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Source: Journal of Wildlife Diseases, 25(3) : 422-424

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-25.3.422

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Journal of Wildlife Diseases, 25(3), 1989, pp. 422–424
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Helminths of California Quail (*Callipepla californica*) and Mountain Quail (*Oreortyx pictus*) in Western Oregon

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ABSTRACT: Eighty California quail (*Callipepla californica*), collected from the E. E. Wilson Wildlife Area near Monmouth, Oregon (USA) during a 22 mo period, were examined for gastrointestinal helminths. Eight birds were infected with three species of nematodes, *Heterakis isolonche*, *Dispharynx nasuta*, and *Capillaria* sp., and two species of cestodes, *Rhabdometra odiosa* and *Davainea* sp. Except for *D. nasuta*, prevalence did not exceed 5% despite mesic conditions in the collection area. Two mountain quail (*Oreortyx pictus*) were collected from Lane County, Oregon (USA), near Blue River Reservoir; both were infected with the nematode *Trichostrongylus tenuis*.

Key words: *Callipepla californica*, California quail, *Oreortyx pictus*, mountain quail, western Oregon, cestodes, nematodes, gastrointestinal helminths, survey.

Western arid-land quail apparently have few gastrointestinal helminths, probably a result of xeric conditions that adversely affect both free-living stages and intermediate hosts of parasites. Surveys of scaled quail (*Callipepla squamata*) by Wallmo (1956) and Dancak et al. (1982), Gambel's quail (*C. gambelii*) by Gorsuch (1934) and Gullion (1957), and California quail (*Callipepla californica*) by O'Roke (1928), Krogsdale (1950) and Chandler (1970) from such habitats revealed an intestinal helminth fauna ranging from one to three species. To test the hypothesis that quail from mesic western habitats would have a richer fauna, we examined the gastrointestinal tracts of 80 California quail from western Oregon. *Dispharynx nasuta*, a proventricular nematode, showed high prevalence (38%) in 76 of these quail (Moore et al., 1988), which was unusual because *D. nasuta* had not been reported from California quail in North America (but see Lewin and Holmes, 1971). A new host record from mountain quail (*Oreortyx pictus*) is reported also.

California quail were collected by shooting on the E. E. Wilson Wildlife Area, a 650 ha site 15 km south of Monmouth, Benton County, Oregon (USA; 44°55′N, 123°15′W), from February 1986 to November 1987. In addition, two immature male mountain quail were collected near Blue River Reservoir in Lane County, Oregon (USA; 44°10′N, 122°20′W), in January and November 1985. Necropsy methods were the same as outlined in Moore et al. (1986, 1988). Representative specimens of parasites from this study were deposited in the U.S. National Parasite Collection (Animal Parasitology Institute, USDA, 1180 BARC-East, Beltsville, Maryland 20705, USA; accession numbers 80473–80474 and 80503–80505).

Eight California quail harbored gastrointestinal helminths other than *D. nasuta*. Cyclophyllidean cestodes included approximately 100 individuals of *Davainea* sp. in one adult female, whereas four birds (two adult and two immature males) were infected with a total of six *Rhabdometra odiosa* (range 1–3). (Fixation did not allow specific identification of *Davainea* sp.) Nematodes other than *D. nasuta* included female specimens of *Capillaria* sp. (one in each of two adult birds, male and female) and four *Heterakis isolonche* in two adult females (range 1–3). *Davainea* sp. and *H. isolonche* have not been reported previously from California quail in North America.

Both mountain quail were infected with *Trichostrongylus tenuis* and had a total of seven worms. This species has not been reported previously as a host for *T. tenuis*.

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Little is known about the helminths of mountain quail; Krogsdale (1950) found *R. odiosa* in one of 24 mountain quail in eastern Washington (USA).

California quail in this study were from areas defined by Leopold (1977, p. 47) as "humid forest ranges" and represented the first survey of this host from mesic habitat. At least five species of helminths occur in this population, two more species than reported in any other western quail survey. Also, there was a high prevalence of *D. nasuta*, which requires a mesic habitat for its intermediate host, terrestrial isopods (Moore et al., 1988). Chandler (1970) found a higher proportion of birds infected with *R. odiosa* in irrigated than non-irrigated sites, but presence of other species did not seem to be affected by local differences in moisture availability.

In our sample, four of these five species of helminths were rare. Despite the mesic habitat and the number of species, this helminth community is depauperate compared with gastrointestinal helminth communities in northern bobwhites, *Colinus virginianus*, the only native member of the Odontophorinae in the eastern United States (Kellogg and Doster, 1972). The historical biogeography of quail in North America is incompletely understood (Gutierrez et al., 1983) and historical factors that may have influenced distribution and abundance of parasites in these birds are not clear. For example, California quail were introduced into western Oregon from native populations in southwestern Oregon in 1912 (Finley, 1915).

The occurrence of *T. tenuis* in the two mountain quail also reflected the mesic habitat of the host. The infective larvae of this nematode are adversely affected by desiccation and survive locally in arid regions only where moist conditions prevail (see Callinan and Westcott, 1986). For example, Demarais et al. (1987) did not find this nematode in northern bobwhites in areas of southern Texas with lower-than-average rainfall and well-drained soil. Mountain quail occupy higher elevation, more mesic habitats, and are more closely associated with water than are California quail (Johnsgard, 1973).

We thank G. D. Schmidt (University of Northern Colorado) for confirming identifications of the cestodes. Celeste Barker and Karen Raines provided technical assistance. This study was funded by NSF BSR 8452076 to J. Moore and by the Oregon Agricultural Experiment Station to J. Crawford. This is Oregon Station Publication #8725.

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Received for publication 22 November 1988.

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