Journal of Tropical Ecology (1986) 2:93-94

SHORT COMMUNICATION

The mangrove understory: some additional observations

RICHARD T. CORLETT

Department of Botany, National University of Singapore, Lower Kent Ridge Road, Singapore 0511

KEY WORDS: Malaysia, mangrove, swamp forest, understory.

Janzen (1985) states that mangrove forest is unique among tropical forests in lacking reproducing understory herbs and shrubs and in the absence of the vine life-form. He suggests three hypotheses to explain these observations, all depending to some extent on the metabolic demands of salt tolerance. Observations in Singapore and southern Malaysia suggest that Janzen's statement and hypotheses are oversimplified.

The exceptionally rich mangrove flora of this region includes at least one understory shrub, *Brownlowia tersa* (L.) Kosterm. (Tiliaceae), and a large woody vine, *Finlaysonia obovata* Wall. (Asclepiadaceae). *B. tersa* is a shrub, 1-2 m high, with narrowly elliptic leaves, which commonly grows under a canopy of mangrove Rhizophoraceae, where it is inundated by normal high tides. On the Benut river, on the west coast of Johor, Malaysia, it forms a sometimes dense understory under *Rhizophora* species and *Bruguiera* species where it flowers freely. I cannot be certain that it would do the same in pristine mangrove, which does not exist in this area, but it appears to be shade tolerant and does not invade cleared areas. *F. obovata* is usually found at higher levels than *B. tersa* but, on river banks, it is sometimes found rooted among and growing over *Rhizophora* species in areas inundated by normal high tides. Its seeds are dispersed by water (Ridley 1930).

It is undoubtedly true, however, that most mangrove forests do lack an understory and vines. Moreover, these life-forms are probably always absent in the seaward mangrove zone, occupied by *Avicennia* species and *Sonneratia alba* in this region. But the metabolic cost of salt tolerance is only one of the problems faced by mangrove plants which can be invoked to explain this apparent

anomaly. In south-east Johor, there is another forest type where the view through the understory is, in Janzen's words, 'largely of sun-dappled and shaded trunks, stilt roots, pneumatophores and little foliage'. This is the pioneer forest on mud banks in the freshwater tidal region of rivers. Corner (1978) calls this forest type the 'mempisang-belt', after its most characteristic species, *Polyalthia sclerophylla.* Corner includes some herbs and shrubs in his species list for this forest type but my observations on a surviving remnant at Mawai, on the Sedili Besar river, suggest they are usually confined to the margins. His plate 11 gives an idea of the understory of this community, which is very mangrove-like in appearance. In addition to the peg-like pneumatophores of *P. sclerophylla*, there are species with knee-roots (e.g. *Horsfieldia irya*) and stilt-roots (*Elaeocarpus macrocerus*), all illustrated by Corner. This region of the river, about 30 km from the sea, has a tidal range of around 2 m and salt water only intrudes in periods of exceptional drought. Irregular rain-floods of many metres depth also occur (Corner 1978).

The similarity of the understory of this forest to that of mangrove suggests that it is not salt which is the major factor but tidal flooding, perhaps through instability of the substrate. Interestingly, seasonally-flooded swamp forests have an understory more like that of dryland rain forest. Detailed studies of the establishment and regeneration of these non-saline, tidal forests might give fresh insights into the biology of the mangrove ecosystem.

LITERATURE CITED

CORNER, E. J. H. 1978. *The freshwater swamp forest of south Johore and Singapore.* Garden's Bulletin Supplement No. 1, Botanic Gardens, Singapore.

JANZEN, D. H. 1985. Mangroves: where's the understory? *Journal of Tropical Ecology* 1:89-92.

RIDLEY, H. N. 1930. *The dispersal of plants throughout the world.* Reeve, Ashford.

Accepted 10 March 1986