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EFFECT OF ZINC ON GROWTH AND INCIDENCE OF POWDERY MILDEW DISEASE OF RUBBER SEEDLINGS IN NURSERY

The incidence of powdery mildew disease of rubber trees (*Hevea brasiliensis* Muell. Arg.) caused by *Oidium heveae* is very high at the time of refoliation after wintering in North Eastern parts of India (Mondal *et al* 1998). Due to continuous availability of tender susceptible leaves, the disease persists in the nursery throughout the year (Edathil *et al.*, 2000). The control of powdery mildew disease by dusting of agricultural grade sulphur powder is the standard practice adopted in mature rubber plantations. For nursery plants spraying of wettable sulphur or carbendazim is recommended (Rubber Board, 2001). There are some reports, which indicate a striking relationship between susceptibility to severe attack of *O. heveae* and zinc status of the plant (Bole-Jones and Hilton, 1956; Rubber Research Institute of Malaya, 1956). Therefore, application of zinc could be a prudent approach to manage powdery mildew disease. Hence, the present investigation was undertaken to find out the effect of zinc chelate on the growth of *Hevea* seedlings and the incidence and severity of powdery mildew disease in nursery.

The experiment was conducted during three consecutive years, 1993-94, 1994-95 and 1995-96. Germinated seeds of *Hevea brasiliensis* (40 nos.) were planted at a spacing of 30 x 30 cm in nursery beds (3.0 x 1.2 m) during August every year at the Regional Research Station of the Rubber Research Institute of India at Sorutari Farm in Kamrup district of Assam. Eleven treatments (Table 1) were imposed in a randomized block design with four replications per treatment. Before imposing treatments, the height (cm) and the diameter (cm) of the seedlings at the collar region were recorded from 16 sample seedlings from the inner rows of each plot. Spraying was carried out using a hand compression sprayer and screens were used to prevent drift.

The incidence of powdery mildew disease was assessed on 16 seedlings from the inner rows of each plot during March-April after the final round of all treatments. Disease severity was scored from five seedlings having immature top whorl of leaves, selected at random from each plot. For a visual scoring and classification of severity a scale of1-5 was used where 1 = 0% (no infection), 2 = 1-15%, 3 = 16-30%, 4 = 31-51% and 5 = 51% and above leaf area infected. For estimation of severity (S) the sum of infection grades of each sample was divided by the total number observed, which included both infected and non-infected leaves (Samaradeewa *et al.*, 1985). Disease incidence (I) was calculated by dividing the number of diseased plants (irrespective of grade of disease) by the total number of plants observed and expressed as percentage. The final height and diameter of 16 sample seedlings from each plot were recorded during June-July every year (Potty *et al.*, 1976). The data were subjected to analysis of variance (ANOVA) and the treatment means were compared by LSD ($P \leq 0.05$).

Incidence and severity of powdery mildew disease was found to be maximum in untreated control plots (T_1) and plots with treatments T_8, T_9 and T_4 (Table 1). On the other hand, the incidence of powdery mildew disease was checked completely in the plots treated with agricultural grade sulphur dust (T_2). Disease incidence was comparatively low in treatments T_6, T_7 and T_3, the former two being on par. Though the inci-