

## RESEARCH NOTE

### THE EFFECT OF DIFFERENT pH VALUES ON THE SURVIVAL OF ROTYLENCHULUS RENIFORMIS IN THE ABSENCE OF A HOST PLANT

The ordinary variations in hydrogen-ion concentrations in productive soils are believed to have little direct effect on soil nematodes. This factor has been studied and discussed by several investigators.<sup>1</sup> Apparently there seem to be no published data available in relation to the effect of pH on the survival of the reniform nematode, *Rotylenchulus reniformis* Lindford and Oliveira, 1940, in the absence of a host plant. A study of this kind was considered of importance because this nematode is very abundant in Puerto Rican soils.

In the laboratory several hydrogen-ion concentrations were tested to determine whether this factor of the soil environment could influence the survival of the reniform nematode in the absence of a host plant. Infested soil was collected from a pineapple field and adjusted to different pH values by means of additions of  $H_2SO_4$  and a mixture of equal parts of  $CaCO_3$  and  $Ca(OH)_2$ . The original hydrogen-ion concentration of the soil was pH 4. The adjusted soils gave aqueous solutions in a range of pH 2.34 to pH 7.92. The original population of reniform nematodes was 155 specimens per 250 gm. of soil. The soil was put in paper cups with a capacity of 250 gm. of soil in an air-conditioned room with a temperature range of 72 to 75°F. The paper cups were weighed, and watered every day with distilled water in order to bring the soil to field capacity. Samples for the determination of pH values and nematode populations were taken weekly for a period of 11 weeks.

<sup>1</sup> Godfrey, G. H., and Hagan, H. R., Influence of soil hydrogen-ion concentrations on infection by *Heterodera radicicola* (Greef) Müller, *Soil Sci.* 35(3): 175-84, 1934; Loewenberg, J. R., Effect of pH and minerals on the hatching and survival of *Meloidogyne incognita incognita* larvae, *Phytopath.* 50: 215-7, 1960; Lownsbery, B. F., Factors affecting population levels of *Crictonemoides senoplax*, *Phytopath.* 51: 101-3, 1961; Peters, B. G., *Heterodera schachtii* (Schmidt) and soil acidity, *Helmintol.* 4: 87-114, 1926; Robinson, T. and Neal, A. L., The influence of hydrogen-ion concentration on the emergence of golden nematode larvae, *Phytopathol.* 46: 665-8, 1956; Smith, A. M., Investigations on *Heterodera schachtii* in Lancashire and Cheshire, II, The relationship between degree of infestation and hygroscopic moisture, loss on ignition and pH value of the soil, *Ann. Appl. Biol.* 16: 340-6, 1929; Van Gundy, S. D., Some soil factors influencing reproduction of the citrus nematode and growth reduction of sweet orange seedlings, *Phytopathol.* 54: 294-9, 1964; Van Gundy and Martin, J. P., Soil texture, pH, and moisture effects on the development of citrus nematode (*Tylenchulus semipenetrans*), (Abst.) *Phytopathol.* 52: 31, 1962; Winslow, R. D., Some Aspects of the Ecology of Free-living and Plant Parasitic Nematodes, pp. 341-415, in J. N. Sasser and W. R. Jenkins, (ed.), *Nematology*, Univ. N. C. Press, Chapel Hill, N.C., 1960.

Table 1 summarizes the results obtained. It was found that after the end of the first week the reniform nematode was no longer detected in the soils giving pH values of 2.34 to 2.92. In soil samples with pH of 3.0 to 3.5 *R. reniformis* was found alive for 8 weeks. In soils with pH values of 3.54 to 4.21, nematodes survived for the longest period, 10 weeks. *R. reniformis*

TABLE I.—*Survival of the reniform nematode in a soil with different pH values, in the absence of a host plant*

Week period	Nematodes per 250 gm. of soil in 7 pH-value ranges						
	2.34-2.92	3.00-3.50	3.54-4.21	4.32-4.62	4.79-5.56	6.15-7.09	7.14-7.92
1	18	56	52	154	153	—	80
2	0	84	109	101	121	71	46
3	0	21	55	36	38	21	33
4	0	0	22	28	21	18	5
5	0	11	17	12	6	7	3
6	0	2	15	15	11	9	9
7	0	0	5	7	0	4	2
8	0	2	4	6	6	5	1
9	0	0	6	1	1	4	0
10	0	0	3	0	0	0	0
11	0	0	0	0	0	0	0

was found alive for 9 weeks in soil samples with a pH range of 4.32 to 7.09, and at the last pH values of 7.14 to 7.92 for 8 weeks. At the end of a period of 11 weeks no nematodes were found in any of the soils. Apparently acid soils with a pH value range of 3.54 to 4.21 are propitious for the survival of *Rotylenchulus reniformis*. This, perhaps, could be evidenced by the fact that the nematodes obtained for this test were originally in an acid soil with pH of 4.<sup>2</sup>

Elvin Quiñones  
Jessé Román  
Department of Entomology

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