

RESEARCH NOTE

Field evaluation of insecticides and biopesticides for the control of marginal gall thrips, *Liothrips karnyi* (Bagnall) on Black pepper

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The black pepper is attacked by wide range of insect pests and among them marginal gall thrips *L. karnyi* is a serious pest in higher altitudes and nurseries in the plains. Apart from the formation of galls, growth of the vine and formation of spikes may be affected adversely. Therefore studies were conducted on the field evaluation of different insecticide molecules and biopesticides against this pest at Kyadagimane village, Sirsi tq., Uttara Kannada district. The results indicated that, sprays of flonicamid 50 WG, spinosad 45 SC and acetamaprid 20 SP were effective in controlling pest infestation with 87.56 (6.66 individuals/leaf), 78.61 (11.41 individuals/leaf) and 76.54 (12.26 individuals/leaf) per cent pest population reduction over control (55.3 individuals/leaf). Among the biopesticides tested, garlic chilli kerosene extract and azadirachtin were found superior in suppressing the thrips population with 65.42 and 58.53 per cent reduction over control.

Keywords: Black pepper, Biopesticides, Leaf gall thrips

Black pepper (*Piper nigrum* L.) is one of the important spice crops, because of its international trade, popularly known as “The king of spices” and also “Black gold”. The important black pepper growing countries includes Vietnam, Indonesia, India, Malaysia, Brazil, Srilanka, etc. In India, Kerala accounts for 90 per cent of country’s black pepper production followed by Karnataka and Tamil Nadu. The major districts which grow black pepper in Karnataka state are Kodagu, Chikkamagaluru, Hassan, Dakshina Kannada, Shivamogga, Uttara Kannada and Udupi. The productivity of black pepper in India is very low (0.85MT / ha). This is mainly because of insect pests and diseases attacking the black pepper. There are more than fifty six species of different insect pests have been reported to infest black pepper in India. The major insect pests infesting black pepper are pollu beetle, *Lanka ramakrishnai* (Prathapan and Viraktamath), marginal gall thrips, *Liothrips karnyi* (Bagnall), top shoot borers, *Cydia hemidoxa* (Meyr), leaf feeders and sap feeders including scales, *Lepidosaphes piperis* (Green) and mealybugs (*Planococcus* sp.). Among them marginal gall thrips *L. karnyi*, is an important and serious pest of black pepper in Karnataka especially at higher altitude and also in nurseries. The feeding activity of the pest induces the formation of marginal leaf galls and also causes reduction in size, crinkling and malformation of the infested leaves (Devasahayam, 1990). Trials were undertaken to evaluate the efficacy of different

Table 1. Field efficacy of insecticide molecules and biopesticides against leaf gall thrips, *Liothrips karnyi* (1st spray)

Sl. No.	Treatments	Dosage (ml, g/l)	No. of leaf gall thrips/leaf	7DAS	10DAS	15DAS	21DAS	Mean	Percent reduction over control
1.	Spinosad 45 SC	0.15	41.86(6.51)	17.20(4.21) ^{ab}	13.21(3.70) ^b	16.00(4.06) ^{ab}	16.33(4.10) ^{ab}	15.35(3.98) ^b	69.87
2.	Acetamaprid 20 SP	0.20	37.20(6.14)	18.16(4.32) ^{ab}	13.74(3.77) ^b	16.67(4.14) ^b	17.20(4.21) ^{ab}	16.06(4.07) ^b	67.42
3.	Flonicamid 50 WG	0.30	38.14(5.89)	12.79(3.65) ^a	5.08(2.36) ^a	9.33(3.14) ^a	10.67(3.34) ^a	8.62(3.02) ^a	83.08
4.	Azadirachtin 300ppm	5.00	41.67(6.49)	25.15(5.06) ^{bc}	19.15(4.43) ^{bc}	18.33(4.34) ^b	24.33(4.98) ^b	21.13(4.65) ^{bc}	58.53
5.	Neem soap	10.00	37.75(5.77)	26.38(5.18) ^{bc}	21.10(4.65) ^{bc}	20.12(4.54) ^b	26.12(5.16) ^b	22.56(4.80) ^{bc}	55.72
6.	Garlic-Chilli Kerosene extract	5.00	39.31(5.90)	21.75(4.72) ^{abc}	14.54(3.88) ^b	18.67(4.38) ^b	19.05(4.42) ^{ab}	17.62(4.26) ^{bc}	65.42
7.	<i>Lecanicillium lecanii</i>	5.00	37.09(6.13)	34.47(5.91) ^{cd}	28.09(5.35) ^c	22.04(4.75) ^b	18.76(4.39) ^{ab}	25.62(5.11) ^c	49.72
8.	Control	-	38.10(6.11)	43.28(6.62) ^d	48.76(7.02) ^d	51.37(7.20) ^d	57.16(7.59) ^d	50.96(7.17) ^d	
	S.E.m. ±		0.49	0.38	0.34	0.31	0.35	0.27	
	C.D. (p=0.05%)		1.49	1.14	1.05	0.94	1.060	0.81	
	CV (%)		13.94	13.23	13.65	11.73	12.73	10.05	

