

24 Sampling of Tropical Terrestrial Plants with Particular Reference to the Determination of Trace Elements

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According to Polunin (1960), there are five main tropical vegetation types, namely the tropical rain forest, forests with seasonal rhythm or monsoon types of forest, the savanna woodland, the thorn woodland and the hot desert. Tropical forests consist broadly of two levels: the high forests of the hot and humid regions which lack a pronounced dry season, and the forests developed in seasonally dry climates. Little is known about the numerous biomes which are found in the tropical forests. With respect to the dynamics of organic and inorganic matter, tropical plant communities differ greatly from plant communities elsewhere due to their special characteristics such as the structure and composition of life forms, the relatively long lifetime of leaves, the complex and multilayered structure of the forests with their wide floristic diversity of species. Therefore, the sampling of plants in tropical forests poses its own problems.

In contrast to the temperate regions, no marked seasonal variations can be observed in the tropical rain forest, but the vegetation of mountains is considerably affected twice a year by the influence of heavy monsoon rains. Uptake rates and interactions of trace elements in tropical plants are significantly affected by high levels of humidity, light intensity, temperature as well as by differing life cycles compared to plants growing in the Northern Hemisphere (Epstein, 1972; Barber, 1984). In established forest ecosystems, atmospheric input, being the only input pathway, is very significant (Adriano, 1986). In this respect, established forests such as the montane forest ecosystem would be ideal for long-term monitoring of atmospheric input of various chemical elements or constituents.

Plants are sampled for many purposes (Lieth and Markert, 1990; Markert 1991) such as to assess the baseline concentration levels, availability of elements in soil, soil-plant chemical relationships, plant nutrient status, inorganic and organic pollutants or to investigate pathogenic problems. With respect to the pollution trend monitoring, investigation of biological and environmental materials from very remote and anthropogenically unaffected ecosystems such as tropical montane rain forest would provide interesting information on pollution trends as virtually no uncontaminated material from preindustrialized times is available in developed countries (Jayasekera and Rossbach, 1993). Irrespective of the purpose of sampling, sound sampling without any contamination is of vital importance to derive reliable and accurate information about the trace element chemistry of the plant population being studied. The objective of this