a similar north-south breakdown, with 11 sightings north of the Refuge and nine to the south. Five sightings were within two miles of the Refuge roost, and 12 sightings were more distant than five miles.

Figure 5 illustrates the plotted results of each pink-tagged (Cayuga) Redwing sighting per sector. Fourteen of the sightings were to the east and 13 were western. The breakdown for south-north sightings was similar. Six sightings were within two miles of the Cayuga roost and 13 sightings were more distant than five miles; five of these sightings were between five and six miles.

Results - Sightings 1971

There were 20 reported sightings of pink-tagged (Cayuga) Redwings during three months in 1971. As in 1970, most birds were seen in corn fields and were reported by mail. The farthest distance recorded was 17.5 miles to the west near Phelps, New York. The average distance from point of release for the 20 sightings was 6.8 miles (median 6 miles).

In 1970 when 644 Redwings were color-marked in the Cayuga roost, 27 sightings of tagged birds were recorded. In 1971 when 660 Redwings were processed in the same roost, 28 sightings were tallied. Figure 6 illustrates the plotted results for 1971 of each pink-tagged Redwing sighting per sector. Sixteen sightings were to the east and 12 were western. Fifteen sightinas were south of the Cayuga roost and 13 were northern. Seven sightings were within two miles of the roost and 15 were more distant than five miles.

Results - Corn Damage Assessment

In 1970, 154 plots in 77 fields were sampled in the primary study area (Figure 7). Thirty-three fields were located in Cayuga County, 32 in Seneca County, and the remaining 12 in Wayne County. A total of 19,516 ears were examined with each 100-foot plot averaging 126.7 ears. Undamaged ears accounted for 62 percent of the total. Of the 38 percent of the ears that were

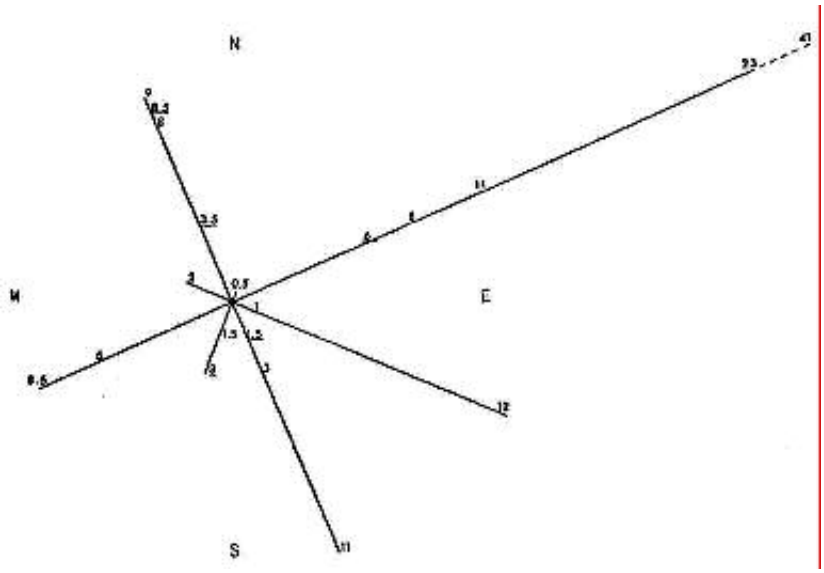


Figure 4. Sightings by sector from 08/06/70 to 11/10/70 of 20 Red-winged Blackbirds color—marked with orange wing tags at the Refuge roost.

Sectors are 45° and one centimeter equals two miles. Central point is release point of marked birds at the Refuge roost. Numbers are miles between release and sighting points; those underlined are author's sightings.

