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Field efficacy of quinalphos 25% EC against sucking pests and its phytotoxicity on Chilli in Karnataka

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Abstract
Insect pests are important constraint for chilli production such as sucking pest complex of thrips, *Scirtothrips dorsalis* Hood, yellow mite, *Polyphagotarsonemus latus* (Banks) and aphid, *Aphis gossypii* Glover. Chemical method of control is one of the promising method to control pests. The present work aimed to control sucking pests like thrips, mites and aphids by Quinalphos 25% EC. The experiment was laid out in a randomized block design (RBD) with three replications. Two days after third spray lowest population thrips population was recorded in the treatment with Quinalphos 25% EC at 750 g.a.i/ha (0.83thrips/leaf), which was on par with the treatment Fipronil 5 % SC (1.20thrips/leaf) and Quinalphos 25% EC at 375 g.a.i/ha (1.25thrips/leaf). Ten days after third spray Quinalphos 25% ECat 750 g.a.i./ha, Diafenthiuron 50%WPat 300 g.a.i./ha, Quinalphos 25% ECat 375 g.a.i./ha and Quinalphos 25% ECat 325 g.a.i./ha recorded significantly lowest mites population ranged from 0.60 to 0.80 mites/leaf respectively. The application of Quinalphos 25% EC did not caused any phytotoxic effect on chilli crop at various dosages @ 375-750 g a.i./ha. Among the different treatments, significantly highest yield was recorded in the treatment Quinalphos 25% EC at 750 g.a.i./ha with 21.25 q/ha. The study indicated that Quinalphos 25% EC is effective against aphids (*Aphis gossypii*) thrips (*Scirtothrips dorsalis*) and mites(*Polyphagotarsonemus latus*) a in chilli @ 375 g a.i./ha. The study showed no build-up of resistance / resurgence of target sucking pests like aphids, jassids, mites and thrips.

Keywords: Evaluation, Quinalphos 25% EC, Evaluation, thrips, *Scirtothrips dorsalis*, yellow mite, *Polyphagotarsonemus latus* and aphid, *Aphis gossypii*

Introduction
Chilli is an important vegetable, spice and condiment crop in India. India is the largest consumer and exporter of chilli in the world with a production of 1492 MT from an area of 775 thousand ha and productivity 1.9 MT per ha during 2014. Chillies constitute about 20.00 per cent of Indian spice exports in quantity and about 14 per cent in value. The major chilli growing states are Andhra Pradesh, Maharashtra, Karnataka, Tamilnadu and Rajasthan. Andhra Pradesh is the largest producer of chilli in India and contributes about 30% to the total area, followed by Karnataka (20%), Maharashtra (15%), Orissa (9%), Tamil Nadu (8%) while other states contributing nearly 18% to the total area under chilli (Sujay and Giraddi, 2015) [5]. Both green and dry chillies are used as spices for the preparation of various curries. Dry chilli is an ingredient of curry powder, sauces and pickles.
A number of factors are responsible for low yield that include adverse climate, poor quality seeds, diseases, insect and mites significantly affects both the quality and production of chilli. The yield losses range from 50-90 per cent due to insect pests of chilli. The pest spectrum of chilli crop is complex with more than 293 nsects and mite species debilitating the crop in field as well as in storage (Anon., 1987 and Dey *et al*., 2001) [1, 2]. A total of 39 and 57 species of pests were recorded by Reddy and Puttaswamy (1983 and 1984) [3] in nursery and field crops, respectively in Karnataka. One of the practical means of increasing chilli production is to minimize losses caused by major sucking pests. Thrips (*Scirtothrips dorsalis* Hood), whiteflies (*Bemisia tabaci* Genn), aphids (*Aphis gossypii* Glover) and mites (*Polyphagotarsonemus latus* Banks) are the important sucking pests contributing to decrease in the crop yield. The damage due to mites and thrips together had been estimated to the tune of 50 per cent.

