



Research projects of counterparts funded at UNJA in 2021

| Name | Counterpart | Title |
|-----------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Upik Yelianti, Raissa Mataniari, Dewi Komalasari | Z01 | Exploration of orchid mycorrhizal fungus at Harapan Rain Forest (HRF), Jambi Province as a learning resource of a plant ecophysiology course |

Background and Objectives

The existence of orchids in the Harapan Rain Forest Jambi Province is now threatened. This is due to the devastating forest fires in 2015 (Anonymous, 2021) that caused a great loss of germplasm or biodiversity, including trees as habitats for epiphytic plants (Ministry of Environment and Forestry Republic of Indonesia, 2018), such as orchids. Orchid is a plant that has an aesthetic value, so beautiful and very liked by the community, so that its occurrence is decreasing in nature, including Harapan Rain Forest Jambi Province. Orchid plants usually have a symbiotic relationship between mycorrhizal fungi and their roots, where mycorrhizal fungi help the orchids absorb water and nutrients (Brundrett, *et al.*, 2003; Taylor, *et al.*, 2004; Wu, *et al.*, 2010), while mycorrhizal fungi receive nutrients from the orchids. This fungus infects orchids through the roots, which are characterized by the presence of hyphae in the form of dense coils in the bark, called platoon (Ningsih, *et al.*, 2014). Therefore, it is necessary to conduct research on the Exploration of Orchid Mycorrhizal Fungus at Harapan Rain Forest (HRF) Jambi Province. This research aims to study the morphological structure of mycorrhizal fungi in symbiosis with the roots of orchid from the Harapan rain forest Jambi Province.

Methods:

The orchid is obtained from Harapan Rain Forest, Jambi Province and was maintained. The roots were collected, washed and cut about 1 cm and observed under a microscope for the presence of external hyphae. Isolation of mycorrhizal orchid came after the modified method of Manoch and Lohsomboon (1992). To observe the colonization structure of mycorrhizal fungi in the roots of orchid plants, observations were made by staining and observed under the microscope. In addition, the morphological structure of the mycorrhizal fungi was determined by growing them on PDA medium, then observing the shape, color, and structure of the fungal colonies under a microscope.

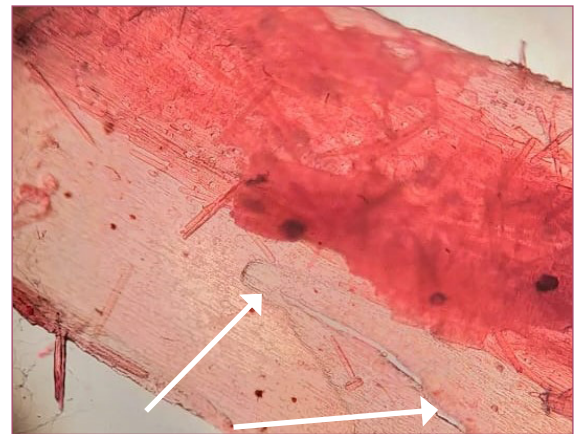


Figure 1. Hypha external mycorrhizal fungi on orchid roots.

Result and Conclusion:

The results showed that there was colonization between mycorrhizal fungi and orchid roots as presented in figure 1.

The growth of mycorrhizal fungi on orchid roots on PDA medium after 2 days after incubation (dai) is presented in the figure 2. In table 1, the characteristics of mycorrhizal fungi isolated from the roots of orchid plants grown on PA medium are presented.

Microscopic observations were

made of the colony of mycorrhizal fungi that are in symbiosis with the roots of orchids (Figures 3a and 3b).

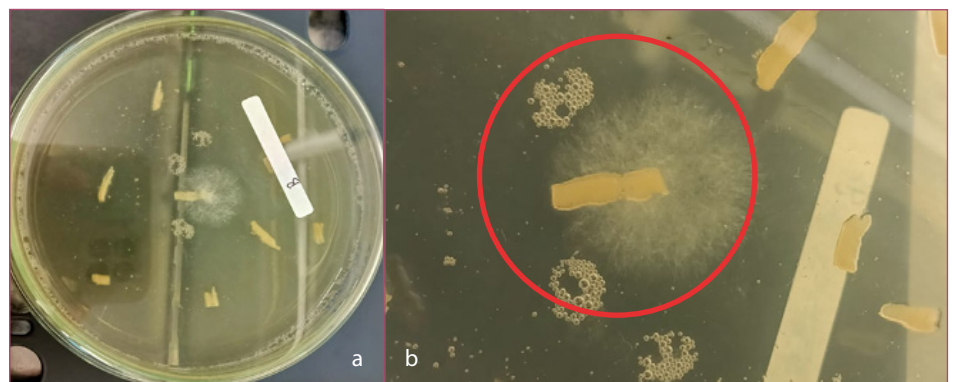


Figure 2. (a) The growth of mycorrhizae fungi orchids on PDA medium. (b) after the image in enlarged

