

THE COWBIRD AND CERTAIN HOST SPECIES IN MICHIGAN

BY ANDREW J. BERGER

ALTHOUGH attention has been directed recently to the problem of clutch size in the genus *Molothrus* (Davis, 1942; Preston, 1948; Nice, 1949), little has been written on the length of the breeding season of the best known species of the group, the Cowbird (*Molothrus ater*). Hann (1937: 206) tabulated dates on which he found Cowbird eggs in Oven-bird (*Seiurus aurocapillus*) nests over a three-year period in southern Michigan. His earliest date for a Cowbird egg was May 20, his latest July 6. Walkinshaw (1949: 83) presented data on 25 Cowbird eggs apparently laid by one female between May 15 and July 20 in southern Michigan. Norris (1947: 86) tabulated dates for Cowbird laying over a two-year period near Butler, Pennsylvania. The first eggs were laid on April 27 and April 10, the last on June 25 and July 12 in 1944 and 1945 respectively. In her study of the Song Sparrow (*Melospiza melodia*) in Ohio, Nice (1937: 155) found that the average date for the first Cowbird egg was April 25.

From April 1, 1946 through September 30, 1949 (except for the periods June 20 to September 1, 1946, and June 22 to August 15, 1947) I studied the Cowbird in Washtenaw County, Michigan. During these four breeding seasons I observed the nests¹ of 72 species of birds. Twenty of these were Cowbird-parasitized, and evidence pointed strongly toward parasitization of two additional species.

I knew to the exact one- or two-day period the laying date of 34 Cowbird eggs. Sufficient data were available on 119 additional eggs to permit my estimating the date of laying. Table 1 presents the laying dates of these 153 eggs.

Table 2, which follows the treatment of Norris (1947), indicates the degree of parasitism of the several host species and the success of the Cowbird eggs laid in these nests.

One obvious factor determining the degree of parasitism is the relationship of the Cowbird's breeding season to that of the host species. Pertinent data concerning the breeding season of certain host species and the relative success of parasitized and non-parasitized nests are given below. These data supplement those presented in Table 2.

¹Several colleagues showed me nests they had found: David Delzell, three of the Phoebe (*Sayornis phoebe*); Charles C. Carpenter, three of the Song Sparrow and one of the Goldfinch (*Spinus tristis*); P. B. Hofslund, two (parasitized) of the Red-wing (*Agelaius phoeniceus*) and one each of the Song Sparrow and Yellow-breasted Chat (*Icteria virens*); N. S. Potter III, one of the chat; and H. B. Tordoff, one of the Field Sparrow (*Spizella pusilla*).

TABLE 1
COWBIRD EGG-LAYING DATES IN SOUTHERN MICHIGAN

	1946	1947	1948	1949		1946	1947	1948	1949
April 21	1				June 9				
22					10				
23					11				
24					12		1		
25				1	13				
26			1	2	14				2
27	2			2	15			1	2
28	1			4	16			1	1
29				4	17				1
30				3	18				
May 1	1		1	2	19				
2			1	2	20				
3			2	1	21				
4			2	1	22				
5	1		2	4	23				
6				4	24				
7				2	25				
8				2	26				
9					27				
10	1				28			1	1
11	1				29				
12			1	1	30				
13				2	July 1				
14			1	1	2			1	
15	1		1	3	3				
16		2	1	2	4				
17		4	2	2	5				
18	1	1		3	6				
19	1	3		1	7				
20	2	1	1	2	8				
21	2	1	1	2	9				
22	3	3	2		10				
23	1		1		11				
24			1		12				
25	1		3		13				
26	1	1	1		14				
27		1		1	15				
28					16				
29					17				
30		2	1		18				
31				1	19				
June 1			1		20				
2		1	4	2	21				
3		1	1	1	22				
4					23				
5					24				
6	1	1			25		1		
7	2	1			26				1
8		1		1	27				