Materials and methods
Evaluation of Quinalphos 25% EC against major pests of chilli was undertaken in an experimental block at Agricultural Research Station, Bheemarayanagudi during Kharif 2016-17. The experiment was laid out in a randomized block design (RBD) with three replications. The test molecule, Quinalphos 25% EC was tested at four different dosages *viz*., 250, 325, 375 and 750 g.a. i./ha for its efficacy against major pests and at 750g. a. i. per hectare for its phytotoxicity reaction.

This was compared with two standard checks *viz.,* Fipronil 5% SC @ 50g. a. i. /ha and Diafenthiuron 50% WP @ 300g.a.i./ha along with an untreated control against major pests. Treatments were imposed three times based on pest population build-up (above ETL). All the agronomic practices were followed as per recommended package of practices of UAS Raichur. Observations were recorded on number of leafhoppers, thrips, mites from top three leaves of randomly selected and tagged five plants in each plot. The observations were taken one day prior to treatment imposition and 2, 5 and 10days after treatment imposition. The data collected from three sprays were averaged, expressed on per leaf basis and percent fruit borer damage was also recorded. The natural enemy population per plant was also recorded after each spray. The yield data collected from each plot was extrapolated on hectare basis. The treatments were subjected to statistical analysis by single factor ANOVA and were compared by following Duncan's Multiple Range Test.

Phytotoxicity

To study the phytotoxicity of Quinalphos 25% EC on chilli plants, a foliar application was given for all treatments at four different dosages *viz*., 250, 325, 375 and 750 g.a. i./ha. along with standard chemicals. The extent of phytotoxicity was recorded on chilli plant on1, 3, 5, 7 and 10 days after application in all treatments. The phytotoxicity observations were recorded for A) Leaf chlorosis B) Leaf necrosis C) Leaf epinasty D) Leaf hyponasty E) Vein clearing F) Wilting and rosetting. The following is the phytotoxic rating scale followed in this trail. Grades: 0 (No phytotoixic symptoms), 1 (1-10 %), 2 (11-20 %), 3 (21-30 %), 4 (31-40 %), 5 (41-50 %), 6 (51-60 %), 7 (61-70 %), 8 (71-80 %), 9 (81-90 %) and 10 (91-100 %).

Results and discussion

Pre-treatment count on number of aphids, thrips and mites were non-significant among the treatments indicating the uniformity in the incidence of the sucking pests in the experimental plots.

Sucking pests population

Thrips population

One Days before spray, the thrips population were found significant and ranged from 2.59 to 3.51 thrips/leaf. Two days after the spray, significantly lowest thrips populations were noticed in the treatment with Fipronil 5 % SC (1.16thrips/leaf), which was at par with the treatment with Quinalphos 25% EC at 750 g.a.i/ha. This was followed by the treatment Quinalphos 25% EC at 375 g.a.i/ha (1.49thrips/leaf). Remaining treatments ranged from 1.88 to 3.55thrips/leaf. Five days after spray significantly lowest population was recorded in the treatment with Quinalphos 25% EC at 750 g.a.i/ha (0.85thrips/leaf), which was on par with the treatment Fipronil 5 % SC (0.98thrips/leaf) and Quinalphos 25% EC at 375g.a.i./ha (1.02thrips/leaf). Ten days after spray Quinalphos 25% EC at 750 g.a.i/ha and Fipronil 5 % SC at 50 g.a.i./ha continued to be recorded lowest thrips population with 1.33 and 1.27 thrips/leaf respectively. Similar trend was observed in second spray also (Table 1).

However, two days after third spray lowest population was recorded in the treatment with Quinalphos 25% EC at 750 g.a.i/ha (0.83thrips/leaf), which was on par with the treatment Fipronil 5 % SC (1.20thrips/leaf) and Quinalphos 25% EC at 375 g.a.i/ha (1.25thrips/leaf). Remaining treatment recorded the thrips population ranged from 1.43 to 3.58 thrips /leaf. Similar trend observed on five and ten days after third spray (Table 1).

