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SEED GERMINATION OF *Avicennia marina* (Forsk.) Vierh. BY PERICARP REMOVAL TREATMENT

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ABSTRACT

Avicennia marina is one species used for building coastal ecosystem stabilization in Surabaya shores because of its tolerance to high salinity level and resistance to wave energy. Their existence is threatened by various factors i.e. land conversion, pollution and interisland bridge existence. Growth of *A. marina* is currently limited by seed dormancy. In an effort to increase propagation efficiency, seed viability and vigor were compared based on collection dates and pericarp removal methods. The results showed no relationship between salinity levels of soaking water or seed buoyancy and seed viability or seed vigor. Collection dates may influence seed viability and vigor. Seeds collected in October and November germinated more quickly than those collected in December, although there were no differences in total germination. Hand-peeled seeds germinated more slowly than soaked seeds for all collections, but with no differences in total germination. Seeds collected in October and November grew more vigorously than those collected in December.

Keywords: *Avicennia marina*, propagation eficiency, seed viability

INTRODUCTION

Avicennia marina (the gray mangrove) produces recalcitrant seeds, dispersed by tidal currents. The dispersal unit or propagule of *A. marina* is the fruit, which usually consists of a single embryo surrounded by a thin pericarp (Tomlinson 1986). The fruit is considered to be cryptoviviparous, a condition where the hypocotyl does not enlarge sufficiently to rupture the pericarp while attach to the parent (Hutchings & Saenger 1987). Seeds of *A. marina* are cryptoviviparous and do not have a dormant stage resulting in germination possibility while still attach to the parent plant (Tomlinson 1986; Farnsworth 2000). *A. marina* seeds possess a hydrophilic pericarp, which seed is abscised, shed upon contact with water (Tomlinson 1986). The seeds are dispersed tidally and may remain viable while afloat in agitated seawater for up to one year, although viability decreases over time (USDA 2009).

Typical *A. marina* seed germination initiates when a propagule comes to rest on a suitable substrate such as tidal mud flat, beach or within a *Spartina* spp. marsh (Lewis 2000). This epigeal germination is first observed with the extension of a geotropic root radical into the soil where the seed comes to rest. The hypocotyl extends to become a vertical stalk supporting the cotyledon (Tomlinson 1986). The propagule then extends its epicotyl, from which the first true leaves emerge, allowing the plant to independently photosynthesize the seed. The cotyledons are then desiccated and abscised (Tomlinson 1986).

Seed germination is controlled by a number of mechanisms and is necessary for growth and development of the embryo, resulting in the eventual production of a new plant. Under unfavorable conditions, seeds may become dormant (secondary dormancy) to maintain their germination ability. However, when the conditions are favorable, seeds can germinate (Miransari & Smith 2014). Among factors controlling seed germination and dormancy is seed pericarp removal (Sari *et al.* 2006). Seed pericarp is responsible for seed-coating dormancy, affecting seed germination and seedling establishment by preventing water

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