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Discovery of *Smacigastes* Ivanenko & Defaye, 2004 (Copepoda: Harpacticoida: Tegastidae) in a deep-sea cold seep, with the description of a new species from the Gulf of Mexico*

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Abstract

The new tegastid species *Smacigastes methanophilus* sp. nov. is described from cold-seep samples collected from the Gulf of Mexico in 2006. Besides *Smacigastes micheli* Ivanenko & Defaye, 2004 and *Smacigastes barti* Gollner, Ivanenko & Martínez Arbizu, 2008, this is the third species of the genus *Smacigastes* Ivanenko & Defaye, 2004. To date, this genus contains the only species within the family Tegastidae known from deep-sea habitats. Furthermore, *S. methanophilus* sp. nov. is the first species of Tegastidae found at cold seeps and associated with tubeworm aggregations. It has the same primitive features as *S. micheli* but can be distinguished from the latter by the setation of second and third segments of female antennule and second segment of male antennule, the setation of the mandibular palp, the ornamentation of P5 exopod in both sexes, setation of male P5 exopod, form of the female P5 baseoendopod, and the different shape and length of the P5 setae in female. Moreover, both sexes of *Smacigastes methanophilus* sp. nov. are much smaller than those of *S. micheli.* Compared to *S. barti, S. methanophilus* sp. nov. differs in the segmentation and setation of female antennule, the setation of male antennule, setation of mandibular palp, setation of the maxillule, number of endites of the maxilla, number of setae in P1, the ornamentation of female P5 and setation in male P5.

Key words: Chemosynthetic habitat, deep sea, taxonomy, Harpacticoida

Introduction

Since their first discovery in the early 80s of the last century, many deep-sea cold seeps have been reported in various parts of the world´s oceans. Most of them occur in geologically active and passive continental margins, where fluids enriched with methane seep out of the sediment forced by pressure. Regarding the presence of reduced chemical compounds, cold seeps are similar to hydrothermal vents. The similar chemical conditions of these habitats may allow the establishment of similar biological communities as has been detected for the specialized symbiont bearing siboglinid tubeworms and bathymodiolid mussels of these chemosynthetic environments (Levin 2005). However, the existing studies do not show this for the meiofauna communities. In fact, the few studies about cold seep copepods (Robinson et al. 2004; Zekely et al. 2006) indicate that there are no specific copepod communities at cold seeps, but in both cases copepods have been determined on family level only. In contrast to hot vents, where a dominance of specialized siphonostomatoid copepods of the family Dirivultidae can be observed (Heptner & Ivanenko 2002), the cold seeps investigated are dominated by harpacticoid copepods (Gollner *et al*. 2006; Robinson *et al*. 2004; Zekely *et al*. 2006). This was also observed in the meiofauna samples of the "Atlantis" cruise in the year 2006 which aimed to

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