

# BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

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VOL. XVI

JANUARY 1945

No. 1

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## FIELD SPARROW, 39-54015

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IN BIRD-BANDING of July and October, 1939, the author published the results of a few months' study of the Eastern Field Sparrow (*Spizella pusilla pusilla* (Wilson)) on an 100-acre tract in section 31, Pennfield Township, Calhoun County, Michigan, an area directly across North Avenue from his home in Battle Creek, and hence easily accessible for study.

During the years since 1938 when 22 Field Sparrow nests were found on this area, the following nests have been studied there: 1939, 104; 1940, 66; 1941, 25; 1942, 47; 1943, 93, and 1944, 105. From these 462 nests much information has been amassed and many parents and young have been banded. Although more of the females have been captured at their nests (by the use of nets) than males, they have not been quite as dependable in returning yearly to the area; consequently the males have produced more of the successive yearly records. One of the most interesting males during this period of seven summers has been 39-54015.

39-54015 was captured on his territory while feeding young July 16, 1939. His mate, 34-153843, had been banded near that same territory at nest 15, July 24, 1938.

During the six summers 39-54015 has been studied he has proved rather tame, allowing me to approach closely enough so that he has been easily identified by a lone yellow band on his right leg and the aluminum band on his left leg, no other bird on the area being marked similarly. All banded adult Field Sparrows were also marked with colored celluloid bands. Young birds were marked with aluminum bands on the right leg only.

39-54015's territory has consisted of a rather steep side hill near the base of which stood two large wild cherry trees (*Prunus serotina*).

Near the northeast cherry tree was a blackberry patch and on the slope above these, many New Jersey tea bushes (*Ceanothus americanus*). Scattered annually over the brow of the hill were groups of *Lespedeza*. The hill sloped gradually to the northwest from here and on this slope was a group of hazelnut (*Corylus americana*) and another large cherry tree. Northeast of this was another small blackberry patch (*Rubus villosus*) where nest 15 of 1938 was found. Beyond this area 39-54015 and his mates fed, often with other pairs of Field Sparrows. During 1943 three pairs often fed in unison only a few feet apart, each pair staying closely together, separated slightly from their neighbors.

Besides the three large cherry trees from 41 to 45 feet in height, there were a number of smaller cherry trees along the steep slope, some having acquired a height of five to twelve feet. In the southwest of the territory were many small hickory (*Carya cordiformis*) trees varying from six inches to four feet tall. The cherry trees have proved to be the best singing perches, three being used more than any of the others. The soil, poor and sandy, was covered sparingly with clumps of grass with some large patches of moss where the birds fed. The grass clumps (*Leptoloma cognata*) offered favorite nesting sites for the first nesting of the Field Sparrows in the spring.

The only other nesting birds observed on this particular area have been a Black-capped Chickadee during 1943, Brown Thrasher during 1941, Towhee during 1938 and 1941 and Vesper Sparrow during 1940. Blue Jays foraged over the area as well as Marsh Hawks, Red-shouldered Hawks, occasionally Red-tailed Hawks, Coopers Hawks and a Great Horned Owl during 1944. Crows, like the Blue Jays, were found almost daily during the summer months. Cats and dogs were often observed. Dogs, on this same territory, tipped over nest 10 during 1938, killing the young Field Sparrows. Only a short distance away I have observed weasel, skunk and opossum. Blue racers, garter snakes and milk snakes have been observed nearby. I have found all three of these snakes eating young birds or bird's eggs.

