Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2019; 8(5): 1483-1485
Received: 04-07-2019
Accepted: 06-08-2019

M Shanmuga Priya
Assistant Professor (Nematology), Centre of Excellence in Millets Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

K Poornima
Assistant Professor (Nematology), Centre of Excellence in Millets Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

V Vigila
Assistant Professor (Nematology), Centre of Excellence in Millets Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

R Sharmila
Assistant Professor (Nematology), Centre of Excellence in Millets Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Corresponding Author:
M Shanmuga Priya
Assistant Professor (Nematology), Centre of Excellence in Millets Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

First report of plant parasitic nematodes associated with little millet (*Panicum miliare* Lam.) in Tiruvannamalai district of Tamil Nadu

M Shanmuga Priya, K Poornima, V Vigila and R Sharmila

Abstract
An extensive field survey of plant-parasitic nematodes associated with little millet field was conducted in rainfed agricultural areas of Jawadhu Hills block of Tiruvannamalai district during October, 2014. Several plant-parasitic nematodes were recorded. The most important genera were root-knot nematodes (*Meloidogyne* spp.), spiral nematodes (*Helicotylenchus* spp.), lance nematode (*Hoplolaimus* spp.) and stunt nematode (*Tylenchorhynchus* spp.) and ring nematode (*Cricinemoides* spp.) were recorded for the first time in Tamil Nadu, India and the surveyed areas were recorded as new sites for nematode genera.

Keywords: Little millet, survey, nematode genera, occurrence, root knot nematode

Introduction
India is the top most consumers of millets in the world (9,041,765 mt). Millets are excellent in their nutrition content and each of the millets is 3-5 times nutritionally superior to rice and wheat in terms of protein, minerals and vitamins. They produce multiple securities i.e. food, feed, fodder, health, nutrition, livelihood and ecological. In nut shell, they act as crops of agricultural security. They grow well even in cultivable fallows, low fertility soil and ecological zones where average rainfall is less than 500 mm. These have a common feature of being capable of growing in very marginal sloppy fields without any input and are invariably grown under rainfed conditions. Despite their importance there is little information on nematode associations with millets. Reasons could be that they are largely produced in a subsistence context, on marginal soils and under adverse climatic conditions (Hash and Whitcombe, 2002). In Tamil Nadu, little millet (Samai), *P. miliare* Lam. is cultivated in about 19, 071ha and in Tiruvannamalai it is cultivated in about 4,714ha as rainfed crop. It is placed 2nd in position next to Dharmapuri in production (Season & crop report 2012-13, Tamil Nadu) and it needs to be more in future to meet the nutritional security.

Plant-parasitic nematodes (PPN) are widely distributed in millet growing areas of the world. PPN have a significant impact on food security and our ability to feed a growing human population (35% increase by 2050, World Bank report, 2008) in the coming years. Other estimates project a 75% increase in food demand between 2010 and 2050, including changes in diet (toward consuming more protein) and steady population growth (Keating *et al.*, 2010). The estimated annual yield loss based on the International survey of crop losses due to nematodes in millet was estimated as 11.8%. There is an urgent need to know the status of plant parasitic nematodes in millets, taxonomy, biology, and ecology to manage the nematodes which enhance the production and productivity of the crops and ensure food and nutritional security.

Occurrence of the plant parasitic nematodes associated with millets was reported from different part of the world including southern part of India (Seshadri, 1970 and Bridge *et al*., 1978) by several workers. However, no work has yet been reported on the community structure of the phytonematodes associated with little millet of Tamil Nadu. Hence, this investigation on the community structure of the phytonematodes associated with little millet in Tiruvannamalai district (Jawadhu Hills) of Tamil Nadu may be considered to be the first recorded documentation of Tamil Nadu, India.

Materials and Methods
A survey of Jawadhuhills block of Tiruvannamalai district, Tamil Nadu state of India was conducted during October 2014 to determine the plant parasitic nematodes associated with little millet. Diseased fields were selected on the basis of above ground symptoms of the crops, such as, wilting, slow growth, stunting and yellowing of leaves.

