Table 3. Multiple regression analysis of the grain damage by podfly and pod characters

Characters	Mean (x)	Multi. Reg. Coe. (b)	SE (b)	't'
X_1 Pod length (cm)	05.20	-0.20	0.18	-1.06 NS
X_2 Pod width (cm)	00.78	10.25	9.45	1.09 NS
X_3 Grains/pod (nos)	03.47	-05.27	3.22	-1.64
X_4 Grain length (mm)	05.01	-07.82	2.80	-2.79**
X_5 Grain width (mm)	04.41	06.30	2.08	3.03**

Constant term (a) = 47.30
Mean of dependant variable (Y) = 24.75
R^2 = 0.37*

* Significant at 5% level
** Significant at 1% level
NS Not significant

REFERENCES

DURAIRAJ,C. (1995). **Ecology and management of tur podfly *Melanagromyxa obtusa* Malloch.** In pigeonpea. *Ph.D. Thesis*, Tamil Nadu Agricultural University, Coimbatore, India,200 p.

ICRISAT. (1986).Annual Report for 1985. Patancheru, Andrapradesh, India, 379 p.

LAL,S.S. YADAVA, C. P. and SACHAN, J.N. (1993). Assessment of pod borer damage on pigeonpea in different agro ecological zones of Utter Pradesh. **India N. J. Pulses Resi., 5:** 174-178.

PIRAVIPERUMAL. A. (1979). **Studies on varietal resistance, biology and control of podfly *Melanagromyza obtusa* Malloch. in redgram.** M. Sc., (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, India. 65 p.

THAKUR, B.S., RAWAT, R.R., VERMA, R. and MOITRA, A. (1990). Influence of shape and size of pods of pigeonpea on the susceptibility to the pod fly, *Melanagromyza obtusa* Malloch and the pod bug *Clavigralla gibbosa* **Spinola. Indian J.Ent., 51** : 159-162.

VEDA, O. P., PUROHIT, M.C. and SOOD, N.K. (1975). Varietal susceptibility of arhar to *Melanagromyza obtusa* Malloch *Exelastis atomosa* W. and *Heliothis armigera* **H.b,JNKVV. Res. J., 9:** 7-9.

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FOLIAR SPRAY OF FUNGICIDES AND THEIR EFFECT ON INCIDENCE OF DIE BACK DISEASE AND YIELD OF RED CHILLI

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ABSTRACT

Eight fungicides were evaluated *in vivo* for their effectiveness to combat die-back disease of chilli incited by *Colletotrichum capsici* by prophylactic spray. All the fungicides were significantly superior over control in reducing the disease incidence but three sprays of Indofil M-45 (0.25%) was found superior over all the treatments which produced least incidence of die-back and yielded maximum. This treatment was followed by three sprays of Difolatan (0.25%) and Bavistin (0.05%).

KEY WORDS : *Capsicum annum*, Die-back, *Colletotrichum capsici*, Fungicides.

Die-back of chilli caused by *Colletotrichum capsici* (Syd.) Bulter & Bisby is one of the most widespread and destructive diseases wherever this crop is grown. At present this disease has gained global importance including almost all chilli growing tracts of India. Bihar is one of the remarkable states of the country where occurrence of the disease was first reported by Dastur (1921) and since then chilli crop has been drastically ruined. The disease affects foliage, branches and fruit resulting in reduced yield and poor quality fruits of chilli (Chowdhury, 1957). Keeping in view the importance of aerial spread of the disease, an attempt has been made to assess the effect of foliar spray of different fungicides on the incidence of die-back disease and yield of chilli.

MATERIALS AND METHODS

Experiment was carried out to ascertain the influence of fungicidal spray on *Colletotrichum capsici* causing die-back disease and cumulative yield of red chilli for two consecutive crop seasons during 1995-96 and 1996-97. The trial was laid out in randomized block design with three replications. Forty days old seedlings raised in nursery bed, were used for transplanting. One row in each replication around the experimental plot was planted 10 days earlier which served as border plants. In each plot 40 seedlings were maintained at 45 cms apart both plant to plant and row to row. Earlier planted border plants were inoculated on 15th day of planting with 10-day old culture of *Colletotrichum capsici* . Plots were sprayed thrice at 21 days interval commencing after 30 th day of planting with different fungicides viz. Carbendazim (Bavistin 0.05%), Copper oxychloride (Blitox 0.25%), Mancozeb (Indofil M-45; 0.25%), Captafol (Difelatan 0.25%), Metalaxyl + Mancozeb (Ridomil MZ 0.1%), Copper oxychlloride (Blue copper, 0.25%), Chlorothalonil (Kavach 0.1%), Copper oxychloride (Fylolan, 0.25%).

