

ABSTRACT

Rohadatul Aisy. 24020123420015. The Effect of Zoning Differences on Environmental Quality, Anatomical Structure, and Physiology of *Rhizophora mucronata*. Lamk Leaves in the Pasar Banggi Mangrove Conservation Area, Rembang Regency. Under the guidance of Erma Prihastanti and Endah Dwi Hastuti.

Mangrove ecosystems are dynamic coastal areas due to tidal fluctuations, salinity, and human activity, causing mangroves to adapt anatomically and physiologically to survive in dynamic environments with different zones. This study aims to analyze the effect of zoning differences on environmental quality, sediment chemical content, and the anatomical and physiological responses of the leaves and roots of *Rhizophora mucronata* in the Mangrove Conservation Area of Pasar Banggi Village, Rembang Regency. The study was conducted in the proximal, middle, and distal zones. Environmental parameters included air temperature, water temperature, salinity, pH, dissolved oxygen, electrical conductivity, and total dissolved solids; sediment content included organic carbon, total nitrogen, phosphate, and potassium; anatomy included leaf and root tissue thickness; and physiological parameters included chlorophyll, phenol, and proline content. Data were analyzed using ANOVA, DMRT follow-up tests, and correlation tests. The results showed that zoning differences caused differences in environmental quality, anatomical structure, and physiology of *Rhizophora mucronata*. The proximal zone had the highest temperature and salinity, lower DO, leaf thickening, the largest root aerenchyma area, and high phenol and proline accumulation. The middle zone had the highest pH, DO, and sediment chemical content, which correlated with the highest stomatal pore size and chlorophyll content. The distal zone had the lowest salinity with relatively stable anatomical and physiological responses. Overall, environmental quality correlated with the anatomical and physiological structure of *Rhizophora mucronata*.

Keywords: *adaptation, sediment, roots, leaves, chlorophyll, phenol, proline*