Mineral Pollution Levels in Soil and their Influence on Population Dynamics of Phytonematodes

(Received November 4, 1987; Revised received September 1, 1988)

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The positive correlation of plant parasitic nematodes with mineral contents of soil has been assessed. The increased concentration of organic carbon, phosphorus and potassium beyond optimum level was found detrimental for the growth of the host plant due to increased plant diseases caused by nematodes.

The aspects of phytonematodes-mineral interaction in soil have attracted the attention of some earlier workers; but without any statistical inferences to establish the correlation of phytonematodes with concentration of mineral contents. This study includes biostatistical assessment of organic carbon, phosphorus and potassium concentration on the population dynamics of phytonematodes viz. Hemicriconemoides sp.,Rotylenchulus reniformis, Criconemoides communis, Xiphinema americanum, Tylenchus filiformis, Tylenchulus semiperenens and Longidorus spp. present around root zones of Carica papaya at 3 different vertical depths viz. 0–10 cm., 10–20 cm. & 20–40 cm. in the field conditions of Alfred Park, Allahabad, U.P. from March, 1983—February, 1985. The concentration of organic carbon, phosphorus, and potassium from the soil has been assessed by the method of Jackson and statistical application has been applied by Milton and Tsokos.

The correlation of nematode population at all vertical depths with organic carbon, phosphorus and potassium has been graphically shown (Figs. 1-3).

This investigation illustrates the adverse effects of mineral pollutants in soil which obviously enter in soil environment by way of irrigation, use of fertilizers containing varieties of organic compounds etc. It has been observed that the population of phytonematodes increases appreciably around the roots of host plant, C. papaya. The limits of mineral pollutants and their implication in depreciation of plant growth by way
of infections has been observed. Thus it can be safely concluded that the excess amount of these minerals content behaved as a mineral pollutant for the growth of host plants.

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\begin{align*}
1Y & = 16.53 + 3.31X, P < 0.10 \\
2Y & = 12.7 + 4.99X \\
3Y & = 7.91 - 5.99X, P < 0.20 \\
1Y & = 183.4 + 3.31X \\
2Y & = 110.555X, P < 0.020 \\
3Y & = 5.53 - 4.19X
\end{align*}
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Fig. 1-3. The correlation of population dynamics of phytonematodes with organic carbon (1), phosphorus (2), and potassium (3) at 3 vertical depths during March, 1983-February, 1985.
ACKNOWLEDGEMENTS

The author is extremely grateful to his parents, spouse, elder brother, sisters who not only provided the financial backing but also provided moral support in the completion of this work.

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