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BLACK-CHINNED SPARROW: NOTES ON BREEDING BEHAVIOR AND NESTING ECOLOGY IN SAN DIEGO COUNTY, CALIFORNIA

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Although the Black-chinned Sparrow (*Spizella atrogularis*) is fairly widespread in the Southwest and locally abundant, it is one of the least studied passerines in North America (Tenney 1997). This is perhaps due to its preference for large tracts of undisturbed chaparral or successional scrub in remote and rugged terrain. Over much of its range its population density tends to be low and its occurrence is erratic. The main breeding populations are in southern to central California, Arizona, New Mexico, southern Nevada and Utah, southwestern Texas, and Mexico. Occasional irruptions are reported north as far as Oregon (Gilligan et al. 1994). The Black-chinned Sparrow is a partial migrant, with the distribution shifting southward during winter and into desert scrub mostly in northern to central mainland Mexico and Baja California Sur. As far as known, all populations breeding in the U.S. are migratory, and only a few birds winter in southern Arizona, southern New Mexico, and southwestern Texas. In southern California it is very rare as a winter visitor and as a migrant away from nesting habitat (Unitt 2004). Results of the North American Breeding Bird Survey suggest a national trend of overall decrease in Black-chinned Sparrow abundance of -5.4% per year 1966–2007 ($P = 0.001$), but many regions of its range are not adequately covered (Sauer et al. 2008).

The individual featured on this issue's back cover was at 900 m elevation on the west slope of the Cuyamaca Mountains, San Diego County, California, in successional chaparral five years after the Cedar Fire of October 2003. It is a singing adult male with substantial black around a pinkish bill and unstreaked gray breast. Females have no black around the bill or only a small amount, making the Black-chinned Sparrow the *Spizella* with the strongest sexual dimorphism. Juveniles have no black around the bill and are lightly streaked on the breast. The Black-chinned Sparrow was one of the most numerous birds in the successional chaparral in this area along Boulder Creek Road, with up to 45 in a day counted in 2007 along two survey routes totaling 5 km (P. Unitt pers. comm.).

I targeted this species as part of a study of distributional change and nesting ecology along an elevational gradient in the Laguna Mountains, San Diego County. Here I present descriptive findings on its breeding behavior and nesting ecology.

METHODS

My study took place along the desert slope of the Laguna Mountains (Figure 1), within an elevation range of 190–1852 m. The habitat was mostly chaparral but included Sonoran desert scrub at lower elevations and montane scrub mixed with coniferous forest at upper elevations. The chaparral varied from very open with scattered shrubs on the desert edge to nearly impenetrable in canyons and at higher elevations. It included one area burned in the Pines Fire of July–August 2002. From 2006 to 2008, 26 plots, each 1200 m × 200 m, were surveyed weekly throughout the nesting season. Numerous people helped with field work (see acknowledgments). We observed pairs for evidence of nesting activity from vantage points that were

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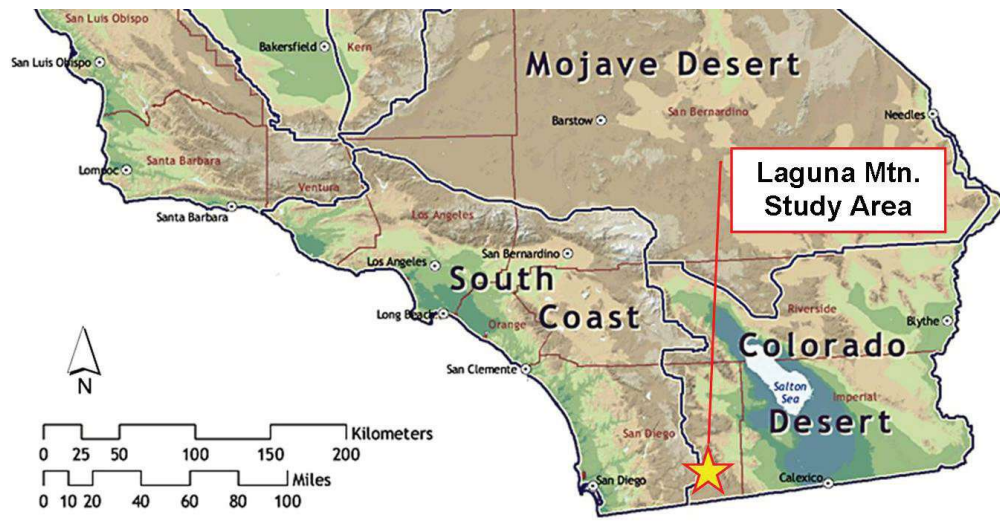


Figure 1. Location of Laguna Mountain study area in southern California.

