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Effect of Different Pesticides against Thrips Insect (Tabaci Lind.) Sucking Insect Pests of Pistachio in District Mastung, Balochistan.

Abdul Fatah[1], Rehana Karim[2], Muhammmad Aimal Khan[3], Dr Abdul Aziz[4], Zahid Hameed[5]

1 Department of Agriculture Saryab Farm District Mastung Balochistan.
2 SST, (SC) Governament Girls High School Kachi Baig Quetta Balochistan.
3Department of Agricuture Education Extension Quetta Balochistan .
4 Dr Abdul Aziz khan Baraich Deputy Director Agriculture Trainning Institue Saryab Road Quetta Balochistan.
5 Engineering university of khuzdar Balochistan.
Corresponding Author ; fatehsheikh1978@gmail.com
Corresponding Author Contact No…0333 8919994

Abstract: *Field evaluation of various insecticides was carried out during 2017-18 against different insect pests of pistachio, in district Mastung (Balochistan). The tested pesticides include Superacide, Acetamiprid and Carbosulfan; while winter oil was also kept as a treatment which is commonly applied in the study area and Control was kept to compare the insecticidal efficacies. The efficacy of these pesticides was evaluated against , thrips. The results show that insect pest population was significantly differed on pistachio trees sprayed with different insecticides. On the basis of pre-treatment count,winter oil (46.85 and 52.72%). Against thrips, the 1st and 2nd spray efficacy of Carbosulfan was highest (90.50 and 88.71%), followed by Superacide (80.78 and 78.89%), Acetamiprid (62.46 and 60.45%) and winter oil (56.18 and 57.21%). Against thrips insects, the 1st and 2nd spray efficacy of winter oil was highest (99.78 and 99.83%), followed by Carbosulfan (52.64 and 49.76%), Acetamiprid (43.54 and 40.01%) and Superacide (36.34 and 38.44%). However, against thrips Carbosulfan showed its maximum effectiveness; and against thrips the winter oil showed almost 100 percent efficacies on pistachio. Ranking of insecticides on the basis of efficacy showed that against thrips Carbosulfan> Superacide > Acetamiprid > winter oil*

Keywords; *Effectiveness, Insecicides , pistachio, scale insects, Mastung Balochistan*

INTRODUCTION

Pistachio, Pistacia vera, is a nut fruit of high economic importance in the Anacartdiaceac plant family. The name pistachio is derived from Persian world "Pista" and nthis has been cultivated in the Iran and surrounding regions extensively. Other species cultivated include P. terelanthus, P. atlantia, P. motica and P. chinesis. It originates in China, mid Asian region, Aljeria and Mediterrranean region. Pitachio is more commonly cultivated in Italy, Spain, France, Palestine, Iran, Pakistan and in various parts of Unites States (PARC, 2018). Pakistan ranks 15th in Pistachio production (682 tons); but ranks 1st in yield per hectare (34145 kg ha-1); while Iran in on top of Pistacho producing countries of the world; followed by USA, China, Turkey, Syria, Greece, Spain, Italy, Tunisia, Madagascar, Afghanistan, Australia, Kyrgyzstan and Uzbekistan (FAOSTAT, 2017). Pakistan has tremendous potential pistachio farming and particularly entire Balochistan province has incredible potential of pistachio farming. However, only 200-300 hectares are under the pistachio cultivation in the province (Khan, 2015). In 2008, the pistachio production of Pakistan was 773 tons but in 2014 production declined to 659 tons. Regardless of tremendous production potential, Pakistan has a tiny share in world production that is only 0.1 percent.

A. stephanii; fruit hull borer, Arimania komaroffi; carob moth, Ectomyelois ceratoniae; leaf miner, Stigmella promissa; soft scale, Anapulvinaria pistaciae; spherical scale, Eulecanium rugulosum; Noghi scale, Salicicola pistaciae; seed wasp, Eurytoma Plotnikovai and pistachio seed chalcid, Megastigmus pistaciae (Mehrnejad, 2001; Bolkan et al., 1984; Bostock et al., 1987; Farivar-Mehin, 1997; Hashemi-Rad and Safavi 1996; (Mehrnejad, 1993; Mehrnejad, 1995; Mehrnejad, 1998; Mehrnejad and Daneshvar, 1991a; Mehrnejad and Daneshvar, 1991b; Michailides and Morgan, 1990). In Pakistan, the pistachio is cultivated mostly in Balochistan and in some parts of KPK. In Balochistan, the pistachio is infested by thrips, aphid, mites, spiders, mealy bug and many scpecies of scale insects. The pistachio foliage is devasted by thrips.

