

Survey of Wilt Disease Incidence of *Fusarium moniliforme* Var. *Subglutinans* in the Sugarcane Field of Darbhanga Division

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Abstract : Sugarcane fields spreading over 15 blocks and 321 plots situated in three districts of Darbhanga division were surveyed for the presence of *Fusarium moniliforme* var. *subglutinans* survey of disease incidence was made during the year 2012, 2013 & 2014 and was found highest in the months from July to October and lowest from March to June. Among the 15 blocks of different districts, Madhepur (Madhubani). Biroul (Darbhanga) and Bithan (Samastipur) were recorded most vulnerable than other blocks because these were flood affected parts of Darbhanga division. This confirmed the findings of earlier works that soil moisture and water stress favour the growth and infection of *F. moniliforme* var. *subglutinans* in sugarcane.

Keywords : *F. moniliforme* var., *Subglutinans*, Sugarcane, Darbhanga division.

I. INTRODUCTION

Sugarcane (*Saccharum officinarum* Linn.) is one of the most important cash crops grown widely in Darbhanga Division. It sustains the organized agro industry, namely the sugar industry; in addition it supports a large number of scattered open pan sugar (Khandsari) and jaggery units in the rural sector. Physiologically it belongs to the C4 cycle group. It occupies a commanding position as an agro industrial crop of the area under investigation. Due to extensive farming as well as frequent flood in the area, this crop suffers a lot of invasions of pathogens. Amongst the pathogens associated with sugarcane at different levels of their pathogenicity through India, *Fusarium moniliforme* var. *subglutinans* deserves special mention as it considered the major parasite to cause sugarcane wilt (Waritch. 1981, 1982, 1984 and 1985). Earlier, Wollenweber and Reinking (1925) reported sugarcane as a host of *Fusarium moniliforme* var. *subglutinans*. Khanna (1947) observed that wilt of sugarcane by *Fusarium moniliforme* var. *subglutinans* had assumed serious proportion in certain parts of North Bihar where the damage was 20-25% in tonnage which resulted in a serious drop in sugar recovery. Yield of wilted canes has shown a tremendous decline (2.18 - 4.71%) in juice quality against the estimated recovery of 11.25 to 12.89% in healthy canes (Khanna, 1951).

II. MATERIAL AND METHODS

Sugarcane fields spread over 15 blocks covering three districts were surveyed for *F. moniliforme* var. *subglutinans* during March to December of 2012 and 2013. More than 321 plots having different varieties (eg. CoO233, Co234, Cos 8436, Cose 92432 etc.) were selected and the entire wilted plants were uprooted.

The stalks were cut into several pieces measuring 4 to 6 cm long after removing the leaves. The roots, stalks and leaves were wrapped with due care in sterilized cellophane wrapping paper separately. Each sample collected from different places was kept at low temperature use (below 4°C) to prevent saprophytic growth.

The percentage of natural disease incidence was calculated as found after the number of infected plants per plot on the basis of observations made at different times and months. Agar plate method and standard blotter test method were followed for isolation of onycoflora associated with different disease samples. The isolated fungi were cultured on PDA medium and studies for *F. moniliforme* var. subglutinans with the help of standard literatures.

III. RESULTS AND DISCUSSION

Altogether more than 20 varieties of sugarcane were encountered during the investigation. These varieties are in common cultural practices throughout the area under investigation. *Fusarium moniliforme* var. subglutinans was recorded from all the varieties of sugarcane during every month. However, percentage of occurrence of *F. moniliforme* var. subglutinans was comparatively high during July to October than March to June (Table-1)

Among the districts investigated, Madhubani was recorded with high level of the disease incidence, whereas Samastipur was the lowest. Among the blocks of different districts, Madhepur in Madhubani district was recorded most vulnerable and Rosara block (Samastipur) was the least vulnerable for sugarcane cultivation against *F. moniliforme* var. subglutinans. A critical perusal of the Table-1 showed that inundated blocks such as Madhepur in Madhubani, Biroul in Darbhanga and Bithan in Samastipur districts have shown greater disease incidence. This confirmed the findings of Sharma (1976) that soil moisture favours wilt disease. Rao et. al. (1972) also observed 68.6% wilt incidence when the crop was raised in July on wilt infected soil followed by water stress with 39.7% loss and 22.8% reduction in juice sucrose. In the present investigation several varieties were tested against wilt throughout the area under investigation but none of them were found to be resistant against wilt. So, this also confirmed the findings of Waraitch (1981), Waraitch and Kumar (1984) and Kanwar and Johnson et. al. (1984).

Table No. 1

Isolation of *Fusarium moniliforme* var. subglutinans from different blocks of Darbhanga Division

Districts	Blocks	No. of Plots	Average % of disease incidence on different months										
			March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
Madhubani	Pandaul	22	2.20	2.40	2.70	2.30	3.20	3.75	4.15	4.00	3.80	3.20	3.170
	Rahika	24	2.00	2.10	2.50	2.25	3.10	3.50	4.00	3.80	3.80	3.10	3.015
	Bisfi	21	2.10	2.00	2.60	2.25	3.10	3.60	3.90	3.80	3.75	3.20	3.030
	Rajnagar	20	1.90	2.10	2.10	2.20	3.00	3.50	3.80	3.80	3.70	3.30	2.940
	Madhepur	22	2.30	2.50	2.75	3.75	4.25	4.75	4.70	4.10	4.00	3.90	3.700
Darbhanga	Benipur	22	1.90	2.00	2.10	2.25	3.10	3.20	3.00	3.00	2.90	2.80	2.625
	Biroul	23	2.25	2.50	3.00	3.60	4.15	4.25	4.10	3.90	3.80	3.50	3.505
	Manigachhi	24	2.10	2.25	2.30	2.30	3.80	3.90	3.70	3.00	3.00	2.75	2.910

	Keoti	19	2.10	2.30	2.50	2.50	3.20	3.40	3.50	3.10	2.80	2.80	2.820
	Hayaghat	18	2.20	2.25	2.40	2.40	3.00	3.00	3.10	2.90	2.90	2.70	2.685
Samastipur	Hasanpur	21	1.80	1.90	2.00	2.00	2.50	2.60	2.60	2.25	2.25	2.20	2.431
	Bithan	22	2.25	2.30	2.40	2.30	3.60	3.90	3.90	3.60	3.00	3.00	3.025
	Rosera	22	2.00	2.00	2.10	2.10	2.60	2.70	2.60	2.10	1.70	1.60	2.150
	Warishnagar	21	2.10	2.10	2.20	2.00	2.70	3.25	3.40	3.00	3.00	2.10	2.585
	Tajpur	20	2.00	2.00	2.00	2.75	3.25	3.75	3.25	2.75	2.50	2.50	2.685
	Total	321	31.20	32.70	35.75	36.95	48.55	53.05	53.70	49.10	46.90	42.65	
	Mean		2.08	2.18	2.38	2.46	3.24	3.54	3.58	3.27	3.13	2.84	

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