TABLE 2
DEGREE OF PARASITISM AND COWBIRD SUCCESS

Species	Total nests	Parasitized nests	Nests with				Cowbird eggs laid	Cowbird eggs hatched	Cowbird young fledged	
			1	2	3	4				5
			Cowbird eggs							
Phoebe.....	15	5 (33.3%)	3	1	1	—	8	5	5	
Alder Flycatcher.....	37	3 (8.1%)	2	1	—	—	4	1	1	
Catbird.....	71	1 (1.4%)	—	1	—	—	2	0	0	
Wood Thrush.....	7	1 (14.3%)	—	1	—	—	2	0	0	
Red-eyed Vireo.....	1	1 (100%)	—	—	1	—	4*	0	0	
Oven-bird.....	2	2 (100%)	—	1	1	—	5	0	0	
Yellow Warbler.....	44	18 (40.9%)	9	3	6	—	33	3	2	
Yellow-throat.....	1	1 (100%)	1	—	—	—	1	0	0	
Yellow-breasted Chat..	3	1 (33.3%)	1	—	—	—	1	0	0	
Red-wing.....	99	5 (5.0%)	5	—	—	—	5	1	0	
Cardinal.....	22	10 (45.4%)	3	5	2	—	19	4	4	
Rose breasted Grosbeak	2	1 (50.0%)	1	—	—	—	1	0	0	
Indigo Bunting.....	9	5 (55.5%)	3	1	1	—	9	4	4	
Goldfinch.....	70	2 (2.8%)	1	1	—	—	4	0	0	
Red-eyed Towhee.....	6	2 (33.3%)	1	1	—	—	3	1	0	
Vesper Sparrow.....	6	2 (33.3%)	2	—	—	—	2	2	0	
Chipping Sparrow.....	8	5 (62.5%)	3	2	—	—	7	1	1	
Field Sparrow.....	33	6 (18.1%)	5	1	—	—	7	2	1	
Swamp Sparrow.....	5	4 (80.0%)	3	1	—	—	5†	?	?	
Song Sparrow.....	59	37 (62.7%)	10	17	4	4	2	82	36	25
Totals.....	500	112 (22.4%)	53	36	15	6	2	204	60 (30.6%)	43 (21.9%)

* Three eggs removed from nest by author; not used in computing percent hatched and fledged.

† None of the Swamp Sparrow nests was re-visited; these five eggs not used in computing percent hatched and fledged.

Sayornis phoebe. All but two of the 15 Phoebe nests were found between April 14 and May 31; with one exception (a re-nesting), nests found after May 15 contained young. The latest nest, found July 4, contained six young Phoebes which would not remain in the nest after being banded. Nine non-parasitized nests containing 38 eggs fledged 34 young. Four parasitized nests, known to contain at least 18 host and seven Cowbird eggs, fledged three Phoebes and five Cowbirds. Cowbird interference caused the desertion of one nest.

Empidonax traillii. The nesting of the Alder Flycatcher at Ann Arbor has been reported on by Berger and Hofslund (1950). Of 37 nests found in a two-year period, three were parasitized, and one Cowbird was fledged from the four eggs laid.

Eremophila alpestris. In southern Michigan, first nests of the Horned Lark are built before the beginning of the Cowbird's breeding season. Nine nests found between March 19 and April 24 were not parasitized. Ten young larks were fledged from 24 eggs (eight nests).

I offer this evidence of Cowbird parasitism: On June 20, 1948, I heard a fledgling Cowbird giving its food call from the remains of a 1947 Robin (*Turdus migratorius*) nest near the University Hospital. This Cowbird was being attended by a male lark. I tethered the Cowbird on the ground, and the lark fed it for the next five days. The Cowbird got loose on June 26,

but I caught it two days later, and placed it in a Potter trap; within five minutes the lark entered the trap. The Cowbird was kept in captivity until May 27, 1949, at which time it (a male) was released. Moore (1947: 39) reported a "horned lark feeding an almost independent Cowbird" at the Chicago airport on June 20, 1946.

