A study on the taxonomy and ecology of aquatic macrophytes of Kuttanad wetland ecosystem was conducted during 2004-2007. Collection and identification was done using taxonomic publications. A total 130 species were recorded, out of which 129 were identified belonging to 88 genera of 44 families. 50 species were common distributed all over Kuttanad; out of which 10 were most abundant. 21 taxa were rare and some of them were observed only once. The collected aquatic macrophytes were classified into 6 growth forms. Species composition varied in different habitat systems. Species richness was highest in cultivated rice fields. Exotic to native ratio was highest at Thottappalli. Ecological studies using percentage cover of macrophytes and physicochemical properties of water revealed that the habitat systems and agro-ecological zones are distinct. There was clear gradient controlled few principal variables such as DO, BOD, pH and Potassium. Community dynamics was prominent in cultivated rice fields. The stagnant canals and the old abandoned rice fields are characterized by stable communities. The long-term ecological succession resulted in the formation of permanent floating islands in these habitat systems. *Eichhornia crassipes* and *Ischaemum travancorense* were identified as the macrophyte communities facilitating the formation of floating islands. Spatio-temporal distribution mapping revealed that cultivated rice occupied the maximum extent. There was considerable increase in the area occupied by aquatic macrophytes over the years. *Nymphaea pubescens* in off-season cultivated rice fields and some of the canals occupied the highest area followed by *I. travancorense* and *Hymanachne acutigluma* in abandoned rice fields. Steady increase in the area occupied by *E. crassipes* and *Cabombo caroliniana* showed the invasion of these exotics. Temporal pattern was in agreement with the seasonal cycling noted during the field survey.

**Key words:** Aquatic macrophytes, Kuttanad, habitat systems, growth forms, succession, floating islands, remote sensing, GIS