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# Forest Endemism in Relation to Hydrology of Western Ghats

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Parting from Madagascar (88-90 m.y.a) and from Seychelles (65 m.y.a) left the Indian sub-continent lone in the Tethys Sea, like an island, drifting northwards, paving way for biological evolution in isolation and development of higher endemism. Tropical rain forests flourished all over during the slow process of crossing the equator, through several million years. Merger with Eurasia resulted in the rise of Himalayas causing increased aridity and monsoonal climate with rain forests persisting in only small pockets, like the North-East and South Indian Western Ghats.

Western Ghats exhibits latitudinal decline in wetness, its south (8-10°N lat) closer to the equator, having higher humidity and 9-10 rainy months due to summer showers and monsoon rains. Progressively northward reduction in rainy months, down to 3-4 in northern Maharashtra (18-20°N), creating differential dryness, decisive in forest related endemism, is reflected in northward decline in tree endemism, viz. 250 tree endemics in 8-10°N lat, 222 in 10-12°N, 139 in 12-14°N, 79 in 14-16°N, 38 in 16-18°N and merely 22 tree endemics in >18°N lat.

As progressive desiccation northwards is a critical factor, the endemics tend to persist around hydrologically richer parts of forests. Agricultural beginnings in the Western Ghats three millennia ago, concomitant with use of fire and axe, affected primeval forests, causing decline in endemism and spread of secondary vegetation. However, relic primary vegetation persisted in higher altitudes, in gorges of rivers and in sacred forests preserved as part of local cultures. These relics were also badly affected beginning in European times with commercial forestry, monoculturing of trees and higher altitude plantations of tea and coffee.

Studies in the Sharavathi river basin of central Western Ghats reveal that higher evergreenness of forests, with higher tree endemism in the catchments of tributary streams, favour endemic fresh water fishes. Swamp and stream laced Kathalekan sacred forest in Sharavathi basin is a refugium for endemic plant species including threatened ones. The forest-swamp complex of Kathalekan, in just 2.25 sq.km area had 35 amphibian species, almost equal to the amphibians of the entire Maharashtra. Study in the coastal Honavar taluk of Sharavathi basin, on hydrological significance of endemism rich Karikan sacred forest on a hill top, in comparison with a nearby hill clad in secondary forests reveals



year-round recharge of ground water from the Endangered *Dipterocarpus indicus* dominated sacred forest, enabling the village community in the valley down to concentrate on highly remunerative garden crops. In contrast is the water scarcity hit, poorer farming community in the village below the secondary forest, where rain-fed rice and garden crops together yield only 50% income of the former. The studies highlight the need for urgent conservation of hydrologically rich forests which are also centres of endemism.

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