

ORIGINAL ARTICLE

Effect of Soil pH On The Incidence Of Root-Knot Nematodes (*M. Javanica*) On Tomato

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ABSTRACT

The root-knot nematodes (*Meloidogynespp*) are plant parasitic nematodes. They exist in soil in areas with hot climates or short winters. About 2000 plants of world are susceptible to the infection by root-knot nematodes and they cause more than 5% of global crop loss. Their larvae infest plant roots, causing development of root-knot galls that drain the plant's nutrients. During recent years, the root-knot nematodes (*Meloidogyne spp.*) have become a cosmopolitan pest of economic crop plants. During present investigation, the effect of soil pH on the incidence of root-knot nematodes (*Meloidogynejavanica*) on tomato was studied. It was observed that maximum root galls per gram of root weight (75.45 galls/gm of root weight) was observed at the 6.5 soil pH followed by 5.5 and 7.5 pH. The minimum root galls per gram of root weight (19.20 galls/gm of root weight) was observed in the soil having 8.5 pH value.

Keywords :Root-knot nematodes, *Meloidogyne*, soil, pH

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INTRODUCTION

India is the second largest producer of vegetables in world. Tomato is the most important vegetable crop in India. According to Choudhary and Kundal[2], the area under tomatoes has risen from 458 (000' HA) in 2002 to 865 (000' HA) in 2011. Similarly, the production of the same has gone up from 7462 (000' T) in 2002 to 16826 (000 ' T) in 2011. The yield of tomatoes in India from 2002 to 2011 has gone up from 16 (T/HA) to 19 (T/HA). Tomato has become one of the most important crops of the farmers for improving their income. As compared with developed countries, in India, the production of tomato is still low due to various factors. Of which infection by root-knot nematodes is also most important. The root-knot nematodes (*Meloidogynespp*) are plant parasitic nematodes. They exist in soil in areas with hot climates or short winters. About 2000 plants of world are susceptible to the infection by root-knot nematodes and they cause more than 5% of global crop loss. Their larvae infest plant roots, causing development of root-knot galls that drain the plant's nutrients. During recent years, the root-knot nematodes (*Meloidogynespp*) have become a cosmopolitan pest of economic crop plants. Nematodes have been reported to show preference for soil types. Some thrive in light loamy soil or coarse textured soil [1]. Wong and Mai [7] reported that some nematodes thrive best in organic soil. According to Wallace, [6], hydrogen-ion concentration (pH) also affects the incidence of root-knot nematodes. During present investigation, the impact of soil pH on the incidence of root-knot nematodes (*Meloidogynejavanica*) on tomato was studied at Muzaffarpur (Bihar) during 2015-2016.

MATERIALS AND METHODS

In order to study the effect of soil pH on the incidence of root-knot nematodes, sterilized soil was put in to five different earthen pots. Each pot was adjusted to five different pH viz. 4.5, 5.5, 6.5 7.5 and 8.5 using a pH meter, by adding required amount of salycilic acid or lime. To stabilize the pH levels, buffer solutions were added when required. The soil having different pH was then filled separately into earthen pots (20 cms indiameter). Two week old tomato seedlings were planted in these pots @ two seed lings / pot. Each plant was inoculated with freshly hatched larvae of *Meloidogyne javanica* chitwood. The trial was replicated five times. All the pots were kept in an identical conditions for 40 days. The soil pH of each pot of every treatment was examined from time to time and it was maintained throughout the period of investigation.

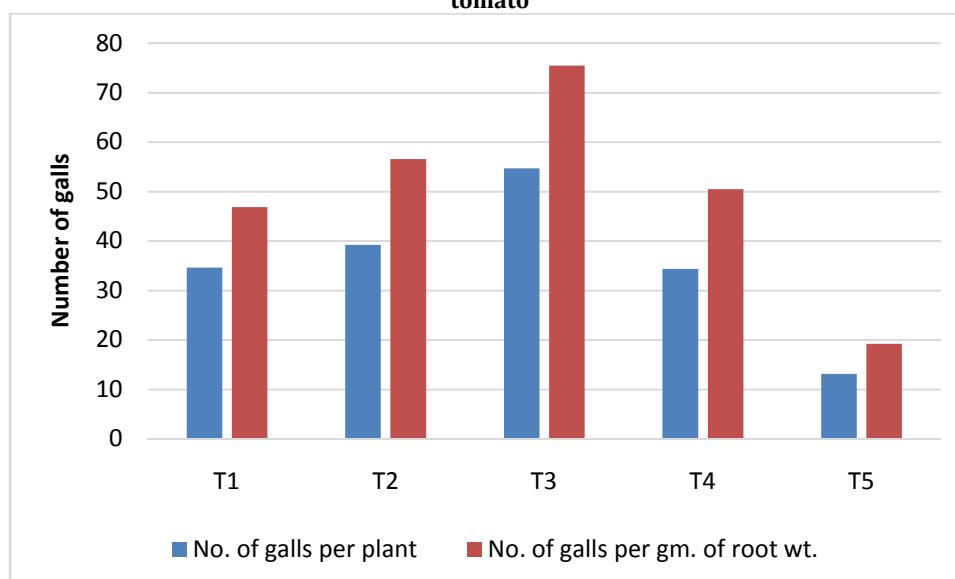
RESULTS AND DISCUSSION

After 40 days of inoculation, plants were carefully uprooted, washed and galls were counted per plant. Results are summarized in Table-1 and graphically represented in Figure-1. From the data of table this is evident that the number of galls varied in different soil due to different pH. Maximum root galls per gram of root weight (75.45 galls/gm of root weight) was observed at the 6.5 soil pH, followed by 5.5 soil pH where galling was 57.3%/ gm of root weight. The minimum galling (19.20 galls/gm of root weight) was found in the soil having 8.5 pH value. Result suggested that maximum development of root-knot nematodes occurred at 6.5 pH while the soil having 8.5 pH value was found most unfavourable for the development of root-knot nematodes. This claim agrees with the findings of Lowenberg *et. al.* [4] Sitaramaiah and Singh [5] reported that the production of egg was enhanced as the pH range of 3.9 to 4.2 According to Hakim *et. al.* [3], the development of root-knot nematodes was more on plants at pH 7 than pH 3 and pH 9.

Table-1: Effect of Different soil pH on the incidence of Root-knot Nematodes (*Meloidogyne javanica*) on Tomato

Treatments	pH	No. of galls per plant	No. of galls per gm. of root wt.
T1	4.5	34.60	46.85
T2	5.5	39.25	56.56
T3	6.5	54.70	75.45
T4	7.5	34.36	50.46
T5	8.5	13.12	19.20

FIGURE-1; Effect of different soil pH on the incidence of root-knot nematodes (*Meloidogynejavanica*) on tomato



T1 - 4.5 pH; T2 - 5.5 pH; T3 - 6.5 pH
T4 - 7.5 pH; T5 - 8.5 pH

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