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Chemical control of apple blossom thrip (*Thrips carthami*) in Kashmir valley

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Abstract
Thrips in apple ecosystem in Kashsmir are devastating particularly during flowering, so in this regard a reseach trial was conducted for the year 2016 and 2017. Three insecticides *viz*., Chlorpyriphos @ 1ml/lt of water (Dursban 20 EC), Thiacloprid @ 0.4 ml/lt of water (Alanto 21.7 SC) and Dimethoate @ 1ml/lt of water (Rogor 30 EC) were evaluated for the control of apple blossom thrip (*Thrips carthami*) and all the chemicals were found significantly effective against the pest at all the three phenological stages *viz*: Green Tip, Pink Bud and Petal Fall of apple crop.Three plots consisting of five trees each (four at corners and one at the middle) were selected for the evaluation of each insecticide. Thrips densities were recorded one day before insecticide spray and at 5, 12 and 20 days after treatment by collecting 5 flower clusters (each with five to six flowers) from four directions and one at center which resulted 25 flower clusters per tree from four directions and at center for 125 flower clusters per treatment per sampling date. Thiacloprid proved significantly superior over all other treatments in managing the pest at all the three phenological stages of apple.

Keywords: Chlorpyriphos, Dursban 20 EC, Thiacloprid, Alanto 21.7 SC, Dimethoate, Rogor 30 EC, *Thrips carthami*

Introduction
The agro-climatic conditions of the Kashmir valley being quite conducive for temperate fruit production, apple productivity per unit area is still low owing to many biotic and abiotic factors. The major biotic factors inflicting huge economic losses are the insect pests, the prominent among them being San Jose scale (*Quadraspidiotus perniciosus* Comstock), Woolly Apple Aphid (*Eriosoma lanigerum* Hausmann*)*, stem borer (*Aeolesthes sarta* Solsky) and European red mite (*Panonychus ulmi* Koch), (Gupta and Gupta, 1992) [5], (Sharma and Bhardwaj, 1999) [9], (Sharma and Verma, 2005) [10]. Besides these, another pest Thrips belonging to order Thysanoptera and family Thripidae are economic pests of deciduous fruit tree, causing direct damage during fruit development. Damage during fruit development is caused when females oviposit eggs in flower buds and flowers (Pearsall and Myers 2000) [7]. Worldwide, at least 12 thrips species have been reported to cause economic damage to deciduous fruits (Broughton *et al*., 2011) [2]. In Australia, three species of thrips are regarded as pests of economic significance *viz.*, plague thrips (*Thrips imaginis* Bagnall); onion thrips (*Thrips tabaci* Lindeman) and western flower thrips (*Frankliniella. occidentalis* Pergande) thrips (Shellhorn *et al*., 2010) [11], (Steiner, 2008) [12]. *T. imaginis* was first recorded as a pest of apples in Australia in the 1930s; attacking flowers and reducing fruit set by damaging flowers (Evans, 1932) [3]. It has also been reported to attack peaches and nectarines at the flowering stage, causing skin blemishes and slight fruit malformation (Brough *et al*., 1996) [1]. In 1998, silvering damage attributed to *F. occidentalis* was first reported by growers in the Sydney Basin with a widespread damage recorded in 2001/02 in nectarines and fine-skinned peach varieties. In 2000, silvering damage of nectarines was reported from Queensland, Victoria and South Australia and in 2002/03 from Western Australia (Thwaite *et al*., 2005) [13]. In 2000, pansy spot damage to apples (cv. Granny Smith, Red Delicious) was reported from Queensland and from the Perth Hills in 2003/04 (cv. Granny Smith, Pink Lady). These insects cause substantial crop losses by feeding on the petals, anthers, pollen, and floral nectarines and ovipositing in the panicles, which leads to discoloration and reduced vigor of the panicles (Pena *et al*., 2006) [8]. They also feed and oviposit on the pericarp of the young fruits, which causes bronzing of the fruit surface, and severe infestations often result in the cracking of the fruit skin.