Table 1: Effect of fungicidal spray on the incidence of die-back disease and yield of red chillies

S. No.	Fungicide	Con cent ration (%)	1995-96					1996-97				
			*per cent disease incidence (days after planting)				Yield (g/ha)	*Per cent disease incidence (days after planting)				yield (g/ha)
			50	71	92	120		50	71	92	120	
1.	Bavistin	0.05	0.00	2.5	12.5	14.2	98.7	0.8	1.7	13.3	15.8	97.7
2.	Blitox-50	0.25	0.8	3.3	23.4	15.8	92.9	1.7	3.3	24.2	27.5	92.0
3.	Indofil M-45	0.25	0.0	2.5	10.8	12.5	100.2	0.0	1.7	10.0	10.8	103.2
4.	Difolatan	0.25	2.5	1.7	11.7	13.3	99.3	0.0	3.3	11.7	15.0	101.4
5.	Ridomil MZ	0.10	2.5	5.0	18.3	20.8	94.5	3.3	6.7	19.2	20.8	94.1
6.	Kavach	0.10	1.7	4.2	19.2	22.5	93.7	4.2	7.5	20.0	22.5	93.0
7.	Blue copper-50	0.25	3.3	4.2	25.8	26.7	93.0	4.2	9.2	25.0	25.0	91.3
8.	Fytolan	0.25	6.7	5.8	24.2	28.3	92.2	5.0	10.8	21.7	24.2	90.7
9.	Control	-	6.7	13.3	40.0	55.0	84.6	9.2	21.7	37.5	60.0	85.5
	SEm	0.96	0.97	6.76	0.94	2.56	1.27	1.34	1.10	0.84	3.11	
	C.D.(P=0.05)	2.87	2.92	2.28	2.82	7.67	3.84	4.00	3.31	2.52	9.32	
	CD (P=0.01)	3.95	4.02	3.14	3.89	10.57	5.24	5.52	4.55	3.78	1.85	
	C.V.%	81.35	35.82	6.41	6.70	4.70	69.81	31.23	9.42	7.31	5.71	

*Average of three replicates.

Regular irrigation and cultural operations were followed. One spray of monocrotophos (0.08%) was given to prevent the crop from insect infestation.

Observations on die-back disease incidence were recorded on 50th, 71st, 92nd and 120th day of planting and red ripened chilli fruits were picked up and finally cumulative yield was calculated in terms of q/ha at the end of experimentation.

RESULTS AND DISCUSSION

It is evident from the Table 1, that all the fungicides were significantly superior over control in reducing the disease incidence irrespective of growth stages of the crop taken for observations. Plots receiving Mancozeb (0.25%) exhibited least incidence of disease (12.5%) being on par with Captafol (13.3%) and Carbendazim (14.2%). The next best fungicide was Metalaxyl + Mancozeb which produced 20.8 per cent disease incidence even at the concentration of 0.1% followed by Chlorothalonil (22.5%). The copper fungicides in the form of Copper oxychloride remained effective and statistically on par in reducing the disease incidence. Mancozeb had pronounced effects on increasing the yield of red chilli and as much as 100.2 q/ha was harvested being on par with captafol (99.3 q/ha) and Carbendazim (98.7 q/ha). All the fungicides under test except Copper oxychloride significantly increased the yield of red chilli. However, fungicidal sprays for enhancement of yield responded differently during 1996 – 97. During the crop season spraying of Mancozeb, captafol and Carbendazim showed significant increase in yield and found on par with each other. Maximum yield to the tune of 10.32 q/ha was harvested with Mancozeb followed by Captafol 101.4q/ha and Carbendazim (97.7 q/ha) whereas other treatments could not increase the yield significantly over control. Combined statistical analysed data of both the years on disease incidence and yield revealed that three sprays of Mancozeb, Captafol, and Carbendazim were superior to other treatments.

Sivasubramanian (1969) suggested that four sprays of copper oxychloride (0.25%) at triweekly interval commencing from 30 days of transplanting reduced the incidence of die-back and fruit rot diseases contribution 7 to 13 per cent increased yield. Subramanian et al.(1971) also found the similar results. Thakur and Singh (1973) reported that fungicides containing zinc were found to be very effective against die-back and increasing the yield. Sivaprakasham et al. (1978) obtained the best result against *C.capsici* on *capsicum* with mandozeb at 2 kg/ha and Captafol at 1 kg/ha sprayed four times at three week interval from the initial appearance of disease symptom and yields were also markedly increased. Die-back and fruit rot diseases of chilli could be controlled by spraying of captan followed by Capatol , Mancozeb, Copper oxychloride and Mancozeb (Raju et al. 1979), Kumar and Manmood (1986) suggested that spraying of chilli plants with Carbendazim performed the best in controlling the die-back and fruit rot diseases. Malraja and Narayanaswami (1968) also advocated the effectiveness of higher concentration of Mancozeb, Coper oxychloride and Carbendazim against die-back. Das and Mohanty (1988) observed in field trials the best control of *Collectotrichum capsici* on *capsicum* by sprays of Carbendazim followed by Benomyl and Difolatan. Mishra (1988) reported that in areas where losses due to die-back are high, the disease could be best controlled with four applications of Carbendazim giving maximum return on investment but where a more economical treatment is required Dithane M-45 (mancozeb) performed good results. Raju and Rao (1989) found Bavistin (Carbendazim), Dithane M-45 (mancozeb) and a new fungicide Fenapanil reduced the incidence of die-back of chilli and increased crop yields compared with an untreated control.

