To assess the impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of insecticides in chili.

ABSTRACT-

The investigation was carried out at Samajik Vigyan Kendra, Dr B.R. Ambedkar University, Bordi, Sehore (M.P.)-INDIA during Kharif 2018-19. To assess the impact of insecticidal spray on leaf curling caused due to sucking pests and phytotoxic effects of higher doses of insecticides in chilli. The bio-efficacy of three different insecticides, namely (i) Chlorfenapyr 240 SC - spray four times with different-different???? doses, (ii) Fipronil 5% SC and (iii) Imidacloprid 17.8 SL. One untreated plot was also used to investigate the effect against leaf curl and phytotoxic effect on chilli. Among these insecticides, Chlorfenapyr 240SC doses 288 g.a.i/hac (gram active ingredient per hectare) has the least leaf curl indications (9.68%). It's the most effective insecticide in chilli. The least impact of leaf curl recorded in treatment T4- (9.68%) followed by T3- chlorfenapyr (11.88%), T5- Fipronil 5% SC (14.46%), T6- Imidacloprid (16.68%), T2- chlorfenapyr (17.69%), and the most elevated twisting in T7- untreated control (56.29). Further, the phytotoxic effect of treatments T1 - chlorfenapyr and T2 - chlorfenapyr were connected contrasting and T3 - untreated control. In these tried portions no phytotoxic impact likes chlorosis, Epinasty, Necrosis, Scorching, wiltingm, and hyponasty were seen at a various interim of perceptions against Chilli crop. The chilli yield was also noted highest in the highest dose of T4 (16.0 tonnes ha^{-1}) followed by second-highest dose of T3 (15.4 tonnes ha^{-1}), however, it was recorded lowest in the untreated control (8.0 tonnes ha^{-1}). The C:B benefit ratio was noted higher in T5- fipronil 5% SC@ 10 g.a.i ha^{-1} (3.20) followed by T6- imidacloprid 17.8 SL @ 50 g.a.i ha^{-1} (2.99).

Keywords: Chilli, Leaf curling**,** Phytotoxic effect, Hybrid, Bio-efficacy,.

INTRODUCTION-

The chilli is a fruit of plants that belongs to the family of "Solanaceae" and genus of "Capsicum". The chilli is also being termed as "Chili Pepper" in many parts of the world. Chilli is one of the most important and the largest produced spice crop in Asia. The fruit is actually called "chilli". Chili ~~have~~ has been a part of the human diet in the Americas since at least 7500 BC. There is archaeological evidence at sites located in a tropical lowland area of southwestern Ecuador that chili peppers were domesticated more than 6000 years ago, the chilli grains show that peppers were among the oldest domesticated foods in the hemisphere and is one of the first cultivated crops in the Central and South Americas. India is the world leader in chilli production followed by China and Pakistan. A large demand for chilli comes from several chilli-consuming countries such as India, China, Mexico, Thailand, the USA, UK, Germany and Sweden. The crop has got great export potential besides huge domestic requirements but a number of limiting factors have been attributed for low productivity The pest spectrum of chilli crop is complex with more than 293 insects and mite species debilitating the crop in the field as well as in storage (Dey *et al.* 2001). One of the practical means of increasing chilli production is to minimize

losses caused by major sucking pests like mites and thrips (Berke and Sheih, 2000). Economic yield loss due to these pests may be 11-75% quantitatively and 60-80% qualitatively in the event of a serious infestation.

MATERIALS AND METHODS-

~~Investigation on field evaluation of~~ The impact of insecticidal spray on leaf curling of chili pepper caused due to sucking pests was investigated on-field condititons, and the phytotoxic effect of higher doses of chlorfenapyr 240SC was evaluated on plants. Infesting chilli was carried out in Kharif period of 2018-19 at Samajik Vigyan Kendra DR. B.R. Ambedkar University, Bordi Sehore (M.P.) . The experiment was laid out in a Randomized Block Design with three replication having a plot size of 198.45 m^2. For the purpose Chilli Hybrid F1 variety NHC-886 (Priya) was raised at 45 X 45 cm spacing. All the Recommended agronomical practices except plant protection were followed for raising the crop. First spray application of respective insecticides was given on the appearance of the pests and subsequently, two sprays were given using manually operated knapsack sprayer having a nozzle with slight moister stage. The observation on the impact of insecticidal spray on leaf curling caused due to sucking pests (Mites and Thrips) and phytotoxic effect was recorded by selecting five plants randomly from the net plot area of each plot and tagged. From five leaves of tagged plants. and note-down impact of insecticidal spray and phytotoxic effect after each spray with the different-different day????. The yield of chilli natural products got from various treatment kg/ plot recorded aimed every picking the yield information acquired was changed over into per ha. Yield and exposed to the factual investigation. Refraze!

