

**PRELIMINARY STUDIES ON THE POTENTIAL MYCORRHIZA
FUNGI OF SAGO (*Metroxylon sagu* ROTTBOLL)**



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**FINAL REPORT OF RESEARCH ON “PRELIMINARY STUDIES ON THE
POTENTIAL MYCORRHIZA FUNGI OF SAGO (*Metroxylon sagu*
ROTTBOLL)”**

With reference to the above, we forward 3 copies of the Final Report entitled
PRELIMINARY STUDIES ON THE POTENTIAL MYCORRHIZA FUNGI OF
SAGO (*Metroxylon sagu* ROTTBOLL) for your reference and retention.

Thank you.

Yours faithfully,



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ABSTRACT

A preliminary study on potential mycorrhizal association of sago, *Metroxylon sagu* Rottboll was conducted. Root samples of sago palms were collected from Kota Samarahan, Sarawak. The root samples were cleaned thoroughly with Teepol detergent solution and cleared of pigments with 10% potassium hydroxide and alkaline hydrogen peroxide. Staining of the processed root samples was done using acid fuchsin and submerging the root samples in lactic acid and glycerol leached excess staining. Slides of the root samples were prepared and directly observed under the microscope. Two characteristic structures of mycorrhiza, the appressorium and the vesicles were observed. The appressorium found at the cell-to-cell contact between two symbionts was detected in one sample, while the vesicles, described as thick-walled structures ranging in shape from oval to spherical were consistently detected in all root samples. However, the arbuscules were not observed. Vesicles were taxonomically found in the order of the Glomales of Zygomycetes suggesting that the sago mycorrhizal fungi could be categorized in this order and of the vesicular-arbuscular mycorrhizal type.

Two other fungi with long strand of hyaline hyphae and brown septate profusely branched hyphae were also observed in the root samples. These fungi were also observed in the roots of swamp rice grass, *Leersia hexandra* L. that grew in the vicinity of the sago palms.

The evaluation of a suitable obligate host for the vesicular-arbuscular mycorrhiza detected in the sago root to develop trapping methods as a prerequisite to obtain healthy spores of the mycorrhiza for identification and as inoculums to establish monospecific cultures was carried out. *In situ* and *ex situ* trappings using

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CHAPTER 1

1.0 INTRODUCTION

Successful clonal propagation of sago (*Metroxylon sagu* Rottboll) through *in vitro* techniques and genetics engineering initiated in 1985 has been suggested as the most economical means of producing vast amounts of quality planting materials as compared to the traditional use of suckers. However, sago tissue-cultured plantlets have not been able to establish successfully in the soil media. Schultz (2001) reported that in the weaning stage of micropropagated oil palm, the period after micro propagation under sterile conditions and before planting to the nursery, plants were subjected to severe environmental stress due to poor root and shoot growth and reduced cuticular wax formation. The percentage of mortality was about 30% during this phase and further 10% of the plantlets did not survive the transfer to pre-nursery.

Previous studies on micro-propagated grape vine done by Schubert as reported by Schultz (2001) have shown that inoculation with vesicular–arbuscular mycorrhiza fungus could improve plant development and survival rates during this period. Experiment conducted by Schultz (2001) confirmed that micro-propagated oil palm at the sensitive age at the weaning stage significantly increased survival rates when inoculated by vesicular–arbuscular mycorrhiza fungus from 70% to 90 – 95%. This work was supported by an experiment conducted by Azmah and Azizah (1996), which concluded that vesicular–arbuscular mycorrhizal fungi had a significant role in the re-