

# Potentiality of Certain Chemical Spreaders/Stickers for Mycosis *Verticillium lecanii* in *Lipaphis erysimi* (Kalt.) on Mustard

G.M. PARMAR AND M.N. KAPADIA

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See end of the article for authors' affiliations

Correspondence to :

**G.M. PARMAR**  
Department of  
Entomology, Junagadh  
Agricultural University,  
JUNAGADH  
(GUJARAT) INDIA

## SUMMARY

Field-cum-laboratory experiment was conducted to evaluate the efficacy of certain chemical spreaders/stickers in increasing the efficacy of *V. Lecanii* on *L. erysimi* in mustard. The dose of *V. Lecanii* was 4.0 g/litre. Ranipal 2BA @ 0.1 per cent was the most effective in increasing the mortality to 67.82 per cent due to *V. Lecanii* in third nymphal stage of *L. erysimi* which IS followed by Aspa-80 @ 0.1 per cent with 58.77 per cent mortality after 10 days of treatment.

## Key words :

*Verticillium  
Lecanii,  
Lipaphis erysimi,  
Mustard,  
spreaders/stickers*

Mustard is an important oilseed crop and this crop heavily infested by mustard aphid, *Lipaphis erysimi* (Kalt). Its heavy incidence resulted in 65.5 to 95.7 per cent losses in seed yield (Sachan, 2003). Several bio-control agents have been tried against this pest to bring down the pesticidal applications. Use of fungal pathogen, *Verticillium Lecanii* (Zimmerman) has been found effective against *L. erysimi* in field condition (Rana and Singh, 2002). Certain chemical spreaders/stickers are supplied to increase the persistence of the fungus, *V. Lecanii* under environmental conditions and thereby improve its efficacy. The efficacy of *V. Lecanii* in combination with polysaccharides and detergents such as soyameal, carboxymethyl cellulose, sodium alginate and Tween 20 has earlier been investigated (Pfrommer and Mendgen, 1992). In the present experiment, different chemical spreaders/stickers were mixed with *V. Lecanii* sprays and evaluated for their effect on virulence of *V. Lecanii* against *L. erysimi* in mustard crop.

## MATERIALS AND METHODS

Field-cum-laboratory experiment was conducted during the *rabi* season of 2005-06, at Junagadh Agricultural University, Junagadh. The experiment was laid out in Completely Randomized Block Design with seven treatments replicated four times. Different treatments consisted of *V. Lecanii* application

alone and in combination with chemical spreaders/stickers against *L. erysimi*. The entomopathogenic fungal preparation (VERTICEL) supplied by Excel Industries, Mumbai was used for the present study. The suspension of *V. lecanii* along with different spreaders/stickers was sprayed on mustard plants in field with the help of a knapsack sprayer. Soap @ 5.0 g/litre was mixed to obtain an oil diluted suspension. The care was taken to obtain the uniform coverage of spray solution in the respective plots. After 24 hours of treatment the treated leaves were collected from the respective plots and provided to the one day starved third instar nymphs of *L. erysimi*. Twenty five nymphs per treatment in each repetition were studied. These nymphs were allowed to feed on the treated leaves for 24 hours. After 24 hours of feeding they were transferred into other Petri dishes and provided with fresh untreated food. The data in percentage were converted into arcsine transformation before analysis. Natural mortality was corrected (Abbott, 1925).

## RESULTS AND DISCUSSION

The results presented in Table 1 indicated that all the chemical spreaders/stickers significantly increased the effectiveness of *V. lecanii* than untreated control. The highest Ranipal mortality (26.04 %) was recorded in the treatment of *V. lecanii* @ 4.0 g/l + Ranipal 2BA 0.1 per cent after one day of treatment.

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**Table 1 : Mortality in third instar nymphs of *L. erysimi* due to *V. Lecanii* combined with chemical spreaders/stickers**

Treatments	Nymphal mortality (%)				
	1 DAS	3 DAS	5 DAS	7 DAS	10 DAS
<i>V. lecanii</i> (4.0 g/l) alone	22.40 (14.58)	29.63 (24.46)	32.93 (29.58)	38.38 (38.57)	42.04 (44.85)
<i>V. lecanii</i> (4.0 g/l)+Teepol (0.1%)	24.86 (17.71)	30.99 (26.59)	38.94 (39.52)	43.04 (46.59)	47.39 (54.16)
<i>V. lecanii</i> (4.0 g/l)+Indtron (0.1%)	25.63 (18.75)	30.97 (26.54)	36.29 (35.07)	39.01 (39.66)	43.38 (47.18)
<i>V. lecanii</i> (4.0 g/l)+Sandovit (0.1%)	23.25 (15.63)	30.30 (25.50)	36.94 (36.16)	40.42 (42.04)	44.04 (48.32)
<i>V. lecanii</i> (4.0 g/l)+Aspa-80 (0.1%)	28.58 (22.92)	35.66 (34.01)	39.58 (40.60)	45.62 (51.08)	50.08 (58.77)
<i>V. lecanii</i> (4.0 g/l)+Ranipal (0.1%)	30.67 (26.04)	37.58 (37.23)	41.47 (43.87)	48.29 (55.63)	55.46 (67.82)
Untreated control	5.74 (0.00)	5.74 (0.00)	5.74 (0.00)	5.74 (0.00)	5.74 (0.00)
S.E.±	0.77	0.97	0.92	1.23	1.12
C.D. at (P=0.05)	2.27	2.85	2.71	3.61	3.29
C.V. %	6.71	6.74	5.56	6.60	5.43

