



## Redescription of *Orobdella ijimai* (Hirudinida: Arhynchobdellida: Gastrostomobdellidae), and two new species of *Orobdella* from the Ryukyu Archipelago, Japan

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### Abstract

Sexannulate *Orobdella* leech, *Orobdella ijimai*, is redescribed based on newly collected specimens from the type locality, Nikko, Tochigi Pref., Japan, since this species was originally described based on limited number of characters. In addition, two new sexannulate species, *Orobdella dolichopharynx* **sp. nov.** from Amamioshima Island in the Ryukyu Archipelago, Japan, and *Orobdella shimadae* **sp. nov.** from Okinawajima Island also in the Ryukyu Archipelago, are described. They resemble *O. ijimai* in the annulation of mid-body somites, but they differ from the latter in the annulation of somite VIII, position of gonopores, the lack of gastropore, the length of pharynx, the shape of gastroporal duct, and the morphology of male genital organ. Two new *Orobdella* species differ from each other in the annulation of somite VII, the position of gonopores, and the shape of gastroporal duct. In accordance with the two new species, the diagnosis of *Orobdella* is slightly emended.

**Key words:** Hirudinida, Gastrostomobdellidae, *Orobdella ijimai*, new species, gastroporous, Japan

### Introduction

The terrestrial macrophagous leech genus *Orobdella* Oka, 1895 includes six species which are divided into three groups according to a mid-body somite annulation (Nakano 2011): 1) *Orobdella esulcata* Nakano, 2010 (quadrannulate); 2) *Orobdella ijimai* Oka, 1895 (sexannulate); 3) *Orobdella kawakatsuorum* Richardson, 1975 (quadrannulate); 4) *Orobdella octonaria* Oka, 1895 (octannulate); 5) *Orobdella tsushimensis* Nakano, 2011 (quadrannulate); and 6) *Orobdella whitmani* Oka, 1895 (quadrannulate). This genus was placed in the family Gastrostomobdellidae Richardson, 1971, together with the genus *Gastrostomobdella* Moore, 1929 based on the presence of the gastropore and gastroporal duct (Richardson 1971; 1975; Nakano 2010). Gastrostomobdellid species are mountainous terrestrial leeches distributed in Southeast and East Asia, and Hawaii (Oka 1895; Moore 1929; 1935; 1946; Gilyarov *et al.* 1969; Richardson 1971; 1975; Lukin 1976; Sawyer 1986). Sawyer (1986) placed this family in Hirudiniformes on account of the euthylaematous pharynx. Recent molecular phylogenetic work revealed that *Orobdella* is included into Erpobdelliformes (Oceguera-Figueroa *et al.* 2011). However, the phylogenetic position of *Gastrostomobdella*, the type genus of this family, still remains uncertain.

Among the six known *Orobdella* species, sexannulate species, *Orobdella ijimai*, was originally described based on ten specimens from Nikko, Tochigi Pref., Japan (Nikkō in his paper) along with *O. whitmani* and *O. octonaria* (Oka 1895). This species was later recorded from Amamioshima Island in the Ryukyu Archipelago, Japan (Oka 1910a; b). However, *Orobdella ijimai* was originally established based on limited number of features. In addition, the type series of *O. ijimai* are missing. Therefore, in order to re-evaluate the morphology and diagnostic characters for *Orobdella ijimai*, new specimens were obtained from the type locality, Nikko, in May, 2010, and from Amamioshima Island in 2009–2010. In addition, sexannulate *Orobdella* specimens were newly collected from Okinawajima Island in the Ryukyu Archipelago in 2010. Herein, *Orobdella ijimai* is made the emended description, and two new *Orobdella* leeches from the Ryukyu Archipelago are described.