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Effects of Salt on Root Aeration, Nitrification, and Nitrogen Uptake in Mangroves

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关键词	mangrove; nitrogen; porosity; radial oxygen loss; salt; suberization;
摘要	<p>The potential effects of salt on the growth, root anatomy, radial oxygen loss (ROL), and nitrogen (N) dynamics in mangroves were investigated using the seedlings of <i>Avicennia marina</i> (Forsk.) Vierh. The results showed that a moderate salinity (200 mM NaCl) appeared to have little negative effect on the growth of <i>A. marina</i>. However, higher salt stresses (400 and 600 mM NaCl) significantly inhibited the biomass yield. Concentrations of N in the roots and leaves decreased sharply with increasing salinity. Nevertheless, the presence of salt directly altered root anatomy (e.g., reduced root porosity and promoted suberization within the exodermis and endodermis), leading to a significant reduction in ROL. The results further showed that reduced ROL induced by salt could restrain soil nitrification, resulting in less ammonia-oxidizing archaea and bacteria (AOA and AOB) gene copies and lower concentrations of NO₃⁻ in the soils. While increased root suberization induced by salt inhibited NH₄⁺ and NO₃⁻ uptake and influx into the roots. In summary, this study indicated that inhibited root aeration may be a defense response to salt, however these root symptoms were not advantageous for rhizosphere nitrification and N uptake by <i>A. marina</i>.</p>
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