\*Angular transformation

DAS = Days after spraying

Figures in parentheses are original values

However, it was at par with the treatment of *V. lecanii* @ 4.0 g/l + Aspa-80 0.1 per cent (22.92 %). Whereas, the remaining chemical spreaders/stickers were more or less equally effective in causing mortality of aphids after one day of treatment by registering 14.58 to 18.75 per cent mortality. The data on aphid mortality of *L. erysimi* recorded at three days of treatment revealed that the treatment of *V. lecanii* @ 4.0 g/litre + Ranipal 2BA 0.1 per cent recorded higher mortality (37.23 %) followed by *V. lecanii* @ 4.0 g/litre + Aspa-80 0.1 per cent (34.01 %). *V. lecanii* @ 4.0 g/litre alone gave the lowest nymphal mortality and it was at par with *V. lecanii* @ 4.0 g/litre + Teepol 0.1 per cent, *V. lecanii* @ 4.0 g/litre + Indtron 0.1 per cent and *V. lecanii* @ 4.0 g/litre + Sandovit 0.1 per cent with the range of 24.46 to 26.59 per cent mortality.

The results obtained five days after treatment indicated that the highest nymphal mortality (43.87 %) was recorded in *V. lecanii* @ 4.0 g/litre + Ranipal 2BA 0.1 per cent. Aspa-80 0.1 per cent (40.60 %) and Teepol 0.1 per cent (39.52 %) were remained at par with each other and found next best spreaders/stickers of *V. lecanii*. The *V. lecanii* @ 4.0 g/litre exhibited poor results as compare to its combination with other spreaders/suckers. The results obtained five days after treatment indicated that the higher aphid mortality (43.87 %) was found in *V. lecanii* @ 4.0 g/litre combined with Ranipal 2BA 0.1 per cent. However, it remained at par with *V. lecanii* @ 4.0 g/litre + Aspa-80 0.1 per cent which gave 40.60 per cent mortality. Teepol 0.1 per cent, Sandovit 0.1 per cent and

Indtron 0.1 per cent remained next best spreaders/stickers of *V. lecanii* @ 4.0 g/litre which recorded 39.52, 36.16 and 35.07 per cent mortality, respectively. The *V. lecanii* @ 4.0 g/litre alone exhibited poor result as compared to its combination with spreaders/stickers.

Perusal of data presented in Table 1 revealed that *V. lecanii* @ 4.0 g/litre combined with Ranipal 2BA 0.1 per cent gave highest nymphal mortality (55.63 %) after seven days of treatment, followed by *V. lecanii* @ 4.0 g/litre + Aspa-80 0.1 per cent (51.08 %). The *V. lecanii* @ 4.0 g/litre combined with Teepol 0.1 per cent, Sandovit 0.1 per cent and Indtron 0.1 per cent remained next best in order as they registered 46.59, 42.04 and 39.66 per cent mortality, respectively. Whereas, *V. lecanii* @ 4.0 g/litre alone exhibited 38.57 per cent mortality. Same trend was also observed after ten days of application of *V. lecanii* @ 4.0 g/litre. The efficacy of *V. lecanii* products in mixture with chemical spreaders differed significantly against *L. erysimi*. However, Ranipal 2BA 0.1 and Aspa-80 0.1 per cent proved to be most effective spreaders to enhance the effectiveness of *V. lecanii* probably due to longer persistence. The *V. lecanii* @ 4.0 g/litre alone exhibited poor result as compared to its combination with other spreaders/stickers. Fungal pathogen requires high humidity for infection and the use of these organisms might be effective only under such favorable conditions. The remaining spreaders/stickers were found in descending order of Teepol, Sandovit and Indtron at 0.1 per cent.

Pfrommer and Mendgen (1992) reported that

survival of spores of *V. lecanii* were increased when the spores were mixed with additives viz., polysaccharides and detergents such as soyameal, carboxymethyl cellulose, sodium alginate and Tween 20. The productivity and entomocidal activity of *V. lecanii* were found to increase after lactic acid and its salts were added to nutrient media together with surface-active agents in laboratory tests (Zukauskiene and Sirvinskas, 1993). Glycerol and cutillol were significantly better in promoting the virulence of the fungi than *V. lecanii* alone (Williams *et al.*, 2000). According to Curtis *et al.* (2003) conidial spray formulations mixed with whole egg powder and glycerol were resulted in profuse mycelial growth of *V. lecanii* on capsicum leaves. Thus, earlier reports support the present findings.

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Authors' affiliations:

**M.N. KAPADIA**, Department of Entomology, Junagadh Agricultural University, JUNAGADH (GUJARAT) INDIA

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