Map source: California Department of Fish and Game Wildlife Diversity Project 2005

unlikely to cause disturbance and avoided approaching nests during construction or egg laying. Nest checks were as brief and unobtrusive as possible, typically at intervals of 3–8 days. We returned after the breeding season was completed to measure nests and vegetation.

Arrival and Territory Establishment

In this study area, Black-chinned Sparrows were found within an elevation range of 896–1852 m. Most birds arrived by mid-April. Males were often seen singing continuously or nearly continuously without a female partner. Once paired, males continued to sing nearly continuously but alternated between singing and following the female or assisting with nesting. Males often sang from exposed perches but were also observed singing while foraging, preening, and carrying nest material or food. Counter-singing of neighboring males was often synchronized, with neighbors singing in alternation or rotation. Aggressive chasing of one male by another was common. Territory size and density were highly variable. The highest density I estimated was 37 singing males per 40 hectares, substantially greater than the highest density previously reported in southern California of 21 birds per 40 hectares (Weathers 1983). In areas of denser population, however, there seemed to be a surplus of males and more frequent chasing, so territory size was difficult to estimate. In areas of low population density, pairs occurred singly without neighbors, and paired males sang from perches over areas of at least 2 hectares.

Nest Placement and Construction

Nests were found within an elevation range of 1213–1816 m ($n = 64$). Nests were placed in various shrubs and subshrubs, often in patches that were structurally heterogeneous or in post-fire succession (Figures 2, 3). Nests were placed most commonly in chamise, *Adenostoma fasciculatum* ($n = 26$), big sagebrush, *Artemisia tridentata* ($n = 16$), and California buckwheat, *Eriogonum fasciculatum* ($n = 8$). Other plants supporting nests included manzanita (*Arctostaphylos glandulosa*), scrub oak (*Quercus* spp.), mountain mahogany (*Cercocarpus betuloides*), desert ceanothus (*Ceanothus greggii*), holly-leaf cherry (*Prunus ilicifolia*), and redberry (*Rhamnus ilicifolia*). Nests

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Figure 2. Examples of Black-chinned Sparrow nests: (A) nest with eggs placed in big sagebrush; (B) adult feeding nestlings in a nest placed in California buckwheat.

Photos by Joe Barth (A) and Anthony Mercieca (B)

