

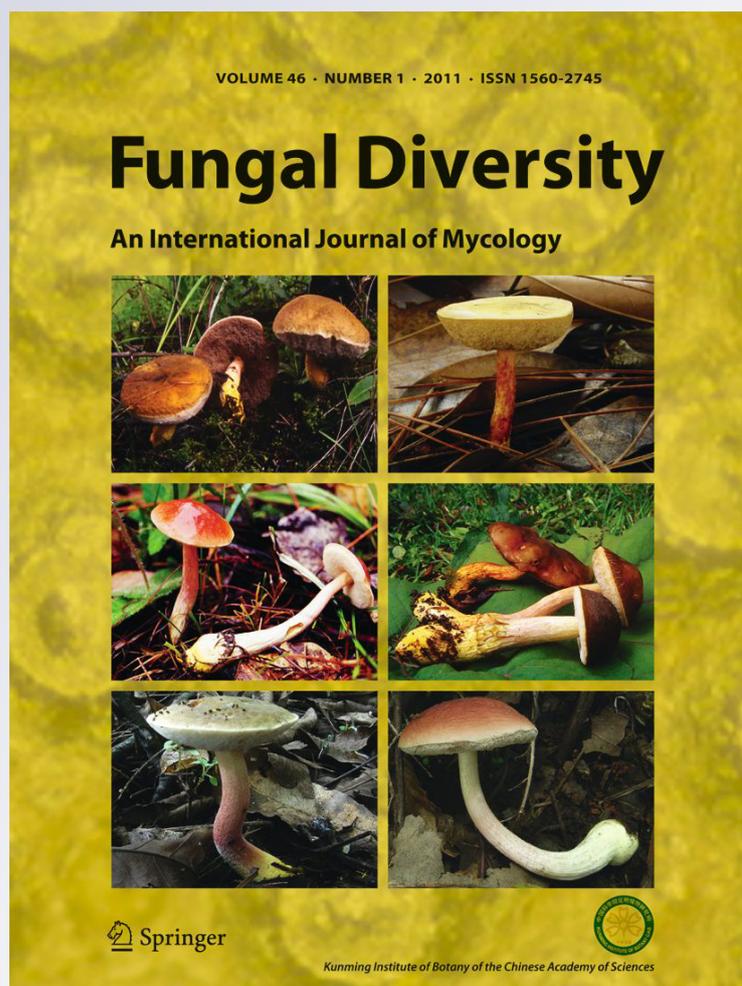
Fungal symbionts of marine sponges from Rameswaram, southern India: species composition and bioactive metabolites

**Nagamani Thirunavukkarasu,
Trichur S. Suryanarayanan,
Kozhikottu P. Girivasan, Ambayeram
Venkatachalam, Venkatachalam Geetha,**

Fungal Diversity
An International Journal of Mycology

ISSN 1560-2745
Volume 55
Number 1

Fungal Diversity (2012) 55:37-46
DOI 10.1007/s13225-011-0137-6



Your article is protected by copyright and all rights are held exclusively by Kevin D. Hyde. This e-offprint is for personal use only and shall not be self-archived in electronic repositories. If you wish to self-archive your work, please use the accepted author's version for posting to your own website or your institution's repository. You may further deposit the accepted author's version on a funder's repository at a funder's request, provided it is not made publicly available until 12 months after publication.

Fungal symbionts of marine sponges from Rameswaram, southern India: species composition and bioactive metabolites

Nagamani Thirunavukkarasu · Trichur S. Suryanarayanan ·
Kozhikottu P. Girivasan · Ambayeram Venkatachalam · Venkatachalam Geetha ·
Jagadesan P. Ravishankar · Mukesh Doble

Received: 8 June 2011 / Accepted: 14 September 2011 / Published online: 1 October 2011
© Kevin D. Hyde 2011

Abstract Ten marine sponge species from Rameswaram, southern India were studied for their filamentous fungal symbionts. The results suggest that fungal symbionts of marine sponges are hyperdiverse. Genera such as *Acremonium*, *Alternaria*, *Aspergillus*, *Cladosporium*, *Fusarium* and *Penicillium* were frequently isolated; no true marine fungal species were present. Species of *Aspergillus* were dominant and co-dominant in all the sponges screened. The fungal isolates produced antialgal, antifungal, antioxidant, antibiotic, antiinsect metabolites. A few fungi produced acetylcholinesterase inhibitors.

Keywords Marine sponge · Sponge symbionts · Fungal symbionts · Bioactive compounds · Acetylcholinesterase inhibitors

Introduction

Fungi, especially the marine-derived ones, form symbiotic associations with marine organisms including algae (Schulz et al. 2008; Zuccaro et al. 2008; Suryanarayanan et al. 2010), marine angiosperms (Devarajan et al. 2002; Sakayaroj et al. 2010), invertebrates (Kim and Harvell 2004) and vertebrates (Morris et al. 2011). Information about the diversity and ecology of fungi associated with primitive marine invertebrates viz. the sponges is inchoate as there are only a few studies focusing on these aspects (Rot et al. 2006; Taylor et al. 2007; Webster and Taylor 2011; Zhou et al. 2011). In recent years, however, fungi associated with marine sponges have been investigated more avidly for their potential technological applications owing to their ability to synthesize metabolites of novel molecular architectures and bioactivities (Bugni and Ireland 2004; Kjer et al. 2010; Lee et al. 2010; Rateb et al. 2010; Suryanarayanan et al. 2010; Chu et al. 2011; Almeida et al. 2011). Fungal symbionts have been isolated from sponges occurring in Australia, Germany, Malta and Spain (Höller et al. 2000), northern Adriatic sea (Proksch et al. 2008), Hawaii (Gao et al. 2008; Wang et al. 2008), Irish coast (Baker et al. 2009), China (Ding et al. 2011; Liu et al. 2010) and the Mediterranean (Paz et al. 2010). To our knowledge, there are no studies on the diversity and bioactive compounds of fungi associated with the marine

N. Thirunavukkarasu
Department of Plant Biology and Plant Biotechnology,
Ramakrishna Mission Vivekananda College,
Mylapore,
Chennai 600 004, India

T. S. Suryanarayanan (✉) · A. Venkatachalam · J. P. Ravishankar
Vivekananda Institute of Tropical Mycology (VINSTROM),
Ramakrishna Mission Vidyapith,
Mylapore,
Chennai 600 004, India
e-mail: t_sury2002@yahoo.com

K. P. Girivasan
Department of Plant Biology and Plant Biotechnology,
Government Arts College for Men (Autonomous),
Nandanam,
Chennai 600 035, India

V. Geetha · M. Doble
Department of Biotechnology,
Indian Institute of Technology of Madras,
Chennai 600 025, India