

**Male Prairie Warbler dies during courtship.**—Natural deaths of birds are infrequently observed and less frequently recorded. On 4 April 1973, I watched the death of a male Prairie Warbler (*Dendroica discolor*) engaged in courtship, and I believe the circumstances warrant the conclusion that death was caused by sexual excitement.

The unbanded male was seen at 0815, perched at a height of 10 m and singing at a rate typical of males in early spring (see Nolan 1977, *Ornithol. Monogr.*, in press; all interpretations of behavior are based on his extensive description). As the male sang, I became aware of an unbanded female Prairie Warbler that was foraging, changing perches frequently, and ascending the tree occupied by the male. Soon (1.5 min) after I noticed the female, the male began to sing muted songs, suggesting he was aware of her proximity. A sexual chase followed immediately, during which harsh call notes were heard. Female approach combined with harsh calls and sexual chase occur most frequently early in courtship, typically on the first day of association (of 138 sexual chases Nolan reported during the first 3 days of association between birds that eventually paired, 73% occurred on day one). One to two minutes after the first sexual chase, I heard the male singing some 30 m distant. I approached him and began to tape-record my observations of his behavior. The female (or another one) soon appeared, and 1.5 min thereafter a second sexual chase ensued. At the end of the chase, the male was approximately 6 m from me, on a perch 1–1.5 m high. He had not overtaken the female and pulled her tail, as males often do. His appearance was indistinguishable from that described by Nolan as typical of males after a sexual chase, "After at least half the chases in which the female was caught and almost all in which she was not, the male perched like a bird that had just concluded a fight, tensely crouching, wings out (rarely drooped), gaping wide with head forward and probably at times with retracted neck. The pose was maintained for as long as 90 sec, during which the female if in sight was watched" (Nolan, loc. cit., Chap. 10). Nolan states that the last step in resuming a normal, nonagonistic posture is closing the bill. "One male, without moving his feet toppled backwards and hung 1 sec upside down while waving his wings, then flew away." In the case I saw, the episode ended differently. Upon landing the male continued to gape as he sang (15 sec after landing, times determined from recorded tape). Still gaping he listed to one side (23 sec), hung upside down from his perch (28 sec), and fell to the ground (44 sec). I approached and found him belly down on the ground, wings spread, now gasping. I picked him up; he was dead (65 sec).

No autopsy was performed, but based on my 3 years of work with Prairie Warblers, the bird initially appeared normal and healthy and showed no apparent external wounds after death. Dilger and Walkinshaw have reported deaths from heart attack in somewhat similar situations: A Cardinal (*Cardinalis cardinalis*) died of an apparent heart attack after prolonged territorial fighting (Dilger, 1955, *Auk* 72: 85); a Field Sparrow (*Spizella pusilla*) died after capture, and its death was attributed to fright (Walkinshaw, 1945, *Auk* 62: 41); and many banders have reported seemingly unharmed birds that gasped and expired during handling. Dr. Jacob Fine of the Harvard Medical School has suggested (pers. commun.) that some deaths of this sort may be due to stress rather than rupture of the heart or some blood vessel. Stress engendered by aggressiveness or fear may lead to overproduction of norepinephrine, which in turn may increase membrane permeability in the digestive tract and permit passage of endotoxins normally present in the gut.

Deaths like the one described here, whether caused by heart attack, stress, or some unnamed factor, are probably not frequent; but then neither are they likely to be observed and may therefore often go unnoticed. I gratefully acknowledge the assistance of V. Nolan, Jr. and H. C. Mueller.—ELLEN D. KETTERSON, *Department of Biological Sciences, Bowling Green State University, Bowling Green, Ohio 43403*. Accepted 5 Nov. 76. (This paper was subsidized by Bowling Green State University.)

**Implications of recaptures of Broad-tailed Hummingbirds banded in Colorado.**—During the summers of 1972 and 1973, we mist-netted and banded 92 Broad-tailed Hummingbirds (*Selasphorus platycercus*) at the Rocky Mountain Biological Laboratory, elevation 2900 m, in the Elk Mountains of western Colorado. In 1972 we captured 31 males, 33 females, and 3 unsexed juveniles; and in 1973 15 males and 10 females. All captured birds were thought to belong to a breeding population that nests between early June and August around RMBL (Calder 1973, Waser 1976). Recapture of a fraction of these birds in summers following their banding now leads us to speculate on their minimum life-span, and also to suggest that site specificity to breeding grounds may be important in this population.

Of the 92 banded Broad-tails, 10 or 10.9%, were recaptured at least one summer after initial banding (Fig. 1). This represents a mean per-summer recapture rate of 3.2% of all birds banded in previous years. The corresponding rate for birds banded and then recaptured within any single summer averaged 6.6%.

