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Efficacy of some insecticides against cotton thrips (*Thrips tabaci* Lind.) under natural field conditions

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Abstract: The Cotton (*Gossypium hirsutum* L.) is the most important cash crop of Pakistan. The thrips, (*Thrips tabaci* Lind) sucking insect pest of cotton crop which create a big problem at the early stages of crop to its maturity. The efficacy of seven common insecticides in use for its control, are, *viz*., Tracer 240SC (Spinosad), Orthene 75SP (Acephate), Sanitox 40EC (Dimethioate), Pirate 360SC (Chlorfenapyr), Radiant125SC (Spinetoram), Mospilan 20SP (Acetamaprid) and Confidor 200SL (Imidacloprid) were evaluated for their effectiveness against thrips. on cotton crop under natural field conditions during the year 2013. Results showed that Tracer and Radiant were less effective (34.52 and31.58% mortality) for 24-hours, but their efficacy increased after 72-hours (68.64 and 73.42 % mortality) and recorded with maximum mortality at 168 hours (83.67 and 84.33%) among all the tested insecticides. Santox and Orthene were found as most effective at 24hours (62.33 and 48.50% mortality), whereas their residual effect decreased gradually from 72 hours up to 168 hours against population of thrips. Confidor and Mospilan were resulted as least effective on thrips population after 24, 72 and 168 hours post application time. Conclusions of our findings are that among the tested insecticides, Tracer 240SC and Radiant 125SC were more effective for the control of thrips on cotton crop.

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1. Introduction

The economy of Pakistan mainly depends on cotton crop which drastically contributes by providing raw material to the textile industry and as an export item. In Pakistan cotton is grown on an area of 2879 thousand hectares with a production of 13.0 million bales during the period 2013 against the target of 14.5 million bales a decline of 10.3% against the targets and decrease of 4.2% over the production of past year which was 13.6 million bales. Severe attack of insect pests like thrips, white fly and disease like cotton leaf curl virus are among the factors of crop limiting (Annonymos, 2013). There are about 93 to 145 insect and mite pests attacks on cotton crop including sucking as well as chewing insect pest complex. (Haque, 1972; Yunus and Yousuf, 1979). Among sucking insect pests, thrips, create a big problem on cotton crop from the early stages up to its maturity, severe attack of thrips cause silvery appreance to leaves of crop. Besides cotton, different plants such as vegetables, greenhouse grown plants and roses are commonly attacked by thrips (Boll et al., 2006; Zhang et al., 2007). It is an important pest at seedling stage of cotton (Williams, 2006) and initial sign of damage occurs on cotyledonary leaves and subsequently cotton leaves turns to have a silvery appearance and in case of sever attack leaves of cotton crop become crinkled and ragged.This pest cause the major leaf area destruction, late maturity and slow down plant growth in early grown cotton crop (Hawkins et al. 1966; Sadras and Wilson 1998).

To control cotton pests, farmers are relying on chemical control by use of different insecticides. With the passage of time, there were a number of insecticides which were found as ineffective against thrips in cotton crop with unsatisfactory control of thrips by using traditional application of some insecticides. The efforts were made in the present study to test the efficacy of different traditional and new insecticides against the thrips population in cotton crop under field conditions.

Table 1. Effect of insecticides and their application on population change of thrips population after 24, 72 and 168 hours.

Insecticides		Dose	Percentage Population Change after		
Trade Name	**Common Name**		**24 Hours**	**72 Hours**	**168 Hours**
Tracer240SC	Spinosad	100 $mlha^{-1}$	34.52ab	68.64ab	83.67a
Orthene75SP	Acephate	875 gha^{-1}	48.50ab	58.73ab	46.99ab
Sanitox40EC	Dimethioate	1000 $mlha^{-1}$	62.33a	63.33ab	42.27ab
Pirate360SC	Chlorfenapyr	250 $mlha^{-1}$	30.73ab	62.55ab	68.70a
Radiant125SC	Spinetoram	150 $mlha^{-1}$	31.58ab	73.42a	84.33a
Mospilan20SC	Acetamiprid	375 gha^{-1}	11.99b	21.63b	15.12b
Confidor200SC	Imidacloprid	625 $mlha^{-1}$	13.38b	23.90b	18.98b
LSD(<0.05)			18.08	13.36	10.97

Means with the same letters are non significant from each other according to Tuky HSD Test at *p*=05

2. Materials and Methods

The experiment was laid out at farmer field located at Mouza Kotli Mahtam tehsil Mailsi District Vehari under supervision of Adaptive Research Farm, Vehari, Government of the Punjab, Pakistan. The cotton variety MNH-886 was sown on May 10, 2013 under randomized complete block design.