Soil samples were collected from the vicinity of little millet crop to a depth of 10-15 cm at the rate of 5 composite samples obtained from four corners and centre of the field per field. Each unit sample was a composite of 20 cores obtained from four corners and centre of the field. Root soil sub samples (prepared from the unit samples) were stored in polythene bags properly and stored at 5 °C in a refrigerator for not more than 7 days. Altogether 50 soil and root samples were collected during mid cropping season from the rhizosphere of different samai crops from different villages of Jawadhu Hills block of Tiruvannamalai district and stored. Extraction of the nematodes was done by Cobb's sieving and decanting method, followed by modified Baermann's funnel technique (Southey, 1986). The nematodes present in the suspension were identified upto generic level.

Results

Plate 1: Galled little millet (*Panicum miliare* Lam.) root due to root knot nematode collected at Jamunamarathur block

Plate 2: Galled little millet (*Panicum miliare* Lam.) root due to root knot nematode collected at Tiruvannamalai block

Table 1: Survey for incidence of plant parasitic nematodes in little millet in Jawadhuhills of Tiruvannamalai district, Tamil Nadu, South India

Sample collection site	No. of samples collected	Plant parasitic nematodes	Nematode population density*
Eriyur	5	-	-
Kanamalai	5	-	-
Kuttakarai	5	*Helicotylenchus* spp.	17
Melsippli	5	-	-
Nammiyambat	5	*Hoplolaimus* spp.	14
Odamangalam	5	*Tylenchorynchus* spp.	12
Pattaraikadu	5	-	-
Puliyankuppam	5	*Criconemoides* spp.	8
Seenkadu	5	-	-
Veerapanur	5	*Meloidogyne* spp.	118
Total	50		

* Nematode population density is average of 5 composite samples/ field, nematode number/ 200 cm^3 rhizosphere soil.

Discussion

In this survey, some important plant parasitic nematodes *viz*., root-knot nematodes (*Meloidogyne* spp.), spiral nematodes (*Helicotylenchus* spp.), lance nematode (*Hoplolaimus* spp.) and stunt nematode (*Tylenchorhynchus* spp.) and ring nematode (*Cricinemoides* spp.) were found in the soil samples of little millet, and sometimes with high populations. Thus, it appears that these species are the likely cause of some of the drastic damage to little millet in the tribal region of Jamunamarathur. The damage potential of some of these

species to little millet was clearly shown in previous studies that Rao and Swaroop (1974) [3] and Padhi and Das, 1982 & 1986) [1, 2] reported *Helicotylenchus* spp, Srivastava and Swarup (1975) [5] reported *Heterodera zea* and Vaishnav and Sethi, 1977 [6] reported *M. incognita* in little millet.

In the present study, species identification, pathogenicity, yield loss or host range tests were not done, but high populations of some important plant-parasitic nematodes were detected in the rhizosphere. Furthermore, galls developed by *Meloidogyne* spp. were observed on the little millet roots collected from several localities. Considering these symptoms and the detection of high densities or frequencies of these plant-parasitic nematodes, more complete studies will be required for accurately determining the importance of these nematodes in little millet production in the surveyed area.

References

1. Padhi NN, Das SN. Indian J Nematol. 1982; 12:53-59.
2. Padhi NN, Das SN. Indian J Nematol. 1986; 16:141-148.
3. Rao VR, Swaroop G. Indian J Nematol. 1974; 4:228-230.
4. Season and crop report, Fasli- 1422. Department of economics and Statistics, Chennai -6, Tamil Nadu, India, 2012-2013.
5. Srivastava AN, Swarup G. Indian J Nematol. 1975; 5:257-259.
6. Vaishnav MU, Sethi CL. Indian J Nematol. 1977; 7:176-177.