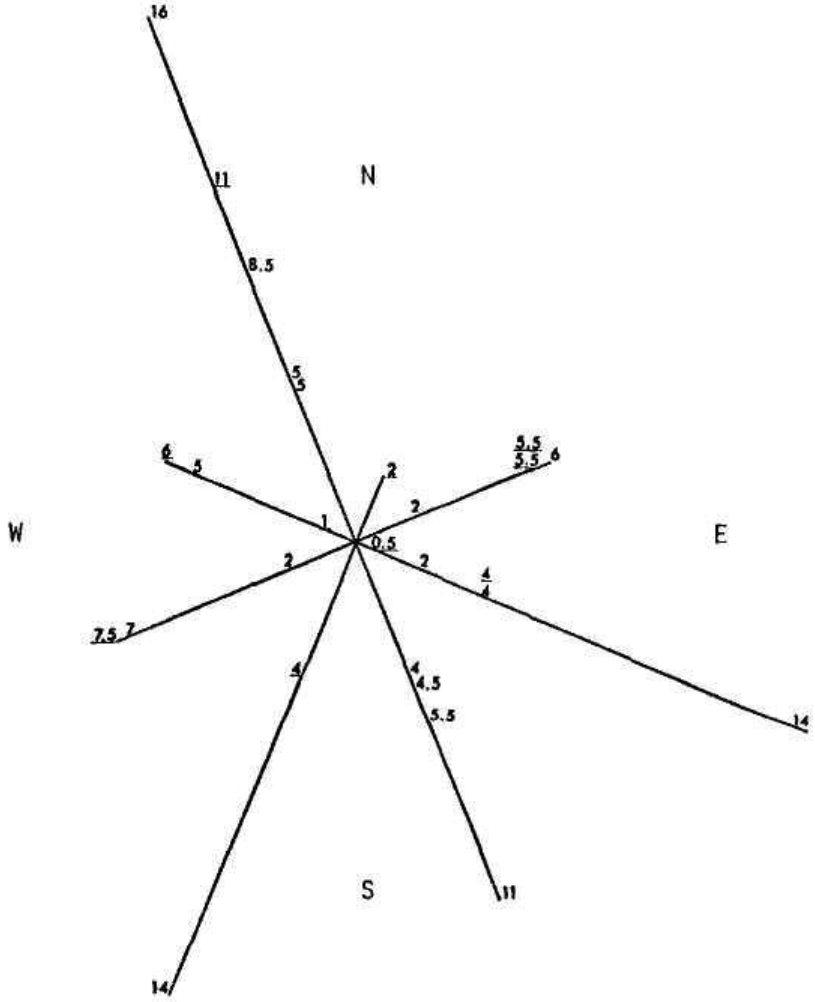


Figure 5. Sightings by sector from 08/19/70 to 10/30/70 of 27 Red-winged Blackbirds color-marked with pink wing tags at the Cayuga roost.

Sectors are 45° and one centimeter equals two miles. Central point is release point of marked birds at the Cayuga roost. Numbers are miles between release and sighting points; those underlined are author's sightings.

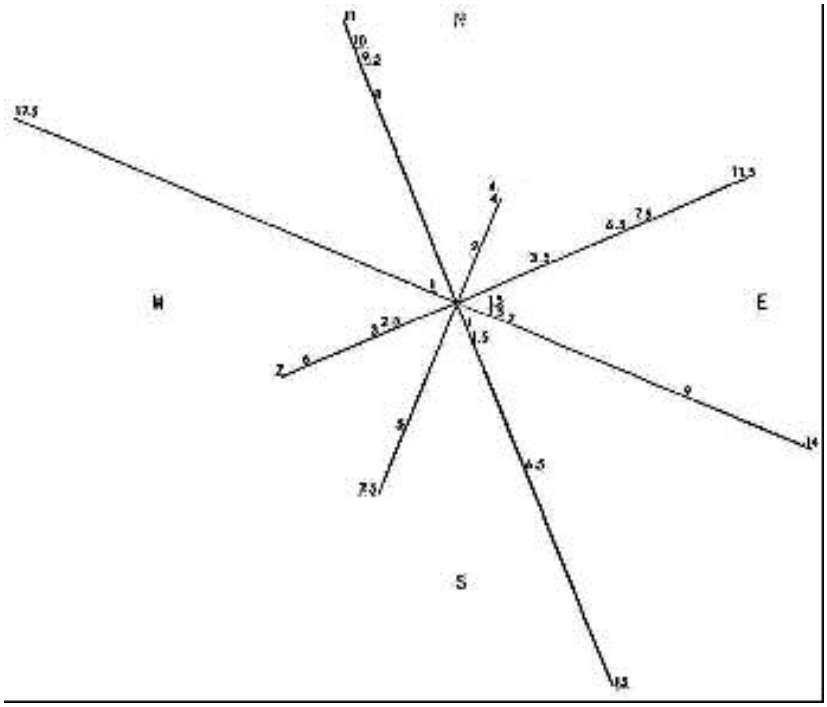


Figure 6. Sightings by sector from August through October, 1971, of 28 Red-winged Blackbirds color-marked with pink wing tags at the Cayuga roost.