34-153843, a female Field Sparrow banded July 24, 1938, at nest 15, returned April 27, 1939, to the territory adjacent on the south of the area she occupied during 1938. She mated with an unbanded male who was first observed April 18, 1939, but might have been there earlier. He was later banded with No. 39-54015, the Field Sparrow about whom this article deals. Four of their nests were found during 1939, the first on May 13, the day the first egg was laid, the last on July 24 from which the young left August 10. Between May 29 when their first nest was destroyed and June 25, I did not find any of their nests but believe there must have been at least one during that time. Following is a record for the summer of 1939 of the four nests found of male 39-54015 and female 34-153843 (numbers of eggs and young in parentheses):

TABLE 1<sup>1</sup>  
Female, 34-153843 and Male, 39-54015. 1939 Nests

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Length mm.	Eggs		Wt. in Grams
						mm.	mm.	
9	Found May 13	May 13-16	May 27	May	16.8	13.7		
				28	17	13.7		
				E-D.	17	13.7		
				(0)	18	13.7		
X 48	Found June 25	(4)	(3)	June 2-5E				
				D.				
79	June 29.30	July 1-4	July 14	June 26D.				
				(0)	18	13.8		
				July 17D.	18	14		
92	Found July 24	July 22-24E	Aug. 3 (2) Aug. 4 (1)	(0)	17.8	14		
				(0)	18	14		
				(0)	18.5	14		
				(3)	19	14		
Total		19 eggs	8 hatched	3 young left	17.73	13.87 (11)	1.83 (3)	

<sup>1</sup>In this and the following tables:

D=destroyed; E=estimated; x=nest not found; \* recorded and weighed the day laid. Number in parenthesis=number of young and of eggs.

It was estimated that probably four eggs were laid in nest x starting five days after nest 9 was destroyed. These eggs did not produce young. The measurements of the eggs in nest 9 averaged 17.2 x 13.7 mm.; those in nest 79, 17.95 x 13.95 mm. and those in nest 92, 18.5 x 14 mm. These eleven eggs averaged 17.73 x 13.87 mm. The only three eggs weighed when fresh, those in nest 92, averaged 1.83 grams. 34-153843 weighed on July 24, 1938, at 7 A.M. 12.7 grams and on July 12, 1939, at 5 A.M., 13.7 grams.

39-54015 was back singing steadily from his three favorite cherry trees on April 2, 1940. Although I was unable to visit the area during late April, he was found to have a new unbanded mate on May 4. She was banded May 25, 1940, with number 40-29206. Following is their record for the 1940 breeding season:

TABLE 2  
Female, 40-29206 and male, 39-54015. 1940 nests.

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Length mm.	Eggs		Wt. in grams
						mm.	mm.	
2	May 11-13	May 15-17	May 29	June 1 D.	17	13		4.9
				(0)	18.5	13		
				(3)	18.2	14		
15	June 4-5	June 6, 8, 9	June 19-20 E	June 27	18.2	14.2		
				(3)	18.5	14.5		
				(3)				
50	Cowbird egg Found July 17	June 6 July 3-4 E	July 15 E	June 27				
				July 21				
				(2)				
Total		8 eggs	8 hatched	5 left	18.15 (6)	13.61 (6)	1.63	

Probably another egg was laid in nest 15 on June 7 and one removed by the female Cowbird which laid her egg in the nest on June 6. Only three eggs were weighed, averaging 1.63 grams when fresh.

The nest of another pair of Field Sparrows was found on July 15, 1940, in a dwarf sumac bush (*Rhus copallina*) on the adjacent territory. The female was banded July 17 with band number 40-29320.

On April 7, 1941, 39-54015 was back again. He was still unmated on April 21 but on April 30 was found to have for his mate 40-29320. I was not in Michigan during the month of May, 1941, but when we returned early during June, found that 39-54015 and 40-29320 had raised four young from a ground nest on the eastern portion of his territory. The young were still unable to fly well on June 6 and were being cared for by their parents. Following is their nesting record for 1941:

TABLE 3  
Female, 40-29320 and male, 39-54015. 1941 nests.

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Eggs	
					Length mm.	Width mm.
		May 14-17 E	May 28-29 E	June 4 E		
22	Found July 10	(4) June 28-30 E	(4) July 10 July 11	(4) July 17	19 19	14 14
Total		(3) 7 eggs	(1) 6 hatched	(2) 6 left	19 mm.	14 mm.