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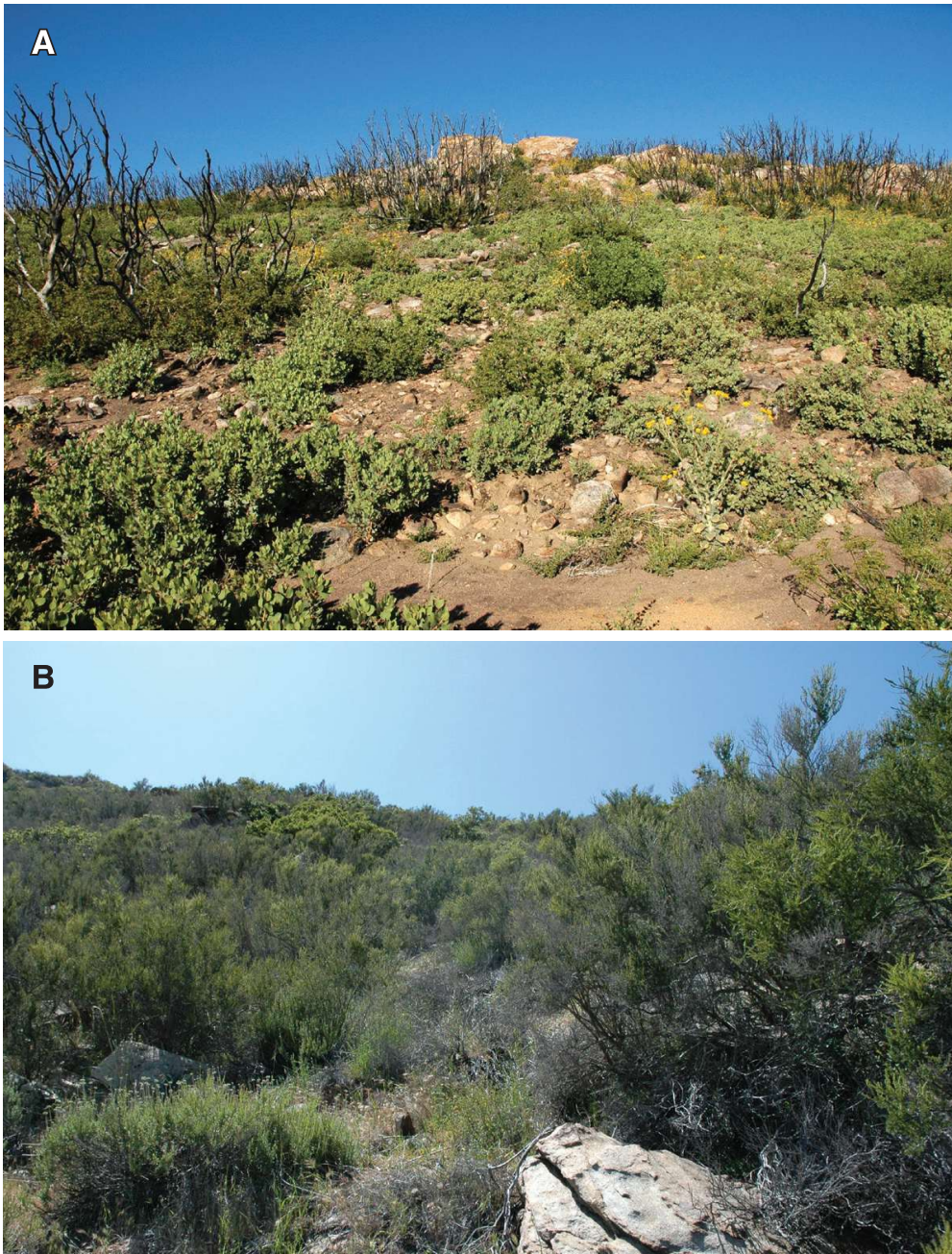


Figure 3. Examples of habitat of Black-chinned Sparrow nests: (A) Chaparral in post-fire succession, dominated by manzanita and scrub oak (elevation 1650 m); (B) heterogeneous patch of chaparral dominated by chamise and California buckwheat (elevation 1350 m).

Photos by Lori Hargrove

tended to be placed toward the middle of shrubs, mostly well concealed, at an average nest height of 44.9 cm (range 20.1–87.6 cm, standard deviation [SD] 15.3 cm, $n = 62$). Nest dimensions were as follows: outer height 5.8 cm (range 3.6–8.0 cm, SD 1.0 cm, $n = 46$), outer diameter 8.1 cm (range 7.0–10.0 cm, SD 0.8 cm, $n = 46$), inner depth 3.3 cm (range 2.0–5.0 cm, SD 0.8 cm, $n = 43$), and inner diameter 4.7 cm

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(range 3.5–6.0 cm, SD 0.5 cm, $n = 43$). Average nest height was somewhat lower and nest dimensions were smaller than previously reported for southern California by Tenney (1997) on the basis of data in the Western Foundation of Vertebrate Zoology (WVZ). Nests were simple cups, often constructed of grasses, yucca fibers, herbaceous stems, shredded bark, and occasionally a few small twigs or leaves, and were often lined with finer material. Some nests were built of yucca fibers exclusively. There was no evidence of re-use of nests or nest sites.

