CONSERVATION BIOLOGY OF MYCOHETEROTROPHIC ORCHID:
CASE STUDY OF IN-VITRO CULTURE OF
DYDIMOPLEIXS PALLENS (ORNTHIDACEAE)

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ABSTRACT

Didymopleixs pallens is terrestrial orchid species, and almost associated with clumps of Bamboo particularly Gigantochloa spp. Although it is widely distributed, the orchid rarely attracts attention as it leafless and is erratic species in terms of flowering and fruiting. In Bogor Botanic Garden D. pallens grows in a restricted area, in a bamboo clump along particularly in one location. The site is highly vulnerable and there is little known of the biology and ecology of the species in terms of the growth and development of the species. Growth and development of this orchid in aseptic condition was observed. However, information gained from invivo culture in the laboratory did not necessarily represent condition occurred in the wild. Thus, long term survival of this species could not depend on this method alone. More detail study involving seed baiting experiment in its habitat is required to assess population dynamics of this species. This is important to determined conservation management strategy of this species.

INTRODUCTION

Bogor Botanic garden is a natural habitat for several epiphytic and terrestrial orchids including Dydimopleixs pallens. The presence of this orchid in Bogor Botanic Garden had been known since early 20th century and was always associated with bamboo (Smith, 1905; Burgeff, 1959). Observation on the life cycle of mycoheterotrophic orchid like Didymopleixs pallens in its habitat was limited by their cryptic habit. In Bogor Botanic Garden this orchid can only be seen in particular site at a limited period during the changing season from wet to dry season (March to July). During flowering time, this ephemeral species emerge from the ground among bamboo leaf-litter, with white flower 15–30 cm height. Long term survival of this species is vulnerable as their presence rarely attract any attention and human activities became a significant threat. In-vitro culture of D. pallens was conducted to get more understanding on the life history of this orchid. This is important to assess and determined conservation management strategy of this species.
MATERIALS AND METHODS

Fruit capsules of *D. pallens* were harvested from the habitat in Bogor Botanic Garden. Seeds were surface sterilized and sown on modified Hyponex (25:5:20) agar medium. The cultures were incubated 26°C ± 2°C, illuminated for 16 hours. Subculturing to a new fresh medium was carried out for further development. Observation on the development of the orchid was recorded.

RESULTS AND DISCUSSION

Germination of *D. pallens* in Hyponex medium occurred after 83 days. This was showed by seed enlargement with *trichome* surround the seeds surface. Rhizome and bulbs formation were recorded on day 256. Bulb is important organ as a food reserve to maintain its existence during dormant period before or after flowering time. However, flowering stage did not occur during the course of this experiment (466 days). Instead of bulb formation, flowering stage was observed in similar experiment by Irawati (2005) using Knudson C medium. It was not clear whether medium has contribution to this. This experiment only depicted the life cycle of the orchid in controlled condition and was not necessarily occurred in the wild. Early stage of orchid seeds development in nature was defined by the presence of its mycorhizal partner (Rassmusen, 1995). The level of dependency of leafless species to its partner is higher than green orchid since they have no photosynthetic capacity. Achlorophyllous species is totally depend on mycorrhizal association for water and nutrient supply (Leake, 2000). Glucose, amino acid, phosphate, vitamins and proteins were transferred to orchid by mycorrhizal fungi (Arditti & Ernst, 1984). The ability of *D. pallens* to grow in invitro culture indicated that nutrient supply required by this species might have represented on medium used in this experiment.

The presence of *D. pallens* in restricted area in Bogor Botanic Garden is an indication of it preference to specific habitat. Thus, although several bamboo clumps are spread in Bogor Botanic Garden, not all clumps of bamboo can accommodate population of *D. pallens*. Study of fungi associated with bamboo by Burgeff (1959) suggested that *Marasmius coniatus* can support the live of *D. pallens* through symbiotic culture in the laboratory. However, in a long run conservation of this species could not depend on laboratory work alone. The risk of contamination, human error, shortage of nutrition supply could occur in artificial medium.

Study on population dynamic of *D. pallens* need to be carried out in its natural habitat by seed burial experiment as suggested by Rassmusen & Whigham (1993) and Matsuura & Katsuya (1993) to get further understanding. Isolation and storage of orchid
symbiotic fungus is a further step to ensure its availability in the laboratory for conservation purposes such as research, relocation, recovery or reintroduction program, not only for D. pallens but also other rare Indonesian orchid species which require support form its mycorrhizal partner.

REFERENCES