The third egg in nest 22 failed to hatch. Possibly there was another nest, between the early one recorded above and nest 22, that was not found.

On April 3, 1942, 39-54015 was found on his territory but on the same day all but a few square yards of it was burned over by a grass fire, leaving it in the worst shape for several years. A few of the New Jersey tea bushes were not burned but the majority were killed and all of the dead grass used in the first nesting sites was gone. 39-54015 sang in vain for a mate through May, June and early July. This was usually the case with other males on burned territories too. Old males returned to their past year's territory but new males did not settle on the burned area. Females joined the males with the best territories for nesting. Then sometime during the summer when the vegetation became higher, other males nearly always acquired a mate.

By the middle of July, 1942, I noted that 39-54015 had stopped singing so searched his territory, finding a nest on July 16. The female was banded with 41-73348. The record of their one nest was as follows:

TABLE 4  
Female, 47-73348 and male, 39-54015. 1942 nest.

Nest No.	Nest Found	Eggs Laid	Eggs Hatched	Young Left	Eggs	
					Length mm.	Width mm.
38	July 16	July 13-15 E	July 25	July 31	17.5	13.5
			(2)		18	13.5
			July 26		18.2	13.5
Total		(3) 3 eggs	(1) 3 hatched	(1) 1 left	17.9 mm.	13.5 mm.

The three eggs were covered over the entire surface with fine reddish brown dots. On July 31 a terrific wind and rain storm tipped over nest 38, killing two young, the third evidently surviving.

Three of the original sixteen males banded during 1939 were back during 1942 for at least their fourth summer. 39-54015 was one of these three so I watched for the three during late March and early April, 1943. None were back on March 31 although two unbanded males were found. On April 9, 39-54015 and 39-54018 were back on their respective territories, the same areas occupied during the previous four summers. 39-54009 did not return. Neither 39-54015 nor 39-54018 had a mate on April 27 although one unbanded male was found mated on that date. On May 4, 39-54015 had a new unbanded mate. She was banded May 31, 1943, with band number 41-73213. Their summer is summarized below:

TABLE 5  
Female, 41-73213 and male, 39-54015. 1943 nests.

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Eggs		Wt. in grams
					Length mm.	Width mm.	
6	Found May 28	May 24-26 E	June 5	June 12	18	13.7	
			(2)		18.2	13.5	
			June 6		18.5	13.5	
44	June 21	June 24-26	(3)	(3)			
			July 6	July 13	*17.5	13.7	1.9
			(1)		*18.1	13.7	1.9
81	Found July 20	July 20-22	July 7	(2)	*18.7	13.7	1.9
			(1)				
			(3)	July 29	*18	13.6	1.9
Total		(3) 9 eggs	(0)	July 30	D*17.5	13.5	1.8
			(0)		*17.5	13.7	1.85
			5 hatched	5 left	18.0	13.62 (9)	1.875 (6)

The last six eggs in table 5 are recorded in the order in which they were laid. 41-73213's first set of three eggs averaged 18.23 x 13.56 mm. in nest 6; those in nest 44, 18.1 x 13.7 mm.; and those in nest 81,

17.66 x 13.62 mm. Her eggs were all marked heavily, almost obliterating the ground color, with reddish brown spots about  $\frac{1}{2}$  to one mm. in width, over the entire surface, all very similar. The first egg was not laid until May 24, evidently because of cooler May weather than normal.

Both parents cared for the young from nest 6 until the second nest was started, then 39-54015 cared solely for them until early July. On July 7 when 32 days old they were independent. 39-54018, the other male on the 100 acres for the fifth summer during 1943 was observed to feed his two young on July 4 when they were 35 days old, thereafter they cared for themselves. I did not observe the young from 39-54015's nest 44 fed by the parents after they were 23 days old.

