Zootaxa 3980 (3): 359–378
www.mapress.com/zootaxa/

Article

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

http://dx.doi.org/10.11646/zootaxa.3980.3.2
http://zoobank.org/urn:lsid:zoobank.org:pub:1E024E35-8591-45AD-B23A-7A21F615A0EF

Two new species of *Dracoderes* (Kinorhyncha: Dracoderidae) from the Ryukyu Islands, Japan, with a molecular phylogeny of the genus

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Abstract

Two new species, *Dracoderes snufkini* **sp. nov.** and *Dracoderes toyoshioae* **sp. nov.**, are described from Okinawa, southern Japan. Diagnostic characters of *D. snufkini* include: lateroventral tubules on segments 2 and 5; a thick, plump middorsal spine on segments 2 and 9; thick plump paradorsal spines on segments 3–8, alternately laterally displaced; and a ventral primary pectinate fringe on segment 1, with long, wide conspicuous tips. Diagnostic characters of *Dracoderes toyoshioae* include: a middorsal subcuticular structure on segment 1; paradorsal subcuticular structures on segments 2–9, alternately laterally displaced; paradorsal acicular spines arising from subcuticular structures, at least on segment 5; ventrolateral acicular spines on segment 1; lateral accessory tubules on segment 2; lateral accessory subcuticular structures on segments 2–7; lateroventral tubules on segment 5; and lateroventral subcuticular structures on segments 2–10. Molecular phylogenetic analyses based on 18S rRNA, 28S rRNA and mitochondrial COI sequences indicate that *D. abei* and *D. nidhug* are more closely related to one another than either is to *D. snufkini* or *D. toyoshioae*.

Key words: Kinorhyncha, meiofauna, taxonomy, phylogeny, Okinawa

Introduction

Dracoderes, one of 23 kinorhynch genera, was established with the description of the type species, *Dracoderes abei* Higgins & Shirayama, 1990. *Dracoderes* had been thought to belong to the order Cyclorhagida, but molecular phylogenetic analyses and high-resolution light microscopy and scanning electron microscopy indicated a close relationship not to Cyclorhagida, but to Homalorhagida and the genus *Franciscideres* (Dal Zotto *et al*. 2013; Sørensen *et al*. 2012; Thomsen *et al*. 2013; Yamasaki *et al*. 2013; but note the contrary hypothesis in Neuhaus & Kegel *et al*. 2015). *Dracoderes* will soon be included in a newly circumscribed class that also includes *Franciscideres* and all homalorhagid genera (Sørensen *et al*. 2015).

The most recently revised diagnosis of the genus specifies a mouth cone with nine outer oral styles, alternating in size between larger and smaller ones; a neck with nine placids, with the dorsal and midlateral placids well-spaced, interrupted by cuticular folding; trunk segment 1 composed of a closed cuticular ring; segments 2–11 composed of one tergal and two sternal plates; dorsal spines on segments 2–9, with the spines on segments 2 and 9 located in the middorsal position, and spines on remaining segments laterally displaced alternately left or right in paradorsal position; lateroventral spines on segments 6–9; segment 11 with lateral terminal spines and without lateral terminal accessory spines; and 3 pairs of penile spines on segment 11 in males (Sørensen *et al*. 2012). Although *Dracoderes nidhug* Thomsen *et al*., 2013, which was described subsequent to Sørensen *et al*. (2012), departs from the generic diagnosis in lacking a dorsal spine on segment 2 and in having a middorsal rather than a paradorsal spine on segment 3, the species appears to belong in *Dracoderes* because other characters match the generic description (Thomsen *et al*. 2013).

Four *Dracoderes* species have been described to date: *D. abei*, originally collected from Mukaishima Island, Inland Sea of Japan, and distributed at depths less than 104 m from western Japan to Korea (Higgins & Shirayama 1990; Sørensen *et al*. 2012); *Dracoderes orientalis* Adrianov *in* Adrianov & Malakhov, 1999, described from Ulsan Bay, east coast of Korea; *Dracoderes gallaicus* Sørensen *et al*., 2012, occurring on the western and southern

Accepted by D. Gordon: 2 Jun. 2015; published: 30 Jun. 2015