BIOLOGY AND ECOLOGY OF *HOPLOLAIMUS INDICUS* (HOPLOLAIMINAE: NEMATODA). II. THE INFLUENCE OF VARIOUS ENVIRONMENTAL FACTORS AND HOST PLANTS ON THE REPRODUCTIVE POTENTIAL

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*Hoplolaimus indicus* Sher, 1963 thrives well under moderate environmental conditions. The most favourable set of environmental conditions for its maximum growth include: a temperature of 30°C, a soil pH of 7, sandy-loam type of soil, and 16% moisture content of the sandy-loam soil.

The most favoured host plants on which rapid multiplication takes place are tomato, sugarcane, and maize. No reproduction occurs on gram, guava (*Cyamposis tetragonoloba*), tobacco, watermelon, sugarbeet and rape-seed. With an increase in the initial level of population a corresponding decrease in the rate of reproduction takes place.

*Hoplolaimus indicus*, described by Sher (1963), has been met abundantly in Punjab (India) associated with the different climatic conditions, soil types and host plants. Prasad *et al.* (1964) reported this nematode from 14 host plants. Keeping in view the frequency of distribution of this nematode, studies were conducted on the influence of various environmental factors and host plants on the reproductive potential of this nematode.

MATERIALS AND METHODS

The culture of *Hoplolaimus indicus* required for the various studies was obtained from the pure population maintained in the green house.

1. **Effect of temperature and soil texture**

The effects of soil temperature and soil texture on the rate of multiplication were studied in a combined experiment so that the interaction, if any, of these two factors could be evaluated. Batches of pots 10 cm diameter were filled with one of three different types of soil viz., sandy-loam (10-20% clay), sand (less than 10% clay) and clay (above 50% clay) planted with fifteen day old tomato seedlings. The pots were then kept for three months at temperatures of 20, 25, 30 and 35°C in constant-temperature water baths. The soil temperatures in the pots were checked at least twice a day throughout the experiment. The experiment was replicated four times in a randomized block design for all three soil types in each of the four temperatures.

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Each of the 48 pots was inoculated with 100 females and 25 males of *Hoplo-
laimus indicus* equivalent to the sex ratio normally found in the field. The plants
were treated with Hoagland's nutrient solution and tap water on alternate days.

2. **Effect of soil pH**

This experiment was designed to see the effect of five soil pH levels i.e.,
5, 6, 7, 8, and 9 on the changes in population of *H. indicus*. For this purpose,
soils of these pH values were procured from different places: — pH 5 from Palam-
pur; pH 6 from Dalhousie; pH 7 from Gurdaspur; pH 8 from Salemtabri (Lud-
hiana) and pH 9 from the Research farm of the Punjab Agricultural University,
Ludhiana.

The soils in 10 cm clay pots were planted with tomato and the experiment
was continued for three months. There were five replications of each treatment.
The pots were watered daily with distilled water. Every pot was inoculated with
100 females and 25 males. After the completion of the experiment the pH of
each soil group was tested and no change was noticed.

3. **Effect of soil moisture**

This experiment was designed to study the effect of four levels of soil moisture
on the population build up of *H. indicus*. The moisture levels included 16 (water
holding capacity of the soil) 8, 12 and 4% by weight of the sandy-loam soil.
The maximum water holding capacity of the soil was determined by mixing a
weighed amount of oven-dry soil with sufficient quantity of water and working
it up into a sticky mass. Kneading was continued, allowing the excess water to
drain off and evaporate till the soil just failed to stick to the hand. The amount
of moisture absorbed by the soil was calculated on percentage basis by weighing
the soil so worked. There were five replications for each treatment and one for
fallow thus making up a total of 24 pots. Every pot was filled with 1500 g of soil.

The final weight of the 1500 g of soil at the 16, 12, 8 and 4 percent moisture
level was 1740, 1680, 1620 and 1560 g respectively. Tomato seedlings were used
as the host plants. The weight of each pot was recorded, which included the weight
of the soil with desired amount of moisture along with the pot and the plant.
This combined weight was maintained throughout the three month (Feb.-May)
period of the experiment by weighing each pot two to three times a day and adding
sufficient tap water to compensate for the loss in weight. To minimise the error
water was added on the basis of the moisture loss which occurred in the fallow
pot only, as the increase in growth of the plant resulted in more weight of the host-
plant pot. The pots were covered with polythene sheet at the top to reduce
moisture loss.

4. **Effect of food plants and initial population levels.**

Twenty one plant species were tested for their suitability as hosts for *H. indicus*.
Fifteen day old plants of each host were used for this purpose. The plants were