Occurrence of Soil Nematodes and their Co-relation with Ecological Factors at Himayat Baugh, Aurangabad (Maharashtra)

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Soil is home to many vertebrate and invertebrate forms of life. Soil micro fauna such as protozoa and nematoda are important for soil food web (Chanu, 2011). The soil regulates the size and function of fungal and bacterial population in the soil (Mwanigi et al., 2014). The assemblage of plant and soil nematode species occurring in nature constitute nematode community and occupy central position in soil web (Reenco & Kova, 2012). Nematode composition and nematode community structure is closely related to their habitats and exhibit rapid response to change in environmental condition (Zhang et al., 2007).

The awareness of the diversity and ecological significance of nematodes have been used as indicator in the area of biodiversity and sustainability. Present work deals in this direction in the area of Himayat Baugh "Phal Phool Sanshodhan Kendra", near Salim Ali lake, Aurangabad (Maharashtra).

Present study compares the population dynamics of nematodes with ecological factors like pH, temperature, moisture and rainfall.

Material and Methods

Soil sampling : Soil samples from selected site were taken. 50 samples were collected from Feb 2014 to Jan 2015. Samples were tagged, stored in sealed plastic bag and brought to the laboratory for further processing. Processing of soil samples was done by sieving and decantation by modified Baermen funnel technique (Singh, 2011). Population count of nematode was made using syracuse counting dish (Chanu, 2011). 2 ml of nematode suspension in the dish for counting final population was obtained by multiplying final quantity of nematode suspension (50 ml) with mean number of nematodes counted and dividing by quantity of suspension used for counting (2ml).

Co-relation by Pearson formula using M.S. Excel soil moisture was done using following formula :

$$\text{Soil moisture \%} = \frac{\text{Loss of Wt on drying} \times 100}{\text{Dry Wt of Soil}}$$

Soil temperature was recorded by soil thermometer, soil pH by pH meter (Kadam et al., 2012).

Results and Discussion

The analysis of linear correlation were significantly positive except soil moisture : significance at 0.01 (95 %) level of significance and above correlation of soil temperature with plant parasitic nematodes is (r x 2y = 0.69128), free-living (r x = 0.81344), and predatory (r x 2y = 10491). Whereas correlation of soil pH with plant parasitic nematodes is 0.39420, for free-living 0.32850 and predatory is 0.10491. The present study revealed that soil moisture is

Table 1. Occurrence of Soil Nematodes during Feb. 2014 to Jan. 2015.

Month	Plant Parasitic	Free-living	Predatory	Total
January	700	650	200	1500
February	800	600	500	2000
March	650	700	550	1800
April	500	600	710	900
May	420	390	100	800
June	560	280	530	1700
July	470	700	430	1600
August	700	600	200	1500
September	800	700	500	2000
October	800	900	700	2700
November	720	320	220	1300
December	700	300	200	1100

Table 2. Ecological factors during the study period.

Month	Soil temp °C	Soil pH	Soil moisture%	Rainfall mm
January	23.00	4.6	23.00	-
February	22.40	4.3	33.00	-
March	22.50	4.6	18.00	80
April	23.40	4.5	16.00	-
May	25.50	4.5	13.00	-
June	21.00	4.4	14.50	131.14
July	20.00	4.3	22.00	168.12
August	20.00	4.4	26.00	166.12
September	22.50	4.3	24.50	125.72
October	22.8	4.4	26.00	80.00
November	22.4	4.5	38.50	20.00
December	22.00	4.6	47.00	

Table 3. Correlation between Nematodes and Ecological factors.

Parameter	Plant Parasitic	Free-living	Predatory
Soil Temperature	0.69128	0.81344	0.10491
Soil pH	0.39470	0.32850	0.20190
Soil Moisture	-0.57680	-0.48450	0.24376
Rainfall	0.351	0.357	0.327

negatively correlated with plant parasitic (- 0.57680) and free-living (-0.4845), whereas positively correlated with predatory forms (0.312).

The findings were correlated with the study of the other authors. According to Mwanigi et al. (2014), the plant parasitic Nematodes dominate over other groups. Singh (2011) reported slight decline in number of nematode genera from sowing to harvesting . According to him tropic diversity of crop field showed abundance of predatory 3% plant parasitic 31% and free living 66%. Zhang et al. (2007) reported that nematode population and diversity act as indicators of overall soil condition. According to Sanei (2011) nematodes are sensitive to chemical and physical disturbance in ecosystem.

In this study free living nematodes was the most abundant group and confirm to the work of (Sultan, 1991). The correlation of moisture with plant parasitic nematodes is negative which confirms with the observations by Zhang et al. (2007) and Sultan (1991). Authors observed the abundance of plant parasitic nematodes 41% , free-living 42% and predatory 17%.

References

Chanu, Loukram Bina 2011. *Soil and Plant Parasitic Nematodes of Mulberry plant of Valley district of Manipur.*

Ph.D. thesis, Dept. of Life Science, Manipur University, Imphal, India.

Kadam, S.G. et al., 2012. Physical characterization of soil of Majalgaon command area—Jayakwadi project stage III. *Internat. J. Basic & Appl. Res.*, 2 : 83-85 .

Mwanigi, J.M, Waceke, J. W. & Kariuki, G. M. 2014. Occurrence and abundance of plant parasitic nematode in Cabbage based cropping system in Kenya. *ARPN J. Agr. & Bio. Sci.*, 9 (10) : 326-332.

Reenco, M. & Kova, P. 2012. Response of plant parasitic and freeliving soil nematodes to soil amendents. *J. Nemat.*, 44 (4) : 329-336 .

Sanei, S.J. 2011. Incidence of plant parasitic nematodes associated with Olive planting stocks at nurseries in northern Iran, *Internat. J. Appl. Sci. & Tech.*, 1 (5) : 79-82.

Singh, Gaurav Kumar 2011. *Taxonomy and Ecology of Nematodes of Agriculture Field and Wetland.* Ph.D. thesis, Aligarh Muslim University, India.

Sultan, Sufian. A. 1991. The effect of soil moisture and soil particle on survival and population increase of *Xiphinema. Revise Nenital*, 14 (3) : 345-351.

Zhang, X.K., Liangd, W. J., Jiang, M., Liu, Z. M. & Jiang, S. W. 2007. Soil nematodes community structure in a Chinese sand dune system. *Helminth.*, 44 (4) : 204-209.