Treatments Details-

S. No.	Treatment Details	Dose/hac		
		a.i	Formulations (mi or g)	Water volume (lit)
1	**T1**-Chlorfenapyr 240SC	144	600	500
2	**T2**-Chlorfenapyr 240SC	192	800	500
3	**T3**-Chlorfenapyr 240SC	240	1000	500
4	**T4**-Chlorfenapyr 240SC	288	1200	500
5	**T5**-Fipronil 5% SC	10	200	500
6	**T6**-Imidacloprid 17.8SL	50	250	500
7	**T7**-Untreated control	-	-	-

Treatments for Phytotoxicity observation-

Tr No	Treatment details	Does/ha		
		g.a.i.	Formulation(ml)	water volum (L)
T1	Chlorfenapyr 240SC	240	1000	500
T2	Chlorfenapyr 240SC	480	2000	500
T3	Untreated control			

RESULTS AND DISCUSSION-

Insecticidal spray effect on leaf curling-

The results presented in (Table 1) revealed that all spray schedules were significantly superior in reducing the leaf curl disease at 30, 50 and 70 days after sowing. The minimum leaf curl was observed in Following ten days of first spray the leaf curling was fundamentally most important in the untreated control (44.68%). It was least in T4-chlorfenapyr (21.67%) and at standard with T3-chlorfenapyr (24.15%) trailed by T5-Fipronil 5% SC (28.55%),T6-Profenophos(29.89%),T2-chlorofenapyr (30.39%) and T1-chlorofenapyr (32.08%).

In the second spray the most elevated leaf curling was noted in T7-51.49% was essentially high over every one of treatments. leaf curling was seen in T4-chlorfenapyr-17.26%, which demonstrated important distinction plus T3-chlorofenapyr (18.77%) trailed by T5-Fipronil 5% SC (21.56%),T6-Imidacloprid(23.69%),T2-chlorfenapyr (25.48%) and T1-chlorfenapyr (27.63%).

In third spray, T4-chlorfenapyr demonstrated best with least leaf curling side effects (9.68%) which was at standard with T3-chlorfenapyr (11.88%) trailed by T5-Fipronil 5% SC (14.46%),T6-Imidacloprid(16.68%), T2-chlorfenapyr (17.69%) and T1-chlorfenapyr (19.48%).The most elevated curling was recorded in T7-56.29.Hossain et. al. (2016) reported that spraying of chlorphenapyr (Intrepid 10SC) @ 1ml/liter of water + white sticky trap @ 40 traps/ha resulted in negative correlation of thrips and mite population with Chlorophyll Concentration Index of the leaf. However, the lowest percentage of upward (19.05%) and downward leaf curl (21.08%) was also obtained from chlorfenapyr + white sticky trap treated plot. Pandey et. al. (2010) studied the management of chilli leaf curl disease management by insecticides, imidacloprid 17.8 SL (0.003%) was most effective than spinosad 48 EC (0.02%), malathion 50 EC (0.05%), acephate 75 SP (0.1%) and methyl-demeton 25EC (0.025%). Management of chilli leaf curl was done by seed extract of plants and insecticides at different concentrations. These findings are in support of the present study.

Table 1-Insecticidal spray effect on leaf curling-

Treatments	Dose/ha	Pre - treatment Count	Per cent leaf curling		
				After Spray	
			1st Spray 10 DAS	2nd Spray 10 DAS	3rd Spray 10 DAS
T_1-Chlorfenapyr 240	144	39.69 (39.02)	32.08 (34.48)	27.63 (31.71)	19.48 (26.16)
T_2-Chlorfenapyr 240	192	41.09 (39.84)	30.39 (33.43)	25.48 (30.32)	17.69 (24.86)
T_3-Chlorfenapyr 240	240	36.8 (37.38)	24.15 (29.39)	18.77 (25.51)	11.88 (20.03)
T_4-Chlorfenapyr 240	288	35.58 (36.47)	21.67 (27.63)	16.26 (23.47)	9.68 (17.57)
T_5- Fipronil 5% SC	10	33.76 (39.1)	28.55 (32.57)	21.56 (27.61)	14.46 (22.34)
T_6- Imidacloprid 17.8SL	50	40.08 (39.25	29.89 (33.12)	23.69 (29.07)	16.68 (23.99)
T_7-Uncontrol	----	41.69 (40.2)	44.68 (41.9)	51.49 (45.81)	56.29 (48.6)
S Em±		**1.58**	**1.05**	**1.33**	**1.37**
CD at 5 % (p=0.05)		**NS**	**3.21**	**4.09**	**4.21**
CV %		**7.03**	**5.44**	**7.52**	**9.01**

The values in parentheses are angular transformed (arc sin) values

DAS- Days After Spray

Phytotoxic effect-

In present investigation (Table 2) the higher portion as treatment T1 - chlorfenapyr and T2 - chlorfenapyr were connected contrasting and T3 - untreated control. In these tried portions no phytotoxic impact likes Chlorosis, rot, Necrosis, hyponasty, Scorching, Wilting and epinasty was seen at a various interim of perceptions against Chilli crop. Sontakke et. al. (2007) reported that chlorfenapyr 240SC in chilli showed no ~~any~~ phytotoxic effect on plants. Sarkar and Samanta. (2010) stated that chlorfenapyr did not produce any phytotoxic symptoms in chilli.

(Table 2) Phytotoxic effect of higher doses of chlorfenapyr 240SC in chilli

Treatment	Dose g.a.i./hac	Chlorosis	Necrosis	Wilting	Scorching	Hyponasty	Epinasty
T1- Chlorfenapyr 240 SC	240	0	0	0	0	0	0
T2- Chlorfenapyr 240 SC	480	0	0	0	0	0	0
T3- Untreated Check	.	0	0	0	0	0	0

CONCLUSION-

Treatment T4- chlorfenapyr 240SC @288 proved, the most effective with the least leaf curling symptoms--9.68% which is at par with T3- chlorfenapyr 240SC @240 (11.88%) followed by T5- Fipronil 5% SC @10 (14.46%) and The maximum leaf curling was noted in T7-Untreated control (56.29%) and no phytotoxic effect of higher doses of chlorfenapyr 240SC on chilli.

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