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Variation in Length of Songs of the Black-headed Grosbeak During the Breeding Season

By HENRY G. WESTON, JR.

From April to September, 1945, and April to June, 1946, data were gathered on the breeding behavior of the black-headed grosbeak (*Pheucticus melanocephalus*) in Strawberry Canyon, on the campus of the University of California at Berkeley, California. Particular attention was given to the role of the sexes at the nest (Weston, 1947). Data were also gathered on variations of songs of the male during the breeding season.

The grosbeak is perhaps best known for its song and literature almost invariably makes some mention of it. Most of the utterances of this species will be described in this report although the song of the male has certain general tonal qualities which are impossible to describe perfectly or even imitate exactly. Grinnell and Storer (1924:486) write, "the black-headed grosbeak possesses a rich voluble song that forces itself upon the attention of everyone in the neighborhood The song resembles in some respects that of a robin . . . the grosbeak's song is much fuller and more varied, contains many little trills, and is given in more rapid time. Now and then it bursts forth fortissimo and after several rounds of burbling, winds up with a number of 'squeals', the last one attenuated and dying out slowly."

The song of the male grosbeak resembles closely that of the robin (*Turdus migratorius*); parts of the song are also reminiscent of that of the western tanager (*Piranga ludoviciana*). Length of individual songs varies considerably. The shortest that I timed lasted one second, the longest eighteen; the average song was about five seconds in length. The intervals between songs in a series varied from one second to twenty-seven seconds.

To emphasize the variations that occur in the male songs, data were gathered in four different situations; before the arrival of the females on the breeding grounds, during the courtship period after the females arrive on the breeding grounds, in the vicinity of active nests and lastly, while the male sits on a nest incubating eggs. These data are summarized in Table 1 and listed in detail in Tables 2-5 inclusive.

Male grosbeaks may sing more or less continuously up to twelve minutes or so at a time, but usually a series of songs lasts about five minutes. I have never heard males in series of songs during incubating or brooding that lasted over three minutes.

Table 1.

Summary of records of songs of male black-headed grosbeaks in different phases of the breeding cycle.

	Before arrival of female	During courtship period	Near nest with eggs	While incubating
Number of observation periods	9 ^a	9 ^b	6 ^c	5 ^d
Total observation time	34.7 min.	37.2 min.	14.6 min.	11.2 min.
Total number of songs recorded	182	283	78	136
Range of song length	1-18 sec.	1-17 sec.	2-18 sec.	1-5 sec.
Mean length of songs	6.1 ± .23	4.9 ± .21	6.8 ± .37	1.9 ± .07
Standard deviation of mean length	3.2 ± .16	3.5 ± .14	3.3 ± .26	0.8 ± .05
Range of intervals between songs	1-27	1-24	1-6	1-7
Mean length of intervals	5.5 ± .29	3.5 ± .14	2.8 ± .12	2.8 ± .09
Standard deviation of mean interval	3.9 ± .24	2.4 ± .10	1.1 ± .09	1.2 ± .06

^aApril 16-18, 1945, all between 7:27 and 8:39 a.m.

^bApril 19-30, 1945, all between 7:38 and 9:08 a.m.

^cMay 3-5, 1945, all between 7:25 and 9:24 a.m.

^dMay 3-5, 1945, all between 8:14 and 9:34 a.m.

Table 2.
Records of songs in seconds of male black-headed grosbeaks in Strawberry Canyon before arrival of females.

	April 16, 1945 7:31-7:34 a.m.	April 16, 1945 7:53-8:00 a.m.	April 16, 1945 8:07-8:09 a.m.	April 16, 1945 8:36-8:38 a.m.	April 17, 1945 7:27-7:29 a.m.	April 17, 1945 7:57-7:59 a.m.	April 17, 1945 8:34-8:39 a.m.	April 18, 1945 7:34-7:40 a.m.	April 18, 1945 8:06-8:09 a.m.
Total number of songs	23	30	14	10	12	17	24	33	19
Period of observation in seconds	248	434	148	119	114	136	325	358	202
Mean length of songs	3.9	3.3	6.1	9.1	5.4	5.0	9.7	6.8	7.5
Range of song length	2-8	1-7	2-11	3-15	2-10	2-8	5-18	2-15	4-11
Mean length of intervals between songs	6.8	11.4	4.7	3.1	4.4	3.1	3.6	4.0	3.2
Range of intervals between songs	4-12	4-27	2-9	1-6	2-8	2-6	2-5	2-11	2-5

Table 3.
Records of songs in seconds of male black-headed grosbeaks in Strawberry Canyon during courtship period.

