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# Frontline Demonstrations: An approach for management of chilli thrips (*Scirtothrips dorsalis* Hood)

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**Abstract**

Front line demonstrations were conducted to popularize the recommended practice for the management of chilli thrips in Panchmahals district of central Gujarat. Results indicated that application of insecticide in recommended practices, *i.e.,* ethion 40 % + cypermethrin 5 % @ 0.045 % was found most effective in managing chilli thrips (1.07/leaf) as compared to farmers practices (3.09/leaf). The yield of chilli in recommended practice was 128.13 q/ha as compared to farmer's practices (80.30 q/ha). The percentage increased in the yield over farmer's practices was computed to be 59.56. Results of study on economic analysis of the yield performance revealed that the recommended practices recorded appreciable higher gross returns (10,2500/ha) and net return (` 61,725/ha) with higher benefit cost ratio (2.51) as compared to farmer's practices (1.62). The technology gap (21.87 q/ha), extension gap (47.83 q/ha) and the technology index values (14.58 %) were recorded. Frontline demonstrations brought out that the recommended practice was feasible and economically viable over farmers practice and was a better option to adopt for managing chilli thrips.

**Key words:** Frontline demonstrations, insecticide, *Scirtothrips dorsalis*, chilli

## Introduction

Chilli (*Capsicum annum* L.) is one of the important vegetable and condiments crop having immense commercial dietary and therapeutic values and grown throughout the year. The total area, production and productivity of chilli in India is 7.94 lakh ha), 13.04 lakh MT and 1.64 MT/ha, respectively (Anonymous, 2012). In Gujarat, area and production of chilli was 43.40 (000 ha) and 68.53 MT respectively (Anonymous, 2012). In Panchmahals district of Gujarat, chilli is one of the most important vegetable crops. The area and production of chilli of the district were 700 ha and 2170 MT, respectively (Anonymous, 2010). In Gujarat, the productivity of chilli is low as compared to other states and average productivity of the country. A number of limiting factors attributes for its low productivity. Of the various biotic stresses, ravages caused by insect pests are significant ones. Nearly, 25 insects have been recorded attacking chilli in India. Among them, thrips, *Scirtothrips dorsalis* Hood (Thripidae: Thysanoptera) is considered as the most serious and important pest. The incidence of thrips starts from nursery and continues till harvest of the produce. Both nymphs and adults of thrips cause damage by scraping the epidermis of the leaves and suck the cell sap from the leaves resulting in upward rolling of the margin of the leaves followed by reduction in leaf size. The damage results from sucking of the cell sap leading to crinkling and curling of leaves and loss of plant vigour. Thrips infestation is a persistent problem for chillies. Severe infestation leads to 30-50 per cent yield loss (Jayaraj and Muthukrishnan, 2013).

Borah (1987) estimated losses due to thrips in chilli ranged from 50 to 90 per cent at Dharwad. Patel and Gupta (1998) also expected the yield loss of green chilli due to thrips ranged from 60.5 to 74.3 per cent.

Besides damage, this thrips act as vector in transmission of leaf curl disease. Use of chemical insecticides is one of the most common and popular method of its control. Present study was undertaken to demonstrate the efficacy of ethion 40 % + cypermethrin 5 % EC, a pyrethroid and organo phosphate combination insecticide for the control of chilli thrips under farm conditions. In view of the above factors, frontline demonstrations were undertaken in a systematic manner on farmers' field to show the efficacy of recommended technology and convince the farmers to adopt the same.

## Materials and Methods

The field experiments were carried out during Kharif season of 2011-12 to demonstrate the efficacy of ethion 40 % + cypermethrin 5 % @ 0.045 % in the control of the chilli thrips under FLD activity of Krishi Vigyan Kendra-Panchmahal (Gujarat) at farmer's field. Twelve

innovative and receptive farmers from taluka Kalol were selected for conducting the demonstrations to ensure their active participation. Ethion 40 % + cypermethrin 5 % @ 0.045 % was used as a recommended pesticide to control the chilli thrips while the prevailing farmers practice i.e. dusting of methyl-parathion 2% dust along with ash was treated as control for comparison.

Experimental trial was conducted by following all standard and recommended packages of practices such as tillage, spacing, irrigation and disease control for cultivation of the crop. Foliar application of recommended insecticide was given as per schedule using a manually operated knapsack sprayer. Initial application was made at an economic threshold level i.e. 1thrip/ leaf, whereas, subsequent two sprays were done at an interval of 15 days. The population of thrips was recorded after each spray from 3 leaves (upper, middle and bottom) of ten randomly selected plants per plot.

Production and economic data of recommended practices for front line demonstrations and farmers' practices were collected. In the present study, technology gap, extension gap and technology index were calculated using the formula given by Samui *et al*. (2000):

Technology gap = Potential yield - Demonstration yield;

Extension gap= Demonstration yield –Yield under existing practice;

Technology index = Potential yield – Demonstration yield/Potential yield ×100.