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REFERENCES

CHOWDRY, S. (1957). Studied on development and control of fruit rot of chillies. **Indian Phytopath . 10(1) : 55-62.**

DAS, S.R. and MOHANTY, K. C. (1988). Management of die-back / twig blight of chilli with fungicides. **Indian J. Plant Protection 16 (1) : 109-111.**

DASTUR J.F. (1921). Die-back of chillies in Bihar. Mem. Dept. Agri. Ind. Bot.Sat.11: 129-144.

KUMAR S. and MAHMOOD, M. (1986). Evaluation of fungicides against *Colletotrichum capsici*, the incitant of die-back of chilli. **Pesticides 20 (4)** : 28-29.

MALRAJA, E.G.E.P. and NARAYANASWAMI, R.(1968). Effect of certain fungicides on incidence of *Colleirtrichum capsici* in chilli varieties K-1 and K-2 **South Indian Hort, 36 (4)** : 205-206.

MISHRA, D. (1988). Fungicidal control of anthracnose and fruit rot (*Colletotrichum capsici*) of chilli (*Capsicum annum* L.). **Indian J. Agri. Sci. 58** : 147-149.

RAJU, K. S. and RAO, G.S. (1989). Studies on bioefficacy of a new systemic fungicide 'Fenapanil' against chilli fruit rot. **Pestology 13 (2)** : 21-22.

SUBRAMANIAN, K. S., SRINIVASAN, S. and SHANMUGAM, N. (1971). A note on the control of fruit rot and die-back of chillies. **Madras Agri. J. 58 (6)** : 548-549.

SIVAPRAKASHAM, K.JAGANATHAN, R., PILLYAR SWAMY, K. and ANAVARADHAM, L. (1978). Control of die-back and fruit rot of chillies. **Vataka 1(1)**:103-105.

THAKUR, D. P. and SINGH,S.A. (1973). Efficacy of chemicals *in vitro* and *in vivo* in controlling fruit rot of chillies by *C.capsici*. **Haryana J. Hort. 2** : 128-133.

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BIOLOGICAL CONTROL OF ROOT ROT OF GROUNDNUT

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ABSTRACT

Field trials were conducted to find out the effect of antagonists and neem cake on root rot disease incidence of groundnut. Among the eight treatments, *Trichoderma Viride* (ST) + Neemcake (SA) reduced the root rot disease (8.97%) as compared to control (22.51%).

KEY WORDS: Root rot, Tichoderma, Neem Cake

Root rot disease caused by *Macrophomina phaseolina* in groundnut is one of the major diseases causing severe damage. Chemical control of plant diseases leads to ill effects like residual toxicity, environmental pollution, resistance to fungicide etc., Therefore, an alternative method, biological control of plant pathogens has been focussed recently. Microorganisms like *Trichoderma harizianum, T.viride* and *Racillus subtilis* inhibited the growth of *M.phaseolina* considerably (Papavizas and Levis, 1981).

Organic amendments reduced the saprophytic activity of *Rhizoctonia bataticola* in the soil (Satisghandra *et.al.*,1979). The present study reports the efficacy of biocontrol agents and amendments on the management of root rot of groundnut.

MATERIALS AND METHODS

Field experiments were conducted at Agricultural Research Station, Aliyarnagar for two years to find out the effect *of Trichoderma viride* and neem cake on root rot disease incidence. The experiments were laid out in randomised block design with five replications in 5x3m plots using the cultivar CO2 (Kharif) and VRI 4 (Rabi) with the spacing of 30x10 cm. The commercial product of the fungal antagonists viz., *Trichoderma viride, T.harzianum* were used for seed treatment at the rate of 4 g/kg of seed. The bacterial biocontrol agent viz., *Pseudomonas fluorescens* was used at the rate of 10 g/kg of seed. The treated seeds were shade dried and sown. Carbendazim seed treatment was given at the rate of 2 g/kg of seed. Neem cake was applied to the respective plots at the rate of 160 kg/ha during the time of sowing. Control plot was maintained without any application.

The initial plant population was taken 10 days after sowing. The observation on root rot disease incidence was taken on 30,60 and 90 days after sowing. Pod yield was also recorded.