To the southwest of 39-54015's territory another pair of Field Sparrows had their territory during 1943. The male was banded with 41-73284 and the female with 140-87727. Following is a record of their nestings during 1943:

TABLE 6  
Female, 140-87727 and male, 41-73284. 1943 nests.

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Length mm.	Eggs Width mm.	Wt. in grams
2	Found May 25	Between May 18-25		May 28 D	16.4 16.9 16.9	13 13 13.5	
10	May 30-31	(4) June 2-5	(0)	(0) June 8 D	18.5 *17 *17 *17	13 13.5 13.5 13.5	6.5 (5-25)
32	Found June 16	(4) June 13-16	(0)	(0) June 20 D	*17 19 18.5 19.2	13.5 13.7 14.1 14	6.8 (6-5)
42	June 22	(4)	(0)	(0)	*18.5	14.1	7.8 (6-17)
42a	June 23-24	June 25-27	July 7 (2) July 8	Deserted July 14	*17.5 *17 *17.5	13 13 13.7	5.1 (6-27)
87	Found July 27	(3) July 27-29	(1)	(3) Aug. 7 D	*17.7 *17.3 *17.5	13.7 13.8 13.7	1.8 (7-27) 1.8 (7-28) 1.7 (7-29)
Total		18 eggs	3 hatched	3 left	17.0	13.52	1.75

Nest 2 was under a grass tuft on the ground; nest 10 in a dense cinquefoil (*Potentilla fruticosa*), 10 cm. to rim; nest 32, 18 cm. up in a dense mass of New Jersey tea where 140-87727 lost all of her tail feathers to the predator which destroyed the nest during the night; nests 42 and 42a both in hawthorns 25 cm. from the ground to the

nest rim; nest 87, 41 cm. up in New Jersey tea. All of the nests were well hidden, number 32 especially well. 140-87727 laid 18 eggs during the summer, equaled by only one other female during the seven summers, although 34-153843 probably laid 19 eggs during 1939. The 18 eggs laid by 140-87727 during the 1943 summer weighed, when fresh, 31.5 grams. She weighed 12.5 grams June 6, 1943, at 6 A.M.

39-54015 was not back on April 2, 1944, but was found April 7 when only six males were there of the 49 which were later found on the 100 acres. 39-54018 was not found until April 13. 39-54018's neighboring males seemed to be overcoming him in battle. At times, after battling with another male, he was noted to drop to the ground as though utterly exhausted, lying there on his side, panting very hard. He was not seen after April 27 nor found anywhere on the 100 acres.

39-54015 was able to cope with his neighboring male Field Sparrows and maintained his exact territorial boundaries of 1943. He was one of the first three males on the area to acquire a mate during 1944, having one on April 20. She proved to be 140-87727, the female which had nested on the adjacent territory to the southwest during 1943. On the morning of April 26 a new unbanded male arrived and tried to take over 39-54015's territory and even though he was at least six years old, he was able to drive the intruding male eventually to a neighboring area. For three days this new male sang from 39-54015's favorite singing trees. 39-54015 tried to stay with his mate and would feed with her for several minutes, then start after the intruder, who was singing loudly and persistently, in a much shriller tone than any other male on the 100 acres. Eventually the intruder settled to the southwest. Following is a table of 39-54015's and 140-87727's 1944 nesting activities:

TABLE 7  
Female, 140-87727 and male, 39-54015. 1944 nests.

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left	Eggs		Wt. in grams
					Length mm.	Width mm.	
2	May 6-9	May 14-17	May 28-29	June 5	*19.3	13.5	1.9 (May 14)
				(2)	*18.5	14	2.0 (May 15)
		(4)	(4)	June 6	*18	13.7	1.8 (May 16)
				(2)	*18	13.7	1.8 (May 17)
67	June 19-20	June 22-24	July 4-5	July 10	*17.8	13.5	1.8 (June 22)
				(1)	*18	14	
		(3)	(3)	July 11	*18	14	
				(2)		(3)	5.2 (June 25)
Total		7 eggs	7 hatched	7 left	18.22	13.77	(7) 1.81 (7)

It happened that I was not able to examine nest 67 the day eggs two and three were laid but by coincidence they were the same size.