Mites population

A day before the spray the mites population was found non-significant and ranged from 2.14 to 3.05 mites/leaf. Two days after spray mite population was significantly reduced in the treatment Quinalphos 25% EC at 750 g.a.i./ha recorded 0.90 mites/leaf, which was onpar with the treatments, Diafenthiuron 50%WPat 300 g.a.i./ha (0.93 mites/leaf) and Quinalphos 25% ECat 375 g.a.i./ha (1.05 mites/leaf). Remaining treatments recorded mites population ranged from 1.68 to 2.90 mites/leaf. Five days after first spray lowest population was recorded in the treatment Diafenthiuron 50%WP300 g.a.i./ha with 0.83 mites /leaf, which was on par with the treatment Quinalphos 25% ECat 750 g.a.i./ha (0.97 mites /leaf). Ten days after first spray, similar trend was observed, significantly lowest population were recorded in the treatments Quinalphos 25% EC at 750 g.a.i./ha and Diafenthiuron 50%WPat 300 g.a.i./ha and with 1.12 and 1.33 mites /leaf respectively. Similar trend was observed in second spray also (Table 2).

Two days after third spray significantly lowest mite population was recorded in the treatment Quinalphos 25% ECat 750 g.a.i./ha (0.63 mites /leaf). Next best treatment was Quinalphos 25% EC at 375 g.a.i./ha and Diafenthiuron 50%WPat 300 g.a.i./ha recorded 1.12 and 1.13 mites/leaf respectively. However five days after third spray, Quinalphos 25% ECat 750 g.a.i./ha recorded lowest population with 0.53 mites/leaf, which was on par with the treatments Diafenthiuron 50%WPat 300 g.a.i./ha (0.70mites/leaf) and Quinalphos 25% EC at 375 g.a.i./ha (0.67mites/leaf). Remaining treatments recorded mites population of 0.97 to 2.48 mites/leaf. Ten days after third spray Quinalphos 25% EC at 750 g.a.i./ha, Diafenthiuron 50%WPat 300 g.a.i./ha, Quinalphos 25% EC at 375 g.a.i./ha and Quinalphos 25% EC at 325 g.a.i./ha recorded significantly lowest mites population ranged from 0.60 to 0.80 mites/leaf respectively (Table 2).

Aphid population

One day before application of the treatments aphid population were found to be non-significant and ranged from 1.18 to 1.47 apids /leaf. However, two days after first spray aphid population was significantly lowest in the treatment Quinalphos 25% EC at 750 g.a.i./ha recorded 0.56 aphids/leaf. This was followed by the treatments Fipronil 5% SC at 50 g.a.i./ha (0.74 aphids / leaf), Quinalphos 25% EC at 375 g.a.i./ha and Diafenthiuron 50% WP were recorded with 0.79 aphids/leaf each. Remaining treatments recorded aphid population ranging from 0.86 to 1.86 aphids/leaf. Five days after first spray, aphids population was significantly lowest in the treatment Quinalphos 25% EC at 750 g.a.i./ha with 0.39 aphids/leaf, which was at par with the treatments Fipronil 5% SC, Quinalphos 25% EC at 375 g.a.i./ha and Diafenthiuron 50% WP recorded aphids populations of 0.52, 0.59 and 0.60 aphids/leaf respectively. Untreated plot recorded aphid population of 1.73 aphids/leaf. Ten days after first spray Quinalphos 25% EC at 750 g.a.i./ha maintained significantly lowest population with0.86 aphids/leaf (Table 3). Similar trend was observed 2,5 and 10 days after second spray also.

Two days after second spray, aphid population was significantly lowest in the treatment Quinalphos 25% EC at 750 g.a.i./ha with 0.52 aphids/leaf. Remaining treatments recorded the aphid population ranging from 0.71 to 1.68 aphids/leaf. Five days after third spray the population was

ranged from 0.4 to 1.73 aphids/leaf and lowest was recorded in the treatment with Quinalphos 25% EC at 750 g.a.i./ha (0.40 aphids/leaf). Ten days after the spray the treatment Quinalphos 25% EC at 750 g.a.i./ha maintained significantly lowest population with 0.35 aphids/leaf. This was followed by the treatments Fipronil 5% SC and Quinalphos 25% EC at 375 g.a.i./ha recorded the aphids population ranged from 0.44 to 0.49 aphids/leaf.

