

FATE OF THE PREDICTIONS IN GALLE-UNAWATUNA MANGROVES, SRI LANKA: A VALIDATION AFTER 10 YEARS USING SATELLITE (IKONOS) AND GROUND-TRUTH DATA

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Validation of earlier predictions is a challenging but significant contribution to ecological research. The present study tests the predictions made 10 years ago by Dahdouh-Guebas *et al.* (2000) on the evolution of mangrove forest in Galle-Unawatuna, Sri Lanka. The ground inventory carried out in five Sectors covering the entire forest (Point Centred Quarter Method - PCQM) (Cintron and Schaeffer Novelli, 1984) revealed that the adult species composition is dominated by *Rhizophora apiculata*, *Excoecaria agallocha*, *Bruguiera gymnorhiza* and *B. sexangula*, with their total density of 216-267 stems 0.1ha⁻¹ and basal area 1.19-1.44m² 0.1ha⁻¹. However, both young and juvenile vegetation in the most Sectors was dominated solely by *B. gymnorhiza* (128-869 stems and 356-1482 propagules 0.1ha⁻¹). According to Dahdouh-Guebas *et al.* (2000), the transition of an *E. agallocha* forest into a *B. gymnorhiza* dominated one or at least their co-dominance in the Sectors 1 and 2 is possible, whereas Sector 3 being dominated by adult and juvenile *R. apiculata* will persist. Overall, the possible transition to a *Bruguiera* dominated forest in Galle-Unawatuna area was forecasted. The recent decadal changes between 1994 and 2004 through the integration of IKONOS satellite imagery of 2004 with ground-truth information confirmed many of the predictions and showed dynamic shifts in young/adult vegetation by *B. gymnorhiza*. Both *E. agallocha* and *R. apiculata* continue to be dominant in Sectors 2 and 3, although the adult turnover by *B. gymnorhiza* has not yet occurred, probably due to the small time interval between the two investigations. Confirming in part with the earlier prediction on *R. apiculata* in Sector 3, present study also revealed the abundance of *B. gymnorhiza* as young and juvenile vegetation. Viewing the present dynamic shifts and sheer dominance as young vegetation by *B. gymnorhiza* with a mean height of 5.8m in most Sectors, it is still possible to anticipate the mangroves being dominated by this species, and actually now validates the predictions made 10 years ago. Because of apparent changes in the mangrove vegetation structure, it could be concluded that the 'moving mosaic' pattern of mangrove species distribution reported earlier for Galle-Unawatuna still persists.

References

- Cintron G. and Y. Schaeffer Novelli. 1984. Methods for studying mangrove structure. p.91-113. In: Samuel C.S. and G.S. Jane (Eds.). The mangrove ecosystem: research methods. UNESCO publication, Paris.
- Dahdouh-Guebas F., A. Verheyden, W. De Genst, S. Hettiarachchi and N. Koedam. 2000. Four decade vegetation dynamics in Sri Lankan mangroves as detected from sequential aerial photography: a case study in Galle. Bulletin of Marine Science 67:741-759.