Dumetella carolinensis. Only one of 71 Catbird nests was known to be parasitized: a nest containing four host and two Cowbird eggs, found May 28, 1949. A Catbird was incubating. On May 30 the two Cowbird eggs were gone, but the four host eggs were still there. The nest contained two recently hatched young and two pipped Catbird eggs on June 8.

On May 29, 1948, I placed a Cowbird egg in a Catbird nest containing two Catbird eggs. The Cowbird egg was gone when I visited the nest two days later and there were three Catbird eggs. Three Catbirds were fledged from this nest.

On May 17, 1949, I placed a Cowbird egg in a nest containing five Catbird eggs and with binoculars retreated to cover 40 paces off. Within three minutes, both Catbirds returned to the nest. One Catbird hopped to the ground below the nest with the Cowbird egg in its bill, then flew to a low branch about 30 feet from the nest. I was unable to find any trace of this egg.

Friedmann and others have mentioned the removal by Catbirds of foreign eggs from their nests. I believe that the Catbird is a more common host to the Cowbird in southern Michigan than is generally assumed, and that the reason so few cases of parasitism have been observed is that Cowbirds lay very early in the morning (Hann, 1939: 201) and Catbirds usually remove the eggs immediately on discovering them.

Hylocichla mustelina. Six Wood Thrush nests were found between May 26 and June 10, the seventh nest (under construction) on July 11. From seven nests containing a total of 24 host and two Cowbird eggs, ten thrushes and no Cowbirds were fledged. The six non-parasitized nests were in the University Arboretum, where the Cowbird population was high.

Vireo olivaceus. I found only one Red-eyed Vireo nest because I spent very little time in that species' habitat. A nest found under construction on May 25, 1948, contained a Cowbird egg the following day. This egg I removed. On May 27 I removed another Cowbird egg. I saw the vireo on the nest for the first time on May 28; the nest contained one egg that day, a Cowbird's. On May 29 the nest still held one Cowbird egg, which I removed. On May 31 the nest contained two vireo eggs, and I saw the vireo on the nest (with the two host eggs) daily until June 7. On that date, one Cowbird and one vireo egg were in the nest. The vireo incubated these two eggs until June 14. On June 15 only the Cowbird egg was in the nest and the vireo deserted the following day.

Dendroica petechia. I found Yellow Warbler nests under construction from May 11 to June 4. Although 13 of the 44 nests were observed only once, I saw Cowbird eggs or young in 40.9 percent of the total. Eleven parasitized nests (containing 21 Cowbird eggs) were deserted. Nine additional Cowbird eggs were buried under lining but the nests were not deserted. Hicks (1934: 386) found 42 percent (62 nests) of 146 nests parasitized in Ohio.

Icterus galbula. I did not inspect the contents of any Baltimore Oriole nest. On June 22, 1948, however, I observed a female oriole feeding a recently fledged Cowbird about 40 feet from the oriole's nest. The female oriole was the only bird to give alarm notes when I picked up the Cowbird, although a pair of Song Sparrows had a nest 15 yards away. I tethered the Cowbird and for three days the female oriole fed it and at least two orioles still in the nest. The orioles left the nest on June 25.

Richmondia cardinalis. My earliest date for a Cardinal nest was May 1 (three Cardinal eggs), my latest August 6 (three fresh Cardinal eggs). Seven parasitized nests containing at least 11 host and 13 Cowbird eggs fledged no Cardinals and only two Cowbirds. This high mortality appears to be due to the tendency of the Cardinal to desert when Cowbird eggs are laid in its nest. Mortality of non-parasitized nests, also, was high: nine such nests, containing a minimum of 21 eggs, fledged only four young.

Passerina cyanea. My earliest date for an Indigo Bunting nest was May 26 (two eggs), my latest August 24 (two young). From eight eggs in four non-parasitized nests, six buntings were fledged. Five parasitized nests containing seven host and ten Cowbird eggs fledged two buntings and four Cowbirds.