Sectors are 45° and one centimeter equals two miles. Central point is release point of marked birds. Numbers are miles between release and sighting points; those underlined are author's sightings.

damaged, seven percent bore only a trace amount of damage.

An average of 830.7 grams was lost per sampled plot or 4.77 bushels per acre. The median was 2.74 bushels per acre. The 4.77 bushels mean damage for the sampled fields has a standard error of 0.94. The 95 percent confidence limits, therefore, are 3.83 and 5.71 bushels loss. Trace damage accounted for 2.5 percent of this loss.

The average losses per acre in the counties of Wayne, Seneca, and Cayuga were 9.38, 4.44 and 3.41 bushels, respectively. Two fields in Wayne County each suffered about a 25 bushel per acre loss. The highest loss observed in this year was 33.22 bushels per acre in a Seneca County field. Zero loss was recorded from only one field. Less than one bushel per acre loss was recorded in 23 fields and in 10 fields a loss greater than 10 bushels per acre occurred.

The seven-inch class was the most common size class (16%), and the average length of all measured ears was 6.8 inches. Five classes, 6-inch through 8-inch, composed 64 percent of the total number of ears. Ears in the three classes, 10-, 10.5-, and 11-inch, accounted for less than one percent of the total. No ears 11.5 inches or longer were encountered in any of the field plots.

In 1971, 88 plots in 44 fields were sampled. Plots in these same 44 fields had been assessed during the 1970 season. Eighteen fields were located in Cayuga County, 19 in Seneca County, and the remaining seven in Wayne County. A total of 11,872 ears were examined with each 100-foot plot averaging 134.9 ears. As in 1970, 7-inch ears were most common, and there was an extreme scarcity of ears 10 inches or longer.

Undamaged ears accounted for 72 percent of the total, 10 percent more than in 1970. Nineteen percent of the ears were measurably damaged. An average of 587.1 grams was lost per sampled plot which corresponds to a per acre loss of 3.37 bushels. This is a decrease from the average in 1970 of 1.40 bushels. The standard error is 0.66, and therefore, the 95 percent confidence limits are 2.71 and 4.03 bushels loss. Zero damage was recorded in the same field as in 1970. The greatest loss recorded for one field was 19.85 bushels per acre compared with 33.22 in 1970. The calculated loss in these same 44 fields in 1970 was 4.95 bushels per acre which is significantly greater than the 1971 figure at the .05 percent level. The median was 1.21 bushels per acre, less than half the median in 1970.

This difference between the two years can be accounted for by the lower Redwing population roosting within the primary study area (Cutright, 1973).

Grouping fields in relation to distance from a roost is difficult because of the complex of roosts in the primary study area. Savannah, the most northerly roost, is 13 miles from Canoga, the most southerly roost. Further complicating the pattern were fields in which active bird control was practiced by the grower. As evidenced in the 1969 questionnaire to growers, many fields, especially those close to the roosting areas, were protected by gas exploders that were active during at least part of the damage season.

In general, corn in fields closest to the roosts was the most severely damaged (Table 4). Case (1962) also found in 1960 that most corn fields within five miles of the M.N.W.R. were more heavily damaged than fields more

Table 4. Field corn losses due to the Red-winged Blackbird in the primary study area, 1970-71, by distance from nearest major roost.