These cosmetic injuries reduce the economic value of fruits and their marketability (Grove *et al*., 2000) [4], (Nault *et al*., 2010) [6].

Thrips in apple ecosystem in Kashsmir are devastating particularly during flowering. The infestation is very high particularly in district Bandipora. The period of flowering coupled with inclement weather makes it very difficult to control the pest. Not much is known about the pest and management of the pest was a challenge. Keeping in view the above facts, a research trial were conducted for the year 2016 and 2017 in Kashmir valley to determine the Management (Chemical Control) of Blossom Thrips on Apple in Kashmir.

Materials and Methods

Three pesticides Chlorpyriphos 20 EC, Thiacloprid 21.7 SC and Dimethoate 30 EC were evaluated at each of the following phenological stages of apple. Chlorpyriphos 20 EC @ 1ml/litre of water, Dimethoate 30 EC @ 1ml/litre of water and Thiacloprid 0.4 ml/litre of water at Green Tip, Pink Bud stage and Petal Fall. Three plots consisting of five trees each (four at corners and one at the middle) were selected for the evaluation of each insecticide. Thrips densities were recorded one day before insecticide spray and at 5, 12 and 20 days after treatment by collecting 5 flower clusters (each with five to six flowers) from four directions and one at center which resulted 25 flower clusters per tree from four directions and at center for 125 flower clusters per treatment per sampling date. The flower clusters were placed individually in plastic bags and brought to laboratory where each bloom was beaten against white plastic tray. Thrips were immediately collected and were count under a dissecting microscope.

Results and Discussion

At green tip stage of apple during the year 2016, all the chemicals used in the study were statistically superior over the control wherein the thrips population increased from 25 (1 DBT) to 32 (12 DAT). Thiacloprid proved to be the best chemical in managing the pest wherein the pest population was brought down significantly from 29 (1 DBT) to 11 (12 DAT). From table 02, it is clear that pest population was reduced by 82.70 percent by Thiacloprid (12 DAT) for the year 2016. This was followed by Dimethoate which also showed the drastic reduction in pest population 24 (1 DBT) to 08 (12 DAT). Table 02 also revealed that the pest population was reduced by 66.67 percent by Dimethoate (12 DAT) for the year 2016. The data in the year 2017 also followed the same trend and Thiacloprid proved to be the best treatment in managing the pest population wherein the pest population was brought down from 35 (1 DBT) to 05 (12 DAT), followed by Dimethoate which managed the pest population substantially from 32 (1 DBT) to 09 (12 DAT). The data in the table 02 revealed that pest population was reduced by 85.71 percent (12 DAT) by Thiacloprid followed by Dimethoate which reduced the pest population by 71.87 percent (12 DAT) for the year 2017. The pest population increased in case of control plot wherein the thrips population increased from 30 (1 DBT) to 35 (12 DAT).

At pink bud stage during the year 2016, all the chemicals used in the study were statistically superior over the control wherein the thrips population increased from 49 (1 DBT) to 60 (12 DAT). Thiacloprid proved to be the best chemical in managing the pest wherein the pest population was brought down significantly from 53 (1 DBT) to 08 (12 DAT). Table 04 also reveals that the pest population was reduced by 84.90 percent by Thiacloprid (12 DAT) for the year 2016. This was followed by Chlorpyriphos which also showed the drastic reduction in pest population 47 (1 DBT) to 12 (12 DAT). A perusal of the data in Table 04 also reveals that the pest population was reduced by 74.46 percent by Chlorpyriphos (12 DAT) for the year 2016. The data in the year 2017 also followed the same trend and Thiacloprid proved to be the best treatment in managing the pest population wherein the pest population was brought down from 55 (1 DBT) to 07 (12 DAT), followed by Chlorpyriphos which managed the pest population substantially from 57 (1 DBT) to 14 (12 DAT). Table 04 reveals that the pest pest population was reduced by 87.27 percent by Thiacloprid (12 DAT) for the year 2017. This was followed by Chlorpyriphos which showed pest reduction by 75.43 percent (12 DAT) for the year 2017. The pest population increased in case of control plot wherein the thrips population increased from 53 (1 DBT) to 63 (12 DAT).

