Fungal Ecology 31 (2018) 9–18

Contents lists available at ScienceDirect

Fungal Ecology

journal homepage: www.elsevier.com/locate/funeco

Ectomycorrhizal fungi diversity in a white sand forest in western Amazonia

Aída M. Vasco-Palacios [a, b, c, d, *], Johnathan Hernandez [a, b], María Cristina Peñuela-Mora [e], Ana E. Franco-Molano [b], Teun Boekhout [c, f]

[a] Fundación Biodiversa Colombia, Carrera 22 # 41 - 80 Apto. 004, 111311, Bogotá D.C., Colombia
[b] Laboratorio de Taxonomía y Ecología de Hongos, Instituto de Biología, Facultad de Ciencias Exactas y Naturales, Universidad de Antioquia, A. A. 1226, Medellín, Colombia
[c] Westerdijk Fungal Biodiversity Institute, Uppsalalaan 8, Utrecht, 3584 CT, The Netherlands
[d] Microbiology, Utrecht University, Utrecht, The Netherlands
[e] Universidad Regional Amazónica Ikiam, Tena-Napo, Ecuador
[f] Institute for Biodiversity and Ecosystem Dynamics, University of Amsterdam, Amsterdam, The Netherlands

ARTICLE INFO

Article history:
Received 2 September 2015
Received in revised form
12 September 2017
Accepted 9 October 2017
Available online 21 November 2017

Corresponding Editor: Kabir G. Peay

Keywords:
Dicymbe uaiparuensis
Dipterocarpaceae
Dispersion
Ecology
Fabaceae
Host specificity
Hymenochaetaceae
Russulaceae

ABSTRACT

The genera *Dicymbe* and *Aldina* (Fabaceae) host ectomycorrhizal fungi (EcM) and are common in white sand forests (WSFs), a highly specialized habitat with a high level of plant endemism compared with *terra-firme* forests. In this study, we visited four times a 1-ha permanent plot established in a small patch of a WSF in the south of Colombia Amazonia. Forty-eight species of EcM fungi were recovered from sporocarps and 15 ITS species-level were detected from root tips. Seventeen species were new reports to Colombia and seven corresponded to undescribed species. These results confirm that this WSF supports a significant EcM fungal diversity. Most of the species found in this study have been previously reported to be associated with other legume and/or dipterocarp species from geographically distant forests. The long-distance occurrence combined with low host specificity, suggest the possibility of gene flow between geographically distant populations of EcM fungi in neotropical lowland rainforests.

1. Introduction

Mycorrhizal fungi are a diverse group of mutualistic root symbionts. Four major types of mycorrhizal interactions have been described based on their structure and function: ectomycorrhiza (EcM), arbuscular mycorrhiza, orchid mycorrhiza, and ericoid mycorrhiza. The EcM fungi form an external sheath enclosing the plant root, and the hyphae penetrate the spaces between the cortical and epidermal cells of the root, thus forming the Hartig network (Halling, 2001; Bonfante and Genre, 2008; Smith and Read, 2008). The EcM interaction improves the acquisition of nitrogen and phosphorus by the host plant through an increased absorptive surface area, and EcM fungi have been also shown to facilitate the acquisition of other nutrients. The hyphae that envelop the root tips act as a physical barrier to pathogens, and secondary metabolites produced by EcM fungi are toxic to pathogenic fungi, nematodes, and bacteria (Agerer, 2006; Smith and Read, 2008). In return, the EcM fungi receive organic compounds from their host plants, including glucose (Bonfante and Genre, 2008; Smith and Read, 2008). Estimates indicate that there are about 6000 species of EcM fungi (Ascomycota, Basidiomycota, and Mucoromycota-Endogonales) that are associated with 20,000–50,000 species of plants (Rinaldi et al., 2008; Tedersoo et al., 2010a). However, there are still many unknown species of several fungal genera occurring in tropical ecosystems, and thus more taxonomic efforts in those areas are needed to complete knowledge of the EcM fungal diversity. The distribution of EcM fungi was considered to be largely limited to

* Corresponding author. Fundación Biodiversa Colombia, Carrera 22 # 41 - 80 Apto. 004, 111311, Bogotá D.C., Colombia.
E-mail address: avascop@yahoo.com (A.M. Vasco-Palacios).

https://doi.org/10.1016/j.funeco.2017.10.003
1754-5048/