Chemical control of insect pests is yet an effective tool to deal with; and with the introduction of new insecticides, their efficacy level needs to be evaluated time to time to ensure their quality and efficacy to control insect pests. There are a number of insecticidal groups used to combat insect pests. Nevertheless, many of the insect and thrips pests of pistachio can be controlled by chemical control using different pesticides. Fajun et al. (2018) reported that imidacloprid controlled D. citri on pistachio and suggested that use of systematic iunsecticides to control pistachio insect pests is essential to achieve quality produce.

In Mastung district of Balochistan, the Pistachio is attacked mainly by thrips and among the minor insect pests. Reportedly while Panadublin, Prapergit and. However, Propenophos and Carbosulfan are found effective against sucking insect pests attacking pistachio (Anon, 2018). The use of pesticides such as Phosalon (2.5–3%) or diazinon (2%) with mineral oil (2%) against K. pistaciella pupae caused parasitoids mortality, and due to the hard coating of cocoon, the efficiency of those pesticides is not more than 70%. The use of ethion or diazinon (1.5–2%), zolone or endosulfan (2.5%) with oil (5–7%) coincided with the peak of moth flight against adults and eggs have the lowest risk for natural enemies in the middle of April. Yazdani (2001) recommends an integrated pest management that included mechanical control, collection and burning of dried branches in the gardens until late March, cultural control with improved soil, regular irrigation and supply adequate soil moisture, use of animal manner, pruning, follow planting distance, ploughing which increased the pupa mortality in soil. The proposed study was carried out to investigate the effect of different pesticides against insect pests of Pistachio at district Mastung Balochistan.

Objectives

1. *To evaluate the efficacy of different insecticides against sucking thrips insects.*
2. *To observe the effect of different insecticides on yield of pistachio.*

MATERIALS AND METHODS

This study was carried out during 2018 in the pistachio plantation at farmers' field at district Mastung, Balochistan.Various synthetic pesticides and locally used winter oil was applied as chemical control against Thrips (Thrips tabaci) insects in the Coccus hesperidum species. An untreated (control) was also kept to compare the efficacy of synthetic pesticides and winter oil. The test was conducted using a randomized block design with three replications of each treatment. The following pesticides were used to evaluate their efficacy against target pests on pistachio.

Preparation of botanical extracts:

Treats	***Trade Name***	***Chemical Name***	***Group***	***Dosage***
T_1	*Superacide*	*Triefluoromethanesulfonic*	*Sulpher*	*1.00 L/100 L water*
T_2	*Winter oil*	*Methyl Salicylate*	*Hydrogen*	*1.00 L/100 L water*
T_3	*Acetamiprid*	*Mospilan*	*Chloropyridinyl*	*1.00 L/100 L water*
T_4	*Carbosulfan*	*Carbosulfan*	*Methylcarbamate*	*1.00 L/100 L water*
T_5	*Control (untreated)*	--	--	--

The pistachio plantation was sprayed using above treatments with a knapsack hand sprayer. Five branches on each of the sample pistachio trees were selected (two branches from the bottom of the tree, two branches from top of the tree and one from the middle of the mottom) and tagged and on the basis of these

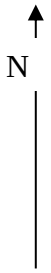
five branches, the insect pest infestation was recorded. Each treatment was applied and the efficacy was examined after 3 days, 7 days and 14 days of spray and compared with pre-treatment population. One pistachio plant/tree was considered as treatment replicated three times; so a total of 15 pistachio trees were selected for spray applications. The significance of the efficacy of insecticides was evaluated using analysis of variance and least significant difference using Statistix Ver 8.1 software package.

LAYOUT PLAN OF THE EXPERIMENT

Layout: *Randomized Complete Block Design*
Replications: *Three*
Total No.of trees: 15

Treatments ***05***
T_1*= Superacide 1.00 L/100 L water*
T_2*= Winter oil 1.00 L/100 L water*
T_3*= Acetamiprid 1.00 L/100 L water*
T_4*= Carbosulfan 1.00 L/100 L water*
T_5*= Control (untreated)*