At petal fall stage during the year 2016, all the chemicals used in the study were statistically superior over the control wherein the thrips population also decreased from 99 (1 DBT) to 29 (12 DAT). Thiacloprid proved to be the best chemical in managing the pest wherein the pest population was brought down significantly from 97 (1 DBT) to 10 (12 DAT). This was followed by Dimethoate which also showed the drastic reduction in pest population 95 (1 DBT) to 15 (12 DAT). From Table 06it is clear that the pest population was reduced by 89.96 percent (12 DAT) by Thiacloprid for the year 2016. This was followed by Dimethoate wherein the pest population was reduced by 84.21 percent (12 DAT) for the year 2016. The data in the year 2017 also followed the same trend and Thiacloprid proved to be the best treatment in managing the pest population wherein the pest population was brought down from 105 (1 DBT) to 07 (12 DAT), followed by Dimethoate which managed the pest population substantially from 104 (1 DBT) to 12 (12 DAT). The data in the Table 06 reveals that the pest population was brought down by Thiacloprid by 89.52 percent (12 DAT) for the year 2017. This was followed by Dimethoate wherein the pest population was reduced by 85.57 percent (12 DAT) for the year 2017. The pest population also got decreased in case of control plot wherein the thrips population decreased from 95 (1 DBT) to 28 (20 DAT).

Table 1: Chemical control of Thrips carthami on apple for the year 2016 (a) and 2017 (b) in Kashmir at green tip stage

Treatments	(Precount)	(a)Year 2016 (Post count Days After Treatment) (Mean ± SE)		
	1DBT	4DAT	08DAT	12DAT
Water	25 ± 0.31	20 ± 0.33	28 ± 0.45	32 ± 0.44
Chlorpyriphos	27 ± 0.37	15 ± 0.18	12 ± 0.41	10 ± 0.57
Thiacloprid	29 ± 0.55	11 ± 0.22	08 ± 0.44	05 ± 0.39
Dimethoate	24 ± 0.42	11 ± 0.62	10 ± 0.36	08 ± 0.28
P Value	0.025	0.33	0.05	0.06
	(b)Year 2017			
Water	30 ± 0.25	24.50 ± 0.19	30 ± 0.26	35 ± 0.56
Chlorpyriphos	33 ± 0.31	18 ± 0.36	14 ± 0.71	10 ± 0.34
Thiacloprid	35 ± 0.35	13 ± 0.48	07 ± 0.39	05 ± 0.33
Dimethoate	32 ± 0.47	15 ± 0.38	12 ± 0.44	09 ± 0.59
P Value	0.05	0.04	0.02	0.02
Pooled Mean	29.37 ± 0.51	15.93 ± 0.54	15.25±0.66	14.25 0.61
P value	0.58	0.01	0.01	0.58

Table 2: Percent decrease in pest population of Apple blossom thrips at Green Tip stage

Treatment	(a) Year 2016			Cumulative Percentage
	04DAT (%)	08DAT (%)	12DAT (%)	
Water	20.00	-	-	-
Chlorpyriphos	44.45	55.56	62.96	54.32
Thiacloprid	62.06	72.41	82.70	72.39
Dimethoate	45.83	58.33	66.67	56.94
	(b)Year 2017			
Water	18.33	-	-	-
Chlorpyriphos	45.45	57.57	69.69	57.57
Thiacloprid	62.85	84.85	85.71	77.80
Dimethoate	53.12	62.50	71.87	62.49

Table 3: Chemical control of *Thrips carthami* on apple for the year 2016 (a) and 2017 (b) in Kashmir at pink bud stage