The three eggs in nest 67 were weighed June 25. All of 140-87727's eggs were marked with very dark almost black spots, concentrated mostly at the larger end of the egg, usually a beautiful cap or wreath with a very few spots over the rest of the egg. Those of her 1943 sets were almost identical with those in 1944 excepting in size. Following are the averages of her 1943 and 1944 eggs:

TABLE 8  
Average Measurements and Weights of 140-87727's 1943 and 1944 eggs

Year	Nest No.	Egg Length mm.	Egg Width	Average Wt. grams	No. Eggs
1943	2	17.1	13.12	1.62	4
	10	17.0	13.5	1.7	4
	32	18.8	13.97	1.95	4
	42a	17.33	13.23	1.7	3
	87	17.33	13.76	1.76	3
Total	5 nests Av.	17.88	13.52	1.75	18
1944	2	18.43	13.72	1.87	4
	67	17.93	13.83	1.73	3
Total	2 nests Av.	18.22	13.77	1.81	7
Total	7 nests	17.98 mm.	13.59 mm.	1.77 grams	25 eggs

1943-1944

140-87727 helped feed the young from nest 2 as late as June 15. They were 34 days old when 39-54015 was last observed feeding them but only 18 days old when last observed fed by 140-87727, their mother. From nest 67 both male and female were feeding the three young July 29, when they were 24 and 25 days old. 140-87727 disappeared on August 1 and 39-54015 was not observed feeding them again. He was last seen on August 20. The hot dry weather of July and August, 1944, brought the Field Sparrow nesting to an earlier termination than usual.

The size of the territory of 39-54015 has varied during the years. During 1939 it was much smaller than during subsequent years, one acre in size. During 1940 it had increased to about 1.2 acres, then from 1941 through 1944 it was practically two acres, although slightly different shaped. In 1939 it was about 280 feet in length and 162 feet wide; 1940, 315 feet long and 200 feet wide; while during 1941, 1942, 1943 and 1944 it measured nearly 400 feet in length and about an average of 200 feet wide.

The most westerly nest on the area, nest 9 of 1939, measured 312 feet from the most easterly one, the early nest of 1941. The next most easterly one, nest 6 of 1943, was 255 feet from nest 9 of 1939. The most northerly ones, 1940 nest 2 and 1944 nest 2, were 129 feet from the most southerly nest, 1940 nest 15. All of these fifteen nests found, belonging to 39-54015 and his mates, including the ground nest from



which the young left early in June, 1941, were on an area of much less than 40,000 square feet or about .9 of an acre. Of these nests, the first ones were always located on the ground underneath tufts of old dead grass and were well concealed. Five of these were found. Of the latter ten nests, eight were in New Jersey tea varying from 24 to 48 cm. from the ground to the nest rim and two were in small hickories, one 11 cm., the other 23 cm. from the ground. Summarizing the nest heights it is noted that nests were progressively higher as the season advanced:

TABLE 9

Year	Height of 39-54015's Nests		
	May	June	July
1939	on ground	24 cm. 11 cm.	48 cm.
1940	on ground	30 cm.	40 cm.
1941	on ground	45 cm.	—
1942	—	—	40 cm.
1943	on ground	25 cm.	34 cm.
1944	on ground	23 cm.	—
Average height	on ground	26 cm.	40.5 cm.

