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CHEMICAL CONTROL OF SUGARCANE WILT UNDER SOUTH GUJARAT CONDITIONS*

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ABSTRACT

Eleven fungicides were evaluated as a soil drench in a field trial at three locations *viz.*, Dhamdod, Butwada and Ganeshsisodra of Valsad district on highly susceptible variety CoC-671 in wilt-sick plot by drenching the fungicides first at planting and second 90 days after planting. Among the fungicides M.E.M.C. (Emisan-6 @ 0.2 %), carbendazim (Bavistin @ 0.1 %), micronised sulphate (Micron-S-3 @ 0.3 %) and Amurt-G (@ 62.5 kg/ha) proved quite effective upto 120 days of planting but at harvest, chlorothalanil 75 % (Kavach @ 0.15 %), Amrut-G (62.5 kg/ha) carbendazim (0.1 %), Ovis-G (Ovis-G 20 % w/w @ 25 kg/ha), M.E.M.C. (Bagalal-6 @ 0.2) and M.E.M.C. (Emisan-6 @ 0.2 %) gave higher yield over control. Thus, two drenching of either of carbendazim, M.E.M.C. (Emisan-6 @ 0.2 %), micronised sulphate, Amrut-G or Ovis-G seem to be quite effective in checking the wilt infection under field conditions.

KEY WORDS : Chemical control, sugarcane wilt

Sugarcane wilt (*Fusarium moniliforme* Sheld.) has been gaining prominence in Gujarat for the last few years. The symptoms are observed 60-70 days after planting. It becomes more severe with the onset of monsoon. The infected canes remained stunted and at this stage, splitted canes showed white pith formation from the base upward and causing considerable loss in affected crop. Parthasarthy (1972) recorded 2 to 10 t/ha of dried and dead canes in wilt infected fields at harvest in South India. According to Sarma (1976), the yield reduction may go as high as 60 per cent. The control of sugarcane wilt has been attempted by several workers (Ganguly, 1964; Singh *et al.*, 1971; Singh *et al.*, 1985; Deshmukh and Patel, 1992). Looking into the seriousness of the disease in South Gujarat area, present investigation was carried out employing fungicides to control wilt disease.

MATERIALS AND METHODS

Field experiment was conducted during 1990 in naturally wilt-sick fields of farmers at three locations *viz.*, Dhamdod, Butwada and Ganesh-Sisodra village on the highly susceptible variety CoC- 671 with 12 treatments (including check) by giving two drenching. Each one was replicated thrice. The first application of fungicides was made just before planting and second 90 days after planting. The first half application of fungicides was made by opening furrow and second half beside the planting and covering the furrow with soil after application. The plot size was 6 x 6 m consisting of six rows keeping 21 sets/row. A total of 126 single eye budded setts/plot was maintained. The fungicides were tested (Amrut-G, Ovis-G, Phytoalexin-15 G, Micron-S-20, Amrut guard, Bagalol-6, Venus, Bavistin, Emisan, Antiwilt and Kavach) as per dosase (Table 1). The natural disease incidence after 120 days of planting and at harvest and cane yield were recorded.

RESULTS AND DISCUSSION

The results of pooled analysis of the data for three locations conducted in wilt-sick field in regard to germination, wilt incidence and yield presented (Table 1) reveal that differences in

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Table 1. Effect of fungicides on germination, wilt incidence and yield of sugarcane in plant crop of Co 671 at Dhamdod, Butwada and Ganesh-Sisodra