RI	***RII***	***RIII***
T_1	T_3	T_5
T_3	T_5	T_3
T_5	T_1	T_4
T_2	T_4	T_2
T_4	T_2	T_1



RESULTS

The field evaluateons were carried out during 2017-18 to investigate the effect of different pesticides against insect pests of pistachio in district Mastung (Balochistan). The tested pesticides included Superacide, Acetamiprid and Carbosulfan; while winter oil was also kept as a treatment which is commonly applied on pistachu and almond and Control was kept to compare the insecticidal efficacies. The efficacy of these pesticides was evaluated against, thrips, Thrips tabaci Lin., and mostly belonging to Coccus hesperidum species. The pre-treatment pest population was monitored one day before spray of each treatment; while post-treatment count of certain insect pests was done after three, seven and fourteen days of each spray of different insecticides. Five branches in each experimental tree were monitored for insect pest infestation and on the basis of insect mortality the efficacies of the insecticides were developed and the data are given in

Table 1: Population of thrips per tree in different plots sprayed with pesticides before and after 3, 7 and 14 days of first spray

Treatment	***Pre treat. count***	***Post treatment count***			***Total reduction***	***Efficacy (%)***
		3 days	***7 days***	***14 days***		
Superacide	*41.63*	14.91^{c}	9.10^{cd}	8.00^{cd}	*33.63*	*80.78*
Winter Oil	*46.58*	27.92^{b}	23.73^{b}	20.41^{b}	*26.17*	*56.18*
Acetamiprid	*39.51*	21.81^{bc}	18.54^{bc}	14.83^{bc}	*24.68*	*62.46*
Carbosulfan	*42.55*	9.68^{c}	5.32^{d}	4.04^{d}	*38.51*	*90.50*
Control	*43.14*	42.92^{a}	42.06^{a}	41.64^{a}	*1.50*	*3.47*
SE±	*97348*	*5.4067*	*47888*	*4.6115*	--	--
LSD	*NS*	*12.468*	*11.043*	*10.634*	--	--
P-value	*0.9623*	*0.0023*	*00004*	*00003*	--	--

Table 2: Population of thrip per tree in different plots sprayed with pesticides before and after 3, 7 and 14 days of 2nd spray

Treatment	Pre treat. count	Post treatment count			Total reduction	Efficacy (%)
		3 days	7 days	14 days		
Superacide	*28.38*	*11.16^{bc}*	*6.81^{c}*	*5.99^{c}*	*22.39*	*78.89*
Winter Oil	*29.33*	*17.17^{b}*	*14.60^{b}*	*12.55^{b}*	*16.78*	*57.21*
Acetamiprid	*29.56*	*17.19^{b}*	*14.61^{b}*	*11.69^{b}*	*17.87*	*60.45*
Carbosulfan	*30.20*	*8.16^{c}*	*4.49^{c}*	*3.41^{c}*	*26.79*	*88.71*
Control	*31.57*	*31.25^{a}*	*30.62^{a}*	*30.56^{a}*	*1.02*	*3.23*
SE±	*6.3048*	*3.2519*	*21.6680*	*2.3626*	--	--
LSD	*NS*	*7.4990*	*6.1525*	*5.4482*	--	--
P-value	*09893*	*0.0009*	*00001*	*0.0000*	--	--

Table 7: Pistachio yield (kg/tree) as affected by different insecticides

Treatments	RI	RII	RIII	Mean
Superacide	*32.12*	*31.45*	*30.45*	*31.34 b*
Winter Oil	*36.25*	*37.10*	*33.65*	*35.66 a*
Acetamiprid	*36.14*	*38.95*	*32.08*	*35.72 a*
Carbosulfan	*33.70*	*31.65*	*35.00*	*33.45 ab*
Control	*19.06*	*20.32*	*16.88*	*18.75 c*

S.E.±	*1.5502*
LSD 0.05	*3.5749*
P-Value	*0.0000*
CV%	*6.13*

DISCUSSION

Pistachio is a fruit crop of high economic significance; and Balochistan is renowned worldover for pistachio production. However, less attention has been given towards quality production of pistachio; and insect pest infestation is the major cause to affect the fruit quality of pistachio. Hence, the present study was carried out to investigate different pesticides against different insect pests of pistachio in district Mastung (Balochistan). The tested pesticides included Superacide, Acetamiprid and Carbosulfan; while winter oil was also kept as a treatment which is commonly applied on pistachu and almond and Control was kept to compare the insecticidal efficacies. The efficacy of these pesticides was evaluated , thrips insects. The major results achieved in this study are discussed in this chapter.

