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Research Article

EFFECT OF DIFFERENT CONTROL PRACTICES ON POPULATION DENSITY OF VARIOUS FUNGI AT PRE-SOWING AND POST-HARVESTING STAG IN NURSERY OF TOMATO

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Abstract: Tomato is the most popular vegetable in the world because of its taste, colour and high nutritive value and also for its diversified use. There are many factors involved in low yield of tomato; among them are infestations by fungi, bacteria, nematodes or viruses and the competing weeds are predominant. The most urgent need is to develop bio-control agents and varieties of tomato that can resist the ravage of important fungal diseases caused by *Alternaria* sp, *Aspergillus* sp, *Penicillium* sp *Helimenthosporium* sp.

Keywords: *Microbial diversity, pre-sowing and post-harvesting stage*

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Introduction

Soil is a precious and complex natural resource that represents a huge reservoir of biodiversity with several billion prokaryotic and eukaryotic microorganisms. These microbes significantly share biomass and ecosystem functions in both natural and managed agricultural soils [1]. Microbial diversity is directly or indirectly affected by cultivation techniques, management practices, crop rotation, soil tillage, animal grazing, plant species and climatic changes [2]. Variations in soil temperature, precipitation and soil pH also influence soil fungal diversity. Fungi are the dominant eukaryotes among soil microbial communities where they play crucial and key roles in terrestrial ecosystems. Microbial abundance, diversity and activity largely have implications on sustainable productivity of agricultural land and production systems. Information on the microbial communities associated with rhizospheres and their complex interrelationship is essential in the selection of sustainable crop rotations and management practices [3] and [4].

Materials and Methods

Effect on population density of various fungi at pre-sowing and post-harvesting stage were studied using various treatment.

Results and Discussion

The present study was carried out to study the effect of various fungicide on population density of various fungi at pre-sowing and post-harvesting stag of tomato. The detail treatment wise application of fungicide and its effect on fungus are mentioned below.

Control (S_1 T_0)

At pre-sowing stage fungal species belonging to six genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 27.91 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Aspergillus* sp. was found to occur in maximum number with 66.67 percent pre-dominance.

Thiram (S_1T_1)

At pre-sowing stage fungal species belonging to five genera were observed. Among them, *Fusarium* sp. was found to occur in maximum number with 40.65 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 44.78 percent pre-dominance.

Bavistin (S_1 T_2)

At pre-sowing stage fungal species belonging to four genera were observed. Among them *Fusarium* sp. was found to occur in maximum number with 55.91 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Penicillium* sp. was found to occur in maximum number with 53.57 percent pre-dominance

Dithane Z-78 (S_1T_3)

At pre-sowing stage fungal species belonging to three genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 76.33 percent pre dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Alternaria*, sp. was found to occur in maximum number with 37.04 percent pre-dominance

Dry neem leaves (S_1 T_4)

At pre-sowing stage fungal species belonging to five genera were observed. Among them, *Mucor* sp. was found to occur in maximum number with 77.96 percent pre-dominance. At pre-harvesting stage fungal species belonging to two genera were observed. Among them, *Mucor* sp. was found to occur in maximum number with 60.00 percent pre-dominance

***Beauveria bassiana* (S_1 T_5)**

At pre-sowing stage fungal species belonging to four genera were observed. Among them, *Mucor* sp. was found in maximum number with 60.15 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Aspergillus* sp. was found to occur in maximum number with 47.17 percent pre-dominance

Soil solarization (S_1 T_6)
At pre-sowing stage fungal species belonging to three genera were observed. Among them *Aspergillus* sp. was found to occur in maximum number with 73.77 percent pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them *Aspergillus* sp. was found to occur in maximum number with 55.55 percent pre-dominance

Control (S_2 T_0)
At pre-sowing stage fungal species belonging to four genera were observed. Among them *Fusarium* sp. was found to occur in maximum number with 63.69 percent pre-dominance. At pre- harvesting stage fungal species belonging to four genera were observed. Among them *Aspergillus* sp. was found to occur in maximum number with 57.14 percent pre-dominance.

Thiram (S_2 T_1)
At pre-sowing stage fungal species belonging to three genera were observed. Among them, *Fusarium* sp. was found to occur in maximum number with 47.37 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 66.67 percent pre-dominance.

