

Control of frenchbean rust through fungicides and a neem based formulation

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Frenchbean (*Phaseolus vulgaris* L.) is an important *rabi* crop of Meghalaya commonly grown for green pods after *kharif* paddy in mid hills of the state. In recent years, rust caused by *Uromyces appendiculatus* (Pers.) Unger caused considerable yield loss thereby limiting its cultivation (6, 7). Various workers (1, 3, 9) have suggested several fungicides and spray schedule for the management of this disease. Biopesticides of plant origin particularly neem (*Azadirachta indica*) is reported to control rust and leaf spot of groundnut (2, 10). Hence in the present study, 5 fungicides including neem-based formulation PJM-C were tested and results presented here.

Experiment was carried out at ICAR Complex, Umiam research farm (900-m msl) in a sandy loam alfisol for two consecutive years during *rabi* (October-January) season of 1998 and 1999 using two local cultivars Manipur local and Meghalaya local. Seeds were sown in the first week of October in a plot of 2.0 × 2.5 m with three replications and nine treatments in randomized block design with a spacing of 40 × 20 cm. A basal application of 25 kg N/ha and 30 kg each of P and K was applied as urea, single super phosphate and murate of potash respectively. Half dose was applied as basal and rest 30 days after sowing (DAS). The fungicial treatments were: mancozeb (indofil M-45) 0.2%; triadimefon (bayleton) 0.1% + mancozeb 0.2%; triadimefon alone 0.1%, carbendazim (bavistin) 0.1% + mancozeb 0.2%; carbendazim

0.1% alone; hexaconazole (contaf 5 E) 0.1% + mancozeb 0.2%; hexaconazole alone 0.1%; PJM-C 0.5% and control. Mancozeb alone and PJM-C were applied 4 times at 10 days interval starting 40 DAS and systemic fungicides, 3 times at 15 days interval. PDI was calculated 7 days after the last spray based on the visual observation using 0-9 scale (5). Green pod yield, pod length and pod weight in each treatment were also recorded.

Contaf alone or in combination with mancozeb were highly effective in both the years (Table 1 & 2). In 1998 trial, contaf performed better than others in reducing rust (PDI from 86.6% in control to 24.1%) and was at par with contaf + mancozeb and PJM-C in Manipur local.

In Meghalaya local also, hexaconazole alone or in combination with mancozeb was highly effective, the carbendazim was least effective. PJM-C was also equally effective like hexaconazole in controlling rust (14.4%). Hexaconazole + mancozeb yielded 3.3 times than control in 1998 and was at par with PJM-C. According to Gonzalez *et al.*, (3), mancozeb, captafol gave good control of rust in Costa Rica. Becerra *et al.*, (1) obtained best result by contaf spray twice before flowering from Mexico. Effective control of this disease on frenchbean was also reported by Gonzalez and Garcia (4) by spraying contaf at 14 days interval from Cuba. Contaf was reported to control leaf spot of groundnut (8). It is interesting to note that neem formulation PJM-C was very effective in managing rust. Ghewande *et al.*, (2) in a multiyear trial, obtained effective control of foliar pathogens

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Table 1. Efficacy of fungicides and neem formulations against rust (*Uromyces appendiculatus*) of frenchbean cv. Manipur local

Treatments	Rust (PDI)		Pod length (cm)		Pod weight (g)		Yield (Q/ha)	
	1998	1999	1998	1999	1998	1999	1998	1999
Mancozeb	57.4 (49.6)*	43.6 (41.3)	11.4	11.9	6.2	6.0	15.0	9.8
Triadimefon +mancozeb	52.2 (46.3)	40.3 (39.3)	11.1	11.0	6.5	6.4	17.5	10.6
Triadimefon	55.2 (48.0)	45.8 (42.7)	10.5	11.7	6.3	6.4	19.0	11.0
Carbendazim +mancozeb	78.5 (62.6)	59.5 (50.6)	9.9	10.1	5.3	6.0	11.8	10.0
Carbendazim	70.4 (58.0)	64.4 (53.5)	10.5	11.0	6.1	6.2	14.9	8.5
Hexaconazole +mancozeb	28.1 (31.9)	19.2 (15.1)	12.8	13.1	7.4	7.7	35.9	15.2
Hexaconazole	24.1 (29.0)	15.1 (22.3)	13.2	12.7	7.6	7.4	32.3	18.3
PJM-C	32.2 (34.3)	29.5 (32.9)	12.1	12.5	6.4	7.4	26.5	15.6
Control	86.6 (68.7)	80.7 (64.7)	8.6	9.5	4.1	4.7	4.9	4.5
CD (0.05)	6.8	12.1	1.7	1.8	1.2	1.3	4.6	2.7

*Figures in parenthesis are angular transformed values

Table 2. Efficacy of fungicides and neem formulations against rust (*Uromyces appendiculatus*) of frenchbean cv. Meghalaya local

Treatments	Rust (PDI)		Pod length (cm)		Pod weight (g)		Yield (Q/ha)	
	1998	1999	1998	1999	1998	1999	1998	1999
Mancozeb	31.8 (33.9)*	27.8 (31.6)	10.2	10.8	5.5	5.3	29.8	14.3
Triadimefon +mancozeb	28.5 (32.1)	15.5 (23.1)	10.4	10.3	6.1	6.0	32.6	16.6
Triadimefon	33.0 (34.8)	27.4 (31.5)	10.1	10.1	6.0	5.0	28.4	12.1
Carbendazim +mancozeb	46.3 (42.9)	28.8 (32.2)	9.8	11.0	5.4	6.0	31.3	14.7
Carbendazim	43.3 (41.0)	33.2 (35.2)	9.5	10.0	5.5	5.0	28.0	11.3
Hexaconazole +mancozeb	14.8 (21.6)	8.4 (16.8)	10.5	11.0	6.5	6.6	49.0	21.4
Hexaconazole	18.5 (25.3)	7.4 (15.4)	11.3	11.8	6.3	6.0	40.2	24.1
PJM-C	14.4 (21.8)	12.9 (20.7)	11.8	11.5	7.4	6.5	42.0	17.7
Control	57.4 (49.3)	44.4 8.5	9.7	4.8	4.8	14.8	9.6	
CD (0.05)	5.2	8.9	1.2	1.3	0.7	1.2	7.8	2.8

*Figures in parenthesis are angular transformed values

of groundnut by using neem leaf extracts. Usman *et al.*, (10) demonstrated through field experiments that neem oil (3%), neem kernel extract (3%) and neem cake extract (5%) effectively controlled rust and leaf spot of groundnut and were at par with fungicides.

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