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SOME FOODS EATEN BY A BURROWING OWL OVERWINTERING ON SOUTHERN VANCOUVER ISLAND

KENNETH H. MORGAN, RICHARD J. CANNINGS, AND CRISPIN S. GUPPY

The burrowing owl (*Speotyto cunicularia*) breeds from southwestern Canada through the western United States and into South America. In British Columbia, breeding is restricted primarily to the Okanagan and southern Similkameen valleys, although there is one record for the Fraser River delta (Cannings et al. 1987; Campbell et al. 1990). Southern British Columbia represents the northern limit of the range of the burrowing owl and the provincial population likely has never exceeded 100 individuals (Howie 1980; Cannings et al. 1987; Campbell et al. 1990).

This owl is a rare winter resident of British Columbia, with most sightings from the Fraser River delta and southeastern Vancouver Island. Between 1927 through 1988, Campbell et al. (1990) reported 14 and 12 winter (October through April) records of this species, for the Fraser delta and Vancouver Island, respectively.

Although the prey consumed by this species nesting in the Okanagan Valley have been described (Cannings et al. 1987), little is known about their winter food habits from coastal British Columbia. Here, we describe some foods eaten by a burrowing owl in winter on southern Vancouver Island in 1991.

LOCATION AND METHODS

On 1 January 1991, a burrowing owl was found approximately 26 km north of Victoria, British Columbia, the first confirmed record for Vancouver Island since 1975 (Campbell et al. 1990). The absence of heavy, extensive barring on the breast and belly suggested this was a male (but see Thomsen 1971 for comments regarding variability in barring).

The owl, present until at least 20 March 1991, habitually roosted on a 2-m high chain-link fence, on the ground next to the fence, or on a row of large concrete blocks, <2 m from the fence. These roosts were approximately 50 m from intertidal mudflats at Patricia Bay and <200 m from an open, grassy field at the Victoria International Airport (48°38'N 123°26'W).

On 27 March, all intact and partial pellets that could be found within 20 m of the roost were collected. The maximum length and width of each intact pellet was measured immediately after collecting. To standardize for possible differences in moisture content, all pellets were oven-dried at 125°C for 4 hours. Each intact pellet and the total collection (including fragments) were weighed.

Pellets were teased apart under a 10-power dissecting microscope and large objects were set aside. The remaining material was soaked overnight in a 2-molar (8%) solution of NaOH to break down hair and feathers, leaving chitin and bony material intact (Degn 1978). Identifiable remains were

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TABLE 1. Numbers of individuals of insect taxa found in burrowing owl pellets.

Order	Family	Genus/species	No. individuals	
Dermaptera	Forficulidae	*Forficularia auricularia*	14 male	5 female
Coleoptera	Curculionidae	species 1	1	
	Carabidae	*Carabus* sp.	1	
	Carabidae	species 1[a]	5	
	Carabidae	species 2[a]	6	
	Carabidae	species 3[a]	3	
	Carabidae	species 4[a]	1	

[a] Species 1–4 of Carabidae were separated on the basis of head capsule size and appearance.

sorted into three broad classes: bones, insects, and rock fragments. The three subsamples were dried (2 hr at 175°C) and weighed.

Bone and insect remains were identified to the lowest possible taxon (by RJC and CSG, respectively) and the number of individuals was estimated. Head capsules, elytra, and cerci were used to identify insects.

RESULTS

Eight intact and two fragmented pellets were found, despite intensive searching. All were within 5 m of the fence roost site. Due to their locations and condition, it is unlikely that they were from another owl.

Mean dry-weight of the eight pellets was 0.8 ± 0.45 (SD) g (range 0.4–1.8 g). Pellets were similar in maximum width ($\bar{x}$ = 13 ± 1.4 mm, range 11–16 mm), but there was considerable variation in length ($\bar{x}$ = 29 ± 7.0 mm, range 19–41 mm). Total dry-weight of all pellets was 9.5 g. Of this, 65% was a mixture of unrecognizable material and disintegrated feathers. Rock fragments accounted for 16%, and bone and insect fragments, 16% and 3%, respectively.

Thirty-six individuals were identified from insect remains (Table 1). The majority of insects were European earwigs (*Forficula auricularia*), with males outnumbering females by approximately three to one.

All bone fragments were from birds and all were found in two intact pellets. Unfortunately, it was impossible to identify the number of individual bird remains as the majority of the bone fragments were extremely fragmented. Of more than 350, only 19 pieces were >10 mm in length. The only fragment that could be identified to species was a mandible from a dunlin (*Calidris alpina*).

We counted 457 insect and 354 bone fragments. Excluding grit and unidentified materials, insects comprised 56% of the food remains based upon the number of fragments, compared with 13% by weight. Remains of birds accounted for 44% (by number) and 87% (by weight). Approximately 1350 rock fragments were found, ranging in size from <0.25 mm in diameter to 17 × 9 mm.

DISCUSSION

Captive burrowing owls cast an average of 1.5 pellets each day (Marti 1973). The owl we observed was present for approximately 80 days; during that time, it could have cast 120 or more pellets. Consequently, our sample may represent less than 10 percent of the total diet.

Earhart and Johnson (1970) and Murray (1976) suggested that burrowing owls were primarily insectivorous. While many authors (including Coulombe 1971; Maser et al. 1971; Thomsen 1971; Gleason and Craig 1979; Cannings et al. 1987; Green and Anthony 1989; Green et al. 1993) have noted the importance of insects in their diet, a wide range of prey has been reported, reflecting geographic and seasonal variations in abundance and availability.

In our study, insect fragments exceeded all other prey remains in terms of numbers. However, Thomsen (1971) noted that pellets are poor indicators of the number of food items consumed.

In winter in central Oregon, birds accounted for less than one percent of the total number of individual prey items (Maser et al. 1971). Similarly, between December and May, Thomsen (1971) found that less than six percent of pellets from California contained bird remains; and, during the nesting season, birds accounted for less than two percent of the total biomass of pellets from Idaho (Gleason and Craig 1979). The presence of bone fragments in two pellets does not prove that two birds were consumed by this owl; both pellets may have been dropped the same day (see Marti 1973).

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Small mammals are often eaten by burrowing owls (Maser et al. 1971; Gleason and Craig 1979; Green and Anthony 1989). We, however, found no evidence of mammals being consumed. Their absence may reflect either a lack of availability or a low diversity of small mammals on southeastern Vancouver Island during that time period (D. Nagorsen, Royal B.C. Museum, pers. comm.), or, it may indicate that the small sample size was inadequate to demonstrate the complete diet.

Earwigs were the major insect species found. Coulombe (1971) suggested that earwigs were the most important food of burrowing owls in winter and early summer. He inferred that high numbers of earwigs were primarily a result of opportunistic feeding, as the two species shared the same burrow. Results from our study also indicate that earwigs are an important food item in non-nesting habitats. The disproportionate ratio of male to female earwigs we observed may have been related to the habit of the more aggressive females driving the males out of the underground nests in late winter (Vickery and Kevan 1983), making the males more accessible to predation.

Ground foraging was the only hunting method of burrowing owls observed by Thomsen (1971) in winter. The type of insects taken by the owl we observed suggests that most food was captured in a similar manner. Circumstantial evidence suggests that the bird we observed was foraging primarily at night and/or at dawn and dusk; KHM observed it on 14 (of 16) separate occasions spanning most daylight hours. Including comments by many other observers, it appeared that the bird was seldom away from its perch during the day.

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