Spinus tristis. Goldfinch nests with fresh eggs were found from June 12 to August 31. Of 70 nests observed only two were parasitized. I have reported on these in detail (Berger, 1948).

Spizella pusilla. The breeding season of the Field Sparrow extended from the first week of May through August. First nests were found on May 5, 6, and 7 in 1946, 1948, and 1949 respectively. Late nests (each with three sparrow eggs) were found August 7 and 20, 1949. Thirteen non-parasitized nests containing 47 eggs fledged 31 (65.9%) young. Five parasitized nests containing six Cowbird and 16 host eggs fledged one Cowbird and three sparrows. I also observed Field Sparrows feeding young Cowbirds out of the nest on June 15 and August 8, 1948.

Melospiza melodia. I found four nests [3, 4, 4 (one Cowbird), 5 eggs] of the Song Sparrow on April 21, 1946. This was my earliest date for a Song Sparrow nest and also my earliest date for a Cowbird egg. During the four years, 13 nests were found between April 21 and 30; 33 nests in May; six in June; five in July; two in August. In 18 non-parasitized nests, 69 eggs were laid, 31 eggs hatched, and 28 (40.5%) young fledged. Twenty-eight parasitized nests (92 host and 68 Cowbird eggs) fledged 18 (19.5%) Song Sparrows and 16 (23.5%) Cowbirds. I observed Song Sparrows feeding young Cowbirds out of the nest on the following dates: May 24 and 31 and June 10, 1948, and May 22 and 31, 1949.

Hicks (1934: 386) found 34 percent (135) of 398 Song Sparrow nests parasitized in Ohio. Nice (1937: 159) reported parasitization of 43.9 percent of 223 Ohio nests observed by her over a seven-year period, although the yearly percentage varied from 24.6 to 77.7. Norris (1947: 90) found 11 (40.7%) of 27 Pennsylvania nests parasitized.

Hann (1937: 202) reported that Cowbird eggs usually were laid in Oven-bird nests during the laying period of that host: "Extreme cases, however, were three days before the first Oven-bird's egg was laid, and three days after incubation began." Friedmann (1929: 186) stressed the coincidence of Cowbird-host laying periods when he said that "a Cowbird has been known to lay an egg in a nest of an Indigo Bunting, containing young. This was a very exceptional case and was doubtless a last resort in an emergency." Norris (1947: 100) called attention to the fact, however, that some Cowbird eggs are laid so long after host incubation has begun that they do not hatch.

A Cowbird egg was laid before the first host egg in five nests which I observed (Phoebe, Red-eyed Vireo, Cardinal and two Song Sparrow). None of these nests was deserted as a result of this early parasitization. Two Alder Flycatcher, one Red-wing, two Oven-bird, and three Yellow Warbler nests, however, were deserted apparently as a result of early parasitization.

A Cowbird egg was laid in a Red-eyed Towhee (*Pipilo erythrophthalmus*) nest after the four host eggs had been incubated at least one full day. On July 1, 1948, I found a Song Sparrow nest which contained one addled Song Sparrow egg, two Cowbird nestlings about 24 hours old, and one Song Sparrow nestling which left as I exposed the nest. The Song Sparrow was feathered and would

not remain in the nest. One of the young Cowbirds disappeared on July 5, but the other fledged July 9. A Chipping Sparrow (*Spizella passerina*) nest which I found June 10, 1947, contained three host young and a fresh Cowbird egg. In a Field Sparrow nest I was observing, a Cowbird egg was laid after one Cowbird and three host eggs had hatched. Walkinshaw (1949: 84) cited two cases in which Cowbird eggs were laid in nests (Field Sparrow) after the host eggs had hatched.

