



# Genetic Variability of Phaius and Dendrobium Orchids Based on Molecular Markers

WLYuhanna<sup>1</sup>, S Hartati<sup>2\*</sup>, Sugiyarto<sup>3</sup>, Marsusi<sup>3</sup>

<sup>1</sup>Department of Biology Education, Faculty of Teacher Training and Education, Universitas PGRI Madiun, Indonesia

<sup>2</sup>Department of Agrotechnology, Faculty of Agriculture, Sebelas Maret University, Indonesia

<sup>3</sup>Center of Biotechnology and Biodiversity Research and Development, Sebelas Maret University, Indonesia

<sup>4</sup>Department of Biosciences, Postgraduate Program, Sebelas Maret University, Indonesia

\*E-mail: tatik oc@yahoo.com

## ABSTRACT

This study aimed to assess the variability and grouping degree of several species of orchids existing in Indonesia. The laboratory works were done in the Laboratory of Study Centre of Horticulture and Tropics of IPB by analyzing the variability of orchids using RAPD. The plant materials were taken from the orchid collection at Kebun Raya Bogor. The relationship of 9 orchids were analyzed using the phenotype binary data and the DNA ribbon pattern which were assessed from amplification of 2 random primer RAPD. Cluster analysis was done under the program of NTSYSpc version 2.02 and UPGMA function SimQual. The study concluded that there were genetic variability and grouping among the species of Orchid, the RAPD under primer of OPA7 and OPA9 on the dendrogram based on Similarity coefficient of 0,40 showed that there were four group. First group : *Phaius tankervilleae* (1), *Phaius montanus* (2) and *Phaius callosus* (3), group II : *Dendrobium mirbelianum* (5), *Dendrobium lamellatum* (6), *Dendrobium liniale* (8) and *Dendrobium biggibum* (9). Group III : *Dendrobium anosmum* (7). Group IV : *Phaius ambionensis* (4).

**Keywords:** Genetic, Phaius, Dendrobium, Molecular Markers

## Introduction

Genetic characterization based on phenotypic markers usually influenced by macro and micro environment, as well as the age of an individual. Another difficulty would happen if quantitative character governed by many genes are expressed at the end of growth. Molecular markers can give an accurate information of kinship between species and relatives away, because the analysis of DNA as the genetic material is not affected by environmental conditions. The research was conducted in order to determine the genetic diversity and grouping of natural orchids Indonesia as supporting information on plant breeding programs.

## Methods

Sample in this research is 9 species of orchids originally grown in Indonesia, namely: 1 *Phaius tankervilleae* (Central Java), 2. *Phaius montanus* (Papua), 3. *Phaius callosus* (Java), 4. *Phaius ambionensis* (Papua), 5. *Dendrobium merbelianum* (Papua), 6. *Dendrobium lamellatum* (South Kalimantan), 7. *Dendrobium anosmum* (Papua), 8. *Dendrobium liniale* (Sulawesi), 9. *Dendrobium biggibum* (Maluku). (Figure 1). Molecular analysis using two RAPD primers that is OPA7 and OPA9. Research was done in Laboratory PKBT IPB Bogor using RAPD.

## Conclusion

RAPD markers with primers OPA7 and OPA9 showed that the genetic similarity coefficient of 40%, there are 4 groups of orchids that group I consisted of First group : *Phaius tankervilleae* (1), *Phaius montanus* (2) and *Phaius callosus* (3), group II : *Dendrobium mirbelianum* (5), *Dendrobium lamellatum* (6), *Dendrobium liniale* (8) and *Dendrobium biggibum* (9). Group III : *Dendrobium anosmum* (7). Group IV : *Phaius ambionensis* (4).

## References

- Abbas B Dailami M Listyorini F H , M, 2017 Genetic Variations and Relationships of Papua's Endemic Orchids Based on RAPD Markers *Nat. Sci.* **09**, 11 3
- Basavaraj B Nagesha N , Jadeyegowda M Y, 2020 Molecular Characterization of Dendrobium Orchid Species from Western Ghat Region of Karnataka using RAPD and SSR Markers *Int. J. Curr. Microbiol. Appl. Sci.* **9**, 1
- Qian X Wang C xia , Tian M, 2013 Genetic diversity and population differentiation of *Calanthe tsoongiana*, a rare and endemic orchid in China *Int. J.*

## Results and discussion

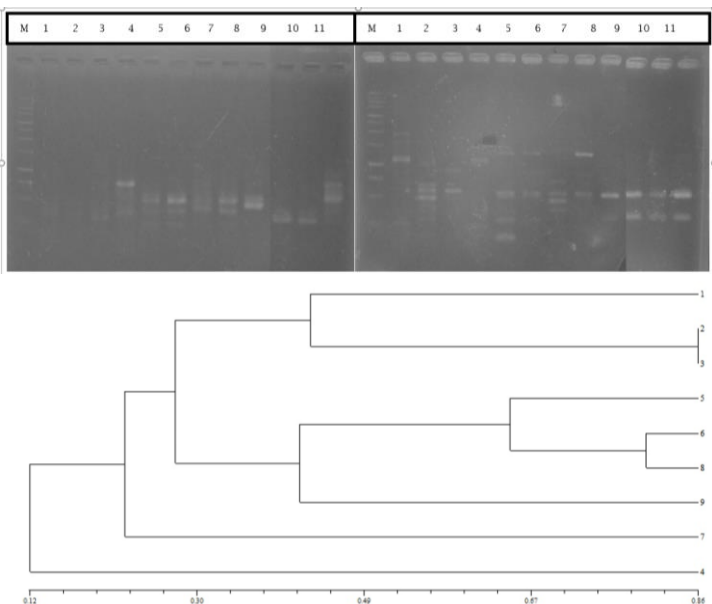


Figure 1a.b. RAPD Visualization and Dendrogram of kindsip Orchid with RAPD. *Phaius tankervilleae* (1), *Phaius montanus* (2), *Phaius callosus* (3), *Phaius ambionensis* (4), *Dendrobium mirbelianum* (5), *Dendrobium lamellatum* (6), *Dendrobium anosmum* (7), *Dendrobium liniale* (8), *Dendrobium biggibum* (9).

