Neotropical Biology and Conservation
8(2):111-114, may-august 2013

SHORT COMMUNICATION

Microdesmus longipinnis (Gobioidei, Microdesmidae): Occurrence, abundance and sampling in a subtropical estuary

Microdesmus longipinnis (Gobioidei, Microdesmidae): ocorrência, abundância e amostragem em um estuário subtropical

José Maria Souza-Conceição[1,*]
zzze.maria@yahoo.com.br

Micheli Duarte de Paula Costa[2]
duarte.micheli@yahoo.com.br

Henry Louis Spach[3]
henry@ufpr.br

Paulo Ricardo Schwingel[4]
schwingel@univali.br

Abstract

This work describes the first occurrence and abundance of larvae of *M. longipinnis* (Weymouth, 1910) in the Babitonga Bay estuary, southern Brazil. During an annual cycle (2007-2008), 144 plankton samples with cylindrical-conical net with 50cm in diameter (500µm mesh) and 72 samples with conical plankton net with 40cm in diameter (200µm mesh) were collected at nine stations. In addition, samplings were done with bottom trawl net (12mm mesh) at each station, aiming to collect juveniles and/or adults of *M. longipinnis*. Larvae occurred from February to May over a broad range area in Babitonga Bay. A total of 7 larvae was collected, with average abundance of 5.4 larvae.100m^{-3}. In sampling with bottom trawl, juveniles and adults were not recorded. Although recorded only in the ichthyoplankton, the results indicate, for the first time, the occurrence of *M. longipinnis* on the subtropical coast of Brazil, thus enabling a discussion on the ecology and sampling of these fishes with cryptic habits.

Key words: Ichthyoplankton, Babitonga Bay, Southwestern Atlantic.

Resumo

Este trabalho descreve a primeira ocorrência e a abundância de larvas de *M. longipinnis* (Weymouth, 1910) na baía da Babitonga, sul do Brasil. Adicionalmente, a ausência de indivíduos juvenis e adultos na amostragem com arrastos de fundo é discutida. Durante um ciclo anual (2007-2008) foram coletadas, em nove estações, 144 amostras com rede de plâncton cilíndrico-cônica de 50cm de diâmetro (malha 500µm) e 72 amostras com rede de plâncton cônica de 40cm de diâmetro (malha 200µm). Adicionalmente, foram realizadas amostragens com rede de arrasto de fundo com portas (malha 12mm) visando a coletar jovens e/ou adultos de *M. longipinnis*. Larvas ocorreram de fevereiro a maio ao longo de extensa faixa espacial na baía da Babitonga. No total, foram coletadas sete larvas, com abundância média de 5,4 larvas.100m^{-3}. Nas amostragens com arrasto de fundo, jovens e adultos não foram registrados. Embora registrada somente no ictioplâncton, os resultados indicam, pela primeira vez, a ocorrência de *M. longipinnis* na costa subtropical do Brasil, permitindo uma discussão sobre a ecologia e a amostragem desses peixes de hábitos crípticos.

Palavras-chave: Ictioplâncton, Baía da Babitonga, Atlântico Sudoeste.

[1] EEB Alexandre Guilherme Figueredo - SED-SC. Rua Osório Domingos Correa, 519, 88380-000, Balneário Piçarras, SC, Brasil.
[2] Laboratório de Ecologia do Ictioplâncton, Instituto de Oceanografia - Universidade Federal de Rio Grande, Campus Carreiros. Av. Itália, Km 8, Caixa Postal 474, 96201-900, Rio Grande, RS, Brasil.
[3] Centro de Estudos do Mar, Universidade Federal do Paraná. Av. Beira Mar, s/n, 83255-976, Pontal do Sul, PR, Brasil.
[4] Centro de Ciências Tecnológicas da Terra e do Mar – CTTMar, Universidade do Vale do Itajaí. Rua Uruguai, 457, 88302-202, Itajaí, SC, Brasil.
* Corresponding author.