**Statistical analysis**

The data collected were transformed into square root values as per the standard requisites. The experiments were subjected to statistical scrutiny following the method of Panse and Sukhatme (1989) and the means were compared with Least Significant Difference (L.S.D.)

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**Result and Discussion**

**Performance of FLDs**

A comparison of frontline demonstrations due to recommended technology and farmers practice were analyzed and presented in Table 1. In the present investigation, infestation of thrips started from 1$^{st}$ week after transplanting and remained in field till crop maturity (3$^{rd}$ week of February). Recommended practice, use of ethion 40 % + cypermethrin 5 % @ 0.045 %, recorded significantly lower mean thrips population as compared to farmers' practice. Thrips population varied from 1.07 (recommended practices) to 3.09 (farmers practices) thrips per leaf. In the present study, recommended practice was found to be effective in bringing down the chilli thrips population. These findings were in close agreement with Patel *et al.* (2009) who reported that per cent mortality of *S. dorsalis* by spray of ethion + cypermethrin was found significantly superior to rest of the insecticidal treatments followed by methomyl, diafenthiuron, lufeneuron, imidacloprid and triazophos. The yield performance of recommended practice was 128.13 q/ha which is almost 59.56 % higher than farmers practice (80.30 q/ha). Yield enhancement in chilli crops in evaluation of insecticides has been documented by Patel *et al.* (2009) who obtained significantly highest yield from ethion + cypermethrin sprayed plots and gave satisfactory control of chilli thrips.

From these results, it was evident that the recommended practice was better than the farmers practices under local conditions. Farmers were motivated by results of technologies applied in the front line demonstrations trials and it was expected that they would adopt this technology in the coming years. Yield of the front line demonstration trials and potential yield of the crop was compared to estimate the yield gaps which were further categorized into technology index.

The technology gap 21.87 q/ha show gap in the demonstration yield over potential yield. The frontline demonstrations was laid down under the keen supervision of KVK specialist at the farmer's field. The observed technological gap might be attributed to dissimilarities in soil fertility, salinity, erratic rainfall and vagaries of weather conditions in the region. Hence, to narrow down the gap between the yields of different varieties, location specific recommendation appeared to be essential. These findings were similar to the findings of Sharma and Sharma (2004).

Technology index show the feasibility of recommended practices at the farmer's field. The lower the value of technology index more is the feasibility. Result of study depicted in Table 1 revealed that the technology index value was 14.58 %. The results of the present study were in consonance with the findings of Hiremath and Nagaraju (2009) in case of onion crop.

Table 1. Yield attributes, technology gap and technology index of demonstration

| Variables | Chilli thrips/leaf | Yield (q/h) | Yield increase (%) (q/h) | Technology gap (q/h) | Extension gap (q/h) | Technology index (%) |
|---|---|---|---|---|---|---|
| Farmer's practice | 3.09 (2.01) | 80.30 | | | | |
| Recommended practice* | 1.07 (1.43) | 128.13 | 59.56 | 21.87 | 47.83 | 14.58 |
| S.E± | 0.04 | 1.11 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| CV | 8.95 | 3.69 | | | | |
| LSD (P = 0.05) | 0.14 | 3.50 | | | | |

*Foliar spray of ethion 40 % + cypermethrin 5 % @ 0.045 %, Figures in parenthesis are transformed values of $\sqrt{x+1}$

The economics of chilli production under front line demonstrations were estimated as presented in Table 2. Economic analysis of the yield performance revealed that front line demonstrations recommended practices recorded higher gross returns (Rs. 102,500/ha) and net return (Rs. 61,725/ha) with higher benefit cost ratio (2.51) as compared to farmers practices. These results were in accordance with the findings of Byrappa *et al.* (2012). Further, additional cost of Rs. 2,175 /ha in demonstration acquired on additional net return of ` 38,260/ha with an incremental benefit cost ratio 17.59 suggesting its higher profitability and economic viability of the demonstration. Similar results were also reported by Hiremath and Nagaraju (2009).

Table 2. Economics of frontline demonstrations

| Variables | Cost of cultivation (Rs./h) | Gross return (Rs./h) | Net return (Rs./h) | Benefit cost ratio |
|---|---|---|---|---|
| Farmer's practice | 38,600 | 64,240 | 25,640 | 1.62 |
| Recommended practice | 40,775 | 102,500 | 61,725 | 2.51 |
| Additional in recommended practice | 2,175 | 38,260 | 36,085 | 17.59* |

*Incremental benefit cost ratio

**Conclusion**

Frontline demonstrations clearly brought out that the adoption of recommended practice (ethion 40 % + cypermethrin 5 % @ 0.045 %) was feasible, economically viable and effective technology for management of chilli thrips. The demonstration convinced most of the farmers to use recommended technology on account of its obvious advantages and effective management of chilli thrips. These innovative practices will help in solving the farmer's problem, decision-making and ability to modify their farming practices.

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