Resurgence/ Resistance of polyphagous sucking pests

From the above observations, we noticed that Quinalphos 25% EC @ 375 g a.i/ha is the effective dose of target pests and did not cause the resurgence of sucking pests like aphids, mites and thrips etc. during the field experiment compared to untreated control plot. Hence, we can conclude that Quinalphos 25% EC has not build up resistance / resurgence of polyphagous sucking pests like aphids, mites and thrips.

Green chilli fruit yield

Among the different treatments, significantly highest yield was recorded in the treatment Quinalphos 25% EC at 750 g.a.i./ha with 21.25 q/ha. Next best treatment was Quinalphos 25% EC at 375g.a.i./ha (19.88 q/ha) and Diafenthiuron 50% WP (19.10 q/ha). Remaining treatments recorded the yield ranged from 10.12 to 18.56 q/ha (Table 4).

The research of Quinalphos 25% EC against chilli sucking pests is very meager. The above results are contradictory to the report of Venkatreddy *et al.*, 2007 [6], who evaluated insecticides along with traditional insecticides as foliar spray against chilli pests. Results indicated that among seventeen insecticides tested, Fipronil 5% SC @ 0.01% followed by Triazophos 40 EC @ 0.06%, Phosalone 50EC @ 0.075 and Carbaryl 50WDP @0.15% were found to be more effective against thrips, as they reduced thrips population, while, Endosulfan 35 EC @0.07% Quinolphos 25 EC @ 0.055 and Indoxacarb 14.5SC @ 0.0145% were found to be least effective. Dicofol 18.5 EC @ 0.09% followed by Phosalone 50EC @ 0.07% and Profenophos 50EC @ 0.05% were found to be effective against mites, while, other treatments were to be in-effective. Similar contradictory reports were revealed by Srinivasa prasad, (1988) [4].

Phytotoxicity of Quinalphos 25% EC on chilli and other harmful effects observed

There were no phytotoxic symptoms observed in any of the treatment with Quinalphos 25% EC at the tested concentrations. None of the Phytotoxicity symptoms like necrosis, epinasty, hyponasty, leaf tip injury, leaf surface injury, wilting and vein clearing were observed at the highest dose of Quinalphos 25% EC@ 750g.a. i./ha (Table 5).

Table 1: To evaluate bio-efficacy of Quinalphos 25% EC against thrips in chilli (Kharif 2016-17)

Treatments	Dosages (g. a. i. /ha)	No of thrips/leaf								
			1st Spray			2nd spray			3rd spray	
		DBS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS
Quinalphos 25% EC	250	3.35	2.47 (1.57)	1.59 (1.25)	2.81 (1.68)	2.05 (1.41)	1.72 (1.29)	2.58 (1.60)	1.90 (1.35)	1.37 (1.16)	1.69 (1.29)
Quinalphos 25% EC	325	2.95	1.88 (1.37)	1.33 (1.15)	2.00 (1.39)	1.43 (1.17)	1.25 (1.08)	2.13 (1.45)	1.43 (1.19)	1.13 (1.05)	1.07 (1.01)
Quinalphos 25% EC	375	3.34	1.49 (1.21)	1.02 (1.01)	1.72 (1.31)	1.17 (1.08)	0.95 (0.96)	1.77 (1.32)	1.25 (1.08)	0.90 (0.93)	0.80 (0.88)
Quinalphos 25% EC	750	2.79	1.20 (1.09)	0.85 (0.91)	1.33 (1.12)	0.92 (0.95)	0.62 (0.78)	1.57 (1.24)	0.83 (0.90)	0.58 (0.75)	0.62 (0.78)
Fipronil 5% SC	50	2.59	1.16 (1.07)	0.98 (0.97)	1.27 (1.10)	1.13 (1.06)	0.92 (0.95)	1.75 (1.31)	1.20 (1.09)	0.92 (0.95)	0.88 (0.94)
Diafenthiuron 50% WP	300	3.51	1.45 (1.20)	1.20 (1.09)	1.57 (1.25)	1.37 (1.15)	1.22 (1.08)	2.17 (1.47)	1.37 (1.15)	1.17 (1.07)	1.03 (1.01)
Control	---	3.18	3.55 (1.88)	3.20 (1.78)	3.75 (1.93)	3.45 (1.85)	3.42 (1.84)	3.78 (1.94)	3.58 (1.89)	3.11 (1.75)	3.05 (1.74)
SeM		NS	0.072	0.107	0.131	0.12	0.151	0.109	0.143	0.131	0.091
CD at 5%			0.214	0.321	0.397	0.390	0.457	0.325	0.430	0.397	0.277

