INVESTIGATING THE ECTOMYCORRHIZAL APPEARANCE OF SEEDLINGS IN TAN PHU FOREST ENTERPRISE'S NURSERY, DONG NAI PROVINCE

Pham Nguyen Duc Hoang, Dang Le Anh Tuan
University of Natural Sciences, VNU-HCM

1.INTRODUCTION

Dipterocarpaceae and Fabaceae, as the families of plants, perhaps hold the distinction of being the most well-known trees in the tropical forests. They pre-dominate the international tropical timber market for ages, and therefore play an important role in the economy of many of the Southeast Asian countries (Poore, 1989). In addition, there are many types of non-wood forest products (NWFPs) from dipterocarps such as dammar, resin and camphor which have a critical impact on the economies of rural people's income.

Recently, the two families are gaining more attention, specially planting either in plantations or in poor forests. Many valuable species of these families become exhausted with every passing day because of over-logging and/or degrading. Otherwise, so many species in Fabaceae and Dipterocapaceae have an absolutely ectomycorrhizal symbiosis which plays the critical role in the life of forest trees and influents the survived and mature ability of seedlings. Therefore, reseach on mycorrhizas as well as their association with dipterocarps has gained a high profile.

2.MATERIALS AND METHODS

2.1.Materials

The seedlings are collected randomly from Tan Phu forest enterprise's nursery. All of seedlings are cultivated from the seeds which are collected from the mother trees in Tan Phu forest. They are the same 2 years old and cultivated in plastic bags with the soil taken arround the mother trees.

The seedlings are in nine specises of two family (Fabaceae, Dipterocarpaceae): *Afzelia xylocarpa* (Kurz) Craib, *Dalbergia bariensis* Pierre, *Sindora siamensis* Teysm. ex Miq. var. *siamensis, Dipterocarpus alatus* Roxb., *Dipterocarpus dyeri* Pierre, *Dipterocarpus turbinatus* Gaertn.f., *Hopea odorata* Roxb., *Shorea roxburghii* G. Don, *Shorea thorelii* Pierre.

2.2.Methods

The root systems of seedlings are cleared of soil with tap water (M.Brundrett et al, 1996; A.Yamada, 1996) immediately after being taken out of nursery, and then stored in alcohol. Some lengths are chosen by macro-character from the root system of every seedling and sectioned (M.Brundrett et al, 1996).

Roots are sectioned, stained by trypan blue (M.Brundrett et al, 1996) and observed the micro-morphology in light microscope Westlab II. We check about mantle, Hartig net, and the extraradical hyphae which are the special micro-characters specialized for ectomycorrhiza (Smith and Read, 1997; Peterson, 2004; Agerer, 2006). Mantle is the general character which is mainly used to check ectomycorrhiza (Peterson, 2004; Agerer, 2006).

3.RESULTS

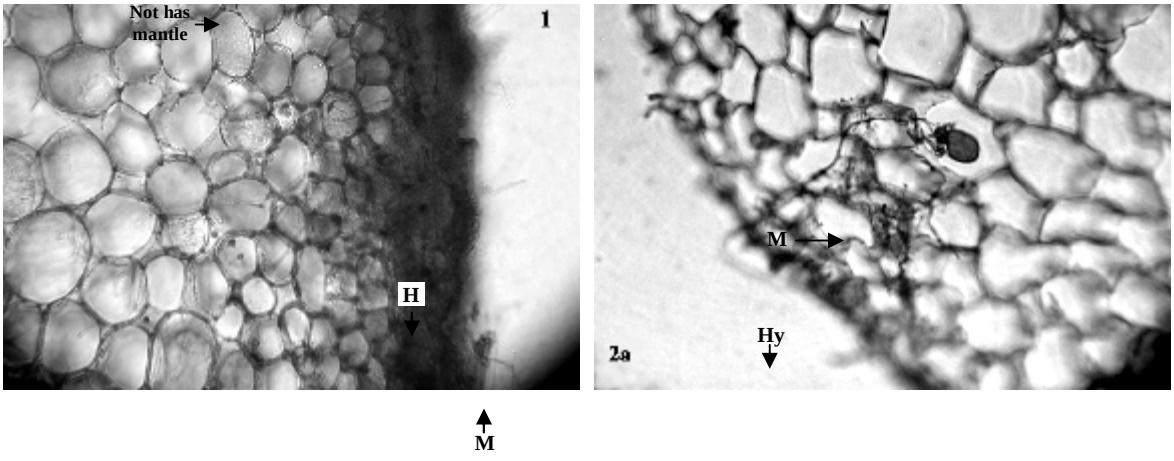
Table 1. The ectomycorrhizal appearance of seedlings