	April 19, 1945 7:58-8:04 a.m.	April 19, 1945 8:19-8:26 a.m.	April 20, 1945 7:38-7:42 a.m.	April 20, 1945 8:21-8:24 a.m.	April 25, 1945 8:23-8:26 a.m.	April 26, 1945 7:56-7:58 a.m.	April 28, 1945 8:04-8:08 a.m.	April 30, 1945 8:50-8:54 a.m.	April 30, 1945 9:05-9:08 a.m.
Total number of songs	34	48	48	18	28	27	31	23	26
Period of observation in seconds	344	455	254	188	178	104	228	282	201
Mean length of songs	6.7	4.6	2.3	6.5	3.6	1.7	4.5	10.2	6.4
Range of song length	2-14	1-17	1-6	2-15	1-11	1-3	1-10	6-15	2-12
Mean length of intervals between songs	3.5	4.9	3.0	4.1	2.9	2.1	2.8	2.1	3.2
Range of intervals between songs	2-10	1-24	1-5	1-9	1-4	1-6	1-8	1-3	2-5

Table 4.

Records of songs in seconds of male black-headed grosbeaks in Strawberry Canyon in vicinity of nest.

	May 3, 1945 7:25-7:29 a.m.	May 3, 1945 8:49-8:50 a.m.	May 4, 1945 8:48-8:51 a.m.	May 4, 1945 7:35-7:37 a.m.	May 5, 1945 8:04-8:07 a.m.	May 5, 1945 9:22-9:24 a.m.
Total number of songs	12	12	16	12	15	11
Period of observation in seconds	172	74	165	135	190	128
Mean length of songs	11.5	4.3	6.5	5.0	6.5	7.1
Range of song length	5-18	2-8	3-9	3-10	2-9	2-11
Mean length of intervals between songs	3.0	2.0	3.4	3.5	3.0	3.2
Range of intervals between songs	2-6	1-3	2-6	2-5	1-4	1-5

Table 5.

Records of songs in seconds of male black-headed grosbeaks in Strawberry Canyon while incubating eggs.

	May 3, 1945 8:34-8:35 a.m.	May 3, 1945 9:13-9:16 a.m.	May 4, 1945 8:20-8:22 a.m.	May 5, 1945 8:14-8:17 a.m.	May 5, 1945 9:32-9:34 a.m.
Total number of songs	15	36	28	31	26
Period of observation in seconds	65	175	125	182	130
Mean length of songs	1.8	1.9	1.7	2.1	2.0
Range of song length	1-3	1-4	1-5	1-3	1-4
Mean length of intervals between songs	2.6	3.0	3.0	2.8	2.7
Range of intervals between songs	1-6	1-7	1-5	1-6	1-5

My work did not afford any evidence as to the influence of weather on the songs and activities of the grosbeaks. The incidence of cloudy and sunny days, did not appear to have a significant influence upon the amount of activity. I did note that the grosbeaks were a little more active at mid-day on cloudy days than at the same time on clear warm days. The reserve seemed to be true in the early mornings. Sometimes rain seemed to depress the songs and activities of the birds; at other times it had no apparent effect on them. More study of these relations is necessary before any conclusions can be reached.

The importance of the time of day as an influence on songs and activities also varies. Some authors claim grosbeaks sing best and most often in mid-day; others state they have found the songs

Table 6.

Order^a of dawn songs of birds in Strawberry Canyon, 1945.

