



## EFFICACY OF CERTAIN INSECTICIDES AND BOTANICALS AGAINST RICE WHORL MAGGOT IN MID HILLS HIMACHAL PRADESH

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### ABSTRACT

Field experiments were conducted to evaluate the efficacy of certain insecticides and botanicals against rice whorl maggot *Hydrellia philippina* Ferino at the RWRC Malan, Himachal Pradesh. Three insecticides viz., monocrotophos, dinotofuran and chlorpyrifos were compared with four botanicals viz., eupatorium. The results revealed that the monocrotophos 36 SL sprayed 15 days after the second spray at 850 ml ha<sup>-1</sup> was the best. The plots sprayed twice (25 and 45 days after transplanting) with dinotofuran and chlorpyrifos followed next. The results revealed that dinotofuran can be recommended. Among the botanicals, eupatorium (2500ml/ ha) showed significant activity, and spray formulation was superior.

**Key words:** *Hydrellia philippina*, rice, monocrotophos, dinotofuran, chlorpyrifos, eupatorium,

Rice productivity is seriously hampered by the insect pests in Himachal Pradesh, with some minor pests being considered now as major pests (Rai et al., 2000). The rice whorl maggot, *Hydrellia philippina* Ferino is one such pest, mainly occurring during five weeks after transplanting, with no infestation at booting stage. Litsinger et al (2013) reported the pest to cause unfilled grains, reduced plant height and root length delaying crop maturity. In Himachal Pradesh, its incidence was first noticed during 2001 at the Rice and Wheat Research Centre Malan, Kangra District. In some parts of Mandi District, it attained the pest status especially on late transplanted rice crop (Anonymous, 2001). Pesticides are a component of IPM, but it has shown many side effects (Ali et al., 2017). Botanicals emerge as ecofriendly alternatives (Prakash et al. 1990; Parmar and Devakumar, 1993). The present study evaluates the field efficacy of certain insecticides and botanicals against rice whorl maggot.

### MATERIALS AND METHODS

The field experiment was conducted in randomized block design with three replications and seven treatments at the Rice and Wheat Research Centre, Malan during *kharif* 2017. The recommended rice variety, "Kasturi Basmati" was sown and transplanted in the plot size of 6 x 4 m, with row to row and plant to plant spacing of 20 cm and 15 cm, respectively. The treatments, and dosage/ ha are as follows: T<sub>1</sub> Dinotofuran 20 SG 200 g; T<sub>2</sub> chlorpyrifos 20 EC 1250 ml; T<sub>3</sub> Melia 5% 2500

ml; T<sub>4</sub> Eupatorium 5% 2500 ml; T<sub>5</sub> Neemazal 1% EC 1000 ml; T<sub>6</sub> Neem oil 2500 ml; T<sub>7</sub> Monocrotophos 36 WSC 850 ml; and T<sub>8</sub> Untreated Check. Manual spraying was done with knapsack sprayer with spray volume was 500 l ha<sup>-1</sup>, with first spray on 20 days after transplanting and second 15 days after. For observations, five hills were marked in each plot and observations on rice whorl maggot incidence observed one day before and thereafter, and seven and fifteen days of sprays. The data were analyzed appropriately for ANOVA after arc sine transformation with CPCS-1 software (Gomez and Gomez, 1984).

### RESULTS AND DISCUSSION

The leaf infestation due to whorl maggot one day before the first spray varied from 15.75 to 19.84%. Seven days after the first spray (DAFS), all the treatments showed significant reduction in infestation. Monocrotophos resulted in the least 9.02% infestation, the descending order of efficacy being- dinotofuran > chlorpyrifos > eupatorium > melia > neemazal > neem oil. Monocrotophos was at par with dinotofuran, dinotofuran with chlorpyrifos and eupatorium. After 15 DAFS, dinotofuran resulted in the least infestation of 4.54%. Dinotofuran, monocrotophos and chlorpyrifos were at par with each other. The next best were eupatorium, melia, neem azal and neem oil (Table 1).

**After the second spray**, monocrotophos continued to show minimum infestation after seven days, and after

Table 1. Field efficacy of insecticides and botanicals against *H. philippina* (kharif, 2017, Malan

Treatments	One day before Spray	% leaf infestation			
		First spray		Second spray	
		7 DAFS	15 DAFS	7DASS	15 DASS
Dinotefuran 20 SG	16.21 (23.59)	10.40 (18.69)	4.54 (12.21)	3.64 (11.00)	2.46 (8.82)
Chlorpyriphos 20 EC	18.32 (25.23)	11.31 (19.57)	5.47 (13.66)	4.21 (11.82)	3.05 (9.90)
Melia (5.0 %)	19.76 (26.4)	15.76 (23.39)	10.39 (18.82)	9.08 (17.51)	7.68 (16.08)
Eupatorium (5.0 %)	15.75 (23.32)	12.40 (20.43)	8.25 (16.56)	6.28 (14.48)	5.49 (13.48)
Neemazal (1.0%)	18.58 (25.36)	16.84 (24.07)	11.84 (20.15)	9.32 (17.69)	8.48 (16.84)
Neem oil	19.84 (26.33)	17.32 (24.52)	12.79 (20.85)	11.41 (19.72)	9.23 (17.97)
Monocrotophos 36 SL	17.42 (24.64)	9.02 (17.28)	4.93 (12.88)	3.39 (10.34)	2.35 (8.77)
Untreated Check	17.77 (24.80)	32.97 (35.04)	40.62 (39.57)	42.21 (40.49)	42.76 (40.56)
00Mean	17.95 (24.95)	15.75 (22.86)	12.35 (19.33)	11.19 (17.88)	10.18 (16.55)
CD (P=0.05) (AxBxC)	2.15	2.15	2.15	2.15	2.15

Figures in parentheses are sin transformed values; DAFS: Days after first spray; DASS: Days after second spray

CD (P= 0.05): Sprays (A): 0.53; Days after spray (B): 0.53; Treatments (C): 1.07; AxB: 0.76; BxC: 1.52; CxA: 1.52; AxBxC: 2.15

fifteen days. Dinotefuran proved to be the next best. Neem oil was the least effective. All treatments were statistically varying from each other except melia and neem azal. Fifteen days after second spray, infestation in control was very less (42.76%). However, there was significant reduction in leaf infestation in all the treatments over untreated check; only 2.35% infestation was observed with monocrotophos. Dinotefuran and chlorpyriphos were the next best. Neem oil showed maximum infested leaves (9.23%) after untreated check.

Second spray was done as whorl maggot infestation increased after 10 days. Hence second spray was done at 35 Days after transplanting or 15 days after first spray. Second spray was effective with infestation of 10.69% and with that of first spray it differed significantly. It was observed that the infestation after 15 days of spray decreased to 11.26% after 7 days of spray. Hence, it was concluded that 15 after second spray was the most appropriate time to record whorl maggot infestation.

The present results are in agreement with those of earlier workers. Sharma et al. (2003) observed that chlorpyriphos and monocrotophos as the most effective. Krishnaiah and Kalode (1984) studied the neem oil against whorl maggot in greenhouse. In the field neem oil did not reduce damage done by the whorl maggot. Karthikeyan et al. (2008) observed that a lower dose of spinosad @ 4S g a.i. was the most effective over monocrotophos.

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