Treatments	Germination (%)				Wilt incidence (%) After 120 days of planting			Wilt incidence (%) After 300 days of planting				Yield (t/ha)			
	Dhamdod	Butwada	Ganesh-Sisodra	Pooled	Dhamdod	Butwada	Pooled	Dhamdod	Butwada	Ganesh-Sisodra	Pooled	Dhamdod	Butwada	Ganesh-Sisodra	Pooled
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Amrut-G	46.35	51.84	42.77	46.99	3.24	2.58	2.91	15.60	15.21	18.24	13.68	221.87	211.87	122.29	185.34
(62.5 kg/ha)	(52.38)	(61.64)	(46.16)	(53.39)	(0.95)	(0.60)	(0.78)	(7.60)	(7.04)	(3.31)	(5.98)				
Amtur guard	44.98	55.04	45.44	48.49	8.30	6.34	7.32	18.96	17.70	12.4	16.37	251.45	167.91	113.75	177.70
(0.5 %)	(50.00)	(67.20)	(50.79)	(55.99)	(3.19)	(1.87)	(2.53)	(11.09)	(9.35)	(4.06)	(8.17)				
Antiwilt	44.83	51.32	42.17	46.11	9.66	7.98	8.82	19.54	18.24	6.87	14.88	248.33	183.12	108.33	179.72
(100 kg/ha)	(49.73)	(60.85)	(45.11)	(51.89)	(2.83)	(1.92)	(2.38)	(11.29)	(9.84)	(2.95)	(8.03)				
Bagalol-6	45.59	49.16	44.38	46.38	9.39	7.68	8.53	18.15	17.64	10.23	15.34	214.58	190.20	114.58	173.12
(0.2 %)	(51.03)	(57.14)	(48.94)	(52.39)	(2.67)	(1.78)	(2.23)	(11.03)	(9.30)	(3.25)	(7.86)				
Bavistin	44.07	55.09	44.67	47.94	3.11	2.56	2.84	15.47	16.87	0.00	10.78	221.88	203.12	124.37	183.12
(0.1 %)	(48.41)	(67.19)	(49.47)	(55.02)	(0.07)	(0.54)	(0.71)	(7.48)	(7.02)	(0.00)	(4.83)				
Emisan	43.77	53.65	42.70	46.71	0.00	0.00	0.00	13.57	13.28	4.10	10.31	212.54	187.50	109.58	169.87
(0.2 %)	(47.89)	(64.89)	(46.03)	(52.93)	(0.00)	(0.00)	(0.00)	(5.73)	(5.73)	(0.51)	(3.99)				
Kavach	44.37	55.22	43.05	47.55	6.63	2.63	4.63	25.02	19.43	5.85	16.77	262.70	187.91	123.33	191.31
(0.15 %)	(48.94)	(67.46)	(46.69)	(54.36)	(1.99)	(0.93)	(1.31)	(17.91)	(7.03)	(0.81)	(8.60)				
Micron-S-20	46.50	49.72	44.53	46.91	0.00	3.73	1.87	13.39	16.07	7.14	12.20	230.41	167.70	125.62	174.58
(0.3 %)	(53.73)	(58.20)	(49.20)	(53.71)	(0.00)	(1.25)	(0.61)	(5.73)	(8.02)	(3.10)	(5.62)				
Ovis-6-G	46.35	53.44	43.85	47.88	3.06	5.27	4.17	15.44	16.84	12.76	15.01	257.70	171.87	109.99	179.85
(25 kg/ha)	(52.38)	(64.55)	(48.01)	(54.98)	(0.85)	(1.26)	(1.06)	(7.48)	(8.43)	(5.01)	(6.97)				
Phytoalexin	44.07	55.69	42.76	47.51	9.80	7.61	8.71	19.61	18.65	10.27	16.18	247.08	188.75	102.70	179.51
(15 kg/ha)	(48.41)	(68.25)	(46.16)	(54.27)	(2.90)	(2.61)	(2.76)	(11.38)	(10.29)	(6.26)	(9.31)				
Venus	44.22	53.93	40.40	46.19	8.47	2.56	5.52	19.57	14.38	11.57	15.17	162.70	142.70	116.66	140.69
(0.1 %)	(48.68)	(65.34)	(42.06)	(52.02)	(3.30)	(0.59)	(1.95)	(11.24)	(6.53)	(4.96)	(7.58)				
Control	44.83	52.24	41.78	46.29	13.65	10.44	12.04	27.43	22.90	21.02	23.78	212.49	162.91	110.41	161.94
(P = 0.05)	(49.74)	(62.43)	(44.44)	(52.20)	(5.92)	(3.36)	(4.64)	(21.24)	(15.29)	(13.75)	(16.76)				
Treatment	NS	NS	NS	NS	7.79	NS	4.96	6.93	4.78	NS	4.83	35.41	NS	6.96	24.67
Treatment x Location				NS			NS				NS				NS

germination were non-significant at all three locations, indicating no effect of fungicides on germination.

Date on wilt incidence after 120 days of planting were significant at Dhamdod and non significant at Butwada, while at Ganesh-Sisodra incidence was not observed. At Dhamdod, the incidence was less in all the fungicides as compared to control and it was nil in M.E.M.C. and micronised sulphate and very low in Ovis-G (3.06 %), carbendazim (3.11 %) Amrut-G (3.24 %) and chlorothalanil (6.63 %). At Butwada, the results were found non-significant. Under pooled results, wilt incidence was significantly low in M.E.M.C. followed by micronised sulphate (1.87 %), carbendazim (2.84 %), Amrut-G (2.91 %) Ovis-G (4.17 %) and chlorothalanil (4.63 %) and all were at par and significantly superior over control, while rest of the fungicides showed higher incidence of the disease. The interaction between the location and treatment was non-significant indicating uniform effect of fungicides at both the locations. It shows that M.E.M.C., carbendazim, micronised sulphate, Amrut-G, Ovis-G and chlorothalanil seem to be effective at initial stage in controlling wilt incidence.

