

California Scrub-Jay Preys on Tricolored Blackbird Nests

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In May 2021, I observed several instances of predation by a California Scrub-Jay (*Aphelocoma californica*) at a Tricolored Blackbird colony (*Agelaius tricolor*). Apparently, predation by this species on Tricolored Blackbird nests has not been reported (Beedy et al. 2018). Therefore, I have documented the details of this event and discuss its implications.

The colonial-nesting Tricolored Blackbird is California-designated threatened species that has experienced a dramatic population decline due to habitat loss, reduction in insect food availability caused by pesticides, and until recently, loss of nesting colonies by agricultural operations (Meese 2012, Beedy et al. 2018, Clipperton 2018). A wide variety of species have been reported to prey on Tricolored Blackbird nests, including mammals, raptors, wading birds, corvids, marsh wrens (*Cistothorus palustris*), and snakes (Beedy et al. 2018). Entire colonies repeatedly have been lost to predation by coyotes (*Canis latrans*), raccoons (*Procyon lotor*), Cattle Egrets (*Bubulcus ibis*), and Black-crowned Night-Herons (*Nycticorax nycticorax*; Beedy et al. 2018).

A substantial proportion of the Tricolored Blackbird population in California nests in the lower elevation, grassland-dominated foothills of the Sierra Nevada (foothill region) (Airola et al. 2018). Since 2014, my colleagues and I have conducted surveys of the foothill population, especially in the Central Valley foothills area between Placer and Tuolumne counties. Over this period, we have made 2-6 visits annually to monitor 24-31 nesting colonies in this area, spending about 10-20 minutes per visit, to determine population size, breeding stage, and breeding success (Airola et al. 2018a).

Approximately 75% of recent nesting colonies in the foothill region have been in patches of Himalayan blackberry (*Rubus armeniacus*; Airola et al. 2016; 2018a, b). The blackberry is highly resistant to penetration by predators because of its large thorns, dense growth form, and robust stems (Airola 2021). Over the course of our surveys, through 2020, I have observed only one incidence of nest predation on a Tricolored Blackbird colony: a Swainson's Hawk (*Buteo swainsoni*) preying on blackbirds nesting in a Himalayan blackberry patch in Amador County (Airola et al. 2015).

The Scrub-Jay predation I observed was at the *Birch Ranch 3* Tricolored Blackbird colony site. (This name is assigned to this site in the Tricolored Blackbird Portal; <https://tricolor.ice.ucdavis.edu/>). Birch Ranch is a small, upscale, large-lot subdivision near Excelsior and Florin Roads in Sacramento County, that borders an extensive area of open annual grassland. The blackberry patch used for nesting was next to a small perennial creek, fed by runoff from an adjacent commercial nursery, that supports patches of blackberry along its banks. Four blackberry patches along 0.6 km of this stream are recognized as separate colony sites (*Birch Ranch 1-4*) and have supported nesting in various years over the last decade, including three active colonies in 2021. The Birch Ranch 3 colony site occurs immediately downstream from where a road crosses the creek and within 50 m of two houses that are landscaped with ornamental trees, shrubs, and lawn.

In 2021, I first identified nesting activity at the Birch Ranch 3 colony on 2 May. I estimated numbers at about 300 breeding adults and based on the birds' quiet demeanor, I deduced that they were likely laying eggs or incubating. On my next visit to this colony on 13 May, I again observed quiet behavior and a moderate number of females, but few males. Females were bringing small food items back to the colony, indicating the presence of young nestlings. At 0745, I heard agitated calls coming from the occupied blackberry patch that suggested the birds were mobbing a predator. I saw a group of 6-8 blackbirds at the top of a 1-m² tall area of blackberry orienting their attention toward the inside of the shrub canopy. The mobbing calls continued for 20-30 seconds when a California Scrub-Jay emerged carrying a small, pinkish-orange, featherless nestling. Based on its size, I estimated the nestling's age as 1-2 days old.

The scrub-jay flew 75 m to some ornamental trees and shrubs at a nearby house. Approximately 5 minutes later, I again heard mobbing calls and saw the blackbirds in the same area as previously. This time, the scrub-jay emerged from the blackberry canopy with a light-blue egg in its bill; light blue is the background color of a Tricolored Blackbird egg. The scrub-jay carried the egg in the same direction as previously. Ten minutes later, I heard mobbing calls again and saw the agitated blackbirds in the same location, which I inferred to be the scrub-jay again. Although all three predation instances occurred within the same small area within the patch, due to the high density of Tricolored Blackbirds nests (Beedy et al. 2018), more than one nest could have been preyed upon.

I was unable to return to the colony until 21 May. Monitoring on that day and on 24 May showed that the colony persisted in similar numbers as on 2 and 13 May, with the adults delivering food to begging older young in nests and a few fledglings. I observed no further predation during about 90 minutes of monitoring on those dates, perhaps because young had grown too large by

then to be removed from nests by a scrub-jay. On 2 June, the colony was inactive, indicating that young had fledged, and the colony had moved on.

The California Scrub-Jay occupies woodlands, shrublands, and residential areas in the Central Valley region (Curry et al. 2017, Airola 2019). The scrub-jay is an opportunistic omnivore, eating acorns, fruit, carrion, invertebrates, and reptiles (Carmen 2004, Curry et al. 2017, Yancey 2018, Airola 2019). It regularly visits bird feeders and is a regular nest predator, known for taking eggs and nestlings. Scrub-jay populations could be higher in human residential areas than in more natural areas because of availability of foods from ornamental plants and bird feeders (Blair 1996, Airola 2019). As a result, the potential impact of predation near residential areas may be higher than in more remote and natural habitat areas. Nonetheless, the scrub-jay's territorial behavior maintains a low population density in occupied areas (Carmen 2004), especially compared with the dense aggregations of hundreds of Tricolored Blackbird nests in a colony. This low scrub-jay population density presumably limits the amount of egg and nestling loss by this predator and the reduces the potential for colony abandonment in response to such predation.

Coloniality in the Tricolored Blackbird likely developed in part as a adaptation to thwart predators (Rolland et al. 1998, Beedy et al. 2018). The dense concentration of nests satiates individual predators and reduces the effect of predation to a small proportion of the nesting colony. Most instances in which predators have caused abandonment of blackbird colonies have involved larger mammals, such as raccoons and coyotes, or groups of herons or egrets (Meese 2012, Beedy et al. 2018). In this instance of predation by a scrub-jay, as well as that by the Swainson's Hawk (Airola et al. 2015) and recently by a Great Blue Heron (*Ardea herodias*; Conard 2021), the losses caused by a single avian predator appear to be below a threshold that triggers colony abandonment. Nonetheless, repeated predation by a pair of scrub-jays over the course of the nesting period may have a significant impact on reproductive success in a colony as small as this one.

The lack of previous reports of predation by the California Scrub-Jay on Tricolored Blackbird nests may simply reflect the general difficulty of observing nest predation. In addition, much of the Tricolored Blackbird's historical and recent geographic range, as well the locations where most research has been conducted on the species, have been in open marshlands, grasslands, and agricultural lands (Beedy et al. 2018) where California Scrub-Jays are absent or very uncommon (D. Airola pers. obs). The blackbird's range, or at least its abundance, has increased in the foothill regions surrounding the Central Valley (Beedy et al. 2018). This expansion may have brought the two species into greater contact and thus could increase predation. Nonetheless, California Scrub-Jay predation on Tricolored Blackbird nests seems unlikely to have a significant impact on their nesting populations.

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