My data also show that the Cowbird tends to lay in deserted nests. I found Cowbird eggs in five Song Sparrow nests after they had been deserted. The interval between desertion of the nest and deposition of the Cowbird egg varied from one to 26 days, and averaged 10.2 days. One nest is of special interest. I found this nest on May 10, 1947, at which time it contained two Song Sparrow eggs; a third sparrow egg and a Cowbird egg lay on the ground a few inches from the nest. It had been deserted by May 15, on which date I placed all the eggs in the nest. On May 19 it contained three Cowbird eggs only. A Vesper Sparrow (*Poocetes gramineus*) nest deserted on April 24 or 25 held two sparrow eggs on the latter date; on May 20 I removed two Cowbird eggs from the nest. One Cowbird egg was laid in a deserted Phoebe nest containing two Phoebe eggs. Nice (1937: 162) noted that three out of 113 Cowbird eggs were laid in deserted Song Sparrow nests. We may infer from this tendency either that the Cowbird is unable to distinguish between active and inactive nests or that, being ready for oviposition, it lays in whatever nest is available to it at the time.

Ornithologists have known for a long time that Cowbird eggs usually hatch before those of the host species. Audubon (1831: 487) said: "In every case the Cow Bird's egg is the first hatched." Bendire (1895: 595) reported that Cowbird eggs hatch "generally in advance of those of the foster parent." Baird *et al.* (1905: 155) noted that "the eggs of the Cowbird are the first hatched, usually two days before the others." More recently, Friedmann (1929: 188) stated that "in the majority of cases, irrespective of the species of bird victimized, the cowbirds' eggs hatch first." Many, perhaps all, of these authors believed that the shortness of the Cowbird's incubation period (ten days, according to Friedmann, *loc. cit.*), accounted for this phenomenon; but Nice (*op. cit.*) and Hann (*op. cit.*) have ascertained that the incubation period is actually at least one day longer than ten. Obviously if the incubation period of the host is considerably longer than that of the Cowbird, the Cowbird eggs will hatch first if they are laid *during* the laying period of the host. On the other hand, Cowbird eggs laid in nests of species having only a slightly longer incubation period than the Cowbird's will hatch first only if deposited on or before the day on which incubation commences. Cowbird eggs usually hatch first, then, because they usually are laid during, or slightly in advance of, the host's laying period. The Cowbird's custom of removing a host egg increases the chances that its own egg will hatch first.

That 'getting a head start' through hatching first is closely correlated with

fledging success seems to be clearly indicated by some of my observations. In six parasitized nests (Wood Thrush, Yellow Warbler, Towhee, Field Sparrow and two Song Sparrow) one or more host eggs hatched first. Every one of these nests fledged one or more host young. Three of them fledged Cowbirds also (one Cowbird and one Yellow Warbler; one Cowbird and three Song Sparrows; one Cowbird and four Song Sparrows). In the following nine nests, on the other hand, Cowbird eggs hatched first: three Phoebe, one Alder Flycatcher, five Song Sparrow. In *only two* of these nests were host young fledged. A Phoebe nest fledged three Phoebes and one Cowbird. A Song Sparrow nest fledged one Song Sparrow and one Cowbird (which, ten days after hatching, was lying dead two feet from the nest the day before the Song Sparrow fledged). Two of the other five Song Sparrow nests fledged no sparrows but three and four Cowbirds respectively. Two Song Sparrow nests, in each of which a Cowbird egg and at least one host egg hatched on the same day, each fledged two Song Sparrows and one Cowbird.

Norris (1947: 100) stated that "No more than two Cowbirds were fledged in a single nest, and this occurred only five times." Table 3, which indicates the relationship between number of host young and number of young Cowbirds fledged in 19 nests, makes clear that three or even four Cowbirds may be fledged from one nest.

On two occasions I found a Song Sparrow nest by watching a female Cowbird. On May 12, 1948, I watched a female Cowbird alight on a weed and peer downward as though looking at or for a nest. I went to the place and flushed a Song Sparrow from a nest containing five eggs (one a Cowbird's). The Cowbird had perched less than a foot from the nest but the Song Sparrow had continued to incubate. I neither saw nor heard the male Song Sparrow during this time, but he appeared and gave alarm notes after I flushed the female. This nest contained three host and two Cowbird eggs when I visited it next on May 14.

