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EFFECT OF SOIL CHARACTERISTICS ON TERMITE INFESTATION IN MANGO ORCHARDS*

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ABSTRACT

Soil samples were collected from mango orchard of various places and analysed. Termite soil galleries on trees in the all orchard have higher organic carbon, phosphorus and potash than the surrounding soil. While termite soil galleries have lower pH than the surrounding soil. As the sand per cent increased in soil the per cent infestation also increased at all places except I.A.R.I. and Kiccha. Clay per cent in soils of Upeda, Rohenda and Khurja gave negative value of r.

Mango is the most important fruit crop of India, which constitutes 65 per cent (9.22 million t) of the world production of 15.7 million t (Anonymous, 1992). Uttar Pradesh is the main mango growing state of India sharing 34% of total mango production in the country (Chadha, 1989). Among the various insects infesting mango crop, termite is the most important soil pest on the basis of extent of damage. Termite feed on the main trunks in the soil galleries and this adversely affects the growth of the plant and fruit yield (Khanna *et al.*, 1956). Majority of the mound building species prefer moist wooded areas with heavy soils having good water retention capacity in contrast to sandy desert soil with poor water holding capacity (Roonwal, 1976; and Thakur, 1981). In the present investigation, attempt has been made to study the comparison of physico-chemical characteristics of termite soil galleries and surrounding soil and interactions of organic carbon, sand, silt and clay with per cent infestation.

Soil samples were collected from mango orchards of Upeda (Ghaziabad), I.A.R.I. (New Delhi), Rohenda and Khurja (Bulandhsahar), Patharchatta and Kiccha (Udham Singh Nagar) at different dates viz. October 12, 13, 14, 16 and 19, 1998, respectively. Soil samples of termite galleries from tree trunk were collected from various places. These were analysed in the department of Soil Science, Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, for study of type of soil, organic carbon, pH, phosphorus, potash, sand, silt and clay. Physico-chemical properties of soil i.e. organic carbon, sand, silt and clay were correlated with per cent infestation of termite.

Comparison of termite soil galleries and surrounding soil: Soil analysis results as given in Table 1 indicated that termite soil galleries on trees in the all orchard have higher organic carbon, phosphorus and potash than the surrounding soil. White termite soil galleries have lower pH than the surrounding soil.

Samra (1979) reported that termite soil galleries had more organic carbon, magnesium, available nitrogen and potash than the surrounding soil but it had lower pH and phosphorus. However, in the present invistigation, phosphorus was also higher in termite soil galleries. Singh *et al.* (1987) reported that termite soil galleries have more organic carbon, phosphorus, potash and nitrogen than the surrounding soil while pH was stable in both the soils. In present studies, termite soil galleries have more organic carbon phosphorus and potash than the surrounding siol but pH was found lower in termite soil galleries. Calcium, magnesium and nitrogen were not analysed.

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Table 1. Comparison of physico-chemical characteristics of termite soil galleries and the surrounding soil

Place	Site of soil	Soil characteristics			
		pH	Oraganic carbon (%)	Phosphorus (kg/ha)	Potash (kg/ha)
Soil from Upeda (Ghaziabad)	Termite soil galleries	6.91	0.75	35	275
	Surrounding soil	7.0	0.65	34	274
Soil from I.A.R.I. (New Delhi)	Termite soil galleries	7.49	0.50	28	219
	Surrounding soil	7.60	0.36	26	215
Soil from Rohenda (Bulandshahar)	Termite soil galleries	6.95	0.60	33	347
	Surrounding soil	7.04	0.48	32	344
Soil from Khurja (Bulandshahar)	Termite soil galleries	6.93	0.62	32	346
	Surrounding soil	7.06	0.51	30	345
Soil from H.R.C. (Patharchatta)	Termite soil galleries	6.45	1.20	30	245
	Surrounding soil	6.6	1.09	27	243
Soil from Kiccha (U.S. Nagar)	Termite soil galleries	6.70	1.24	31	243
	Surrounding soil	6.85	1.10	29	240

Table 2. Correlation coefficient (r values) between per cent infestation and organic carbon, sand, silt and clay

Places	Per cent infestation	Organic carbon (%)	r value of organic carbon	Sand (%)	r value of sand	Silt (%)	r value of silt	Clay (%)	r value of clay
Upeda (Ghaziabad)	54.17	0.62	-0.90	56.7	0.58	29.2	0.25	14.1	-0.169
Rohenda (Bulandshahar)	82.31	0.48	-0.86	55.0	0.665	30.4	0.509	14.6	-0.62
Khurja (Bulandshahar)	86.2	0.51	-0.33	57.9	0.104	28.1	-0.62	14.0	-0.352
I.A.R.I. (New Delhi)	46.5	0.36	-0.072	53.0	-0.087	35.6	-0.02	11.4	0.88
Kiccha (U.S. Nagar)	13.57	1.10	-0.85	51.0	-0.092	35.4	0.683	13.6	0.067
H.R.C. Patharchatta (U.S. Nagar)	2.0	1.09	-0.06	24.0	0.037	46.6	0.59	29.4	0.064

Relationship of organic carbon, sand, silt and clay on termite infestation: Interactions of organic carbon, sand, silt and clay with termite infestation were studied. Result (Table 2) indicates that soil organic carbon was negatively correlated with per cent termite infestation in all places. On the other hand sand has a positive correlation in Upeda (0.58), Rohenda (0.665), Khurja (0.104) and Patharchatta (0.037). While I.A.R.I. and Kiccha it was a negative value with -0.087. and -0.093, respectively. Silt have a positive value of r at Upeda, Rohenda, Patharchatta and Kiccha while in Khurja and I.A.R.I. it has negative values. Clay was negatively correlated with per cent termite infestation in Upeda (-0.169), Rohenda (-0.62) and Khurja (-0.352) while opposite in I.A.R.I. (0.88), Patharchatta (0.064) and Kiccha (0.067).

It is clear from the results that per cent termite infestation decreases with increase of organic carbon. Growth in percentage of sand increased in per cent termite infestation in orchard of Upeda, Rohenda, Khurja and Patharchatta except in orchard of I.A.R.I. and Kichha. Silt has positive values of correlation coefficient at Upeda, Rohenda, Kiccha and Patharchatta while at Khurja and I.A.R.I. it has negative value. Percentage of clay in soils of Upeda, Rohenda and Khurja gave negative value of correlation coefficient except at i.A.R.I., Kiccha and Patharchatta. At I.A.I.R.,

Kiccha and Patharchatta other factors might orchards.
be affecting the termite damage in mangoes

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