The presence of Microdesmidae fishes in Brazil has been described in few studies (Eskinazi, 1972; Dawson, 1973; Lopes *et al.*, 1998, 1999; Castro *et al.*, 2001; Ekau *et al.*, 2001; Marcolin, *et al.*, 2010). *Microdesmus longipinnis* (Weymouth, 1910) is widely distributed in western Atlantic, from Bermuda and northern Gulf of Mexico, along the coast of South America to Brazil (Richards, 2006). In Brazil, specimens of *M. longipinnis* have been recorded on the coast of Pernambuco, Espírito Santo, Alagoas and Bahia States (Eskinazi, 1972; Castro *et al.*, 2001; Severi *et al.*, 2008; Marcolin *et al.*, 2010; SIBIP/NEODAT III, 2011). They are small fishes of the suborder Gobioidei, elongated, benthic with burrowing habits, which can live in sandy and muddy bottoms, as well as on the outskirts of rock structures (Eskinazi, 1972; Thomson *et al.*, 2000; Severi *et al.*, 2008). Records of larvae have been more common than those of adults in studies of fish assemblages in Brazil, according to Marcolin *et al.* (2010), which is probably related to their habitat. In such context, the main goal of the present study was to describe the occurrence and abundance of *M. longipinnis* larvae in the Babitonga Bay estuary, located in subtropical Brazil. Additionally, the lack of young individuals and adults in the bottom trawl sampling is discussed.

Field work was done in Babitonga Bay, which is part of the largest estuarine complex of the Santa Catarina State coast, according to IBAMA (1998), where marine water mixes with continental drainage, forming a vertically homogeneous estuary. The ichthyoplankton sampling was performed at 9 stations along the main axis of the bay (Figure 1), evenly distributed at 1km distance from each site inside the sectors of the estuary (mouth sector: sampling stations 1, 2 and 3; middle: 4, 5 and 6; inner: 7, 8 and 9). Each station was sampled during the neap high tide in eight diurnal campaigns (October, November, January, February, April, May, July and August) between 2007 and 2008. *Microdesmus longipinnis* larvae were sampled with a 200µm mesh conical plankton net of 40cm diameter and 1.6m length, fitted with a calibrated Hydrobios mechanic flow meter. It was obliquely hauled for two minutes in each site, resulting in 72 samples. In addition, two 5-minutes oblique hauls were simultaneously performed, using a 500µm mesh cylindrical-conical plankton net of 50cm diameter fitted with a calibrated Hydrobios mechanic flow meter, representing 144 samples. The 200µm mesh was used in order to capture small larvae (Chute and Turner, 2001). Samples were fixed in 4% formaldehyde solution and identified according to the specialized literature (Moser, 1996; Richards, 2006). The abundance was estimated as the number of larvae per 100m³. All individuals were measured with a micrometer rule (precision of 0.1mm) and the ontogenetic stage of development was classified as pre-flexion, flexion and/or post-flexion stages.

Additionally, for comparison with larval distribution, adult and/or juvenile of *M. longipinnis* were searched at each station with double bottom trawling, lasting five minutes each, with a two wooden door net (Wing Trawl model), amounting to 144 samples. Each net measured 8.0m wide, 1m high and 2cm mesh between knots.

A total of 7 larvae of *Microdesmus longipinnis* (Figure 2) was captured in four sampling stations in February, April and May 2008, resulting in abundances of 1.4 to 9.69 larvae.100m^{-3} with 5.41 on average (Table 1). The larvae were mainly collected close to the sea (Table 1). In contrast, the results obtained by Severi *et al.* (2008) revealed the occurrence of larvae throughout the year in three estuaries of Pernambuco State, and the seasonal record of larvae corroborates the present study. Our results regarding the spatial distribution of the larvae were similar to those obtained by Castro *et al.* (2001) in the Rio Piraquê-Açú estuary (Espírito Santo State). The average abundance obtained herein was greater than the average abundances obtained by Marcolin *et al.* (2010) in the estuaries of Tabatinga and Itapicuru rivers (Bahia State), possibly influenced by different environmental conditions.

In the Babitonga Bay estuary a small variation in size was detected for *M. longipinnis*, resulting in an average of 2.14mm. The 200µm mesh net (conical) captured most of the larvae, but the ontogenetic stages of development were the same for all individuals (Ta-

