

Seasonal variation in population of phytonematodes associated with peppermint (*Mentha piperita* L.) and spearmint (*Mentha spicata* L.)¹

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Abstract

Seasonal variations in the population of four phytonematodes namely, *Tylenchorhynchus vulgaris*, *Pratylenchus thornei*, *Meloidogyne* sp. and *Longidorus pisi* in the rhizosphere of peppermint (*Mentha piperita*) and spearmint (*M. spicata*) were studied at Lucknow, India. Population of *T. vulgaris* was maximum in March while it was least in May. Population of *P. thornei* was high in February and low in June. Populations of *Meloidogyne* sp. and *L. pisi* were low throughout the year.

Key words: *Mentha piperita*, *Mentha spicata*, peppermint, phytonematodes, population, spearmint.

Studies on population dynamics and biology of phytonematode species are imperative for understanding their role in causation of diseases in plants. Plants species, root depth, rainfall, soil moisture, soil type and temperature influence population dynamics of phytonematodes (Barker & Nusbaum 1971; O' Bannon *et al.* 1971; Ferris & McKenry 1974; Pandey 1989). However, information pertaining to population changes of phytonematodes associated with peppermint (*Mentha piperita* L.) and spearmint (*M. spicata* L.) is lacking. Therefore attempts were made to determine the seasonal variations of phytonematodes in the rhizospheres of

M. piperita and *M. spicata*.

The experiments were conducted at the experimental farms of Central Institute of Medicinal and Aromatic Plants, Lucknow, India. Soil samples were collected with a metallic soil sampler (3 cm dia.) from the rhizosphere of *M. piperita* and *M. spicata* separately at monthly intervals. Soil collected from three beds of each crop was mixed and 200 g soil sample was processed separately for isolation of phytonematodes by using Cobb's sieving and decanting technique along with Baermann funnel technique (Southey 1986). The phytonematodes in the soil samples

Table 1. Seasonal variation in population of phytonematodes associated with *Mentha piperita* and *M. spicata**

Month	Nematode population/200g soil								Soil Moisture (%)	Temp. (°C)
	<i>M. piperita</i>				<i>M. spicata</i>					
	Tv	Pt	M	Lp	Tv	Pt	M	Lp		
Jan	520	100	60	40	500	80	40	40	21.5	12.0
Feb	600	160	80	60	580	120	60	40	22.6	13.0
Mar	780	140	60	40	740	100	60	60	23.7	20.5
Apr	300	80	20	40	200	60	40	60	22.8	26.0
May	200	60	20	20	180	40	20	40	18.3	35.0
Jun	260	20	20	20	200	20	40	60	18.7	36.0
Jul	280	40	40	60	240	40	60	60	26.1	32.0
Aug	300	40	60	40	280	60	40	20	24.3	27.0
Sep	320	60	60	40	300	80	20	20	24.4	25.0
Oct	340	80	40	20	340	60	20	40	22.8	24.5
Nov	380	80	20	20	360	60	40	40	21.5	21.0
Dec	400	100	20	40	380	80	40	20	20.6	13.0

* = Average of 3 years data

Tv = *Tylenchorhynchus vulgaris*, Pt = *Pratylenchus thornei*, M = *Meloidogyne* spp.,

Lp = *Longidorus pisi*

were identified and counted. The per cent soil moisture in each sample was determined using oven dry method.

The highest population of *Tylenchorhynchus vulgaris* was recorded in March (740-780/200 g soil) while the least population was observed in May (180-200/200 g soil) from the rhizosphere of peppermint and spearmint. Similarly, maximum population of *Pratylenchus thornei* was recorded in February (120-160/200 g soil) and least in June (20/200 g soil). Populations of *Meloidogyne* sp. and *Longidorus pisi* were low during

the studies (20-80/200 g soil) (Table 1). In general, the population development of the four phytonematodes was low in May-June and this may be due to the high temperature and low moisture content, while in March when nematode population was maximum, the temperature was lower and moisture content was higher than in June (Table 1). Increase in temperature and decrease of soil moisture and vice versa seems to be directly associated with nematode population variation. Maximum root emergence and proliferation was also observed in March and this may be one of

the factors for the increase in nematode populations. The present studies revealed the presence of high populations of *T. vulgaris* and *P. thornei* on peppermint and spearmint thus establishing host suitability of these crops for the multiplication of these nematodes.

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