

Naupliar Development of *Tigriopus japonicus* Mori, 1932 (Copepoda: Harpacticidae)

Hans U. Dahms¹, Supawadee Chullasorn², Pawana Kangtia², Frank D. Ferrari³, and Jiang-Shiou Hwang^{1,*}

¹Institute of Marine Biology, National Taiwan Ocean University (NTOU), Keelung 202, Taiwan

²Department of Biology, Faculty of Science, Ramkhamhaeng University, Bangkok 10240, Thailand

³Smithsonian Institution, IZ, MSC, MRC-534, Washington DC 20560-0544, USA

(Accepted May 21, 2007)

Hans U. Dahms, Supawadee Chullasorn, Pawana Kangtia, Frank D. Ferrari, and Jiang-Shiou Hwang (2007) Naupliar development of *Tigriopus japonicus* Mori, 1932 (Copepoda: Harpacticidae). *Zoological Studies* 46(6): 746-759. Six naupliar stages of *Tigriopus japonicus* Mori, 1932 are described from the rocky coast off Keelung, northeastern Taiwan. A key for the identification of stages is provided. Naupliar morphology within the Harpacticidae differs among species and even more at the supraspecific level. The present study on nauplii of *Tigriopus japonicus* confirms the observation that representatives of the Tachidiidae and Harpacticidae (Copepoda-Harpacticoida) show a peculiar reduction of the oral structures from N V to N VI. The nauplii of the Harpacticidae are creeping larvae, and many are not able to swim; however, nauplii of *T. japonicus* are an exception to this rule. <http://zoolstud.sinica.edu.tw/Journals/46.6/746.pdf>

Key words: Naupliar development, Larval stages, Identification key, Evolution.

Like several other groups of Crustacea, harpacticoid copepods develop nauplius larvae as their early postembryonic stages (Bjørnberg 1986, Dahms 2000). Harpacticoids as do most free-living Copepoda, go through 6 naupliar and 6 copepodid stages (Ferrari and Dahms 2007). The naupliar phenotype is quite unlike the adults, and it is difficult to tell which nauplius belongs to which species, unless the development of isolated females is observed in the laboratory. Compared to other copepod taxa, naupliar development of harpacticoids has been far less studied (Dahms 1990, 2004a b). There are no fewer than 16 harpacticoid families for which nothing is known about the developmental instars. Naupliar instars are exposed to different selection pressures, and nauplii, therefore, have undergone remarkable adaptive radiation, leading to a diversity of structures, behavioral characteristics, and distribution patterns (Borutzky 1952). Due to their great abun-

dances and variety, nauplii may also play important ecological roles (Alekseev 2002, Dahms and Qian 2004). Life-history studies in the field and investigations of stage-specific phenomena in the laboratory are also hampered by a lack of descriptive information and missing keys for identification that are the basis for all work on stage-specific phenomena in the laboratory and heterogeneous assemblages in the field (Dahms 1993, Dahms et al. 2006). Much rearing and descriptive work has to precede any serious attempt to tackle ontogeny-related problems. This is particularly true for *Tigriopus* since this taxon has become the focal point of several in-depth studies, e.g., of its field ecology (Dethier 1980), life history (Koga 1970), internal anatomy (Itô 1973), chemical ecology (Kelly and Snell 1998), genetics of adaptation (Davenport et al. 1997, Burton et al. 1999), population genetics (Edmands and Burton 1998, Edmands 1999), and genomics in general

*To whom correspondence and print requests should be addressed. Tel: 886-935-289642. Fax: 886-2-24629464. E-mail: Jshwang@mail.ntou.edu.tw