The differences in wilt incidence at harvest among the fungicides were significant at Dhamdod and Butwada, while non-significant at Ganesh-Sisodra. At Dhamdod the wilt incidence was minimum in micronised sulphate (13.39 %) followed by M.E.M.C. (13.57 %), Ovis- G (15.44 %), carbendazim (15.47 %), Amrut-G (15.60 %), M.E.M.C. (18.15 %), Amrut-guard (19.5 %), Antiwilt (19.54 %), Venus (19.57 %) and Phytoalexin (19.6 %) and significantly superior over control. At Butwada the wilt incidence was lowest in Emisan (13.28 %) followed by Venus (14.38 %), Amrut-G (15.21 %), Micron-S-290 (16.07 %), Ovis-G (16.84 %), Bavistin (16.87 %), Bagalol-6 (17.64 %) and Amrut guard (17.7 %) and all were at par and significantly superior over control. In the pooled results of three locations, wilt incidence was lowest in Emisan (10.31 %) followed by Bavistin (10.78 %), Micron-S-20 (12.20 %), Amrut-G (13.68 %), Antiwilt (14.88 %) and Ovis-G (15.01 %) and significantly superior over control (23.78 %).

The yield differences were significant at Dhamdod and Ganesh- Sisodra, while non significant at Butwada. At Dhamdod, all the fungicides gave higher yield over control except Venus. Kavach gave highest yield, while Phytoalaxin, Micron-S-20, Bavistin and Amrut-G proved next best in order of merit. At Butwada Amrut-G gave higher yield followed by Bavistin Bagalol-6 Phytoalexin, Kavach and Emisan. Considering the pooled results, the treatment differences were significant and all the treatments gave higher yield over control, except Venus (140.69 t/h).

Considering the efficacy of fungicides with regard to wilt incidence after 120 days of planting at harvest and the yield at various locations and under pooled results, Bavistin, Micro-S-20, Amrut-G, Ovis-G and Emisan appeared to be superior and almost equally effective in checking wilt infection, whereas Amrut guard, Antiwilt Bagalol-6, Phytoalexin and Venus can be ranked second order fungicides.

Singh *et al.* (1985) reported soil amendment with boric acid and sett treatment of Aretan followed by soil drenching of Bavistin was most effective in reducing sugarcane wilt caused by *F. sacchari*. Waraitch *et al.* (1985) reported sprinkling of Emisan-6 @ 62.5 t/h over the setts in furrow was very effective for higher germination and cane yield. Patel (1989) showed two drenchings either of 0.1 % Emisan, 0.1 % Bavistin, 0.1 % Thiram or 0.1 % Agrozim at 30 days interval were very effective in reducing sugarcane wilt disease. Kalaimani *et al.* (1989) advocated sett dip treatment with 0.06 % carbendazim for effective control of sugarcane wilt. Our results of carbendazim and M.E.M.C. are in agreement to the earlier reports, but the efficacy of micronised sulphate, Amrut-G and Ovis-G against *F. moniliforme* causing sugarcane wilt reported here is for the first time, which can be used for effective management of sugarcane wilt. It can be concluded from this study, that two drenching of carbendazim (0.1 %) or M.E.M.C. (0.2 %) or micronised sulphate (0.3 %) or Amrut-G (62.5 kg/ha) or Ovis-G (25 kg/ha) proved quite effective in controlling sugarcane wilt under field conditions.

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EFFECT OF IRRIGATION REGIMES, COMRADE CROPPING AND SOIL AMENDMENTS ON LAND EQUIVALENT RATIO AND YIELD OF CASSAVA, GROUNDNUT AND SESAME

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ABSTRACT

The study revealed that irrigation at 0.6 IW/CPE ratio recorded maximum yields. Cassava raised as sole crop or as comrade cropping in groundnut recorded comparable tuber yield. Either sole groundnut or sesame or in combination with cassava as comrade crop did not alter the yield of groundnut and sesame. Raising groundnut as comrade cropping with cassava recorded higher LER. Coir waste applied at 10 $t.ha^{-1}$ increased the tuber and groundnut pod yields.

KEY WORDS : Comrade crop, coir waste, amendments, complementarity, tuber yield

Cassava is cultivated in about 0.48 lakh hectares in Tamil Nadu with a production of 1.5 million tonnes of tuber annually contributing about 42 per cent of national production. Even with the higher contribution to the national cassava production, the productivity (10.25 tonnes ha^{-1}) is far below the normal productivity (19.33 tonnes ha^{-1}) (FAO, 1988) as well as the maximum (40 tonnes ha^{-1}) potential productivity. Inadequate provision of inputs like water and nutrients are the probable reasons for the low productivity. Any attempts to develop a package for efficient irrigation and moisture management may pave way for increasing the productivity of cassava. Cassava being a wide spaced crop with a low initial establishment and canopy coverage provides scope for raising short duration crops at early growth stages particularly under irrigated condition. With a view to accommodate the full population of cassava as well as intercrops, the concept of comrade cropping is being followed. Bulky organic manures like farm yard manure and coir industrial wastes may play an important role not only in improving the physical and chemical condition of the soil but also in providing an ideal source of plant nutrient as well as for moisture conservation. In this context an attempt has been made to combine the effect of scheduling since little research has been carried out. Therefore, a study has been formulated to quantify the effect of irrigation and moisture conservation practices on soil moisture depletion pattern and yield of cassava comrade cropping systems.

MATERIALS AND METHODS

The first experiment during December 1991 to September 1992 and the second experiment during 1992-93 were laid out in field No. 37 E of Eastern