



## Revision of tapeworms (Cestoda: Bothriocephalidea) from lizardfish (*Saurida*: Synodontidae) from the Indo-Pacific region

ROMAN KUČHTA<sup>1,2</sup>, TOMÁŠ SCHOLZ<sup>1,2</sup>, ROMANA VLČKOVÁ<sup>2</sup>, MILAN ŘÍHA<sup>2,3</sup>, THORSTEN WALTER<sup>4</sup>, ASRI T. YUNIAR<sup>5</sup> & HARRY W. PALM<sup>6</sup>

<sup>1</sup>Institute of Parasitology, Biology Centre of the Academy of Sciences of the Czech Republic and <sup>2</sup>Faculty of Science, University of South Bohemia, Branišovská 31, 370 05 České Budějovice, Czech Republic. E-mail: krtek@paru.cas.cz

<sup>3</sup>Institute of Hydrobiology, Biology Centre of the Academy of Sciences of the Czech Republic, Na Sádkách 7, 370 05 České Budějovice, Czech Republic;

<sup>4</sup>Ostseestation Priwall, Am Priwallhafen 10, 23570 Lübeck-Travemünde, Germany

<sup>5</sup>Marine Research Center, Central Pertiwi Bahari Ltd., Desa Suak, Kecamatan Sidomulyo, Lampung Selatan, Indonesia

<sup>6</sup>Institute for Zoomorphology, Cell Biology and Parasitology, Heinrich-Heine University Düsseldorf, Universitätsstrasse 1, Geb. 26.03, 40225 Düsseldorf, Germany

### Abstract

Bothriocephalidean cestodes reported from lizardfish (*Saurida* Valenciennes in Cuvier & Valenciennes) were revised on the basis of newly collected material from type-hosts and available type- and voucher specimens. Instead of nine taxa of four genera listed in the literature, only *Oncodiscus sauridae* Yamaguti, 1934 and *Penetrocephalus ganapattii* (Rao, 1954) are considered valid and thus both genera become monotypic. Both taxa are redescribed, including the first scanning electron micrographs and data on intraspecific variability. Both species are unique among bothriocephalid cestodes in the lateral position of the vagina in relation to the cirrus-sac. *Oncodiscus sauridae* found in *Saurida longimanus* Norman, *S. nebulosa* Valenciennes (new host record), *S. tumbil* (Bloch) and *S. undosquamis* (Richardson) differs from *P. ganapattii* found in *S. micropectoralis* Shindo & Yamanda and *S. tumbil* in the following characters: (i) scolex shape (fan-shaped, with crenulated bothrial margins in *O. sauridae*, replaced by a *scolex deformatus* in *P. ganapattii*); (ii) site of scolex attachment (in the intestinal lumen in the former taxon versus penetrating through the intestinal wall, and encysted on pyloric caeca in *P. ganapattii*); (iii) shape of segments (usually only slightly wider than long in *O. sauridae* versus very short, much wider than long in *P. ganapattii*); and (iv) number of testes (50–100 per segment in *O. sauridae* whereas fewer than 60 in *P. ganapattii*). *Bothriocephalus sauridae* Ariola, 1900 is considered a *species inquirendum*, although conspecificity with *O. sauridae* is very probable. The present study demonstrates the necessity of using standard procedures, especially adequate fixation methods of freshly collected cestode material (hot 4% formaldehyde solution is strongly recommended for morphological studies), because most previous descriptions were based on poor-quality material, including partly macerated worms missing hooklets on the apical disc of the scolex in *O. sauridae*.

**Key words:** Bothriocephalidae, Eucestoda, Indo-Pacific, Pseudophyllidea, lizardfish, *Oncodiscus sauridae*, *Penetrocephalus ganapattii*, *Saurida*, Synodontidae, tapeworm

### Introduction

Fish parasitological studies in the Indo-Pacific region have indicated that several species have a wide range of distribution throughout the region, causing taxonomic confusion due to duplicate species descriptions (e.g. Palm & Overstreet 2000). Palm (2000, 2004) summarized the trypanorhynch cestode fauna from the southern Indonesian coast, demonstrating significant overlap of species composition in Indian and southern Indonesian waters. Lönnberg (1893) described the first tetraphyllidean cestode from Java, and Yamaguti (1954) studied