In case of thrips population, the insect population decreased after 3, 7 and 14 days of first spray of Carbosulfan (9.68, 5.32 and 4.04/tree); Superacide (14.91, 9.10 and 8.00/tree); Acetamiprid (21.81, 18.54 and 14.83/tree); winter oil (27.92, 23.73 and 20.41/tree). After second spray, the thrips population declined after 3, 7 and 14 days of treatment i.e. Carbosulfan (8.16, 4.49 and 3.41/tree); Superacide (11.16, 6.81 and 5.99/tree); Acetamiprid (17.19, 14.61 and 11.69/tree); winter oil (17.17, 14.60 and 12.55/tree). The 1st and 2nd spray efficacy of Carbosulfan was highest (90.50 and 88.71%), followed by Superacide (80.78 and 78.89%), Acetamiprid (62.46 and 60.45%) and winter oil (56.18 and 57.21%). Thrips are commonly found infesting pistachio and chemical control has been found effective and in most cases thrips can be 100 percent controlled by systematic pesticides spray. Mostafavi et al. (2017), Mohammad (2015) and Sheibani and Hassani (2014) reported that these tiny insects are abundantly exist on fruit crops including pistachio, and they damage the fruit quality. Hence, application of synthetic pesticides could easily control and keep their population below economic threshold levels. Panahi et al. (2013) and Arbabtafti et al. (2012) reported

that thrips can damage pistachio fruit quality, so using chemical control can be effective and profitable for pistachio gardeners. The study concludes that Carbosulfan has oproved to be most effective insecticide for controlling the thrips on pistachio.

SUMMARY,

In order to investigate different pesticides against different insect pests of pistachio, the field evaluation was carried out during 2017-18 in district Mastung (Balochistan). The tested pesticides included Superacide, Acetamiprid and Carbosulfan; while winter oil was also kept as a treatment which is commonly applied on pistachu and almond and Control was kept to compare the insecticidal efficacies. The efficacy of these pesticides was evaluated against thrips nsects.

CONCLUSIONS

1. *Acetamiprid proved to be most appropriate insecticide to combat thrips on pistachio on the basis of thr[ps population record after two spray applications.*
2. *The Carbosulfan has proved to be most effective insecticide for controlling the thrips on pistachio.*
3. *The winter oil is highly effective against thrips to control them timely; and with the application of winter oil, the fruit quality couyld be maintaibned.*

4. *The treatments were effective to increase pistachio yield over control. However, thripand suppression by Acetamiprid and winter oil more positively influenced the pistachio yield over rest of the treatments.*

SUGGESTION

On the basis of research findings from the present stuydy, it is suggested that Acetamiprid may be applied to control whitefly on pistachio; while against thrips Carbosulfan may be sprayed to combat this insect pest effectively. However, for combating scale insects on pistachio, winter oil could be a single economical and effective solution to combat these insect pests on pistachio.

REFERENCES

Anon, 2018. Pistachio insect pest management in Balochistan. Department of Agriculture (Entomology Section), Govt; of Balochistan

Arbabtafti, R., A. Sheikhigarjan, M. Mahmoudvand and A. Mohammadipour. 2012. Cost–benefit analysis of pistachio twig borer, Kermania pistaciella Amsel chemical control, Arch. of Phytopathology and Plant Protection, first article: 1–8.

Beck, J.J., N.E. Mahoney, B.S. Higbee, W.S. Gee, N. Baig and C.M. Griffith. 2014. Semiochemicals to monitor insect pests – future opportunities for an effective host plant volatile blend to attract navel orange worm in Pistachio orchards. biopesticides: state of the art and future opportunities, Chapter 1: 191–210.

Bolkan, H.A., J.M. Ogawa, R.E. Rice, R.M. Bostock and J.C. Crane. 1984. Leaf-footed bug implicated in pistachio epicarp lesion. California Agriculture, 38: 16-17.

Bostock, R.M., C.S. Thomas, J.M. Ogawa, R.E. Rice and J.K. Uyemoto. 1987. Relationship of woundinduced peroxidase activity to epicarp lesion development in maturing pistachio fruit. Phytopathology,77: 275-282.

FAOSTAT, 2014. Pakistan: Pistachios production quantity (tons). FAO-UNO http://www.factfish.comstatistic-country pakistan pistachios

FAOSTAT, 2017. Pistachios, production quantity (tons) for all countries. FAO Factfish. http://www.factfish.com/statistic/pistachios%2C%20production%20quantity

Hanif, M. 2019. Insect pests of Pistachio in Balochistan. Directorate General of Agriculture Extension, Government of Balochistan, Quetta.

