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Gastrointestinal Nematodes of *Laudakia nupta nupta* (Sauria: Agamidae) from Iran with Descriptions of Two New Species (Oxyuridea: Pharyngodonidae) and comments on the diagnostic features of *Parapharyngodon* and *Thelandros*

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Abstract

Seventeen specimens of *Laudakia nupta nupta* (De Filippi, 1843), from several locations in central plain of Iran were examined for gastrointestinal parasitic helminths. Nematodes of different families and genera were the only worms found. The nematodes included one *Parapharyngodon* sp., three *Thelandros* spp., and one *Thubunea* sp. All species found in this study are new geographical records and two of the species are new to science. *Parapharyngodon thulini* sp. nov. and *Thelandros karkasensis* sp. nov. are, hereby, described and illustrated. To identify some of the fine morphological characteristics, Scanning Electron Microscopy (SEM) was carried out for selected specimens. Furthermore, the most important discriminating characteristics for species of *Parapharyngodon* and *Thelandros* are described. This study represents the first parasitological study on *L. nupta nupta*.

Key words: Kashan, Lizards, parasites, nematodes, *Parapharyngodon, Thelandros,* SEM

The large-scaled rock agama, *Laudakia nupta nupta* (De Filippi, 1843), inhabits large limestone rocks and other outcrops with deep crevices and can also be found on walls, mud-brick dwellings, old buildings and watery valleys, throughout the Iranian plateau. Populations of this lizard occur in the foothills of the Zagros Mountain chains along the Iraq-Iran border, eastward through southern Iran into southern Afghanistan and Pakistan, Baluchistan (Anderson 1999). Iran has a rich reptilian fauna, with some 125 species of lizards assigned to 36 genera in eight families from different areas of the country (Rastegar-Pouyani *et al*. 2008). Despite the wealth of knowledge on lizards of Iran, little is known about their parasite fauna; in fact, there is only one published paper on the subject from Iran (Rezazadeh *et al*. 2012). Goldberg *et al*. 2003 have studied parasites of a closely related taxon, *L. nupta fusca*, from neighbouring Pakistan, and, among other parasites, they found five species of nematodes: *Spinicauda hardwicki*, *Tachygonetria paradentata*, *Thelandros baylisi*, *T. massae* and *T. taylori*. To help fill the gap in our knowledge on the parasites of lizards in the region, we carried out a systematic study of the parasitic fauna of *L. nupta nupta* from Kashan Province in central Iran. Our study revealed that most of the nematode species recovered from *L. nupta nupta* belong to a single family of nematodes, the Pharyngodonidae Travassos, 1919**.**

The taxonomic status of *Parapharyngodon* Chatterji, 1033 has been contentious almost since its proposal by Chatterji (1933), and there have been numerous debates over diagnostic characteristics used for assigning species to either *Parapharyngodon* Chatterji, 1933 or *Thelandros* Wedl, 1862 (Baylis 1936; Karve 1938; García-Calvente 1948; Skrjabin *et al*. 1951; Freitas 1957; Yamaguti 1961; Chabaud 1965; Sharpilo 1976; Petter & Quentin 1976; Castaño-Fernandez *et al*. 1987; Gupta *et al*. 2009; Pereira *et al*. 2011). Adamson (1981) re-established *Parapharyngodon* based on the dietary habits of the host, the morphology of the male genital cone, egg morphology and the morphology of the female tail. Subsequently, Adamson & Nasher (1984b) distinguished members of *Thelandros* from those of *Parapharyngodon* based on of the two more reliable traits of the males.

To the best of our knowledge, there is no report of helminths of *L. nupta nupta* from Iran. Consequently, any systematic study would likely produce new geographical records, but we also found several new species from different nematode families, two of which are described here.

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