During the six summers the following nest and egg successes for 39-54015 and his mates have been made:

TABLE 10

Nesting successes of 39-54015 and his mates

Year	Total Nests	Nests in Which Young Hatched	Nests from Which Young Left	Number of Eggs Laid	No. of Eggs Hatched	No. of Young to Leave
1939	5†	3	1	15†	8	3
1940	3	3	2	8	8	5
1941	2	2	2	7	6	6
1942	1	1	1	3	3	1
1943	3	2	2	9	5	5
1944	2	2	2	7	7	7
Total	16	13	10	49†	37	27
Yearly average	2.7	2.2	1.7	8.1	6.1	4.5
Per cent success	100%	81.25%	62.5%	100%	75.51%	55.10%

† Only four nests were found during 1939 with 15 eggs but there certainly must have been a fifth and probably 18 or 19 eggs laid.

Following is a summary of 39-54015's history during the six summers:

TABLE 11  
39-54015's Summer Histories

Year	First Observed in Spring	First Observed with Mate	First Egg Laid by Mate	Last Nest Terminated	Date of departure	Days Present
1939	April 18	April 27	May 13	Aug. 10	Sept. 4	139
1940	April 2	May 4	May 15	July 21	Aug. 20	140
1941	April 7	April 30	‡May 11	July 17	Aug. 15‡	130‡
1942	April 3	#July 6	#July 13	July 31	Aug. 15	134
1943	April 9	May 4	May 24	July 30	Sept. 2	146
1944	April 7	April 20	May 14	July 11	Aug. 20	135
Average	April 7	April 29	May 15	July 30	Aug. 23	137

‡ Approximate

# Not in averages

The summary of the seasons of the females who mated with 39-54015 from 1939 through 1944 follows:

TABLE 12  
39-54015's Mates, 1939-1944

Year	Female Band No.	No. of Nests	No. of Eggs Laid	Last Seen	No. of Days Present
1939	34-153843	4§	15§	Sept. 4	130
1940	40-29206	3	8	Aug. 2	90
1941	40-29320	2	7	Aug. 15	109
1942	41-73348	1	3	Aug. 15	40□
1943	41-73213	3	9	Sept. 2	119
1944	140-87727	2	7	Aug. 1	103
Average		2.5	8.1	Aug. 17	110
Excluding 1942		3§ nests	10§ eggs		

§ Probably five nests and 18 or 19 eggs, June, 1939

□ 1942 season not in average

Excluding 1942, which was not a normal summer, and adding one nest, and probably four eggs, which were not found during 1939, the averages are three nests and ten eggs per summer.

From the above tables, one notes that the male arrived on an average, 22 days previous to his mate. During this time he spent nearly all of the morning hours singing from some favorite tree. 39-54015 had three favorite cherry trees on his territory. During the afternoons, singing decreased.

Besides singing from favorite trees 39-54015, like the typical Field Sparrow male, circled on wing at times over his territorial domain. When there were few males present, territories were much larger than when they had all arrived. Later they crowded into their little niches of one or two acres of shrubby field, each singing and guarding his territorial boundaries. The behaviour of 39-54015 to the strange male

who tried to take over his territory April 26-29, 1944, was typical of territorial boundary battles. This male tried repeatedly to create disorder in 39-54015's family relationship, boldly placing himself in front of 39-54015 at every opportunity. Then slowly flying, keeping the distance between them about one to five feet, around and around they flew, until both, nearly exhausted, dropped to the ground, but almost immediately repeating the performance, often several times in succession. He gave the regular mating call, "Zip-zip-zip-zip" or a louder "Chip-chip-zip-zip-zip," trying to entice 39-54015's mate to him while 39-54015 was separated from her. On occasions they would move slowly from branch to branch in some bush or tree, 39-54015 following the other for several minutes, finally resorting to active chasing again. Seldom did they clash in battle but occasionally 39-54015 would get close enough so that they would come together in mid-air, falling to the ground, a mass of beating wings and scratching feet until the new male left again to repeat the performance. Sometimes another male to the southeast would join and all three would battle for a few minutes; or two of the three while the other rested. During this entire three days, 39-54015 maintained the upper hand and eventually the new male settled to the southwest. After territorial boundaries had been established, all that males usually did to drive neighboring males from their territories was to approach them with wings slightly lowered.

