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## LETTER TO THE EDITOR

Endoparasites of the kodkod, *Oncifelis guigna* (Carnivora, Felidae) in ChileEndoparásitos de la güiña *Oncifelis guigna* (Carnivora, Felidae) en ChileDANIEL GONZÁLEZ-ACUÑA<sup>1,\*</sup>, LUCILA MORENO<sup>1</sup>, KAREN ARDILES<sup>1</sup>, MARCELO FLORES<sup>2</sup>,  
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The kodkod, *Oncifelis guigna* o *Felis guigna* (Molina 1782), is one of the smallest and least known felids of the world. They are found in southwest Argentina, and central and southern Chile (Redford & Eisenberg 1992). Although it is found from sea level to 1900 m in rainforest, savanna, scrubs and mountains (Quintana et al. 2000), *O. guigna* prefers forest habitats connected by corridors containing free-ranging domestic fowl (Sanderson et al. 2002), and thicket-forest and dense bush cover far from roads and close to large patches of native forest, being almost exclusively restricted to these types of habitats (Dunstone et al. 2002, Acosta-Jamett & Simonetti 2004). The kodkod is distributed in a total area of approximately 160000 km<sup>2</sup> (33°-50° S and 70°-75° W), one of the smallest geographic distributions known for any felid, and therefore information that can improve their conservation is of high priority (Nowell & Jackson 1996).

Information on the endoparasites of neotropical felids is scarce, especially from Chile. In Argentina, Flueck & Jones (2006) warned that kodkod could be a host for the potential existence of a sylvatic cycle of *Taenia ovis krabbei* Moniez in Patagonia. In Chile, Wolfhügel (1949) reported *Spirometra mansonoides* Mueller (named as *Diphyllbothrium decipiens* [Diesing]) in kodkod from Valdivia forest. Alvarez (1963) found three kodkod negative for echinococcosis, and Alvarez et al. (1970) found two kodkod negative for trichinellosis. Fernández & Villalva (1984) examined one kodkod from Chaimavida (36°50'

S; 73°03' W) and found the helminths: *Uncinaria stenocephala* Railliet, *Toxocara cati* Shrank, *Taenia taeniaformis* Batsch, *S. mansonoides* and *Taenia* sp. Since the kodkod is known to be a species in decline (Muñoz-Pedreros & Yáñez 2000), the purpose of this study is to extend our knowledge of helminth parasites in this endangered wild feline.

We necropsied one specimen from San Antonio (33°37' S; 71°37' W) and another from Pemuco (36°59' S; 71°58' W), Chile. Both kodkod were found run over on the highway. Each kodkod was dissected and the organs examined under a stereoscopic microscope for endoparasites. In addition, 14 fecal samples were examined from Laguna San Rafael National Park (46°40' S; 73°52' W). Helminths collected were preserved in 70 % ethanol and studied in temporary mounts of lacto-phenol. Skeletal muscle samples were also examined for *Trichinella* larvae. Taxonomy for helminths follows Sprent (1968) for *Toxascaris leonina* (Von Linstow) and *T. cati*, Quentin (1970) and Rojas & Digiani (2003) for *Mastophorus muris* (Gmelin). Voucher specimens were deposited at the United States National Parasite Collection at Beltsville, Maryland, USA and the collection of the Laboratory of Zoology of the Faculty of Veterinary of the University of Concepción.

The two kodkod necropsied were negative for trichinellosis. Three species of helminths representing 98 individuals were found.

*T. leonina* (Ascaridida, Ascarididae): a total of 18 adult specimens were collected from the

small intestine of the kodkod from San Antonio. This ascaridid has been isolated in many different wild and domestic felids of the world (Torres et al. 1998), including *Lynx pardinus* (Temminck) in Spain (Torres et al. 1998), *Panthera tigris altaica* Temminck and *Felis bengalensis euphilurus* Kerr from Eastern Siberia (González et al. 2007), and *Panthera onca* Linnaeus in Bolivia (Beltrán-Saavedra et al. 2009). In Chile, it has been reported in domestic dogs and cats (Tagle 1966, López et al. 2006) however the present report is the first in wild animals.

