

Evolution of a New Community Type during the Degradation of a Mangrove Ecosystem

The southeastern coast of the Guanabary Bay, Rio de Janeiro, Brazil, has over the last 50 years suffered the impact of increasing industrial and human activity; and, as a result, the marginal vegetation communities have undergone changes. The original marginal vegetation was composed of mangrove communities. The primary association (arboreal) consisted of *Rhizophora mangle* L., occurring closest to the bay, followed by a zone of *Avicennia germinans* Jacq. and further inland by *Laguncularia racemosa* (L.) Gaertn.

The secondary association, farther inland, was composed of three herbaceous zones of *Salicornia* sp. then *Lagenocarpus* sp. and then *Paspalum* sp. (Dansereau 1947). During 1979, observations were made on the floristic composition of the marginal plant communities at several sites in this region of Guanabara Bay. Our results were then compared with a list of the original community composition in this area (Oliveira 1947).

Our data show that the primary association of mangroves in this region has practically disappeared. This change is probably due to factors such as exploitation of the wood and asphyxiation of the mangrove roots by oil pollution. The herbaceous association, on the other hand, is well developed, presenting a conspicuous community formed by two perennial succulent halophytes: *Sesuvium portulacastrum* (L.) L. and *Iresine vermicularis* Mog. Neither of these species had been reported as forming distinct vegetation zones in this region. However, *Sesuvium* is considered a common species in mangrove systems (Chapman 1978), and *Iresine* has been reported in other mangrove systems extant in Guanabara Bay (Araujo and Maciel 1979). Both species are heliophytes since their distribution within the mangrove systems is shade-limited; and both are resistant to periodic inundations (Segadas-Vianna *et al.* 1967).

The present dominance of the *Sesuvium-Iresine* association, on the sandy beaches in this region, indicates that a disturbed pattern of ecological succession has occurred. Although this association has been cited by Boughey (1957) as a component of a natural system, we believe that its presence in Guanabara Bay represents the influence of human and industrial activity in this area. The disappearance of the mangroves was probably the decisive factor in the development of this association through increased insolation, permitting the expansion of both species, and accelerated erosion of the fine particles that previously had been deposited. The consequent higher frequency of inundation of the remaining herbaceous community would destroy the less-resistant species, thus eliminating competition between these plants and the *Sesuvium-Iresine* association, and leaving it as the dominant association in this region. The *Sesuvium-Iresine* association is currently being studied in reference to its importance as a component of the marginal vegetation of Guanabara Bay (Lacerda 1980), and as an indicator of heavy metal pollution.

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- ARAUJO, D. S. D. DE, AND N. C. MACIEL. 1979. Os manguezais do Recôncavo da Baía de Guanabara. FEEMA. Fundação Estadual de Engenharia do Meio Ambiente. Cadernos FEEMA, serie técnica 10/79. Rio de Janeiro, Brasil.
- BOUGHEY, A. S. 1957. Ecological studies of tropical coast-lines. *J. Ecol.* 45(3): 665-687.
- CHAPMAN, V. J. 1978. Coastal vegetation. Pergamon Press, Oxford, England, 292 pp.
- DANSEREAU, P. 1947. Zonation et succession sur la restinga de Rio de Janeiro. I. Halosere. *Rev. Canad. Biol.* 6: 448-477.
- LACERDA, L. D. DE. 1980. Ciclagem mineral em uma comunidade de halófitas da Baía de Guanabara T. Mestrado, Inst. Biofísica, Univ. Fed. Rio de Janeiro, Brasil.
- OLIVEIRA, L. P. H. DE. 1947. Distribuição geográfica da fauna e flora da Baía de Guanabara. *Mem. Inst. Oswaldo Cruz* 48: 363-391.
- SEGADAS-VIANNA, F., W. T. ORMOND, AND L. DAU. 1967. Flora ecológica das restingas do Sudeste Brasileiro. Vol. VIII. Aizoaceae. Museu Nacional, Univ. Fed. Rio de Janeiro, Brasil.

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