Natural Rubber Research, 21 (1&2): 145-147, 2008 SHORT SCIENTIFIC COMMUNICATION

EPIPHYTES ON RUBBER TREES IN THE DOOARS AREA OF WEST BENGAL

Rama Shankar Singh, Gitali Das, D. Chaudhuri* and James Jacob**
Regional Experiment Station, Nagrakata-735 995, Jalpaiguri, West Bengal, India
*Regional Research Station, Guwahati-781 006, Assam, Kerala, India
**Rubber Research Institute of India, Kottayam-686 009, Kottayam, India

Singh, R.S., Das, G., Chaudhuri, D. and Jacob, J. (2008). Epiphytes on rubber trees in the Dooars area of West Bengal. *Natural Rubber Research*, **21**(1&2):145-147.

A survey on the occurrence of epiphytes on rubber trees of different age groups was made at Regional Experiment Station, RRII, Rubber Board, Nagrakata, Jalpaiguri in the northern part of West Bengal as they could be indicators of atmospheric pollution and agroclimatic changes. The epiphytic growth was more frequent on older trees and it increased with age of trees. This could be because the old bark (with rough surface) provide good hold for the development and growth of epiphytes.

Key words: Age of plants, Biodiversity, Climate, Epiphytes, Growth index, Rubber tree.

Epiphytes such as orchids, ferns, moss and lichens depend on other plants for structural support and anchorage. They are important components of a natural ecosystem and play significant roles that include better interception and retention of rainwater (Hoelscher *et al.*, 2004) and nitrogen fixation (Bermudes and Benzing, 1991). They act as a source of food for birds and other animals (Hietz, 1998). Epiphytes are powerful biological indicators of environmental health. They are very sensitive to climatic changes (Hietz, 1998; Nadkarni and Solano, 2000; Gignac, 2001) and atmospheric pollution (Hauck, 2003). Monitoring the epiphyte population in a region will help in a general assessment on the environmental health of that region. The abundance of epiphytes on rubber trees compared to two popular forest trees teak (*Tectona grandis*) and jarul (*Lagestroemia flosreginae*) has been reported (Jacob *et al.*, 2002).

In the forest tree species that grow in the foot hills of Himalayas luxuriant growth of epiphytes on the older trees is a common feature. The present study examined the growth of naturally occurring epiphytes on mature rubber trees of different ages (Fig.1). The epiphytes were scored in the Regional Experiment Station of Rubber Research Institute of India at Nagrakata in northern West Bengal. The average rainfall in this location is 3966 mm and the mean maximum and minimum temperatures are 29.6 and

Correspondence: Gitali Das (Email: gitalidas@rubberboard.org.in)

Fig. 1. An epiphyte in bloom on a mature rubber tree

17.2°C respectively. The station is situated 26°46'N and 88°26' E with an attitude of 69mMSL. Different age groups of rubber trees (6 years to 16 years) having epiphytic growth

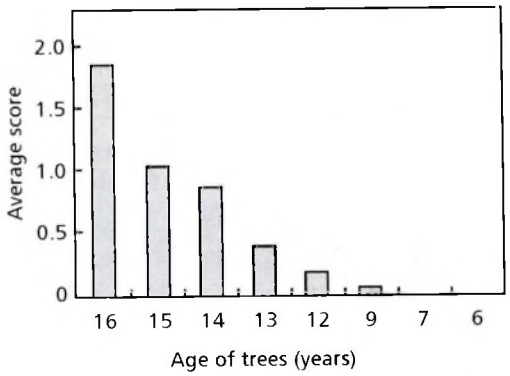

Fig. 2. Distribution of average empirical score of epiphytes on rubber trees

were assessed (Table 1) through empirical scoring from 1 to 10 for each tree where score 1 indicated no growth of epiphyte and 10 maximum growth irrespective of the different rubber clones included. The data on frequency of distribution was scored, tabulated and the average distribution represented graphically.

In order to understand the growth of epiphytes on rubber plants of different age groups, an assessment was made taking the average of all the plants in each group (Fig. 2).