Distance[1] From Nearest Roost	Field #[2]	Bushels/Acre 1970	Bushels/Acre 1971	Distance From Nearest Roost	Field #	Bushels/Acre 1970	Bushels/Acre 1971
0.8 Ref.	53	12.29		4.0 Cay.	66	3.77	1.72
1.0 Sav.	10	14.65		4.2 Cay.	20	5.30	
1.0 Cay.	26	17.31	11.66	4.3 Can.	43	0.76	0.67
1.2 Sav.	11	25.77	19.85	4.4 Can.	75	0.60	
1.2 Ref.	56	12.74		4.6 Can.	74	0.65	0.22
1.2 Cay.	22	33.22	15.98	4.8 Sav.	4	7.12	5.25
1.3 Sav.	9	24.75	14.24	4.8 Ref.	47	2.58	1.11
1.4 Ref.	57	5.10		4.8 Cay.	64	5.94	
1.4 Cay.	61	14.15		4.9 Cay.	27	1.97	
1.5 Sav.	5	6.60		4.9 Can.	67	1.12	
1.6 Ref.	52	8.83	4.62	5.2 Sav.	2	3.60	1.84
2.0 Sav.	16	18.94	9.55	5.4 Can.	32	3.23	
2.0 Cay.	63	7.44		6.0 Sav.	1	5.24	3.41
2.1 Sav.	13	4.74	3.43	6.2 Ref.	50	2.32	
2.2 Sav.	15	10.38	4.60	6.3 Can.	77	0.59	
2.2 Cay.	25	3.25	2.20	6.4 Sav.	3	1.73	
2.2 Can.	33	4.15		6.4 Can.	44	0.10	
2.2 Cay.	59	6.24	2.45	6.6 Cay.	23	0.42	
2.4 Sav.	6	5.90		6.6 Can.	41	0.52	
2.4 Can.	35	4.15	1.27	7.0 Ref.	55	1.57	1.10
2.5 Cay.	21	2.74	1.01	7.2 Sav.	19	0.45	
2.8 Ref.	18	2.47	1.46	7.4 Can.	40	1.25	
2.8 Cay.	62	0.81	2.44	7.4 Ref.	51	1.54	0.22
2.9 Can.	37	9.52	11.16	7.5 Sav.	45	1.02	
3.0 Can.	30	4.27	1.21	7.7 Cay.	60	1.84	
3.0 Can.	36	1.85		8.0 Can.	60	0.08	0.03
3.0 Ref.	58	4.13	1.82	8.2 Can.	76	0.47	0.24
3.0 Can.	70	3.01		8.4 Ref.	54	1.51	0.23
3.2 Sav.	14	6.52	7.72	8.6 Cay.	65	0.07	0.02
3.2 Can.	38	1.10	0.44	9.0 Can.	29	0.40	0.09
3.3 Can.	31	0.53		9.1 Can.	39	0.49	0.17
3.4 Sav.	7	8.12	7.89	9.2 Sav.	24	0.00	0.00
3.4 Sav.	8	1.90	0.62	9.2 Can.	71	0.30	0.10
3.4 Ref.	49	5.22	1.43	9.2 Ref.	46	0.77	
3.4 Can.	72	2.75	1.10	9.6 Ref.	48	0.72	
3.6 Sav.	12	7.00		9.8 Can.	73	0.32	0.31
3.8 Sav.	18	2.47	1.46	9.8 Can.	28	0.14	
3.9 Can.	69	1.79	3.32	10.0 Can.	34	0.11	0.01
4.0 Can.	42	0.47	0.10				