Treatments	Precount	(a) Pink bud stage 2016 (Post count Days After Treatment) (Mean ± SE)		
	1DBT	5DAT	12DAT	20DAT
Water	49 ± 0.52	40 ± 0.22	53 ± 0.53	60 ± 0.30
Chlorpyriphos	47 ± 0.31	25 ± 0.29	18 ± 0.50	12 ± 0.62
Thiacloprid	53 ± 0.44	20 ± 0.19	14 ± 0.28	08 ± 0.36
Dimethoate	51 ± 0.41	29 ± 0.51	20 ± 0.67	15 ± 0.41
P Value	0.02	0.03	0.05	0.03
	(b) Pink bud stage 2017			
Water	53 ± 0.55	45 ±0.33	58± 0.65	63± 0.91
Chlorpyriphos	57 ± 0.37	30 ± 0.38	19 ± 0.52	14 ± 0.52
Thiacloprid	55 ± 0.46	18 ± 0.60	13± 0.23	07 ± 0.64
Dimethoate	50± 0.25	29 ± 0.45	21± 0.56	16 ± 0.38
P Value	0.07	0.05	0.02	0.04
Pooled Mean	52 ± 0.51	29.50 ± 0.80	27.00 ± 0.68	24.37 ± 0.71
P value	0.05	0.04	0.04	0.05

Table 4: Percent decrease in pest population of Apple blossom thrips at Pink Bud stage

Treatment	(a) Year 2016			Cumulative Percentage
	04DAT (%)	08DAT (%)	12DAT (%)	
Water	18.36	-	-	-
Chlorpyriphos	46.80	61.70	74.46	60.98
Thiacloprid	62.26	73.58	84.90	73.58
Dimethoate	43.13	60.78	70.58	58.16
	(b) Year 2017			
Water	15.07	-	-	-
Chlorpyriphos	47.36	66.67	75.43	63.15
Thiacloprid	67.27	76.36	87.27	76.96
Dimethoate	42.00	58.00	68.00	56.00

Table 5: Chemical control of T*hrips carthami* on apple for the year 2016 (a) and 2017 (b) in Kashmir at petal fall stage

Treatments	Pre count	(a) Petal fall stage at 2016 (Post count Days After Treatment) (Mean ± SE)		
	1DBT	5DAT	12DAT	20DAT
Water	99 ± 0. 67	73 ± 0.80	54 ± 0.90	29 ± 0.46
Chlorpyriphos	101± 0.29	61 ± 0.33	33 ±0.45	18 ± 0.30
Thiacloprid	97 ± 0.50	43 ± 0.53	18 ± 0.20	10 ± 0.60
Dimethoate	95± 0.34	52 ± 0.22	25 ± 0.56	15 ± 0.45
P Value	0.035	0.004	0.005	0.004
	(b) Petal fall stage at 2017			
Water	95 ± 0.39	68 ± 0.36	50 ± 37	26 ± 0.57
Chlorpyriphos	98 ± 0.41	58 ± 0.23	28 ± 0.50	16 ± 0.10
Thiacloprid	105 ± 0.65	45 ± 0.49	14 ± 0.15	11 ± 0.65
Dimethoate	104 ± 0.30	50 ± 0.46	23 ± 0.55	15 ± 0.44
P Value	0.021	0.002	0.004	0.006
Pooled Mean	99.25 ± 0.70	56.25±0.80	30.62 ±0.25	17.50 ± 0.33
P value	0.030	0.004	0.003	0.001

Table 6: Percent decrease in pest population of Apple blossom thrips at Petal Fall stage

Treatment	(a) Year 2016			Cumulative Percentage
	04DAT (%)	08DAT (%)	12DAT (%)	
Water	26.26	45.00	70.70	47.32
Chlorpyriphos	39.60	67.32	82.17	63.03
Thiacloprid	55.67	81.44	89.69	75.6
Dimethoate	45.26	73.68	84.21	67.71
	(b)Year 2017			
Water	28.42	47.36	72.63	49.47
Chlorpyriphos	40.81	71.42	83.67	65.3
Thiacloprid	57.14	86.67	89.52	77.77
Dimethoate	51.92	77.86	85.57	71.78

