

Evaluation of biopesticides against spotted alfalfa aphid, *Therioaphis* spp on Alfalfa

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Introduction

Alfalfa or Lucerne, *Medicago sativa* L. recognised as the oldest among the forage crops, also called as Queen of forages is considered as a superior feed for dairy, horses etc because it is quickly digested, relatively high in protein, low in NDF, excellent source of Ca, Mg, P, vit D and carotene. As a legume it is also known to improve soil structure because it is effective source of biological nitrogen. It mainly suffers both qualitatively and quantitatively from the spotted alfalfa aphid, *Therioaphis maculata* and pea aphid, *Acyrtosiphon pisum*. Green fodder yield losses were reported to be 33% in alfalfa due to aphid in new Mexico. Since insecticide usage is discouraged in fodder crops, it was intended to manage the spotted alfalfa aphid with few of the available biopesticides.

Materials and Methods

An experiment was conducted in the field of AICRP on Forage Crops at ARI, Rajendranagar, Hyderabad, India during rabi 2014-15 to evaluate different biopesticides against spotted alfalfa aphid on alfalfa. The experiment was laid out in RBD with seven treatments and three replications. Plot size was 3x4m². Crop was sown on 27.11.2014 using RL88 variety following all the recommended agronomic practices. Observations on the aphid count per tiller was taken one day prior to spraying and 3, 7 and 12 days after spraying. Data was subjected to two way analysis after square root transformation. Modified Abbott's formula was applied to find out per cent reduction over control (Fleming and Ratnakar, 1985). The treatments are as follows:

- T₁ : Foliar application of *N.rileyi* @ 10⁸ cfu/g (5g/l)
- T₂ : Foliar application of *V.lecani* @ 10⁸ cfu/g (5g/l)
- T₃ : Foliar application of *B.bassiana* @ 10⁸ cfu/g (5g/l)
- T₄ : Foliar application of *M.anisopliae* @ 10⁸ cfu/g (5g/l)
- T₅ : Foliar application of *B.thuringiensis* @ 2.5 g/l
- T₆ : Foliar application of Neem 1500 ppm @ 3ml/l
- T₇ : Untreated control

Results and Discussion

At 3 days after spraying (DAS), 31.12% reduction of aphid population was observed over control in *V.lecani* treated plot. *B.bassiana* and Neem proved to be better after *V.lecani*. No significant difference was observed in the mean number of aphids in all the treatments. At Dharwad, *V.lecani* and *B.bassiana* @ 4x 10⁶ cfu/ml were at par and more effective than any other entomopathogenic fungi in controlling aphids on lucerne (Anonymous, 2014). Neem at 2% provided 90% mortality of *Lipaphis erysimi* in kale crop (De Araujo *et al.*, 2009).

At 7 DAS, per cent reduction of aphid population over control in *V.lecani* treated plot was 60.23. Mean number of aphids was significantly lowest in this treatment. *V.lecani* @ 4x10⁵cfu/ml recorded 10.63 aphids/tiller at 7 days after application with maximum green fodder yield (122.38q/ha) of lucerne (Golage *et al.*, 2011)

At 12 DAS, *V.lecani* was on par with all other treatments except control and *B.bassiana*. Natural reduction of pest population was observed may be due to the rains received during two days on 11th and 12th days after spraying.

The highly specific activity of Bt insecticides might limit their use on crops with non-susceptible insects like aphids and grasshoppers (<http://ipmguidelinesforgrains>). *Bt* products are not active on aphids. However, when *Bt* products are used to control diamondback moth, the beneficial insect complex is maintained and usually keeps aphid populations in check (Hines and Hutchison, 2013).

Table 1: Efficacy of biopesticides against spotted alfalfa aphid

Treatments	Pre count	3 DAS		7 DAS		12 DAS		Mean No. of lady bird beetles/tiller
		Mean No. SAA/tiller	% reduction over control	Mean No. SAA/tiller	% reduction over control	Mean No. SAA/tiller	% reduction over control	
T ₁	45.4(6.77)	40.6(6.4)	16.2	29.13(5.44)	36.35	1.07(1.25)	67.09	3.27(1.94)
T ₂	45.73(6.8)	33.6(5.83)	31.12	18.27(4.31)	60.23	0.6(1.04)	81.68	3.33(1.96)
T ₃	46.6(6.85)	41(6.43)	17.52	32.53(5.73)	30.52	1.93(1.53)	42.17	3.27(1.94)
T ₄	38.47(6.23)	34.8(5.93)	15.2	30.2(5.5)	21.86	0.53(1.01)	80.76	2.8(1.82)
T ₅	38.8(6.22)	35.47(5.95)	14.3	31.47(5.58)	19.27	1.13(1.23)	59.33	2.53(1.74)
T ₆	43.67(6.64)	38.87(6.27)	16.56	34.2(5.89)	22.05	1.53(1.42)	51.08	2.8(1.82)
T ₇	42.87(6.58)	45.73(6.8)	--	43.07(6.6)	--	3.07(1.88)	--	3.13(1.90)
CD	NS	NS		0.95		0.39		NS

Figures in parentheses are $\sqrt{x+0.5}$ transformed values

Conclusion

V. lecanii was proved to be the best biopesticide among the treatments tested against spotted alfalfa aphid on lucerne.

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