

# Birds Foraging on Jerusalem Crickets, with Recent Observations in the Central Valley, California

Gary Woods, Fresno Audubon Society, P. O. Box 9324, Fresno, CA 93791, [woodshots@earthlink.net](mailto:woodshots@earthlink.net)

Hannah Nadel, Department of Entomology, University of California, Riverside, CA 92521;

Howard O. Clark, Jr., H. T. Harvey & Associates, 7815 North Palm Avenue, Suite 310, Fresno, CA 93711, [hclark@harveyecology.com](mailto:hclark@harveyecology.com)

Susan I. Hagen, H. T. Harvey & Associates, 7815 North Palm Avenue, Suite 310, Fresno, CA 93711

Fourteen recognized species of Jerusalem crickets (*Stenopelmatus*; Family Stenopelmatidae) occur in western North America (Powell and Hogue 1979, Weissman 2001). These insects spend most of their lives burrowing in soil, feeding on roots and tubers, which make them generally difficult for birds to find. Predation on Jerusalem crickets, however, has been reported for several bird species. Here, we document additional observations of species use of Jerusalem crickets in the Central Valley and summarize past use reported in the literature.

We provide a new record of an avian species feeding on Jerusalem crickets: the Long-billed Curlew (*Numenius americanus*). The lead author (GW) observed Long-billed Curlews probing under cow dung and successfully obtaining Jerusalem crickets in December 2008 in western Madera County. The curlews probed under the edges of the cow dung by turning their heads sideways and leaning down. This observation of Long-billed Curlews eating Jerusalem crickets is, to our knowledge, the first record reported in the literature. This observation contributes to information on food habits and foraging behavior in the Central Valley and other inland areas, which has not been described (Dugger and Dugger 2002).

We also report foraging behavior of the Mountain Plover (*Charadrius montanus*), a species of special concern in California (California Department of Fish and Game 2008), and the American Kestrel (*Falco sparverius*) feeding on Jerusalem crickets. In previous years, GW noted that the largest invertebrate items eaten by Mountain Plovers were earthworms (Order Lumbriculida), taken as the plovers followed behind a tractor forming furrows in western Madera County. However, on 7 February 2008, while photographing a flock of Mountain Plovers from his vehicle on a dry cattle pasture in western Madera County, GW observed two Mountain Plovers eat Jerusalem crickets that they uncovered from beneath cow dung (Figure 1). The plovers were able to flip over smaller and medium sized “cow pies”; likely limited by the strength of the bird and the weight of the dung. In the

Table 1. Literature accounts of predation on Jerusalem crickets by avian species.

<b>Bird Species</b>	<b>Comments</b>	<b>Location</b>	<b>Reference</b>
Red-tailed Hawk	Remains of 99 Jerusalem crickets found in 2094 pellets	San Joaquin Experimental Range, Madera County, CA	Fitch et al. 1946
American Kestrel	Remains of 3 Jerusalem crickets found in stomach	Stanislaus County, CA	Bryant 1918
Mountain Plover	10 mandibles and other parts of Jerusalem crickets found in stomach of female; 46 mandibles of Jerusalem crickets found in stomach of another female	Solano County, CA	Stoner 1941
Barn Owl	<i>Stenopelmatus longispina</i> found in pellets	E. San Francisco Bay Area, CA	Smith and Hopkins 1937
	Jerusalem crickets the only invertebrates eaten and accounted for 2% of diet	Davis, CA	Evans and Emlen 1947
Flammulated Owl	5 Jerusalem crickets found in analysis of 27 stomachs	Western Arizona	Marshall 1957
Western Screech-Owl	Remains of one Jerusalem cricket found in stomach	Fresno County, CA	Bryant 1918
	117 mandibles found in 19 castings	SE. Oregon	Brown et al. 1986
Whiskered Screech-Owl	Jerusalem crickets present in stomachs	Arizona	Campbell 1934
Great Horned Owl	One mandible found in pellet	Fallon, NV	Alcorn 1942

Table 1. (Continued)

<b>Bird Species</b>	<b>Comments</b>	<b>Location</b>	<b>Reference</b>
Great Horned Owl	Remains of 27 Jerusalem crickets found in stomach	Berkeley, CA	Bryant 1913
	Remains of approx. 43 Jerusalem crickets found in stomach	Benicia, CA	Stoner 1931
	<i>Stenopelmatus fuscus</i> most common species of Jerusalem cricket consumed	Berkeley, CA	Mobley and Stidham 2000
Burrowing Owl	Owl retrieved Jerusalem cricket from airport runway	Oakland, CA	Thomsen 1971
	155 mandibles found in 9 castings	SE. Oregon	Brown et al. 1986
Spotted Owl	20.7% of diet was Jerusalem crickets	San Bernardino Mountains, CA	Smith et al. 1999
	Many Jerusalem cricket remains in 3 stomachs	Arizona	Marshall 1957
Loggerhead Shrike	Reported	Unspecified	Bent 1950
Common Raven	Stomachs of 2 ravens each contained at least one cricket part	SE. Oregon	Nelson 1934
Eastern Bluebird	Jerusalem crickets found in stomach	W. Arizona	Marshall 1957
Sage Thrasher	Remains of one Jerusalem cricket found in study of 70 stomachs	Utah	Knowlton and Harmston 1942
Western Meadowlark	Fragments of several Jerusalem crickets found in 5 gizzards	Foothills of Yuba County, CA	Anderson and Merritt 1977

same area he also observed an American Kestrel fly from a pasture fence post and catch and consume a Jerusalem cricket.

Based on our extensive literature review, owls are the most commonly recorded group of avian predators of Jerusalem crickets (Table 1), probably because the insects often wander on the surface of the soil at night where they are easily found, although owls' production of pellets may make detection of Jerusalem crickets more evident in their diets than in the diets of other species. *Stenopelmatus* species may be important prey items due to their large size (up to 5 cm in body length) and slow movements, which makes them easy to capture.

We surmise from our literature review (Table 1) and our own observations that Jerusalem crickets may be common and important prey of several avian species, especially those that use open cattle pastures during the winter. During the day, Jerusalem crickets usually hide under surface objects such as logs and stones, or as GW observed, under cow dung. Therefore, compared to nocturnal predators, diurnal avian predators must expend additional energy to procure them from their hiding places. Our observations, however, suggest that Long-billed Curlews and Mountain Plovers may be able to efficiently forage diurnally for Jerusalem crickets. Additional investigation of Jerusalem cricket abundance in cow pastures regularly used by the Long-billed Curlew and Mountain Plover, and their importance in these birds' diets, may be warranted.

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Figure 1. Mountain Plover (*Charadrius montanus*) eating a Jerusalem cricket in western Madera County, on 7 February 2008.

*Photo © Gary Woods*