Khan, A. 2015. Pakistan has tremendous potential in pistachio, olive farming. The Nation (News paper) 25th Aug;

Mehrnejad, M.R. 1993. Biology of the carob moth Apomyelois ceratoniae a new pest of pistachio in Rafsanjan. Applied Entomology and Phytopathology, 66(1,2): 1-12.

Mehrnejad, M.R. 1995. The carob moth, a pest of pistachio nut in Iran. Acta Horticulturae, 419: 365-372.

Mehrnejad, M.R. 2001. The current status of pistachio pests in Iran. Proc. Ak B.E. (ed.). XI GREMPA Seminar on Pistachios and Almonds, Zaragoza. CIHEAM:315-32 2s

Mehrnejad, M.R. and H. Daneshvar. 1991a. First report of two eriophyid mites from pistachio in Kerman and Yazd. Applied Entomology and Phytopathology, 58(1,2): 55.

Michailides, T.J. and D.P. Morgan. 1990. Etiology and transmission of stigmatomycosis disease of pistachio in California (Abstract). Phytopathology, 80: 973.

Mourikis, P.A., A. Tsourgianni and A. Chitzanidis. 1998. Pistachio nut insect pests and means of control in Greece. Ishs Acta Hortic: 470.

PARC, 2018. Production technology of Pistachio (In Urdu Language. Pakistan Agricultural Research Counmcil, Islamabad. http://www.parc.gov.pk/ index.php/en/153-urdu-m/fruits-m/1090-cultivation-of-pista

Yanlk, E. and Y. Yildirin. 2016. Effectiveness of mass trapping for control of the pistachio twig borer, Kermania pistacchiella. Bulletin of Insectol .69 (1): 35-40.

Yazdani A. 2001. Pistachio woodborer Kermania Pistaciella, key pest in pistachio gardens and its control methods. Kerman, Iran: Kerman Agric, and Natural Resource Res, Center: 28.

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APPENDAGES

Thrips first spray

Appendix-IX Analysis of variance for pre-treatment count of thrips

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*61.96*	*30.982*		
Treatment	*4*	*79.83*	*19.957*	*0.14*	*0.9623*
Error	*8*	*1137.20*	*142.150*		
Total	*14*	*1278.99*			

Appendix-X Analysis of variance for post-treatment count of thrips three days after first spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*89.01*	*44.503*		
Treatment	*4*	*1993.67*	*498.419*	*11.37*	*0.0022*
Error	*8*	*350.79*	*43.848*		
Total	*14*	*2433.47*			

Appendix-XI Analysis of variance for post-treatment count of thrips seven days after first spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*101.18*	*50.589*		
Treatment	*4*	*2510.07*	*627.517*	*18.24*	*0.0004*
Error	*8*	*275.19*	*34.399*		
Total	*14*	*2886.44*			

Appendix-XII Analysis of variance for post-treatment count of thrips fourteen days after first spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*90.80*	*45.401*		
Treatment	*4*	*2608.12*	*652.031*	*20.44*	*0.0003*
Error	*8*	*255.19*	*31.899*		

Total	*14*	*2954.12*			

Thrips second spray

Appendix-XIII Analysis of variance for pre-treatment count of thrips second spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*57.639*	*28.8193*		
Treatment	*4*	*16.727*	*4.1818*	*0.07*	*0.9893*
Error	*8*	*477.008*	*59.6260*		
Total	*14*	*551.374*			

Appendix-XIV Analysis of variance for post-treatment count of thrips three days after second spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*35.06*	*17.532*		
Treatment	*4*	*946.08*	*236.521*	*14.91*	*0.0009*
Error	*8*	*126.90*	*15.863*		
Total	*14*	*1108.05*			

Appendix-XV Analysis of variance for post-treatment count of thrips seven days after second spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*29.65*	*14.827*		
Treatment	*4*	*1257.50*	*314.374*	*29.44*	*0.0001*
Error	*8*	*85.42*	*10.678*		
Total	*14*	*1372.57*			

Appendix-XVI Analysis of variance for post-treatment count of thrips fourteen days after second spray

Soruce	***DF***	***SS***	***MS***	***F***	***P***
Replication	*2*	*24.13*	*12.063*		
Treatment	*4*	*1353.77*	*338.444*	*40.42*	*0.0000*
Error	*8*	*66.98*	*8.373*		
Total	*14*	*1444.88*			