

RESEARCH ARTICLE

Conservation attempt of critically endangered mangrove *Lumnitzera littorea* (Jack) Voigt in Madu Ganga Ramsar Site of Sri Lanka; stand composition and seed germination

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Abstract: Considering the environmental and specific socio-economic significance of the critically endangered mangrove *Lumnitzera littorea*, this study was conducted aiming the conservation of the species. The specific objectives were to define the diversity of the other mangrove species in association with the existing *L. littorea* plant population in the Madu Ganga wetland, Sri Lanka, to study its seed germination and identify the barriers for seed germination. The existing population of *L. littorea* is an aged population with low regeneration potential. Most of the seeds collected at the dispersal maturity were empty. A micro moth belonging to Family Gelechiidae was identified as the embryo predator. Although GA3 (Gibberellic acid) treatment and dry storage reduced the germination time, none of the seed treatments significantly improved the seed germination of *L. littorea*. Low seed germination observed was due to absence of embryo in mature seeds as a result of insect predation and physiological dormancy of seeds. Optimum GA3 concentration, duration of dry storage and potting medium with suitable salt concentration for seedlings should be optimized in future research.

Keywords: *Lumnitzera littorea*, seed germination, diversity, seed dormancy.

INTRODUCTION


Lumnitzera littorea (Jack) Voigt (E: Red Teruntum, S: Rathamilla) of Family Combretaceae is a true mangrove indigenous to Sri Lanka (Dassanayake *et al.*, 1995). Although this species has a wide distribution in tropical Asia, Northern Australia and Polynesia, locally it was only known from few locations. In 1894, Trimen has recorded a population of *Lumnitzera coccinea* (Wight & Arn.), (a synonym of *L. littorea*) in Benthota estuary, Sri Lanka (de Silva and de Silva, 2006). However, this population was not observed recently and considered as destroyed (Prassanna and Ranawana, 2014). A second population of *L. littorea* plants was discovered in 1983 in the Balapitiya estuary and thus, Jayatissa *et al.* (2002) has reported *L. littorea* as a rare species with a restricted distribution to Balapitiya estuary. At present mangrove scrub vegetation located in the Pathamulla area of the lower reaches of Madu Ganga

wetland is the only habitat of this species remaining in Sri Lanka (Bambaradeniya *et al.*, 2002; Jayatissa *et al.*, 2002; Prasanna and Ranawana, 2014). Further, this remaining plant population is restricted to few trees and the mangrove ecosystem of the location is under immense pressure due to clearing for developmental purposes (personal observations). Thus, it is important to take immediate actions to conserve this critically endangered species to stop being extinct in the wild in Sri Lanka.

Lumnitzera littorea not only possess ecological significance but also it has many socio economic uses. In Thailand and Singapore, it is grown as an ornamental plant due to its conspicuous red flowers (Anonymous, 2017; Ellison *et al.*, 2010). Heavy and fine-grained, durable yellow-brown wood is used for boat building and construction purposes and also as fuel. The species is planted along dykes of ponds (Anonymous, 2017; Ellison *et al.*, 2010). *L. littorea* is traditionally known as a remedy for sprue. Bacteriostatic and bactericidal activities of *L. littorea* extracts against *Staphylococcus aureus*, *Bacillus cereus* and *Escherichia coli* suggest that the plant may possess therapeutic action in the treatment of infectious diseases caused by these microbes (Saad *et al.*, 2011).

Lumnitzera littorea is an evergreen tree growing up to 8-15 m with terminally racemose conspicuous red inflorescences and woody fruits (Dassanayake *et al.*, 1995) (Figure 1). Further, it is an out-crossing non viviparous species (Raju *et al.*, 2014). As reported by Tomlinson (1994), although the fruit set is high in *L. littorea*, a high percentage of mature fruits have aborted embryos. Regeneration length of the species is 40 years. However, no literature was found with special reference to seed germination of *L. littorea*. There are only two species in the genus *Lumnitzera* (Mabberley, 2013), where the other species, *L. racemosa* Willd. (S: Beriya) is also a true mangrove with extended distribution in East Africa and Madagascar (Dassanayake *et al.*, 1995; Senaratna, 2001). *Lumnitzera racemosa* is pollinated predominantly by day-active insects (Tomlinson, 1994) such as bees, wasps, diurnal moths and butterflies (Raju *et al.*, 2014).

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