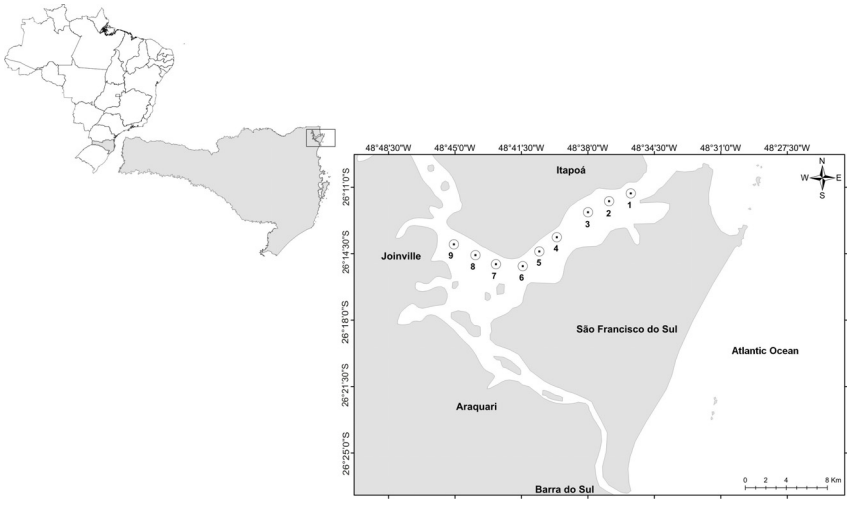

Figure 1. Babitonga Bay (Santa Catarina State, Brazil), and the location of the nine sampling stations along the main estuarine channel.

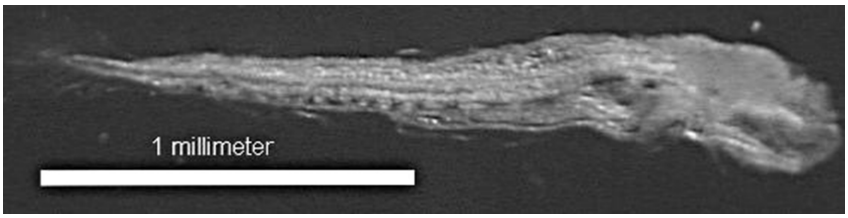

Figure 2. *Microdesmus longipinnis* larvae in pre-flexion stage, collected in the Babitonga Bay estuary, Santa Catarina State, Brazil.

Table 1. Sampling details, length (mm), ontogenetic stages of development (Ont. Stage) and abundance (larvae.100m^{-3}) of the *Microdesmus longippinnis* larvae obtained in the Babitonga Bay estuary, southern Brazil, from October 2007 to August 2008.

Date	Sampling station	Coordinates	Net	Mesh (µm)	Length (mm)	Ont. stage	Abundance (larvae.100m^{-3})
Feb/2008	4	26°13.625'S - 48°39.638'W	conic	200	2.10	pre-flexion	5.26
Feb/2008	7	26°15.058'S - 48°42.841'W	conic	200	2.00	pre-flexion	4.63
Feb/2008	7	26°15.058'S - 48°42.841'W	conic	200	2.10	pre-flexion	4.63
Apr/2008	1	26°11.318'S - 48°35.743'W	conic	200	2.25	pre-flexion	9.69
Apr/2008	3	26°12.318'S - 48°37.998'W	conic	200	2.10	pre-flexion	5.29
Apr/2008	3	26°12.318'S - 48°37.998'W	cyl-conic	500	2.10	pre-flexion	1.40
May/2008	1	26°11.318'S - 48°35.743'W	conic	200	2.35	pre-flexion	6.95

ble 1, Figure 2). The low capture of the 500µm mesh net (cylindrical-conical) indicated the strong presence of the species in less developed stages. Larvae may be generated by individuals living in the bay or in the continental shelf, being probably transported by tidal circulation in this case. Although the origin of the larvae requires further studies, results indicated that this estuary contributes as a shelter area for part of the individuals of the population during the early life, providing, according to Elliott and Hemingway (2002), favourable conditions for their development.

Despite the fact that a great sampling effort was employed with double trawling hauls during the study period, neither a single young nor an adult individual of *M. longipinnis* was captured in the entire extension of the main channel of Babitonga Bay, even with different environmental characteristics of each sampling station (usually sand or mud bottom). This result indicates the migration of individuals throughout development into other habitats, such as the continental shelf and rocky areas that were not possible to study in this work. However, samples collected with beach seine nets (1, 2.5 and 5 mm meshes between adjacent knots) on the shores of the Babitonga Bay did not record the presence of both young and adult individuals (Souza-Conceição, 2008; Araújo, 2009; Bordin, 2010). Mariculture areas also offer conditions to recruits of the species, under or between the culture structures. The use of these areas for several fish species has been described in Babitonga Bay (Santos and Souza-Conceição 2008; Freitas and Velastim, 2010), but not for *M. longipinnis*. In addition to the aforementioned habitats, tide-pools represent another area of recruitment according to Reid (1936) and SIBIP/NEODAT III (2011). Thus, sampling in other habitats of the study area and the use of visual census will play a decisive role in the description of the species distribution, which had not been recorded for the southern Brazil until now (Eskinazi, 1972; Castro *et al.*, 2001; Severi *et al.*, 2008; SIBIP/NEODAT III, 2011).