	April 20 — low fog	April 26 — clear	April 27 — high fog	April 30 — clear	May 4 — high fog	May 6 — high fog	May 17 — high fog	May 22 — clear	May 30 — rain	June 9 — high fog
California quail	—	10	10	—	—	—	—	—	—	—
Red-shafted flicker	—	—	—	—	10	10	—	—	—	—
Western flycatcher	—	—	—	—	—	—	8	—	—	9
Steller's jay	—	15	—	—	—	—	—	—	—	—
California jay	7	11	11	7	13	13	—	9	9	11
Bush-tit	—	12	12	—	11	11	—	—	—	—
Wren-tit	—	9	9	—	12	12	—	—	—	10
Bewick's wren	6	6	6	6	6	7	11	7	6	3
Western robin	—	—	—	—	—	—	—	5	4	—
Swainson thrush	5	14	—	4	4	4	2	2	1	13
Warbling vireo	11	13	13	—	—	—	10	—	—	7
Orange-crowned warbler	9	3	3	—	3	3	7	3	2	8
Pileolated warbler	10	8	8	—	9	9	9	—	9	4
Black-headed grosbeak	8	2	2	8	8	8	5	4	3	1
Purple finch	2	1	1	5	1	1	1	—	—	2
Spotted towhee	4	5	5	2	7	6	4	1	—	5
Brown towhee	3	7	7	3	5	5	6	6	5	—
Song sparrow	1	4	4	1	2	2	3	8	7	12

^anumbers 1-18 indicate order in which songs were first recorded each dawn.

coming most often in the early morning. The latter appears to hold true for Strawberry Canyon. In general, the songs in the early morning are longer and louder and their quality is richer than those uttered at other times during the day.

During the period of study the grosbeaks were normally one of the first birds to be heard at dawn. On ten mornings records were kept of the order in which species of birds first began uttering vocal sounds. These records usually covered about fifteen species. The times the grosbeaks were first heard varied from first to eighth, the average being fourth. See Table 6.

Males of the black-headed grosbeak incubate and brood on the nest. Males also sing while they incubate or brood. Male songs during incubation or brooding usually consisted of short bursts lasting only a few seconds each and marked by up and down twitchings of the tail, which projected up over the rim of the nest.

The male sings on the wing and occasionally during the nesting period as he moves from tree to tree. The latter flights follow a

straight line and extend as far as three hundred feet. Upon the arrival of the females and the commencement of the courtship period, flight songs become more elaborate. The male flies up and then out on a horizontal course, circling out from the summit of a tree, and with wings and tail spread utters an almost continuous song. The flights, lasting from eight to ten seconds, usually ended by the male returning to the perch just vacated. The flights normally occurred at infrequent intervals. I never witnessed this display before a female coming more often than four minutes apart. The male also performed song-flights while the females were incubating.

Songs may be given repeatedly from a single prominent elevated perch or as a momentary interruption while the bird is foraging. The male also utters single call-notes frequently while foraging. His songs and call are quite loud when he forages alone, but when both sexes forage together, the songs are low and much softer.

In general, the songs of female grosbeaks were never more than four seconds in duration and were never loud. They occasionally were uttered while the female was incubating or brooding, usually as the male came to take his place on the eggs or young. The female will also occasionally sing while foraging in the peripheral foliage of trees, but only when the male is close by. I have not heard female song after the nesting is completed, nor have I heard it before nesting begins.

During the early stages of nest life the vocal sounds of young consist of faint *peep* calls uttered when the parent are present or when the young are being handled. Toward the end of the nest life the young develop a distinct musical *pee-urr'-rrr*, whistle-like in quality. After leaving the nest, the young continue to give this hunger call intermittently. It also apparently serves as a location call. Song of the young male was not heard; Wheelock (1904:256) states grosbeaks only eight weeks old utter a low warble.

The common call-note, a sharp *spic*, closely resembles that of the rose-breasted grosbeak (*Pheucticus ludovicianus*). It is commonly emitted while both sexes are foraging and at these times the calls are especially frequent, being repeated over and over at regular intervals. It is also used while each bird is at the nest, coming most often when one is relieving the other of its incubating or brooding duties.

SUMMARY

1. Data on the variation of the voice of black-headed grosbeaks were gathered during the breeding seasons of 1945 and 1946 in the Berkeley Area of California.

2. Male grosbeaks are in song upon their arrival in spring and continue to sing until mid-July. Both sexes sing while incubating

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eggs and brooding young. Both frequently utter low, short songs and calls while foraging for food. Males sing chiefly from some elevated perch; shortly after spring arrival and through the courtship period, they also sing on the wing.

3. Data were gathered on variations that occur in the male songs under four different situations; before the arrival of the females on the breeding grounds, during the courtship period after the females arrive on the breeding grounds, in the vicinity of active nests and lastly, while the male sits on a nest incubating eggs. In the first three situations, mean song length varied from 4.9 to 6.8 seconds while in the latter situation the mean length was only 1.9 seconds.

4. Data were also gathered on the order in which different species in the study area began dawn singing.

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