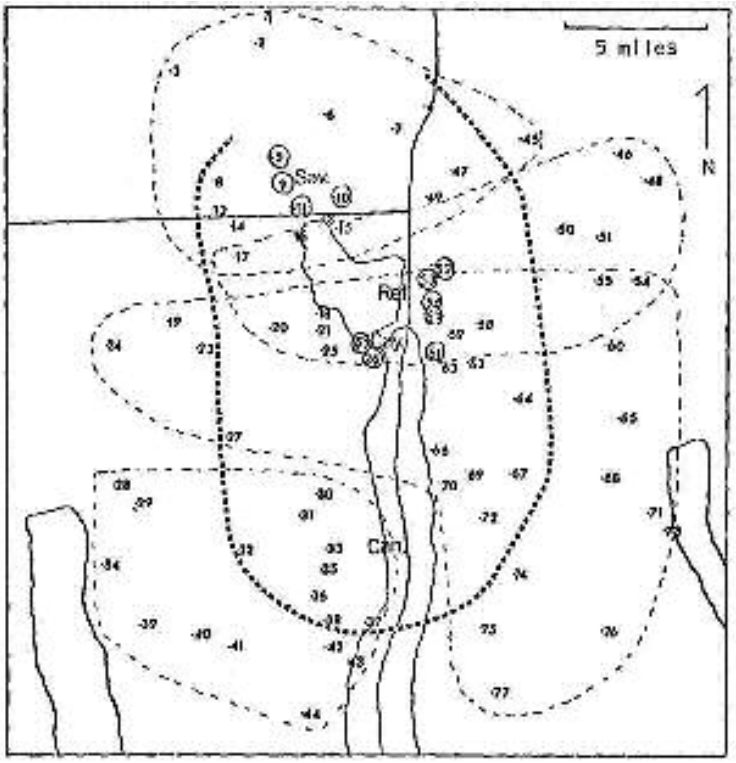
[1] Distance in miles; Can.-Canoga, Cay.-Cayuga, Ref.-Refuge, Sav.-Savannah
[2] Field # corresponds to field # in figure 7.

than five miles from the Refuge. In the 1970 assessment, 28 fields sampled were more than five miles from the Savannah, Refuge, or Cayuga roosts and four miles from the Canoga roost. The dotted line in Figure 7 separates these fields from those closer to the four roosting sites. The average loss in these 28 fields was 0.74 bushel per acre compared with 7.07 bushels per acre in the 49 fields closer to a major roost. Thirteen of these 28 fields were assessed in 1971, and the average loss was 0.25 bushel per acre compared to 4.68 for the remaining 31 fields sampled.

Eleven fields assessed were within two miles of either the Cayuga, Refuge, or Savannah roost. The field numbers are circled in Figure 7, and the average loss was 15.96 bushels per acre in 1970 compared with 2.90 bushels per acre for the 66 fields located more than two miles from a roosting site. Local movement data for 1970 and 1971 previously discussed, showed that more than one-half of the color-marked Redwings that were sighted were within five miles of the point of release at the Refuge or Cayuga roost and about one-fourth of the total were within two miles. Upon first examination it would seem that since damage to corn is most severe within a five mile radius around a major roost and that since more birds are visiting these fields to cause this greater damage, a greater majority of the sightings should be closer to these roosts. However, Redwings that travel further from their nighttime roosts in their daily foraging activities have a greater chance of being sighted since they are travelling over a wider area. It is probable that birds visiting and remaining near fields close to a major roost are less likely to be observed since greater time is spent in loafing and resting activities. Less time may be spent in active feeding since those birds that disperse greater distances must balance the increased time and energy expenditure required to reach these more distant ranges with an increased food intake.

There were a few exceptions to the generalization that fields closer to roosts experience greater bird damage. The three fields, numbers 13, 15, and 16 (Figure 7), are located between the Savannah and Refuge roosts, and Redwings utilizing both roosts visit these fields. In 1970, damage in field 13 was very close to the average for the area; losses in fields 15 and 16 were high, 10.38 and 18.94 bushels per acre, respectively. Corn in field 13 was protected by several gas exploders, and no woody vegetation grew near the boundaries of the field. The corn variety planted in this field seemed to have very thick and tough husks that may have afforded additional protection. No exploders were present in fields 15 and 16 and flocks of Redwings were seen approaching both fields from the north and south. Woody vegetation bordered field 16 on three sides and served as resting or “taking-off” points. While the husks covered the tips of the ears, they were thinner than what I would term normal or average.

