Zoological Studies **51**(3): 372-382 (2012)

Zoological Studies

Naupliar Development of an Ancorabolid, *Paralaophontodes* sp. (Copepoda: Harpacticoida) Sheds Light on Harpacticoid Evolution

Supawadee Chullasorn[1], Hans-U. Dahms[2], Nozomu Iwasaki[3], Pawana Kangtia[2], Frank D. Ferrari[4], Hyoung Joo Jeon[5], and Wan-Xi Yang[6,*]

[1]*Department of Biology, Faculty of Science, Ramkhamhaeng University, Bangkok 10240, Thailand*

[2]*Green Life Science Department, College of Natural Science, Sangmyung University 7, Seoul 110-743, South Korea*

[3]*Usa Marine Biological Institute, Kochi University, Usa-cho, Tosa, Kochi 781-1164, Japan*

[4]*National Museum of Natural History, Smithsonian Institution, 4210 Silver Hill Rd., Suitland, MD 20746, USA*

[5]*National Fisheries Research and Development Institute, Inland Fisheries Research Institute, Gyeonggi-do 114-3, South Korea*

[6]*The Sperm Laboratory, College of Life Sciences, Zhejiang University, Zi Jin Gang Campus, 866 Yu Hang Tang Rd., Hangzhou, Zhejiang 310058, China*

(Accepted November 24, 2011)

Supawadee Chullasorn, Hans-U. Dahms, Nozomu Iwasaki, Pawana Kangtia, Frank D. Ferrari, Hyoung Joo Jeon, and Wan-Xi Yang (2012) Naupliar development of an ancorabolid, *Paralaophontodes* sp. (Copepoda: Harpacticoida) sheds light on harpacticoid evolution. *Zoological Studies* **51**(3): 372-382. Loss of the naupliar arthrite during the molt to naupliar stage (N) VI provides a developmental apomorphy for all Harpacticoida and sheds light on the evolution within this diverse copepod taxon. Naupliar development of *Paralaophontodes* sp. is unusual because the bud of swimming legs 1 and 2 does not bear setae at N VI and because the naupliar arthrite, present on the coxa of antenna 2 during the 1st 5 stages, fails to form during the molt to N VI; in addition, setal elements are lost from the basis and endopod of the mandible during this molt. This is only known from some harpacticoid copepods belonging to *Tisbe*; loss of setal elements on the mandible was also otherwise reported for species of the Tachidiidae and Harpacticidae. Five naupliar stages of the ancorabolid, *Paralaophontodes* sp., are described. A key to the identification of the stages is provided. Stages can be distinguished by the number of segments of the exopod of antenna 2, setation of the limbs including the bud of the caudal ramus, and the presence and setation of the bud of maxilla 1. This is the 1st description of nauplii of a species belonging to the oligoarthran family Ancorabolidae.
http://zoolstud.sinica.edu.tw/Journals/51.3/372.pdf

Key words: Naupliar characters, Evolution, Systematics, Phylogeny, Development, Ancorabolidae.

Larvae of copepods provide a rich source of information about their structure, genetics, behavior, systematics, evolution, and ecology (Dahms et al. 2007, Ferrari and Dahms 2007). This includes valuable information for reconstructing evolutionary histories and determining phylogenetic relationships (Barnett 1966, Dahms 1991 2004, Ferrari 1998, Chullasorn et al. 2009, Dahms et al. 2009, Ferrari et al. 2010). Development of copepod larvae can be divided into naupliar and copepodid phases (Dahms et al. 2005 2006). Copepod nauplii are much smaller relative to copepodids, and do not show clear external expression of somites, although the naupliar body increases in size from 1 stage to the next, and limb buds are often added in a way that predicts evolutionary trends of increasing somite numbers (Ferrari and Dahms 2007). The caudal rami of early nauplii have 3 well-developed, segmented appendages and seta-bearing buds. Buds of some limbs between the mandible and

*To whom correspondence and reprint requests should be addressed. Hans-U. Dahms and Wan-Xi Yang contributed equally to this work. Tel: 86-571-88206643. Fax: 86-571-88206485. E-mail:wxyang@spermlab.org