Table 1. The characteristic of colony of orchids mycorrhizae fungi on PDA media

| No. | Samples | Shape | Margin | Size | Elevation | Appearance | Optical property | Texture | Color |
|-----|----------|-------------|----------|----------|-----------|------------|--------------------|---------|----------|
| A | Colony 1 | Circular | Entire | Moderate | Convex | Dull | Opaque | Velvet | Greyish |
| | Colony 2 | Irregular | Undulate | Moderate | Convex | Dull | Opaque-Translucent | Velvet | Yellow |
| | Colony 3 | Circular | Entire | Moderate | Flat | Dull | Opaque | Velvet | White |
| | Colony 4 | Spindle | Entire | Moderate | Convex | Dull | Opaque | Velvet | Blackish |
| B | Colony 1 | Circular | Undulate | Large | Flat | Dull | Translucent | Velvet | White |
| | Colony 2 | Circular | Undulate | Large | Convex | Dull | Opaque | Velvet | White |
| | Colony 3 | Circular | Entire | Large | Flat | Dull | Translucent | Velvet | White |
| | Colony 4 | Irregular | Undulate | Large | Flat | Dull | Opaque | Velvet | White |
| C | Colony 1 | Circular | Entire | Moderate | Raised | Dull | Opaque | Velvet | White |
| | Colony 2 | Irregular | Undulate | Large | Convex | Dull | Opaque | Velvet | Greyish |
| | Colony 3 | Irregular | Curled | Large | Flat | Dull | Opaque | Smooth | White |
| D | Colony 1 | Irregular | Rhizoid | Large | Raised | Dull | Opaque | Cotton | Greyish |
| | Colony 2 | Circular | Entire | Moderate | Convex | Dull | Opaque | Velvet | White |
| | Colony 3 | Circular | Entire | Small | Flat | Dull | Opaque | Velvet | Greyish |
| | Colony 4 | Filamentous | Rhizoid | Moderate | Raised | Dull | Opaque | Smooth | White |

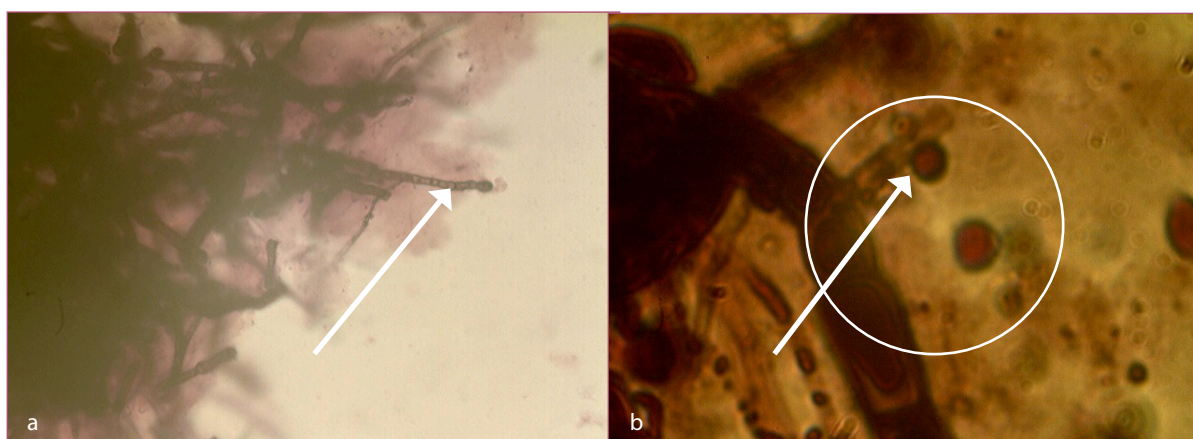


Figure 3. (a) Insulated hypha with conidia, and (b) the spores of mycorrhizal fungi on roots of orchids.

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