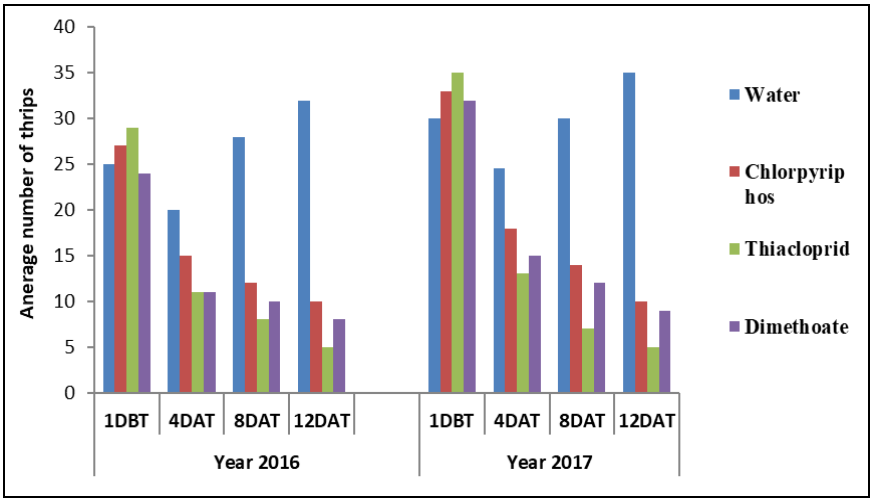

Fig 1: Chemical control of *Thrips carthami* on apple for the year 2016 and 2017 in Kashmir at Green Tip stage

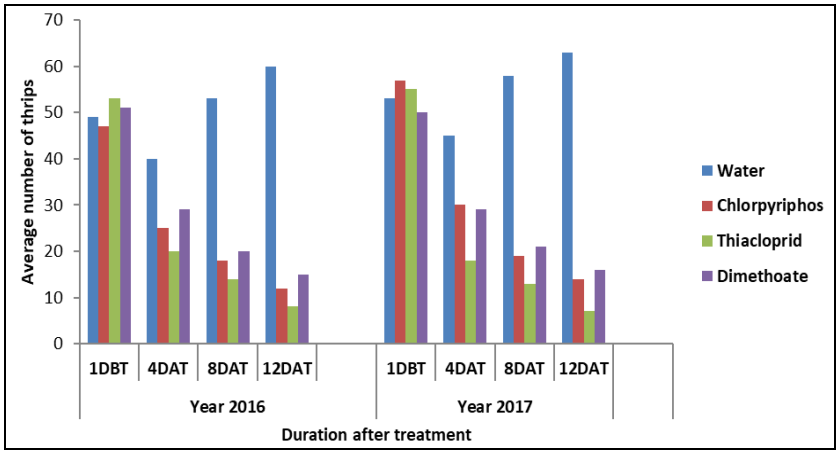

Fig 2: Chemical control of *Thrips carthami* on apple for the year 2016 and 2017 in Kashmir at Pink Bud stage

