Zootaxa 4000 (5): 531–546
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.4000.5.3
http://zoobank.org/urn:lsid:zoobank.org:pub:80866FE3-7990-4689-9637-1E68377E586E

Molecular and morphological characterization of *Veleshkinema iranicum* n. gen., n. sp. (Nematoda: Hexatylina, Sphaerularioidea) from Iran

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Abstract

Veleshkinema iranicum **n. gen.**, **n. sp.** is described and illustrated based on morphological, morphometric and molecular characters. The new genus is characterized by having slender females and males, stylet with asymmetrical knobs, dorsal gland orifice just posterior to subventral knob, lip region with flattened apex and eight sectors, pharynx with a non-muscular and non-valvular median bulb, pharyngeal glands slightly overlapping intestine dorsally, visible cellular cardia, female with a single gonad having a quadricolumellate crustaformeria with 8–10 cells in each column, no postvulval uterine sac and rounded and offset spermatheca containing spheroid sperm cells, males with arcuate tylenchoid spicules and subterminal bursa. The new genus is morphologically compared with four genera: *Abursanema*, *Deladenus*, *Prothallonema* and *Sphaerularia.* Molecular phylogenetic studies of the new genus using 808 bp partial sequences of SSU ribosomal RNA gene placed the new genus in a clade with *Sphaerularia* spp. In phylogenetic analyses using 756 bp partial sequences of the 28S ribosomal RNA gene (D2–D3 segments), the new genus formed a monophyletic group with *Abursanema iranicum* and *Sphaerularia* spp.

Key words: Hexatylina, Iran, new genus, new species, partial LSU, partial SSU, SEM, Sphaerulariidae

Introduction

The family Sphaerulariidae (Lubbock, 1861) Skarbilovich, 1947 contains one subfamily, Sphaerulariinae (Lubbock, 1861) Pereira, 1931. This subfamily contains three genera namely *Tripius* Chitwood, 1935, *Prothallonema* Christie, 1938 and *Sphaerularia* Dufour, 1837. Members of these genera can be parasites of Diptera, Coleoptera and Hymenoptera. The free-living stage is well-known for some genera like *Prothallonema*, in which it is mycetophagous, but for others is unknown (Siddiqi, 2000). Bovien (1944) described the general life cycle of Sphaerulariinae as follows: The slender free-living form penetrates the body wall of insect host. In the haemocoel of host, it undergoes transformations, during which the body size increases and becomes mostly filled with reproductive organs. In the well-studied species, *Sphaerularia bombi* Dufour, 1837, uterus grows and is everted out of the body, which contains the rest of reproductive organs and intestinal cells. The eggs are laid in the body of the host. In some cases, juvenile nematodes may reach full maturity while the host is still in larval stage, but in others they do not mature until the host completes development. When the nematodes reach the fourth (last) juvenile stage, they start to exit from the host body. After exiting the host, they undergo the final molt and become adults, ready to penetrate a new host. Currently *Hexatylus mulveyi* Das, 1964, *Prothallonema mucronatus* (Thorne & Malek, 1968) Siddiqi, 1986, *Deladenus durus* (Cobb, 1922) Thorne, 1941 and *Prothallonema obtusum* (Thorne, 1941) Siddiqi, 1986 have been reported from Iran (Kheiri, 1972; Gharakhani *et al.,* 2010; Jahanshahi Afshar *et al*., 2014). Recently, Yaghoubi *et al.* (2014) described a new genus in the superfamily Sphaerularioidea (Lubbock, 1861) Poinar, 1975, namely *Abursanema* Yaghoubi, Pourjam, Pedram, Siddiqi & Atighi, 2014. During our

Accepted by P. Mullin: 23 Jun. 2015; published: 19 Aug. 2015