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

Satyanarayana Behara1,2, Kriki De Smet1, Diana Di Nittol1,2, Maite Bauwens1, Loku Pulukkuttige Jayatissa1, Stefano Cannicci4, Nico Koedam2 and Farid Dahdouh-Guebas1,2*

1 Complexité et Dynamique des Systèmes Tropicaux, Département de Biologie des Organismes, Faculté des Sciences, Université Libre de Bruxelles-ULB, Avenue Franklin D. Roosevelt 50, B-1050 Brussels, Belgium
2 Laboratory of Plant Biology and Nature Management, Mangrove Management Group, Vrije Universiteit Brussel-VUB, Pleinlaan 2, B-1050 Brussels, Belgium
3 Department of Botany, University of Ruhuna, Matara, Sri Lanka
4 Dipartimento di Biologia Evoluzionistica, Università degli Studi di Firenze, via Romana 17, I-50125, Firenze, Italy

*Corresponding author: fdahdouh@ulb.ac.be

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 0.1 ha−1 and basal area 1.19-1.44m² 0.1 ha−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