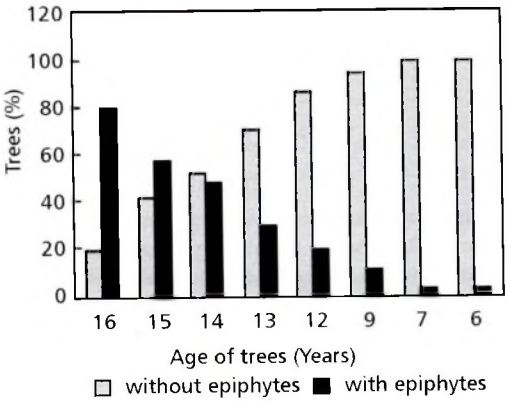

Fig. 3. Growth index of epiphytes on rubber plants of different age groups

Epiphytic growth was found to increase with age of the rubber plants. While the 16 year old plants had the highest average score of 1.88, the nine year old plants had a score of only 0.09. The six and seven year old plants did not show the presence of any epiphytes. Of the total 4133 trees surveyed, the highest score of 10 was recorded in two 16-year-old plants, while the highest score recorded in the 9 year old group was only 4.

The frequency of occurrence of epiphytes in the different age group is shown in Figure 3. Out of 1132 16-year-old trees, 81.1 per cent had

Table 1. **Number of trees under different age groups**

Age of rubber trees (years)	6	7	9	12	13	14	15	16	Total
No. of trees assessed	300	300	539	537	264	539	519	1139	4133

Table 2. **Percent distribution of plants**

Age of rubber trees (year)	Empirical score index									
	1	2	3	4	5	6	7	8	9	10
16	29.9	34.7	22.1	8.6	2.9	0.9	0.2	0.4	0.0	0.2
15	48.4	32.8	13.9	2.3	2.3	0.3	0.0	0.0	0.0	0.0
14	53.1	26.0	15.5	1.2	1.2	1.2	0.8	0.0	0.4	0.0
13	61.5	32.1	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	66.7	24.7	4.4	4.4	0.0	0.0	0.0	0.0	0.0	0.0
9	92.6	3.7	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

epiphytes. This frequency decreased in the younger plants, with the trees in the 6-7 year age groups recording no epiphytic growth at all.

Table 2 shows the percentage distribution of the different age groups for each score. Only a low level of epiphytic growth on a few trees could be seen in the 9-year-old plants as indicated by the scores. With increase in age, a larger proportion of trees had more intense infestation (as shown by the higher empirical score).

Compared to young trees, the higher growth of epiphytes on older trees may be due to the more congenial growth conditions for epiphytes, created by the rough bark surface and crevices of the older trees which provide suitable anchorage for development.

Growth of epiphytes was found to increase with age of the trees. Epiphytic growth results in accumulation of more minerals, carbon and moisture that could be useful to the host plant also.

REFERENCES

Bermudes, D. and Benzing, D.H. (1991). Nitrogen fixation in association with Ecuadorean bromeliads. *Journal of Tropical Ecology*, 7(4): 531-536.

Gignac, L.D. (2001). Bryophytes as indicators of climate change, *Bryologist*, **104**(3):410-420.

Hauck, M. (2003). Epiphytic lichen diversity and forest dieback. The role of chemical site factors. *Bryologist*, **106**(2): 257-269.

Hietz, P. (1998). Diversity and conservation of epiphytes in a changing environment. *International Union of Pure and Applied Chemistry (IUPAC)*, **70**:11.

Hoelscher, D., Koehler, L., Van-Dijk, A.I.J.M. and Bruijnzeel, L.A. (2004). The importance of epiphytes to total rainfall interception by a tropical montane rain forest in Costa Rica. *Journal of Hydrology (Amsterdam)*, **292**(1-4):308-322.

Jacob, J., Chaudhuri, D., Thapliyal. A. P., Mandal, D., Singh, R.P., Meti, S., Deka, H.K. and Devakumar, A.S. (2002). Ecological impact of natural rubber, teak and jarul plantations. In: *Plantation Crop Research and Development in the New Millennium.* (Eds. P. Rethinam, H.H. Khan, V.M. Reddy, P.K. Mandal and K. Suresh). Coconut Development Board, Cochin, India, pp.365-69.

Nadkarni, N.I. and Solano, R. (2000). Potential effects of climate change on canopy communities in a tropical cloud forest: an experimental approach. *Oecologia*, 131(4): 580-586.