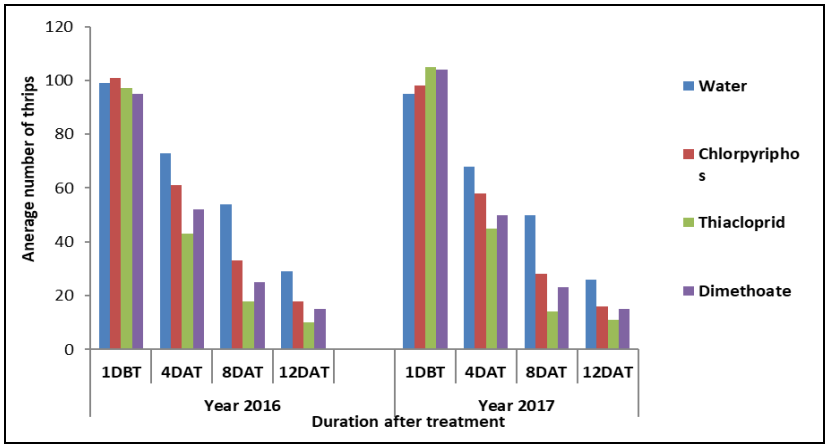

Fig 3: Chemical control of T*hrips carthami* on apple for the year 2016 and 2017 in Kashmir at Petal Fall stage.

Conclusion

At green tip stage, all the chemicals used to manage thrips were statistically superior over the control. Thiacloprid proved to be the best chemical in managing the pest wherein the pest population followed by Dimethoate. At pink bud stage, all the chemicals used to manage thrips were statistically superior over the control. Thiacloprid proved to be the best chemical in managing the pest wherein the pest population followed by Chlorpyriphos. At petal fall stage, all the chemicals used to manage thrips were statistically superior over the control. Thiacloprid proved to be the best chemical in managing the pest wherein the pest population followed by Dimethoate.

References

1. Brough EJ, Elder RJ, Beavis CHS. Managing Insects and Mites in Horticultural Crops. Department of Primary Industries, Brisbane, 1996, 154.
2. Broughton S, Bennington JMA, Cousins DA. Thrips (Thysanoptera) damage to apples and nectarines in Western Australia. Crop Protection. 2011; 72:47-56.
3. Evans JW. The Bionomics and Economic Importance of *Thrips imaginis* Bagnall. In: Pamphlet of the Council for Scientific and Industrial Research Australia. 1932; 30:1-48.
4. Grove GG, Elfving D, Peryea FJ, Parker R, Martin S. Crop protection guide for tree fruits in Washington. State University Cooperative Extension, Pullman, 2000, 124.
5. Gupta SK, Gupta GK. Relative efficacy of scab fungicides in protective spray programme against summer diseases of apple during four years period. Pestology. 1992; 16:28-31.
6. Nault BA, Shelton AM. Impact of insecticide efficacy on developing action thresholds for pest management: a case study of onion thrips (Thysanoptera: Thripidae) on onion. Journal of Economic Entomology. 2010; 103(4):1315-26.
7. Pearsall IA, Myers HJ. Effect of Neem on Oviposition Choice and Larval Survival of Western Flower Thrips, *Frankliniella occidentails* (Thysanoptera: Thripidae). Journal of Economic Entomology. 2000; 93:389-395.
8. Pena JE, Duncan RE, Meister CW. Chemical Control of Flowering Thrips Infesting Tropical Fruits. Proc. Fla. Stat Hort. Soc. 2006; 119:21-24.
9. Sharma IM, Bhardwaj SS. Canker and foliar diseases of apple. IN: Diseases of Horticultural Crops – Fruits. (Eds. L.R. Verma and R.C. Sharma). Indus publishing company, New Delhi, 1999, 724.
10. Sharma JN, Verma KD. Integrated management of foliar and fruit diseases of apple in Himachal Pradesh. Journal of Mycology and Plant Pathology. 2005; 35:368-380.
11. Shellhorn NA, Glatz RV, Wood GM. The risk of exotic and native plants as hosts of four pest species (Thysanoptera: Thripidae). Bulletin of Entomology. 2010; 23:1-10.
12. Steiner MY. A Guide to the Key Species Damaging Stone and Pome Fruits in New South Wales. New South Wales Department of Primary Industries, 2008.
13. Thwaite G, Hardy S, Steiner M. Western flower thrips in stone fruit. In: Orchard Plant Protection Guide for Deciduous Fruits. NSW Department of Primary Industries, 2005.