When the female arrived, the male, similar to the Song Sparrow (M. M. Nice, 1937, p. 84; 1943, p. 174) "pounced" at her. Two males during the early spring of 1944 did not acquire mates. They continued to sing from their territories, guarding their boundaries with great zest. On June 11 both males were not singing in the early morning and had new mates. Both were watched for some time and both behaved exactly alike. Each male actually pounced on his new mate, then followed her, flying around and around her, at times pouncing on her. Neither female seemed to reject this attention but fed leisurely on the ground while the male exerted himself with his active demonstration. On the second day after her arrival, the male did not do this at all but fed with her, the two feeding and flying together, only a few inches or feet apart. Song Sparrow males "pounced" on their mates until egg laying started (Nice, 1937, p. 84). In the case of the two males mentioned above, the two females laid their first eggs on June 15 and June 18 respectively.

On one occasion I watched a male attack a bird which I felt sure was a female. Consequently, I watched him for some time. Instead of leaving the territory, which strange males do when attacked, this bird hid in some thick brush, then reappeared several times, the male attacking her when she appeared but finally changing his behaviour, not exactly to an attitude of friendliness but more to one of tolerance.

He did not fly about her as these other males had, but continued to sing from his favorite perches. The next morning they were feeding leisurely together, the male having stopped singing.

After mating, males do very little if any singing. It is easy to tell from a distance just which males are not mated on an area during an early spring morning; those not having mates, singing loudly and persistently; those with mates not singing at all. If a mate is lost, the male again begins his continuous and persistent singing. Where the females come from during the middle of the summer, I am unable to say; they have always been unbanded birds. Once a pair becomes mated, they remain together throughout the season. A female wandered away from her mate with young on one occasion, finally mating with a neighboring male, leaving the young with her former mate.

The female constructs the nest, working mostly during the early morning hours, but the male usually accompanies her on her trips for material. When the eggs are being laid, the pair is often found separated and the female begins incubation the day before the last egg is laid.

The mates of 39-54015 have laid an average of 3.26 eggs per nest. The average for seven summers on the 100 acres was 3.37. The average for the Song Sparrow (Nice, 1937, p. 136) at Columbus, Ohio, was 4.05 for six summers. Besides the larger egg sets in Ohio, the Song Sparrow usually attempted raising three broods while as a rule the Field Sparrow only attempted two. During the seven summers, only one pair has raised three broods in a season. Wm. Shantz (1937, p. 189) observed a pair of Song Sparrows which raised four broods in one nest at Columbus, Ohio, somewhat different than those observed by Mrs. Nice. Chipping Sparrows in our yard each year usually raise only two broods but might occasionally raise three.

The average incubation period at Field Sparrow nests has been between 11 and 12 days. In early nests, when the weather is slightly cooler, it was invariably 12 days. For later nests, when the weather was warmer, it was 11 days. In the case of some late nests, when the weather was cool, it again became 12 days. If the weather was normal or cool, the young remained in the nest seven or eight days. The male fed them a great deal at first while the female brooded. The male often fed the female while she was incubating, also. When the young were three or four days old and later they were brooded very little. If the weather became unbearably hot the young left often when five or six days old because the parents did not shade them at some nests. From there they would try to crawl underneath some bush or grass tuft for shade but if this were not to be found were often found the next morning dead or nearly devoured by ants. One notes in the above tables that invariably a female Field Sparrow laid her first egg in a nest five days after the previous one was destroyed. Also that the period

of time after the young left one nest and the first laid egg in the next nest for five nests was 6, 12, 7, 13 and 16 days.