Nesting Dates

On the basis of estimated dates of laying, most nests were initiated from the second week of May through the third week of June (87%, $n = 62$). The earliest nest was found on 3 May with nestlings that appeared to be at least one week old, and an adult was seen feeding a young fledgling near the nest on 11 May. The eggs in this nest were evidently laid near 16 April, before all birds had arrived. Nest building continued through the end of June. The latest nest building was noted on 26 June, eggs on 3 July. The nestlings of this late nest hatched probably on 13 or 14 July but did not fledge successfully. These records are close to previously reported egg dates ranging from 23 April to 7 July for California ($n = 91$; Newman 1968). I estimated incubation periods at 13–14 days and nestling periods at 11–13 days, which are slightly longer than the only published record of 12 days for incubation period and 10 days for nestling period (Wheelock 1904).

Clutch Size and Nest Success

Where it could be determined with certainty, average clutch size was 3.2 (range 2–4, SD 0.6, $n = 25$). This is similar to the previously reported mean clutch size of 3.4 for southern California (range 2–4, SD 0.6, $n = 36$, WVZ data in Tenney 1997). Sixteen of 55 nests fledged young, for an apparent nest-success rate of 29% ($n = 55$). Since many nests failed early, biasing estimates of nest success when not all nests are found early, the true nest success rate is likely much lower. Expressed by the exposure method (Mayfield 1961), the daily survival rate was 0.89, meaning that a nest had an 89% chance of surviving from day i to day $i + 1$, and if the total exposure period was 24 days, then nest success was 5.9%. The only previously reported estimate of nest success was a somewhat higher daily survival rate of 0.94 and an apparent success rate of 39% in southern California ($n = 31$, USDA Forest Service 1997). Nest failures were due mostly to depredation of eggs and nestlings. Suspected nest predators included Western Scrub-Jays (*Aphelocoma californica*), ants, snakes, lizards, and rodents. Western Scrub-Jays were often scolded and seen in the vicinity of depredated nests. On three occasions freshly hatched chicks were found covered with ants. Snakes, lizards, and rodents were seen near nests, and rodent scat was found in a few depredated nests. Though Brown-headed Cowbirds (*Molothrus ater*) were present in the study area, no nests were found parasitized, but parasitism rates for all species in this study area were low. We observed four nests where a single egg failed to hatch and two nests that were abandoned at the egg stage for unknown reasons. Birds were frequently observed building a new nest near a recently failed nest. In at least two instances we observed pairs that were feeding fledglings while they were building a second nest (26 June 2006 and 15 June 2008). Both second nests failed (nestling and egg stages, respectively), but this is the first evidence of Black-chinned Sparrows attempting multiple broods.

Nestlings and Fledglings

Nestlings were pink and bare when first hatched or occasionally had a few small patches of dark gray down. They often begged quietly but called more loudly as they neared fledging. Fledglings were often seen up to two weeks within 50 m of the nest. Compared to adults, fledglings had short tails, yellow gapes, faintly streaked breasts,

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paler gray heads, and darker bills. They often called conspicuously while following parents and begged while being fed.

Adult Attendance

It appeared that females did all incubation and brooding and most nest building. On two occasions females were observed incubating a single egg, with a final clutch size of three eggs observed at a later date. Males often assisted with nest building, fed females on or near the nest, and participated equally in feeding nestlings and fledglings and removing fecal sacs. During nest building and incubation males often engaged in “escort” behavior, following females and perching near the nest as the female entered or exited the nest area. This puts the male in a position to guard females from other intruding males and possibly to provide vigilance and distraction for nest predators. On a few occasions females gave calls from the nest when the male was near. Very few behavioral data have been published on this species, but these observations are consistent with previous notes that females appear to do all incubation and brooding while males assist with feeding young (Tenney 1997). Incubation before the clutch is complete, mate guarding, and this degree of male assistance have not been previously reported.

ACKNOWLEDGMENTS

This research was partially funded by the California Department of Parks and Recreation, the Mewaldt–King Student Research Award (Cooper Ornithological Society), and the Ralph W. Schreiber Ornithology Research Award (Los Angeles Audubon Society). I am grateful to many people for field assistance: Joe Barth, Bob Sanger, Dave Schutz, Rachel Racicot, Bill Mauck, Alisa Zych, Kim Bender, John Hargrove, Beverly Hargrove, Dave Pound, Linda Stone, Diane Black, and Bill Black. Thanks to Jack Daynes, Anthony Mercieca, and Joe Barth for their beautiful photographs. I also thank John Rotenberry and Philip Unitt for their invaluable advice.

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