Figures in the parantheses are square root transformed values Means showing similar alphabet do not differ significantly by DMRT (p=0.05%), DBS - Day before spray, DAS - Day after spray

Table 2. Field efficacy of insecticide molecules and bio pesticides against leaf gall thrips, *Liothrips karnyi* (2nd spray)

Sl. No. Treatments		Dosage (ml, g)/l	DBS	3DAS	No. of leaf gall thrips/leaf					Mean	Percent reduction over control
					7DAS	10DAS	15DAS	21DAS			
1.	Spinosad 45 SC	0.15	20.67 (4.60)	9.67 (3.19) ^{ab}	7.00 (2.74) ^{ab}	7.33 (2.80) ^b	7.83 (2.89) ^{ab}	8.22 (2.95) ^{ab}	7.48 (2.82) ^a	87.34	
2.	Acetamaprid 20 SP	0.20	19.78 (4.50)	11.00 (3.39) ^b	8.67 (3.03) ^b	7.00 (2.74) ^b	9.67 (3.19) ^{bc}	9.00 (3.08) ^{ab}	8.47 (2.99) ^{ab}	85.66	
3.	Flonicamid 50 WG	0.30	15.75 (4.03)	6.00 (2.55) ^a	4.11 (2.15) ^a	3.35 (1.96) ^a	4.35 (2.20) ^a	5.67 (2.48) ^a	4.70 (2.28) ^a	92.04	
4.	Azadirachtin 300 ppm	5.00	21.76 (4.72)	17.33 (4.22) ^c	16.89 (4.17) ^c	14.67 (3.90) ^c	12.42 (3.59) ^{bc}	12.33 (3.58) ^{ab}	14.49 (3.87) ^b	75.48	
5.	Neem soap	10.00	23.20 (4.87)	18.33 (4.34) ^c	18.00 (4.30) ^c	17.01 (4.18) ^c	14.60 (3.89) ^c	14.00 (3.81) ^b	15.01 (3.94) ^b	74.60	
6.	Garlic-Chilli Kerosene extract	5.00	19.33 (4.45)	19.00 (4.42) ^c	18.33 (4.34) ^c	17.33 (4.22) ^c	13.65 (3.76) ^{bc}	12.67 (3.63) ^{ab}	14.37 (3.86) ^b	75.68	
7.	<i>Lecanicillium lecanii</i>	5.00	17.00 (4.18)	16.95 (4.18) ^c	16.33 (4.10) ^c	14.56 (3.88) ^c	14.00 (3.81) ^c	12.33 (3.58) ^{ab}	14.83 (3.92) ^b	74.90	
8.	Control	-	56.75 (7.57)	57.42 (7.61) ^d	60.41 (7.80) ^d	56.75 (7.57) ^d	58.04 (7.65) ^d	62.86 (7.96) ^c	59.10 (7.72) ^d		
	S.Em.±	-	0.26	0.22	0.25	0.27	0.26	0.23			
	C.D.(p=0.05%)	NS	0.79	0.68	0.77	0.82	0.78	0.71			
	CV (%)	-	10.67	9.64	11.22	12.34	11.55	10.35			