39-54015 and his mates have been much more successful than many of the other Field Sparrows on the 100 acres. In table 10 one notes that 62.5% of 39-54015's nests were successful and 55.10% of the eggs. During the seven summers only 34.41% or 159 nests of 462 have been successful and 36.19% or 447 young fledged from 1235 eggs. During the six summers only one Cowbird egg was laid in their nests, and this, unlike most Cowbird eggs in Field Sparrow nests, was not deserted but was hatched and the young raised. Much of the nesting success was produced by the male 39-54015. Some other males have been observed to have the same behaviour too. When an enemy was observed, man, Cowbird, Blue Jay or Crow, he would start a rapid, low yet attracting "*chip-chip-chip-chip-chip*," moving at the far corner of his territory from tree to tree. This was done at nest 6, 1943, while I was trying to find it. The female was with him feeding. When she wished to go to the nest he moved from tree to tree chipping rapidly. I watched the female and she went right to the nest. Often a male would stay right near the nest scolding with a sharp "*chip*" when these same enemies appeared. When a hawk appeared, all Field Sparrows uttered a penetrating "*zeeeeeeeee*" and all rapidly disappeared into dense shrubbery, producing a complete void of bird life over the area where the hawk passed. Farther in front of the hawk, bird life was in evidence and farther back, but none could be seen in the immediate region.

#### SUMMARY

During a period of six summers a male Field Sparrow, banded with number 39-54015 and a colored band, was studied in Pennfield Township, Calhoun County, Michigan.

His territory in 1939 was about one acre in size, during 1940 about 1.2 acres and during 1941, 1942, 1943 and 1944 about two acres, consisting of a grass and shrub-covered hillside.

His arrival averaged in the spring, April 7 (April 2-18). Upon arrival he defended his territory against other male Field Sparrows usually by chasing, occasionally by battling. He spent most of the early morning hours singing.

During the six summers 39-54015 has had a different mate each summer. Three of these had been banded as adults nesting on adjoining territories the summer before they mated with him. The females arrived an average of 22 days later than 39-54015, April 29 (April 20-May 4). He retained one mate for the entire summer each year.

When the female arrived, the male Field Sparrow stopped singing, starting again on a lesser scale after nesting started.

The female built the nests. First or May nests were on the ground; June nests averaged 26 cm. (11-45 cm.) from the ground to the nest

rim; July nests 40.5 cm. (34-48 cm.). Nest construction required about three or four days.

Egg-laying started May 15 for the average (May 11-24), the last nest terminating by July 30 (July 11 to August 10). Beginning of nesting was affected by cooler weather, starting later during cooler springs. Summer nestings were terminated earlier during 1944 by dry hot weather.

Fifteen of 39-54015's nests were found during the six summers. There were probably sixteen during this time and young hatched in thirteen of these (81.25%) and left ten nests (62.5%). In these fifteen nests, 49 eggs were laid; of these 37 hatched (75.51%) and 27 young left the nest (55.10%). The average for the 100 acres during the six summers was 34.41% of 462 nests successful and 36.19% of 1235 eggs.

The average egg set was 3.26 for 39-54015's mates.

The incubation period lasted either 11 or 12 days. Young remained in the nest an average of 6.8 days. The male fed young as long as 35 days of age at early nests; the female only to eighteen days. In later nests 39-54015 was not observed feeding young after they were 25 days old.

140-87727, a female who nested adjacent to 39-54015's territory during 1943 and mated with him during 1944, was found to lay 25 eggs during the two summers, eighteen during 1943 and seven during 1944. These eggs averaged 1.75 grams in weight during 1943 (measured 17.88 x 13.52 mm.) and 1.81 grams in 1944 (measured 18.22 x 13.77 mm.). The total 25 eggs averaged 17.98 x 13.59 mm. in measurements and 1.77 grams in weight. Females vary in weight from 10.8 to 15 grams.

39-54015 remained on the area an average of 137 days (130-146), leaving about August 23 (August 15-September 4). His mates averaged 110 days present, leaving on an average on August 17 (August 1 to September 4).

All of the fifteen nests belonging to 39-54015 and his mates were located on less than .9 of an acre, from 1939 through 1944. The two nests farthest apart were only 312 feet from each other.

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