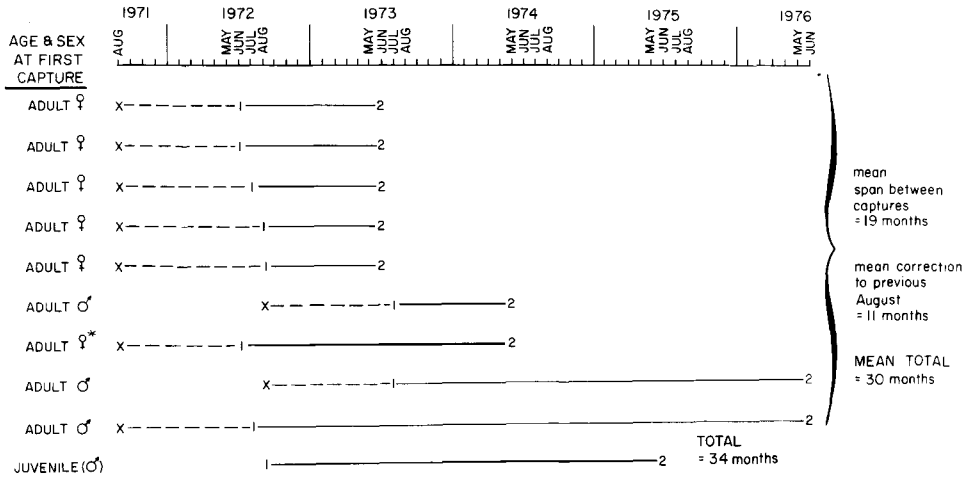


Fig. 1. Timing of captures and recaptures of 10 Broad-tailed Hummingbirds at RMBL. 1 = month of first capture and banding, 2 = month of recapture, X = month of last possible fledging for birds initially captured as adults. \* Records of month of first capture not kept; June 1972 used for purposes of computing age.

Of the 10 recaptured birds 9 were initially banded as adults, and were recaptured on the average almost 19 months later. We estimate 30 months as a mean minimum life-span for these individuals, by adding to the time between captures the period between first capture and the previous August, which is the month of most fledging at RMBL. Further indirect estimates of minimum age follow from the color-marking of 31 adults in 1973. We saw (but did not capture) several of these birds at the beginning of the next two summers, again indicating cases of survival for at least two seasons. Our 10th and last recapture, a male banded as a juvenile, was the only bird of known age (34 months).

Mention of site fidelity to breeding grounds occasionally appears in the hummingbird literature (cf. Bent 1940: 388, 425), but our recaptures and sightings provide the first documentation of such behavior of which we are aware. The male captured in 1972 and again in 1975 may be the only direct record of a reproductive adult returning to the place of birth. We expect that migratory return by Broad-tailed adults to the place of birth or previous breeding may maximize the probabilities of encountering (1) plants flowering long enough to permit a complete nesting cycle, and (2) locations free from interspecific hummingbird competitors. A great number of regional floras in the western United States contain flowers that provide nectar (Grant and Grant 1968: 17-24; 40-55), but not all regions or elevations enjoy growing seasons of sufficient length or predictability to support a complete nesting cycle. Further, those regions that support nesting are partitioned roughly according to elevation and geographic location (Bent 1940; Grant and Grant 1968: 5-16; but see Legg and Pitelka 1956), among seven hummingbird species whose habits and similar bill lengths suggest potential competition for flower nectars (Cody 1968 and references therein, Grant and Grant 1968: 26, Hainsworth 1973).

If we indeed assume that site specificity is strong (and thus that few newcomers enter the RMBL population), we speculate that the population roughly maintains itself only if the reproductive life-span of

TABLE 1  
SUMMARY OF NESTING ACTIVITY AND PRODUCTIVITY AT RMBL DURING THREE SUMMERS

Year	N nests with eggs	N eggs laid	N chicks fledged	Mean productivity (chicks per nest)
1971	8	16	10	1.25
1972	22	43	23	1.05
1973	22	43	27	1.23
Total	52	102	60	1.15

<sup>1</sup> Includes all nests discovered that were carried at least through egg laying, thus involving substantial energy commitment by the hen.

females averages 1.7 seasons or longer. This follows from an observed mean productivity of 1.15 chicks per nest in 52 nests in 1971, 1972, and 1973 (Table 1), given that the sex ratio is even (as it is at least among captured birds), and that no winter or multiple summer broods are raised. The length of flowering at RMBL seems to preclude double summer broods (2 months versus a mean duration from first egg laying to fledging of 40 days for 46 nests), and we have seen no signs of them. There is also no evidence that these birds breed on their southern wintering grounds (but see opinions in Wagner 1948). This speculative deduction of minimum longevity of RMBL females is in accord with our empirical estimates for ten individuals of at least a two-season life-span.

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**Brown-headed Cowbird courting a Purple Martin.**—The evening of 21 March 1976 I was watching 14 pairs of Purple Martins (*Progne subis*) at my backyard martin colony in Sherman (Grayson Co.), Texas. At about 1850 a male Brown-headed Cowbird (*Molothrus ater*) lit on a nearby utility wire between two adult male martins. The martins were preening and ignored the cowbird. Within a few seconds the cowbird fluffed out the feathers of its back, neck, breast, and flanks and gave a series of notes that might be represented as a liquid "bub ko lum tsee." The cowbird slowly stepped toward one of the martins, continuing the display with half-open wings. The martin stopped preening, and bending low and horizontal to the wire, gaped at the cowbird which approached within about 6 inches of the martin. After displaying constantly and directly to the martin for 60 sec or longer, the cowbird flew away. The martin resumed preening. I saw no female cowbirds in the vicinity.

The cowbird's behavior fits the arboreal courtship display as described by Friedmann (1929, The Cowbirds. *A Study in the Biology of Social Parasitism*, Charles C Thomas, Springfield, Ill.). I saw no indications that this behavior was of the preening invitation display (Selander and La Rue 1961, *Auk* 78: 473-504). The cowbird's bill was not pointed in toward its body, and its head was not especially directed toward the martin. Moreover, almost its entire plumage was fluffed out which is not consistent with the preening invitation display, which is described as unaccompanied by any vocalizations. I have seen male cowbirds display in this same manner to female cowbirds, and I suggest that this is probably an example of interspecific courtship by the Brown-headed Cowbird.—CHARLES R. BROWN, 2601 Turtle Creek Drive, Sherman, Texas 75090. Accepted 6 May 76.