Figures in the parantheses are square root transformed values

Means showing similar alphabet do not differ significantly by DMRT (p=0.05%), DBS - Day before spray, DAS - Day after spray

Table 3. Efficacy of insecticide molecules and bio pesticides against leaf gall thrips, *Liothrips karnyi* (Mean)

Sl. No.	Treatments	Dosage [(ml, g)/l]	No. of leaf gall thrips/leaf					Percent reduction over control
			First spray		Second spray		Mean	
			Mean	Percent reduction over control	Mean	Percent reduction over control	Mean of first and second spray	
1	Spinosad 45 SC	0.15	15.35	69.87	7.48	87.34	11.41	78.61
2	Acetamaprid 20 SP	0.20	16.06	67.42	8.47	85.66	12.26	76.54
3	Flonicamid 50 WG	0.30	8.62	83.08	4.70	92.04	6.66	87.56
4	Azadirachtin 300 ppm	5.00	21.13	58.53	14.49	75.48	17.81	67.01
5	Neem soap	10.00	22.56	55.72	15.01	74.60	18.79	65.16
6	Garlic-Chilli Kerosene extract	5.00	17.62	65.42	14.37	75.68	15.99	70.55
7	<i>Lecanicillium lecanii</i>	5.00	25.62	49.72	14.83	74.90	20.23	62.31
8	Control	-	50.96	-	59.10	-	55.03	-

insecticide molecules and biopesticides for the control of the marginal gall thrips.

The field efficacy study of promising insecticide molecules and bio pesticides against marginal gall thrips was conducted in existing black pepper garden of farmer at Kyadagimane village, Sirsi, Uttara Kannada district. Black pepper vines of Panniyuru -1 variety were trained on arecanut plant as a standard and are about fifteen years age. Garden was well maintained with all the scientific practices except for the plant protection measures against marginal gall thrips. For each treatment, three vines were maintained with three replications. Thrips population was observed on three randomly selected vines, from each replication totally nine leaves were observed covering top, middle and bottom region of the 8 m height vine on day before, 3rd, 7th, 10th, 15th and 21st days after imposition of

treatment. The data on thrips population was converted to square root transformation ($\sqrt{x+0.5}$) and then subjected to one-way ANOVA. Statistical differences among the treatments were compared by following Duncan's Multiple Range Test (DMRT) P=0.05.

Number of thrips per leaf was significantly less in all the treatments as compared to untreated control at 3rd, 7th, 10th, 15th and 21st days after imposition of treatment in both the sprays. On the mean of two sprays indicated that, flonicamid 50 WG at 0.30 g/l recorded the lowest population of thrips (6.66 individuals/leaf) with 87.56 per cent reduction over control and was statistically superior over rest of the treatment, followed by spinosad 45 SC (11.41) and acetamiprid 20 SP (12.26) with 78.61 and 76.54 per cent reduction over control respectively. Among the bio pesticides, garlic chilli kerosene extract found

superior in suppressing the thrips population by recording least population of thrips per leaf (15.99) and 70.55 per cent reduction over control followed by azadirachtin which recorded 17.81 individuals per leaf with 67.01 per cent reduction over control.

These results are in agreement with the findings of Ambrish *et al.* (2017) who reported flonicamid 50 WG at 100g a.i. /ha was effective in managing the thrips population (0.9/leaf) over control (4.5/leaf). Muzammil *et al.* (2017) noticed the superiority

garlic chilli kerosene extract at 2 per cent against defoliators of sunflower by recording the lowest population and percent foliage damage and Rudramuni *et al.* (2011) reported that neemazal (1%) and NSKE (5%) were more effective in suppressing the cotton thrips by recording the lowest population per leaf. Mallapur and Lingappa (2010) reported that, the chilli plants sprayed with garlic chilli kerosene extract (0.5%) + nimbicidene (2.5 ml/l) were found least incidence of thrips.

References

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