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Survey of Pigeon Pea Wilt Caused by Cyst Nematode (*Heterodera cajani*) in Trans Yamuna and Ganga Taluks of Allahabad District, India

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A B S T R A C T

A roving survey was conducted in the trans Yamuna and Ganga taluks of Allahabad district to evaluate the outburst of cyst nematode (*Heterodera cajani*) on pigeon pea wilt. The maximum cysts population was recorded in Kuanvillage where in 51 cysts were found in 500 g of soil followed by Telghana (41) and the lowest population was recorded in Panwar (41) per 500 g of soil followed byKarchhana (18). Highest larval population was found in the soil sample of Telghana (664) followed by Dera (659) in all the surveyed villages of trans Yamuna and Ganga taluks of Allahabad.

Introduction

Pigeon pea [*Cajanus cajan* (L.) Mills.], a pulse crop of Indian origin is a major source of protein in the world's vegetarian diet. Belongs to family Fabaceae. It is the most important kharif pulse crop with much higher productivity. World production of pigeon peas is estimated at 4.3 million tons[2]. About 82% of this is grown in India. In India, South Asia and in remaining world, it is consumed as 'Dal' or Sambhar and is an important item in the vegetarian menu.

India is the largest producer, 25% of world's production, and consumer 27% of total pulses of the world. The domestic production is often less than the estimated demand i.e. 23-24 million tons. Studies on consumption pattern has revealed that in India only 8-10 million tons of pulses are used directly as a food item (Dal), the remaining 12 million tons being indirect actual consumption as processed/value added products such as snacks, fast food for domestic consumption and export.

Pigeon peas contain high levels of protein and the important amino acids methionine, lysine and tryptophan.

It now occurs in all the major pigeon pea producing states of India i.e. Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh. It is particularly

widespread on sandy loams in Northern India and vertisols of Southern India (Sharma *et al.*, 1992).

Pigeon pea is affected by various diseases caused by fungus, bacteria, nematode and viruses. Wilt is one of the most prominent diseases of pigeon pea and can cause losses up to 30 to 40%. The crop has been reported to suffer severe damage due to wilt disease caused by *Heteodera cajani* and *Fusarium udum* complex (Koshy and Swamp, (1971); Sikora and Greco, (1990); Ali and Askary, (2001). Nematodes are widely distributed in most of the pigeon pea growing regions in India. Pigeon pea is vulnerable to many plant parasitic nematodes *viz.*, *Meloidogyne* spp., *Heterodera cajani*, and root knot nematode (*M. javanica*) and pigeon pea cyst nematode (*Heterodera cajani*) are the most important parasites.

Some 70 genera and 160 species of fungi have been found associated with nematodes (Qadri, 1989).The main symptoms of an *H. cajani* infection are stunted growth and reduced yield due to damage to the host plants root system. Flowers and pods are reduced in size and number and the root system may also be poorly developed.The main objective of this survey was to estimate and observe the wilt incidence and their association with cyst nematode.

Materials and Methods

A roving field survey was conducted in 15 villages of trans Yamuna taluks (Table 1) and 10 villages of trans Ganga taluks (Table 2) of Allahabad districts. About 45 days old crop was taken into consideration. 5 fields from each villages and 3 villages from each blocks were surveyed. The sample were collected /drown from the rhizosphear region of five or more stunted plants at random in each field. Each sample consisted of 250g of soil and the soil was mixed thoroughly and 500g of soil was collected and cob's sieving and shifting techniques was followed for further nematode extraction. (Thorne, 1961)

Calculation of disease incidence (DI)

The percent disease incidence of wilt disease was calculated by using the formula:

$$\text{Disease incidence } \% = \frac{\text{Total no.plants wilted}}{\text{Total no. of plants examined}} X\ 100$$

(Trapero-casas, 1983).

Results and Discussion

The intensive roving survey was conducted in 15 pigeon pea growing villages of trans Yamuna taluks of Allahabad district during *rabi* season of 2016. The occurrence of important genra *H. cajani* associated with rhizosphere of pigeon pea. The below table 1 shows that *H. cajani* was observed with minimum of 14 cysts in Panwar followed by Karchhana (18) to a maximum of 51 cysts in Kuan followed by Telghana (41) per 500 g of soil. In a intensive roving survey conducted in 10 pigeon pea growing villages of trans Ganga taluks of Allahabad district during *rabi* season of 2016, minimum of 18 cysts per 500 g of soil were found in Hardaun followed by 23 cysts in Mandav. Maximum cysts were found in the soil sample of Mairi (35) followed by Mohrub (33). Over all highest larva population was found in Telghana (664) followed by Dera (659) as shown in table 2. The symptoms produced were identical to those described earlier by Singh and Singh (1990) reported distribution of *H. cajani* from the different pigeon pea growing areas of Varanasi and Mirzapur of Uttar Pradesh. Similarly Devi (1994) and Sharma and Trivedi (1994), Devappa V and S Lingaraju (2011) reported *H. cajani*, *Rotylenchulus reniformis* and *Meloidogyne.*

Table.1 Survey on the incidence of cyst nematode (*Heterodera cajani*) of pigeon pea in 15 villages of trans Yamuna talukas of Allahabad district during 2016

District	Taluka	Village	No. of cyst / 500g soil	No. of larvae
Allahabad	Bara	Kanti	28	250
		Amreha	30	353
		Ojhapatti	35	556
		Dera	38	659
		Telghana	41	664
		Newariya	19	239
	Karchhana	Hathigan	-	-
		Chaka	39	461
		Mahuari	37	579
		Kuan	51	670
		Gaura	-	-
		Panwar	14	178
		Karchhana	18	153
		Ghatwa	-	-
		Naraina	29	347

Table.2 Survey on the incidence of cyst nematode (*Heterodera cajani*) of pigeon pea in 10 villages of trans Ganga talukas of Allahabad district during 2016

District	Taluka	Village	No. of cyst / 500g soil	No. of larvae
Allahabad	Koraon	Dhus	26	294
		Hardaun	18	287
		Mandav	23	307
		Sirawal	-	-
		Tikar	27	321
		Usari	29	328
	Soraon	Gaura	31	347
		Mairi	35	482
		Mohrub	33	397
		Rohi	-	-

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