

RESULTS OF THE DIVA-1 EXPEDITION OF RV “METEOR” (CRUISE M48/1)

**A parthenogenetic, simplified adult in the life cycle of
Pliciloricus pedicularis sp. n. (Loricifera) from the deep sea of
the Angola Basin (Atlantic)**

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Abstract

A new species, *Pliciloricus pedicularis* (Pliciloricidae, Loricifera), is described inhabiting fine-grained clayish sediments in the deep sea of the Angola Basin. This is the first report of a *Pliciloricus*-species with a simplified parthenogenetic adult in its life cycle. The simplified adult is a non-free-living stage differing morphologically considerably from the free-living bisexual adults. It has a sack-like body without an introvert but with a persisting neck region covered with hooks or spiny pads. The sack-like body contains mainly the mature ovary. Large eggs are released into a shelter formed by the exuvium of the last or seventh instar Higgins-larva. Both types of adults, the parthenogenetic as well as the bisexual ones, are surrounded during metamorphosis by two exuviae: a simple inner one as rest of the postlarval stage and an outer one belonging to the seventh instar Higgins-larva. The bisexual adult of the new species is characterized by type B spinoscalids in the fourth row basally equipped with a ventral row of minute denticles; long rigid trichoscalids basally with numerous strong cross walls; small cuticular bars directly above the well-defined edge of the lorica, and a lorica consisting of 44 primary plicae. Distinguishing features of the Higgins-larva of the new species are: very long toes, and clavoscalids with a dorsal row of spinules and an additional fourth segment. The most conspicuous feature of the Higgins-larva is the stem-like basal part of the anterior setae called pedicels. Especially the enlarged pedicels of the posterolateral setae enable the larva to be determined even when the introvert is retracted. The study revealed new information about embryology and development, which have never been observed in any Loricifera-species so far. The great abundance of the new species in samples from the Angola Basin allows the identification of most life history stages and developmental instars.

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Keywords: Loricifera; Pliciloricidae; Parthenogenesis; Life history stages; Life cycles; Deep-sea meiofauna

Introduction

There are only few reports of Loricifera from the deep sea so far (Soetaert et al. 1984; Kristensen and Shirayama 1988; Hubbard et al. 1988). The first and to date only species described from the deep sea belongs to the Pliciloricidae. *Pliciloricus hadalis* Kristensen and

Shirayama, 1988 was found inhabiting red clay at 8260 m depth in the Izu-Ogasawara Trench of the Western Pacific (Kristensen and Shirayama 1988).

During the DIVA 1 (*Diversity of the deep sea in the Atlantic*) expedition many new species of Loricifera were discovered in the deep sea of the Angola Basin indicating that Loricifera are more widely distributed in the deep sea than previously assumed (Gad 2001, 2004a). What is regarded as the basic life cycle of the Loricifera includes sexually dimorphic adults of both

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Nomenclature Abbreviations

ac	anal cone	lr	longitudinal fold in larva
Ad	bisexual adult	lr ₁	longitudinal (primary) ridge in adult
Ad*	simplified (parthenogenetic) adult	ls ₁	anterolateral seta
af	anal field	ls ₂	anteroventral seta
cgl	caudal gland	lw	lateral weal
an	anus	mac	macromeres
ap	anal plate	mc	mouth cone
apl	anterior plate of prepharyngeal armature	mca	mouth cone anlage
apo	apodeme	mcr	mouth cone retractor
bar	cuticular bar	mcs ₁₋₃	first to third section of mouth cone
bc	buccal channel	mic	micromeres
bg ₁	anterior cuticular bridge	mo	mouth opening
bg ₂	posterior cuticular bridge	ms	midventral oral seta
bl	blastula	muc	multicorer
bp	basal plate	nc	nucleus
bp _{1-2a}	first to second row of type A basal plates	ne	protonephridium
bp _{3a}	third row of type A basal plates with single type A trichoscalid	ngl	neck gland
bp _{1-2b}	first to second row of type B basal plates	nk	neck
bp _{3b}	third row of type B basal plates with double type B trichoscalid	oc	oocyte
br	brain	oe	oesophagus
bra ₁	anterior double bracelet	or	primary oral ridge
bra ₂	posterior single bracelet	os	oral stylet
bt	basal plate of toe	ost	oral stria
bu	buccal tube	ot	oral tooth
bug	buccal gland	ov	ovary
cb	central body	p ₁₋₅	first to fifth row of placoids
clo	cloaca	pa	papilla-like oral elements of postlarva
co	collar	pb	pharyngeal bulb
cr ₁	first row of clavoscalids	pc	pharyngeal crown
cs	clavoscalid	pd	pad
ct	claw-tip	ped	pedicel
cw	cross wall	pl ₁	primary plica
d	dorsal	pl ₂	secondary plica
do ₁	primary double-organ	Pla	postlarva
do ₂	secondary double-organ	plm	midventral transformed plica
ec	end cone	por	gonopore
ed	anterior edge of lorica	ps	protoscalid
eg	egg	pt	pore of tubular part of toe
egs	egg shell	ram	radial muscle
em	embryo	re ₁	retractor of scalids
fl	flosculus	re ₂	main retractor of introvert
fo	follicle	re ₃	neighbouring retractor of introvert
ga	gastrula	rec	rectum
gu	midgut	rim	ring muscle
ho	hook	rim ₁	ring muscle of thorax
ia	prepharyngeal armature	rim ₂	ring muscle at end of midgut
in	introvert	ro	round structure
Lar I	first instar Higgins-larva	ru	ruff
Lar VII	seventh instar Higgins-larva	sbp ₄₋₈	basal plates of fourth to eighth row of spinoscalids
lm	longitudinal muscle	sc	scalid
lo	lorica	scm	scalid muscle
		sca	scalid anlage
		se ₁	posterodorsal seta
		se ₂	posterolateral seta

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