MANGROVE SPECIES' ASSOCIATION AND DISTRIBUTION PATTERNS IN TUMPAT, KELANTAN DELTA, EAST COAST OF PENINSULAR MALAYSIA

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We studied mangrove vegetation at Tumpat to estimate different tree structural parameters (e.g., stem density and basal area) at selected sites (PCQ-Method). There were 5 dominant taxa in the vegetation, i.e., *Sonneratia caseolaris*, *Nypa fruticans*, *Avicennia alba*, *Rhizophora mucronata*, and *Bruguiera gymnorrhiza* in order of importance. Total tree density varied between 79 and 132 stems $0.1ha^{-1}$, and basal area from 0.14 to $4.9m^2$ $0.1ha^{-1}$. Based on species composition and stem density, the mangrove sites could be separated into two groups (Bray-Curtis similarity: 60%). While Group-1 (sites G9, J5, K4, N6 and O4), dominated by *S. caseolaris* and *N. fruticans*, was distributed throughout the forest, Group-2 (sites C6 and G6), represented largely by *A. alba*, is present close to the bay-mangrove boundary. Elevation measurements indicate that Group-1 species occupied low-lying to elevated grounds (0.87-2.23m above the mean sea level) with a (mean) salinity between 0.38 and 14.6psu, whereas Group-2 occurred preferentially at low to medium elevations (0.86-1.29m) and high salinity (14.6psu). Discrete mangrove associations (=groupings) were discerned, wherein the distribution of species is governed by factors such as proximity of land or sea, freshwater input and elevation.