Each experimental unit consisted of plot dimension of 4.5 m × 20.4 m having row to row distance of 75cm and plant to plant distance was maintained at 23cm during the time of thinning. All the recommended agronomic practices *viz*., hoeing, fertilizer and irrigation were applied in the field according to the crop requirements. There were eight treatments including a control and each treatment was replicated thrice. Seven insecticides namely Tracer 240SC (Spinosad), Orthene 75SP (Acephate), Sanitox 40EC (Dimethioate), Pirate 360SC (Chlorfenapyr), Radiant125SC (Spinetoram), Mospilan 20SP (Acetamaprid) and Confidor 200SL (Imidacloprid) were sprayed with the help of knapsack sprayer at recommended doses at economic threshold level (10 Nymphs/adults $leaf^{-1}$). The control treatment was sprayed with water only. The population of thrips recorded from 10 randomly selcted plants of each plot by selecting a full grown leaf at each portion of plant from upper, middle and lower during 24-hours before spray, 24- hours, 72- hours and 168- hours post spray. Population change increase or decrease was calculated by using modified Abbot's formula as below:

% Population Change=

$$\left\{1 - \frac{\text{Post treatment population in treatment}}{\text{Pre treatment population in treatment}} \times \frac{\text{Pre treatment population in control}}{\text{Post treatment in control}}\right\} \times 100$$

(Flemings and Ratnakaran 1985)

Analysis of data was carried out by ANOVA using MSTAT-C (MSU 1982). The means were separated by using Tuky HSD test at 5% level of significance.

3. Results and discussion

The thrips population fluctuated in terms of mortality (%) after 24, 72, and 168 hours spray application of seven insecticides is presented in table 1. Maximum mortality (%) after 24 hours of application was observed in the treatment treated with Santox (62.33%) followed by Orthene (48.50%), Tracer (34.52%), Radiant (31.58%) Pirate (30.73%), Confidor (13.38%) and Mospilan (11.99%). After 72-hours of application, the Radiant resulted into the highest mortality *i.e*., 73.42% whereas, Tracer, Sanitox, Pirate and Orthene showed statically at par mortality *i.e*., 68.64%, 63.33%, 62.55% and 58.73% , respectively. Confidor and Mospilan were recorded low mortality *i.e.,* 23.90% and 21.63%, among the all other tested insecticides. The data recorded after 168 hours showed high mortality in the plots which were treated with Radiant, Tracer and Pirate (84.33, 83.67 and 68.70%) with statically non-significant effect with each other. Orthane and Santox were observed with low mortality (46.99 and 42.27 %) as compared to their effect after 72 hours and clued that the residual effect of both the insecticides was reduced after 168 hours. Confidor and Mospilan were resulted as reducing effect in their action against controlling thrips after 168 hours.

In the present study, Tracer and Radiant were showed maximum control against thrips, there is no published material to compare this study from Pakistan. The previous studies about efficacy of Confidor and Mospilan against thrips were proved most effective by Aslam et al., 2004, Tayyab et al., 2005 and Asi et al., 2008, which is inconsistant to this study, the reason may be establishing as the resistance effect against thrips towards these insecticides.

4. Conclusion

From this field trial, it is concluded that Tracer and Radiant were found the most effective insecticides for controlling thrips population in cotton crop up to one week to give highest control in management of thrips.

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References

Anonymous, 2013. Economic survey of Pakistan. Ministry of food, agriculture and livestock. Islamabad Pp. 17-18.

Asi, M.R., M. Afzal, S. A. Anwar and M.H. Bashir, 2008. Comparative Efficacy 0f Insecticides Against Sucking Insect Pests of Cotton. Pakistan J. Life Soc. Sci. 6(2): 140-142.

Aslam, M., M. Razzaq, S.A. Shah and M. Faheem, 2004. Comparative efficacy of different insecticides against sucking pests of cotton. J. Res. Sci. 15: 53-58.

Fleming, R. and A. Retnakaran, 1985. Evaluating singletreatment data using Abbot's formula with modification. J. Econ. Entomol. 78: 1179.

Haque, H. Cotton Entomology, 1972. In Cotton in Pakistan. Pakistan Central Cotton Committee, Karachi, pp. 183-238.

Hawkins, B. S., H.A. Peacock and T.E. Steele. 1966. Thrips injury to upland cotton (*Gossypium hirsutum* L.) varieties. Crop Sci. 6: 256-258.

MSU., 1982. User's Manual for MSTAT-C, Michigan State University.

Sadras, V.O. and L. J. Wilson. 1998. Recovery of cotton crops after early season damage by thrips. Crop Sci. 38: 399-409.

Tayyib, M., A. Sohail, Shazia, A. Murtaza, and F.F. Jamil. 2005. Efficacy of some new chemistry insecticides for controlling the sucking insect pests and mites on cotton. Pak. Entomol. 27(1): 63-66.

Williams, M.R., 2006. Cotton loss estimates-2005. Pp. 1135-1150. San Antonio, TX. January 3-6, 2006. In Proc. Beltwide Cotton Conf., National Cotton Council, Memphis, TN.

Yunus, M. and M. Yousuf. 1979. Insect and mite pests of cotton in Pakistan. Pak.. J. Agric. Sci. 16(1-2): 67-71.

Zhang, Z.J., Q.J. Wu, X.F. Li, Y.J. Zhang, B.Y. Xu and G.R. Zhu. 2007. Life history of western flower thrips, Frankliniella occidentalis (Thysan., Thripae) on five dif-ferent vegetable leaves. J. Appl. Entomol. 131(5): 347-354.