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In humid tropical regions, bacteria that fix atmospheric nitrogen were found to abound in a complex layer of microorganisms covering foliage. The activities of the biocoenosis in the phyllosphere suggest the importance for plant growth in general and in agriculture and forestry in particular. Reports on biomass production in the tropics support this hypothesis. [The *SCI*® indicates that this paper has been cited in over 125 publications.]

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It was 1939 when I arrived in Indonesia as the secretary and assistant of my former professor, Baas Becking, at that time the temporary director of the Buitenzorg Botanic Gardens in Bogor (Java). This famous institute had sadly deteriorated for lack of personnel and finances during the recent depression. The government of The Netherlands East Indies had charged Becking with presenting a detailed programme for rehabilitation of the five divisions of fundamental biological research. It could touch the fields of applied research in agriculture, forestry, and fisheries, but it should not interfere with schedules in progress. The contract was for a one-year duration. Many lengthy conferences were required to reach a consensus with the standing research establishment regarding this programme.

In 1940 the proposal to reorganize was accepted officially and became operative at once. I was confirmed in my position as the assistant to the director. The past year had been extremely propitious for me. I lived within the garden compounds, near the central office and the Treub Laboratory for general botany. This situation offered me the double opportunity to get acquainted with the diverse aspects of tropical research during my secretarial hours while extending my botanical knowledge by exploring the century-old park at leisure.

Actually, the phyllosphere concept emerged here from a study on epiphytic growth of ferns and orchids for their harmful influence versus the reputed innoxiousness of this growth, the reason the ferns and orchids had not been removed.[1] Closer testing, originally started as a hobby, proved that apart from damage by overgrowth and weight, mycorrhizal fungi and other potential parasites would invade the supporting limb and eventually cause its death. After clean-weeding however, the support recovered readily.

A logical follow-up to these results was the closer investigation of the rhizosphere and the adjacent "bare" plant surface. Methods of soil microbiology showed the phyllosphere to be an extremely nutritious milieu, harbouring a complex microbial growth containing *Beijerinckia* species. It seemed a lucky coincidence that these new tropical nitrogen-fixing bacteria had been isolated from soil and water at the Treub laboratories.[2] The wide distribution on foliage of trees and shrubs opened the exciting perspective of better understanding the luxuriant growth of tropical vegetation in nitrogen-poor soils and the importance that the phyllosphere had for agriculture and forestry.[3]

The observations and considerations stretched out over the many years of war: Japanese occupation, the Indonesian war of independence, and slow recovery afterwards. Three months after this discovery of *Beijerinckia* in the phyllosphere (1955), I repatriated, obliged by the heavy anti-Dutch propaganda.

Back in Holland I was lucky enough to find sponsors for extending my explorations in Surinam, the results of which were reported in the *Classic* publication. Afterwards, alternate periods of field observations and laboratory analyses followed at research centers in Surinam, Leiden, Wageningen (The Netherlands), the Ivory Coast, and once more in Indonesia. This involved closer examination of particular phyllosphere organisms and emerging problems in the vegetation.[4] The work was carried out single-handedly, with incidental assistance by local technical assistants.

In 1974, five years after my retirement, a comprehensive review of the topic was published[5] in which the phyllosphere was presented as the major centre of production and distribution of nutrients in vegetation, within the frame of all environmental conditions, including the soil. Review reports on progress in this field using new techniques are often presented at symposia.

The attention the above publication has received might be explained by the realization of the impending dangers of unbalanced strategies and technologies in land use and in world trades. Reckless large-scale world deforestation for farming purposes and industrial needs and the use of fertilizers in extensive farming of annual crops for export aimed at instant success and material gain continue to result in the exhaustion and destruction of natural resources. The need for reconsideration is obvious. The phyllosphere concept presents another approach for re-evaluation of methods for recovery and maintenance of growth and fertility under a sustained green cover.

1. **Ruinen J.** Epiphytosis. A second view on epiphytism. *Ann. Bogorienses* 1:101-58, 1953.
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3. **Ruinen J.** Occurrence of *Beijerinckia* species in the 'phyllosphere.' *Nature* 177:220-1, 1956. (Cited 65 times.)
4. **Fokkema N J & van den Heuvel J,** eds. *Microbiology of the phyllosphere.* Cambridge, England: Cambridge University Press, 1986. 392 p.
5. **Ruinen J.** Nitrogen fixation in the phyllosphere. (Quispel A, ed.) *The biology of nitrogen fixation.* Amsterdam: North-Holland, 1974. p. 121-67.

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