

INTENSITY OF DIE-BACK DISEASE IN THE RUBBER PLANTATIONS OF RUPAICHHARA RUBBER ESTATE, BANGLADESH

Rubber (*Hevea brasiliensis* Mull.-Arg) is an economic tree crop in Bangladesh. It was first introduced in Bangladesh by the Forest Department in 1952. About 287 ha of land were planted under a pilot scheme by 1959. In 1962, the Rubber Plantation Project was handed over to Bangladesh Forest Industries Development Corporation (BFIDC). By 1985, BFIDC planted 7,383 ha of land in 11 different Estates of the country. Die-back has now become a problem in these plantations. In recent years, BFIDC reported that there had been a severe infection of die-back disease in the Rupaichhara Rubber Estate of greater Sylhet district. But, at present no information is available on the intensity of the disease in these plantations. Rahman (1987) reported that a severe die-back attack was found on grafted rubber seedlings at Kanchanagar and Raozan Rubber Estates in 1985. According to him, it was primarily due to poor root regeneration on transfer to polyethylene bag and, secondarily, due to the attack by a weak fungus, *Phomopsis hevae* (Petch) Boedijn. Turner (1985) reported die-back in at least 50% of the seedlings at the entrance of Gala Chhara Nursery, and also in certain beds of Bhatara Rubber Estate. He also mentioned that the RRIC-100 clones planted at Rupaichhara Rubber Estate showed high mortality due to the disease.

The present study is an attempt to determine the intensity of die-back infection in the Rupaichhara Rubber

Estate. There were as many as 23 different plantations in the Estate, established from 1977 to 1985. It covered about 720 hectares, in 19 different blocks of about 40 ha each. Three major clones were used in these plantations. The local seedlings were planted in 1977 and 1978 (65 ha), the GG-seedling in 1981 (134 ha), and the RRIM-600 from 1982 to 1985 (521 ha). The local seedlings were planted in two blocks, GG-clones in four and RRIM-600 in 13 blocks. A total of 311,993 seedlings were planted in the entire area of which 291,862 plants survived (Chowdhury 1988).

The survey was conducted using stratified random sampling with proportional allocation of trees in each stratum (clone). For each clone, a sample of 1% trees was assumed to represent the total population. The stratification was made with the assumption that there might have been an association between the degree of infection and the types of clones planted. The entire plantation was, therefore, divided into three distinct strata. Data on the intensity of disease of the sampled trees were then recorded. This involved 2952 trees from a total of 291,682 of the population area. The intensity of disease was categorized into following four groups, namely 1) healthy : no infection, 2) slightly : one to two branches infected, 3) moderately : three to five branches infected and 4) severely : more than ten branches infected. Data collected on the intensity of the die-back disease was analysed statistically.

The analysis of the data collected from the survey area are presented in Table 1. For all the clones, an average of 55.7% trees were found healthy; while 40.7% were slightly attacked, 2.6% moderately attacked, and 1.0% severely attacked.

An overall estimate of the healthy, slightly attacked, moderately attacked and severely attacked trees irrespective of clones were made separately. The proportion estimate for different types of infection and the corresponding standard error of the estimates were calculated. The population estimate for healthy were found to be 55.7 (%SE = 0.02). Infection were found to be 40.7 (%SE = 0.02) for slightly, 2.6% (%SE = 0.11) for moderately

and 1.0% (%SE = 0.18) for severely attacked trees.

A chi-square test was made to see the association between the degree of infection and the clones used. The results are presented in a 2x3-contingency table (Table 2).

The test indicates a highly significant difference which means the local clones are less susceptible to die-back disease than the exotic clones. This situation warrants an immediate preventive measure against the die-back disease in the Estate. Special attention should be paid to RRIM-600 and the GG-seedlings.

Table 1. Percentages of healthy, slightly attacked, moderately attacked and severely attacked trees in different clones

Clone (Stratum) (i)	Sample size (ni)	Healthy (%)	Diseased (%)		
			Slightly	Moderately	Severely
Local	255	68.2	30.2	1.6	—
GG-Seedling	766	62.0	36.0	1.8	0.2
RRIM-600	1931	51.6	44.0	3.1	1.3
All	2952	55.7	40.7	2.6	1.0

Table 2. A 2x3-contingency table for chi-square test

Diseased/ Healthy	Number of trees (%)				Chi-square value (calculated)
	Local	GG-seedling	RRIM-600	Total	
Diseased	81 (32%)	291 (38%)	935 (48%)	1307	41.99**
Healthy	74 (68%)	475 (62%)	996 (52%)	1645	
Total	225 (100%)	766 (100%)	1931 (100%)	2952	

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