Bavistin (S_2 T_2)
At pre-sowing stage fungal species belonging to five genera were observed. Among them, *Fusarium* sp. was found in maximum number with 46.30 percent pre-dominance. At pre-harvesting stage fungal species belonging to five genera were observed. Among them *Penicillium* sp. was found to occur in maximum number with 34.61 percent pre-dominance

Dithane Z-78 (S_2 T_3)
At pre-sowing stage fungal species belonging to five genera were observed. Among them *Penicillium* sp. was found to occur in maximum number with 51.67 percent pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 74.07 percent pre-dominance.

Dry Neem leaves (S_2 T_4)
At pre-sowing stage fungal species belonging to four genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 24.51 percent pre-dominance. At pre-harvesting stage fungal species belonging to two genera were observed. Among them, *Mucor* sp. was found to occur in maximum number with 56.82 percent pre-dominance

Soil solarisation (S_2 T_6)
At pre-sowing stage fungal species belonging to four genera were observed. Among them, *Aspergillus* sp. was found to occur in maximum number with 60.00 percent pre-dominance pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them *Mucor* sp. was found to occur in maximum number with 54.43 percent pre-dominance.

Control (S_3 T_0)
At pre-sowing stage fungal species belonging to three genera were observed. Among them, *Aspergillus* sp. was found to occur in maximum number with 74.12 percent pre-dominance. At pre- harvesting stage fungal species belonging to four genera were observed. Among them, *Mucor* sp. was found to occur in maximum number with 71.92 percent pre-dominance

Thiram (S_3 T_1)
At pre-sowing stage fungal species belonging to three genera were observed. Among them, *Fusarium* sp. was found to occur in maximum number with 78.43 percent pre-dominance. At pre-harvesting stage fungal species belonging to five genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 54.59 percent pre-dominance

Bavistin (S_3 T_2)
At pre-sowing stage fungal species belonging to four genera were observed. Among them, *Fusarium* sp. was found to occur in maximum number with 73.96 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Penicillium* sp. was found to occur in maximum number with 56.121 percent pre-dominance.

Dithane Z-78 (S_3 T_3)
At pre-sowing stage fungal species belonging to four genera were observed. Among them, *Rhizopus* sp. was found to occur in maximum number with 67.11 percent pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them, *Alternaria* sp. was found to occur in maximum number with 84.03 percent pre-dominance.

Dry neem leaves (S_3 T_4)
At pre-sowing stage fungal species belonging to three genera were observed. Among them, *Curvularia* sp. was found to occur in maximum number with 71.43 percent pre-dominance. At pre-harvesting stage fungal species belonging to four genera were observed. Among them, *Mucor* sp. was found to occur in maximum number with 55.55 percent pre-dominance

***Beauveria bassiana* (S_3 T_5)**
At pre-sowing stage fungal species belonging to five genera were observed. Among them *Mucor* sp. found to occur in maximum number with percent pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them *Aspergillus* sp. was found to occur in maximum number with 59.05 percent pre-dominance

Soil solarisation (S_3 T_6)
At pre-sowing stage fungal species belonging to four genera were observed. Among them *Aspergillus* sp. was found to occur in maximum number with 49.02 percent pre-dominance. At pre-harvesting stage fungal species belonging to three genera were observed. Among them, *Aspergillus* sp. was found to occur in maximum number with 50.70 percent pre-dominance. The above results were in agreement with [2-9].

Application of research: Study the compatibility of this fungus with commonly used Agro-chemicals pesticides

Research Category: Plant Pathology

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Table-1 *Population density of soil fungi at pre-sowing stage (g^{-1} dry weight of soil x 10^3) in field condition*