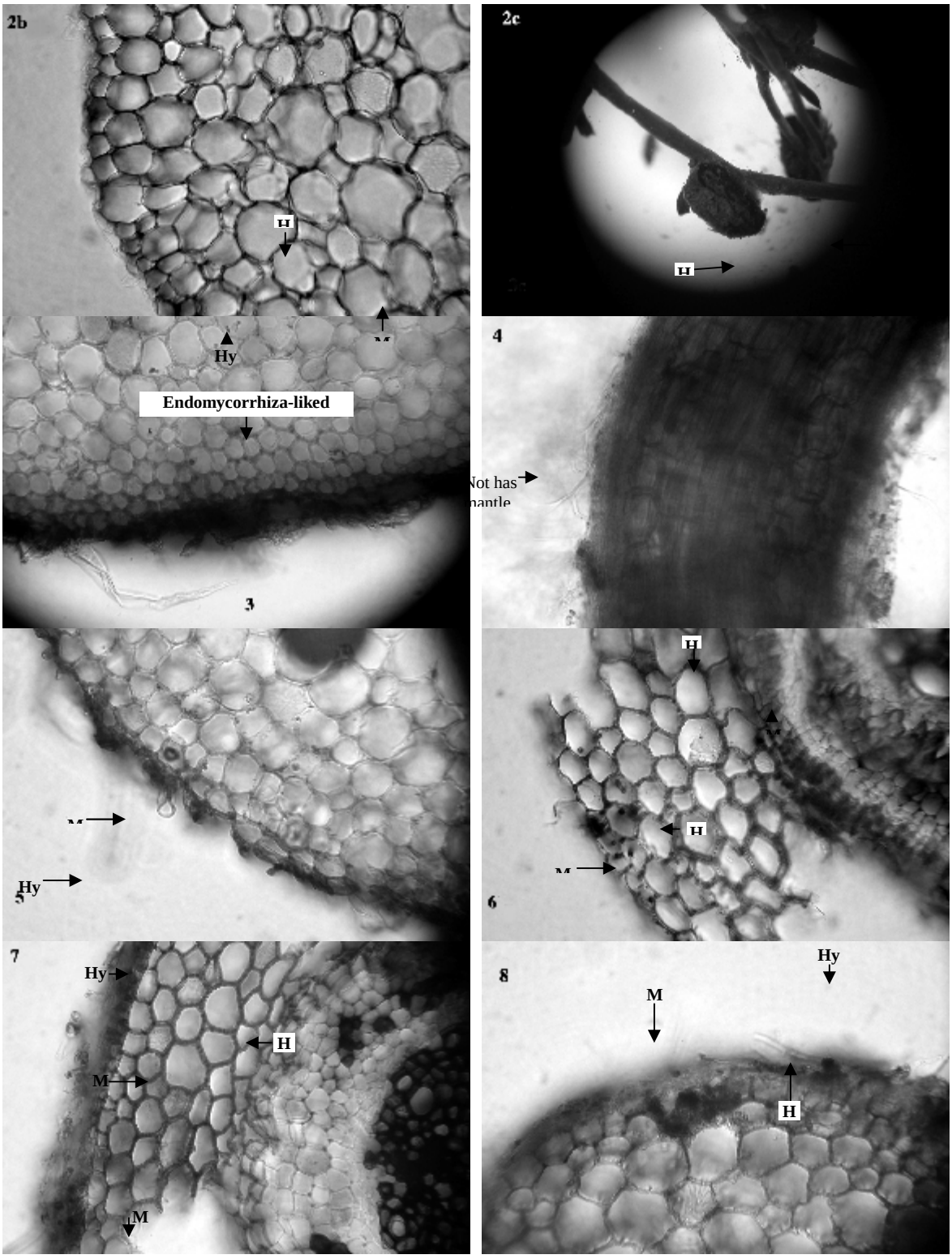
No.	Family	Species	Total	Ectomycorrhiza

				Appearance
1	Fabaceae	*Afzelia xylocarpa*	5	5
2		*Dalbergia bariensis*	5	0
3		*Sindora siamensis*	5	5
4	Dipterocarpaceae	*Dipterocarpus alatus*	5	5
5		*Dipterocarpus dyeri*	5	5
6		*Dipterocarpus turbinatus*	5	5
7		*Hopea odorata*	5	5
8		*Shorea roxburghii*	5	5
9		*Shorea thorelii*	5	5

Seedlings of all species in Dipterocarpaceae, Fabaceae except *D. bariensis* (Fig.2b) have ectomycorrhiza. However, *D. bariensis* has a structure which is like endomycorrhiza (Fig.2a) and all of seedlings are nodulated (Fig.2c).

The mantle of all species which are ectomycorrhizal can be viewed clearly except *D. turbinatus* because of brittle sections (Fig.6). Some species such as *A. xylocarpa*, *H. odorata*, *S. roxburghii* have thick mantle (Fig.1, 7, 8) but some others have thin mantle as *D. dyeri* and *S. thorelii* (Fig.5, 9). Hartig net can not be observed clearly in seedlings of some species of *S. siamensis* and *D. dyeri* (Fig. 3, 5). Extraradical hyphae is viewed in *A. xylocarpa*, *D. alatus*, *H. odorata*, *S. roxburghii* (Fig.1, 4, 7, 8) in a few sections only.




2b
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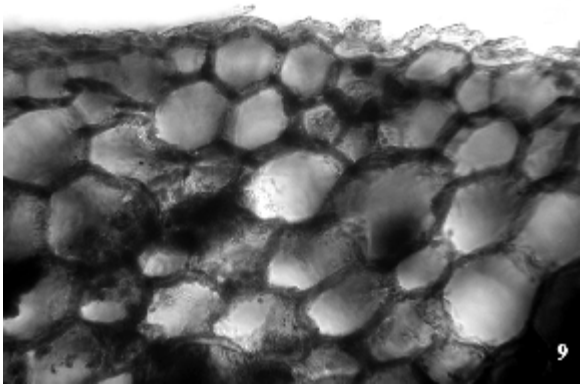

Fig. 1. *Afzelia xylocarpa* **Fig. 2.** *Dalbergia bariensis*
Fig. 2a. endomycorrhiza-liked structure **2b.** not ectomycorrhiza **2c.** nodule