Currently, capture with plankton nets is the major source of data for the species along the Brazilian coast (*e.g.* Severi *et al.*, 2008; Marcolin *et al.*, 2010) and the non-occurrence of adults in ichthyology works suggests the inefficiency of the routine methods used. According to Dawson (1990), sub-adults and adults are occasionally found swimming near the surface at night. Thus, nocturnal campaigns should be considered in further studies as an important factor on the capture, since the data on *M. longipinnis* in Brazil were obtained during the diurnal period.

The habits of living in burrows and hiding in the face of threat signals make the record of *M. longipinnis* (Eskinazi, 1972; Thomson *et al.*, 2000) difficult. Lopes *et al.* (1998) reported that the size of the specimens can negatively influence the sampling. The passage of the trawl nets could be coded as a threat and thus encourage individuals to hide, which would have eliminated the chances of capture by this sampler. This study brought important information on the occurrence and abundance of ichthyoplankton of *M. longipinnis* on the Brazilian coast (Southwestern Atlantic), showing the

lack of captures of young and adults in a wide sampling of bottom trawling. Thus, it indicates the need for other sampling strategies (method and habitat) to capture individuals in these stages of the life cycle.

Acknowledgments

We thank Universidade da Região de Joinville (UNIVILLE), Universidade Federal do Paraná (UFPR) and Universidade do Vale do Itajaí (UNIVALI) for their financial and logistic support, to Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for the grant to the second author, to volunteer students and to fisherman E.P. Neres for their help in the field and/or laboratory, R. Schroeder who helped in reviewing the manuscript, and the anonymous referees and the Editor for their helpful suggestions.

References

ARAÚJO, C.C.V. 2009. *Estrutura, dinâmica espacial e sazonal da ictiofauna de áreas entremarés da baía da Babitonga, Santa Catarina. Curitiba, PR.* Dissertação de Mestrado. Universidade Federal do Paraná, 63 p.

BORDIN, D. 2010. *Peixes de áreas rasas de diferentes setores da baía da Babitonga, Santa Catarina, Brasil.* Curitiba, PR. Dissertação de Mestrado. Universidade Federal do Paraná, 65 p.

CASTRO, L.L.M.; PEREIRA, B.B.; ALMEIDA, H.G.; JOYEUX, J.C. 2001. Ocorrência de *Microdesmus longipinnis* (Microdesmidae) no estuário do rio Piraquê-açu, ES. Available at: http://www.doc.ufes.br/ictiolab/Publicacoes/resumos/2001-ocorrenciadelarvasdemicrodesmus.p df. Accessed on: 2012/08/10.

CHUTE, A.S.; TURNER, J.T. 2001. Plankton studies in Buzzards Bay, Massachusetts, USA. V. Ichthyoplankton, 1987 to 1993. *Marine Ecology Progress Series*, **224**:45-54.

DAWSON, C.E. 1973. *Microdesmus bahianus*, a new western Atlantic wormfish (Pisces: Microdesmidae). *Proceedings of the Biological Society of Washington*, **86**:203-210.

DAWSON, C.E. 1990. Microdesmidae. *In*: J.C. QUÉRO; J.C. HUREAU; C. KARRER; A. POST; L. SALDANHA (ed.), *Check-list of the fishes of the eastern tropical Atlantic (CLOFETA)*. Lisbon, JNICT, p. 960-961.

EKAU, W.; WESTHAUS-EKAU, P.; MACÊDO, S.J.; VON DORRIEN, C. 2001. The larval fish fauna of the "canal de Santa Cruz" estuary in Northeast Brazil. *Tropical Oceanography*, **29**:117-128.