Treatments	*Alternaria* sp		*Aspergillus* sp.		*Mucor* sp.		*Penicillium* sp.		*Rhizopus* sp.		*Fusarium* sp.		*Helimintho-sporium* sp.		*Curvularia* sp.		Total
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	
S1 T0	0.26	12.09	0.36	16.47	0.30	13.95	0.23	10.70	0.60	27.91	0.40	18.60					2.15
S1 T1			0.20	16.26	0.10	8.13	0.41	33.33			0.50	40.65			0.02	1.63	1.23
S1 T2					0.30	32.26	0.01	1.07			0.52	55.91	0.10	10.75			0.93
S1 T3			0.11	8.40					1.00	76.33	0.20	15.27					1.31
S1 T4			0.03	3.37	0.40	44.94	0.06	6.74	0.21	15.79	0.01	1.12			0.21	23.59	0.89
S1 T5	0.02	1.50			0.80	60.15	0.30	22.56	0.12	9.84							1.33
S1 T6			0.90	73.77											0.10	8.20	1.22
S2 TO			0.30	19.11			0.02	1.27			1.00	63.69	0.25	15.92			1.57
S2 T1	0.30	22.55	0.40	30.07							0.63	47.37					1.33
S2 T2	0.20	37.04	0.01	1.85			0.03	5.55	0.05	9.25	0.25	46.30					0.54
S2 T3			0.08	6.67	0.10	8.33	0.62	51.67			0.30	25.00	0.10	8.33			1.20
S2 T4					0.02	1.96			0.25	24.51	0.05	4.90			0.70	68.63	1.02
S2 T5			0.03	2.70	0.62	55.85			0.46	41.44							1.11
S2 T6			0.75	60.97			0.11	8.94	0.16	13.01					0.20	16.26	1.23
S3 T0			1.26	74.12			0.40	23.53			0.04	2.35					1.70
S3 T1	0.03	1.96					0.30	19.61			1.20	78.43					1.53
S3 T2					0.30	17.75					1.25	73.96	0.10	5.92	0.04	2.37	1.69
S3 T3	0.40	26.84			0.03	2.03			1.00	67.11			0.06	4.03			1.49
S3 T4					0.15	10.71			0.25	17.86					1.00	71.43	1.40
S3 T5			0.20	12.27	1.00	61.35			0.30	18.40	0.10	6.13			0.03	1.84	1.63
S3 T6			0.75	49.02	0.50	32.68			0.03	1.96					0.25	16.34	1.53

Table-2 *Population density of soil fungi at post-harvesting stage (g^{-1} dry weight of soil x 10^3) in field condition*

Treatments	*Alternaria* sp		*Aspergillus* sp.		*Mucor* sp.		*Penicillium* sp.		*Rhizopus* sp.		*Fusarium* sp.		*Helimintho-sporium* sp.		*Curvularia* sp.		Total
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	1.50
S1 T0			1.00	66.67	0.02	1.33	0.18	12.00			0.30	20.00					0.67
S1 T1	0.25	37.31			0.10	14.92			0.30	44.78	0.02	2.98					0.56
S1 T2			0.01	1.78			0.30	53.57			0.02	3.57			0.23	41.07	0.54
S1 T3	0.20	37.04	0.10	18.52					0.18	33.33			0.06	11.11			0.54
S1 T4					0.30	60.00			0.20	40.00							0.50
S1 T5			0.25	47.17			0.08	15.09	0.10	18.87					0.10	18.87	0.53
S1 T6			0.50	55.55	0.30	33.33							0.10	11.11			0.90
S2 TO			1.00	57.14			0.40	22.86	0.25	14.28	0.10	5.71					1.75
S2 T1	0.09	12.00			0.06	8.00			0.50	66.67			0.10	13.33			0.75
S2 T2			0.22	16.92			0.45	34.61	0.30	23.08			0.15	11.54	0.18	13.85	1.30
S2 T3			0.03	2.78			0.25	23.15	0.80	74.07							1.08
S2 T4			0.03	3.41	0.50	56.82							0.35	39.77			0.88
S2 T5	0.20	18.69	0.65	60.75	0.10	9.34							0.12	11.21			1.07
S2 T6			0.30	37.97	0.43	54.43									0.06	7.59	0.89
S3 T0	0.03	2.05	0.20	13.60	1.05	71.91							0.18	12.33			1.46
S3 T1					0.01	1.56			0.35	54.69	0.12	18.75	0.01	1.56	0.15	23.43	0.64
S3 T2					0.30	30.61	0.55	56.12			0.10	10.20			0.03	3.06	0.98
S3 T3	1.00	84.03					0.15	12.60	0.04	3.36							1.19
S3 T4					0.30	55.55			0.03	5.55			0.11	20.37	0.10	18.52	0.54
S3 T5			0.75	59.05					0.40	31.50			0.12	9.45			1.27
S3 T6			0.36	50.70	0.25	35.21			0.10	14.08							0.71

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