Fig. 3. *Sindora siamensis* **Fig. 4.** *Dipterocarpus alatus* **Fig. 5.** *Dipterocarpus dyeri*
Fig. 6. *Diptercarpus turbinatus* **Fig. 7.** *Hopea odorata* **Fig. 8.** *Shorea roxburghii*
Fig. 9. *Shorea thorelii* **(M)** mantle **(H)** Hartig net **(Hy)** hyphae

4.CONCLUSION

The genus *Afzelia, Dipterocarpus, Hopea* and *Shorea* are recorded that having some ectomycorrhizal species (Smith and Read, 1997; Molina, Massicotte and Trape, 2002). Particularly, it has the ectomycorrhizal appeared record in *D. alatus* (Appanah, 1998), *H. odorata* (Appanah, 1998; See, 1994) and *S. roxbughii* (Appanah, 1998; Kanchanaprayudh, 2003). Therefore, the ectomycorrhizal records of *A. xylocarpa, D. alatus, D. dyeri, D. turbinatus, H. odorata, S. roxburghii, S. thorelii* in this study are corresponding with previous researches. The ectomycorrhizal appearrance in *S. siamensis* is still recorded by diagnostic characters which are specified ectomycorrhiza.

The most obvious micro-character is mantle because it is the general character to investigate ectomycorrhiza of plant roots (Peterson, 2004).

All seedlings of 8 of 9 species having ectomycorrhiza in this study show that soil around mother trees has got many ectomycorrhizal germs suitable with them. Moreover, the ectomycorrhizal seedlings may have the high adaptation with field conditions of Tan Phu forest. Therefore, they have high survival ability when are planted in Tan Phu forest.

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