Fields 56 and 57, located about 1.3 miles southeast of the Refuge roost, are about 1000 yards apart. Corn in field 56 matured about 10 days ahead of corn in field 57. Flocks of Redwings began to visit and feed in field 56 earlier and continued to utilize this corn to a greater extent even when corn in field was in the “milk” and “early dough” stages of maturation. This same pattern was observed in two additional pairs, fields 30-31 and 40-41. I believe this may be explained by the feeding behavior of Redwing flocks. Dyer (1967) has shown that Redwing flock feeding behavior is non-random and that their foraging patterns are organized and repetitive. Birds through visual and/or auditory stimuli decide to feed in a certain field. I observed that they continued to feed in this field even when corn in a neighboring field



Fields located outside the broad dotted line are more than 5 miles

Figure 7. Location of 77 corn fields assessed for Red-winged Blackbird damage and showing the influence of four major Redwing roosts in the primary study area.

from the Sav.-Savannah; Ref.-Refuge; and Cay.-Cayuga; and 4 miles from the Can.-Canoga roosts. The narrow dotted lines show the sphere of influence of Redwings utilizing each roosting site. Fields that are circled are within 2 miles of a major roost.

was in the same or more susceptible (usually younger) stage of development. In addition to choosing a particular field, Redwings usually select a certain portion of a field. This is often the portion of the field in which the corn matures first. Thus, there is not a uniform distribution of feeding birds within a field of corn. This behavioral trait as well as agronomic differences within a field accounted for most of the variation in corn damage between plots. Meanley (1971) also has noted this pattern in rice.

Discussion

Field location in relation to Redwing roosts has been shown to be very important in the overall damage scene. Roosting Redwing populations during later July and August are particularly important in the amount of corn damage experienced in the area. It may be possible in the future to manage these marsh roosting areas to make them less attractive as roosting sites. Even if Redwing populations remain more or less stable within the area, by breaking these huge concentrations into smaller aggregations, damage would at least be distributed over a greater area at a lower level. However, the current methods of controlling marsh vegetation, such as discing, burning, and use of herbicides, is adverse to managing wetlands for ducks, muskrats, and other forms of wildlife. Blackbird management seems to be the reverse of waterfowl management.

Flocking actions probably allow birds to make more efficient foor resource evaluation. More reliable information concerning food resources is provided through the experience of the flock members. Redwing flocks seem to be highly organized, with their feeding pattern more or less constant from day to day once the pattern is established. While some flocks travelled 15 to 20 miles daily and even a few to greater distances, color marking and corn damage assessment data showed that most Redwings stayed within a ten mile radius of one of the area's communal roosts. The major factor for increased dispersal distance is probably a depletion in food resources (corn) near the roosting site. Competition for available food is reduced at more distant ranges. The strategy that an individual chooses to acquire food is based on its success in maintaining an energy balance. It would seem that as the number of individuals using this center increases, the area penetrated will increase. I did not observe this increased dispersal resulting from the greater Redwing population roosting in the area in 1970 compared with 1971. However, the total amount of corn damage in the area was higher in 1970. Food was probably sufficient near the roosts so that intraspecific competition for these resources did not become so great as to increase roost dispersal significantly.

References Cited

Case, N.A. 1962. Nesting and flocking of the Red-winged Blackbird. M.S. Thesis, Cornell Univ., Ithaca, N.Y. 79pp.

Cutright, N.J. 1973. Summer and fall flocking and roosting activities of the Red-winged Blackbird in central New York. Ph.D. Thesis, Cornell Univ., Ithaca, N.Y. 151pp.

Cutright, N.J. 1973. An airboat-scoop technique used to capture birds roosting in a cattail marsh. EDDA News 36(3):166-172.

DeGrazio, J.W., J.F. Besser, J.L. Guarino, C.M. Loveless, and J.L. Oldemeyer. 1969. A method for appraising blackbird damage to corn. J. Wildl. Manage. 33:988-994.

Dyer, M.I. 1967. An analysis of blackbird flock feeding behavior. Can. J. Zool. 45:765-772.

Hewitt, O.H. and P.J. Austing-Smith. 1966. A simple wing tag for field-marking birds. J. Wildl. Manage. 30:625-627.

Meanley, B. 1965. The roosting behavior of the Red-winged Blackbird in the southern United States. Wilson Bull. 77:217-228.

Meanley, B. 1971. Blackbirds and the southern rice crop. U.S. Dept. Int. Res. Publ. 100:1-64.