ELLIOTT, M.; HEMINGWAY, K.L. 2002. *Fishes in estuaries*. Oxford, Blackwell Science Ltd., 636 p.
http://dx.doi.org/10.1002/9780470995228

ESKINAZI, A.M. 1972. Ocorrência de *Microdesmus longipinnis* (Weymouth) (Pisces: Microdesmidae) para o Brasil. *Trabalhos Oceanográficos da Universidade Federal de Pernambuco*, **13**:303-306.

FREITAS, M.O.; VELASTIM, R. 2010. Ictiofauna associada a um cultivo de mexilhão *Perna perna* (Linnaeus, 1758) Norte Catarinense, Sul do Brasil. *Acta Scientiarum Biological Sciences*, **32**(1):31-37.
http://dx.doi.org/10.4025/actascibiolsci.v32i1.2515

IBAMA. 1998. *Proteção e controle de ecossistemas costeiros – Manguezal da Baía da Babitonga*. Série Estudos da Pesca nº 25. Brasília, IBAMA, 147 p.

LOPES, P.R.D.; OLIVEIRA-SILVA, J.T.; SENA, M.P. 1998. Ocorrência de *Microdesmus bahianus* Dawson, 1973 (Actinopterygii: Microdesmidae) na baía de Todos os Santos (estado da Bahia), Brasil. *Acta Biologica Leopoldensia*, **20**:217-224.

LOPES P.R.D.; OLIVEIRA-SILVA, J.T.; SENA, M.P.; SILVA, I.S.; VEIGA, D.C.M.; SILVA, G.R.; SANTOS, R.C.L. 1999. Contribuição ao conhecimento da ictiofauna da praia de Itapema, Santo Amaro da Purificação, baía de Todos os Santos, Bahia. *Acta Biologica Leopoldensia*, **21**:99-105.

MARCOLIN, C.R.; CONCEIÇÃO, B.L.; NOGUEIRA, M.M.; MAFALDA-JR, P.; JOHNSSON, R. 2010. Mesozooplankton and Ichthyoplankton composition in two tropical estuaries of Bahia, Brazil. *Check List*, **6**:210-216.

MOSER, H.G. 1996. *The early stages of fishes in the California Current Region. CALCOFI ATLAS N° 33*. Lawrence, Allen Press Inc., 1505 p.

REID, E.D. 1936. Revision of the fishes of the family Microdesmidae, with description of a new species. *Proceedings of the United States National Museum*, **84**:55-72.
http://dx.doi.org/10.5479/si.00963801.84-3002.55

RICHARDS, W.J. 2006. *Early stages of Atlantic fishes. An identification guide for the Western Central North Atlantic*. Boca Raton, CRC/Taylor & Francis, 2640 p.

SANTOS, G.S.M.; SOUZA-CONCEIÇÃO, J.M. 2008. O cultivo de moluscos na baía da Babitonga (Santa Catarina) como habitat para *Hippocampus reidi* e *Hippocampus reidi erectus* (Teleostei: Syngnathidae) - ocorrência e aspectos da biologia. *Revista Saúde e Ambiente*, **9**:34-41.

SEVERI, W.; URACH, B.F.; CASTRO, M.F. 2008. Occurrence of *Microdesmus bahianus* and *M. longipinnis* (Teleostei: Microdesmidae) larvae and juveniles in estuaries of the State of Pernambuco, Brazil. *Revista Brasileira de Ciências Agrárias*, **3**:360-364.
http://dx.doi.org/10.5039/agraria.v3i4a455

SIBIP/NEODAT III. 2011. Sistema Brasileiro de Informações sobre Biodiversidade de Peixes. Sistema Nacional de Informações sobre Coleções Ictiológicas. Available at: http://www.mnrj.ufrj.br/results2.ihtml. Accessed on: 2012/06/15.

SOUZA-CONCEIÇÃO, J.M. 2008. *Praias estuarinas como habitat de criação para estágios iniciais de peixes na ilha de São Francisco do Sul (baía da Babitonga, Santa Catarina)*. Curitiba, PR. Tese de Doutorado. Universidade Federal do Paraná, 198 p.

THOMSON, D.A.; FINDLEY, L.T.; KERSTITCH, A.N. 2000. *Reef fishes of the Sea of Cortez. The Rocky-Shore Fishes of the Gulf of California.* Austin, University Texas Press, 353 p.

Submitted on November 29, 2012
Accepted on May 10, 2013