*T. cati* (Ascaridida, Ascarididae): 72 specimens were collected from the small intestine of the kodkod from Pemuco. This ascarid is a cosmopolitan parasite of felids, including domestic cats and wild felids in the subfamilies Felinae and Pantherinae (Anderson 2000). *T. cati* is commonly encountered in felines in zoo collections (Fowler & Theobald 1978, Garden et al. 1978). This parasite has been reported in *P. t. altaica*, from Eastern Siberia (González et al. 2007), *Panthera leo* Linnaeus of Northern Tanzania (Bjork et al. 2000), *Panthera pardus sexicolor* Pocock in Iran (Esfandiari et al. 2010), *P. onca* in Bolivia (Beltrán-Saavedra et al. 2009), *Puma concolor* Linnaeus in Belize (Central America) and North America (Patton et al. 1986, Rickard & Foreyt 1992), *Leopardus pardalis* Linnaeus in Bolivia (Fiorello et al. 2006), and *Oncifelis geoffroyi* d'Orbigny et Gervais in central Argentina (Beldomenico et al. 2005). It has been reported in domestic animals in southern Chile with a prevalence of 70 % (Torres et al. 1972a), and in populations from the Valdivia river with a prevalence of 19 % and 65.1 % in dogs and cats respectively (Torres et al. 1995), besides in Santiago in 10 % of the cats (López et al. 2006). It has been also detected in *P. concolor* in Chile (Torres et al. 1972b).

There are two main paths of infection of *T. cati* and *T. leonina*, either by direct transmission or indirect involving a paratenic host, usually rodents or earthworms (Anderson 1992). We suspect that infection of the kodkod occurs through the consumption of rodents which are its principal food source (Correa & Roa 2005).

*M. muris* (Spiruroidea, Spirocercidae, Mastophorinae): 8 specimens of this spirurid were found in one of the 14 fecal samples from

Laguna San Rafael. This is a cosmopolitan nematode parasite of rodents (Prokopic & Genov 1974, Zagicek 1987, Torres et al. 2001). However, it has also been reported in marsupials and carnivores (Baylis 1927, Smales 1995, Feliu et al. 1991, Torres et al. 1996, 1997, 1998, 2001). Smales (1995) postulated that *M. muris* was introduced into the continents of Australia, and North and South America with its most common hosts, *Rattus norvegicus* Linnaeus and *Rattus rattus* Linnaeus. Vicente et al. (1997) reported *M. muris* in *Rattus* spp. in different urban localities of Brazil. Rojas & Digiani (2003) reported the first record of *M. muris* from South America in a wild host, the leaf-eared mouse (*Graomys griseoflavus* [Waterhouse]), from Argentina.

In the National Park of Lago San Rafael, kodkod are sympatric with other wild felids such as puma, Geoffroy's cat and the pampas cat; various species of rodents (*Oligoryzomys longicaudatus* [Bennett], *Akodon olivaceus* Waterhouse, *A. longipilis* [Waterhouse], *Phyllotis darwini* [Waterhouse], *Geoxus valdivianus* [Philippi], *Irenomys tarsalis* [Philippi]); and mustelids (*Lutra provocax* [Thomas], *L. feline* [Molina], *Conepatus humboldtii* Gray, *Galictis cuja* Molina, and the introduced *Mustela vison* Schreber).

*M. muris* has an indirect life cycle, which requires insects (mainly coleopterans) as intermediate hosts (Quentin 1970, Anderson 1992, Rojas & Digiani 2003). Since the principal diet of kodkod consists of rodents (Housse 1953, Greer 1965, Correa & Roa 2005), it is common to speculate that the nematodes were simply ingested when the predator ate a rodent. However, since there are so many records of this species from various species of carnivores, it is more likely that this is just a case of a nematode developing in an abnormal host. This represents the first report of the species in Chile, and constitutes the first record of *M. muris* in *O. guigna*.

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