Hann (1937: 213) stated that female Cowbirds "discover the Oven-bird's nests by seeing the females building." Nice (1937: 163) believed that Cowbirds find nests both by watching the host build and by direct search. She said further (p. 165): "Cowbirds apparently do not find well concealed nests quite as readily as those poorly concealed, and the same is true of predators." This seems to be a logical conclusion, but at the same time it raises the question of whether or not a nest, well concealed from the human point of view, is also well concealed from Cowbirds and predators. Eight Song Sparrow nests which I thought to be well concealed were parasitized, whereas five nests which I considered exposed were not parasitized. Judging from what I have observed of field nests, I believe that there is a correlation between parasitism and proximity to higher vegetation. In general, parasitized nests in fields were near bordering woodlots or thickets, whereas non-parasitized nests were not near such vegetation. Thickets and trees apparently provide perches and cover for female Cowbirds on the alert for nest building activity.

TABLE 3
SURVIVAL OF HOST AND COWBIRD YOUNG IN 19 PARASITIZED NESTS

Host Species	Host eggs	Host young fledged	Cowbird eggs	Cowbirds fledged
1-Phoebe	5	0	1	1
2- "	4	0	3	3
3- "	5	3	1	1
4-Alder Flycatcher	4	0	1	1
5-Yellow Warbler	4	1	3*	1
6-Cardinal	3	0	2	1
7- "	3	0	3	1
8-Chipping Sparrow	0†	0	1	1
9-Song Sparrow	4	0	4‡	1
10- " "	4	0	5	2
11- " "	3	0	4	3
12- " "	3	0	4	4
13- " "	4	1	2	0
14- " "	2	1§	2	1
15- " "	4	2	1	1
16- " "	4	2	3	1
17- " "	4	3	1	1
18- " "	4	4	1	1
19- " "	5	4	2	1
Totals	69	21	44	26

* Two Cowbird eggs laid after incubation began.

† One Cowbird only in nest when found.

‡ Two Cowbirds died nine days after hatching.

§ Song Sparrow left prematurely when nest was found; Cowbird fledged nine days later.

SUMMARY

A study of Cowbird parasitism in Washtenaw County, Michigan, from 1946 through 1949 involved twenty host species and two additional species believed to be hosts.

The Cowbird laying season extended from April 21 to July 26. Of 112 parasitized nests observed, 53 contained one Cowbird egg, 36 contained two, 15 contained three, six contained four, and two contained five. Of 196 Cowbird eggs observed, 60 (30.6%) hatched. Forty-three of these 60 young Cowbirds (21.9% of the 196 eggs) fledged.

In each of four nests, a Cowbird egg was laid after incubation had begun: in two cases while eggs were still unhatched; in two cases after the young had hatched.

Cowbird eggs were laid in seven deserted nests. The interval between nest-desertion and deposition of the Cowbird egg in five Song Sparrow nests varied from one to 26 days and averaged 10.2 days.

The relative time of hatching of host and Cowbird eggs is important in the

fledging success of the respective species. Host young were fledged from each of six nests of five species in which the host eggs hatched first. In only two of nine nests in which Cowbird eggs hatched first were host young also fledged. Both host and Cowbird young were fledged from two Song Sparrow nests in which a Cowbird egg and at least one host egg hatched the same day. Host eggs hatched first in two Song Sparrow nests which fledged three host and one Cowbird and four host and one Cowbird respectively. Cowbird eggs hatched first in two Song Sparrow nests which fledged three and four Cowbirds respectively but no sparrows.

Parasitized nests of field-nesting species which I observed were in portions of fields bordered by a woodlot or thicket, whereas non-parasitized nests were not near such vegetation.

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DEPARTMENT OF ANATOMY, UNIVERSITY OF MICHIGAN MEDICAL SCHOOL,
ANN ARBOR