Figures in parenthesis are square root transformed values
DBS: Days before spraying, DAS: Days after spraying

Table 2: To evaluate bio-efficacy of Quinalphos 25% EC against mites in chilli (Kharif 2016-17)

Treatments	Dosage (g.a.i/ha)	No of mites/leaf								
			1st Spray			2nd spray			3rd spray	
		DBS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS
Quinalphos 25% EC	250	2.40	1.93 (1.37)	2.07 (1.41)	1.97 (1.39)	1.57 (1.24)	1.42 (1.17)	1.88 (1.37)	1.43 (1.19)	1.23 (1.09)	1.20 (1.08)
Quinalphos 25% EC	325	2.81	1.68 (1.28)	1.37 (1.14)	1.63 (1.26)	1.22 (1.09)	1.07 (1.02)	1.38 (1.16)	1.35 (1.15)	0.97 (0.98)	0.80 (0.89)
Quinalphos 25% EC	375	3.05	1.05 (0.99)	1.34 (1.13)	1.40 (1.18)	0.85 (0.91)	0.77 (0.87)	1.10 (1.03)	1.12 (1.04)	0.67 (0.80)	0.62 (0.78)
Quinalphos 25% EC	750	2.14	0.90 (0.92)	0.97 (0.96)	1.12 (1.04)	0.53 (0.72)	0.50 (0.70)	0.73 (0.83)	0.63 (0.79)	0.53 (0.72)	0.60 (0.77)
Fipronil 5% SC	50	3.20	1.70 (1.29)	1.63 (1.26)	1.85 (1.34)	1.30 (1.13)	1.20 (1.08)	1.43 (1.18)	1.33 (1.15)	1.13 (1.06)	0.94 (0.96)
Diafenthiuron 50%WP	300	2.17	0.93 (0.95)	0.83 (0.90)	1.33 (1.15)	0.88 (0.93)	0.78 (0.87)	1.08 (1.04)	1.13 (1.05)	0.70 (0.82)	0.68 (0.82)
Control	---	2.73	2.90 (1.69)	3.07 (1.73)	2.95 (1.72)	2.57 (1.60)	2.48 (1.56)	2.60 (1.60)	2.63 (1.62)	2.48 (1.57)	2.33 (1.51)
SeM			0.148	0.167	0.127	0.105	0.135	0.143	0.110	0.123	0.098
CD at 5 %		NS	0.447	0.499	0385	0.319	0.408	0.432	0.360	0.366	0.293

Figures in parenthesis are square root transformed values
DBS: Days before spraying, DAS: Days after spraying

Table 3: To evaluate bio-efficacy of Quinalphos 25% EC against aphids in chilli (Kharif 2016-17)

Treatments	Dosage (g.a.i/ha)	No of Aphids /leaf									
			1st Spray			2nd spray			3rd spray		
		DBS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS	2DAS	5DAS	10DAS
Quinalphos 25% EC	250	1.31	1.04 (1.00)	0.95 (0.96)	1.47 (1.20)	1.15 (1.06)	1.03 (1.01)	1.41 (1.17)	1.14 (1.05)	0.82 (0.89)	0.72 (0.83)
Quinalphos 25% EC	325	1.18	0.86 (0.91)	0.73 (0.84)	1.20 (1.08)	0.95 (0.96)	0.81 (0.90)	1.11 (1.04)	0.91 (0.94)	0.70 (0.82)	0.61 (0.77)
Quinalphos 25% EC	375	1.31	0.79 (0.87)	0.59 (0.75)	0.99 (0.98)	0.75 (0.85)	0.59 (0.75)	1.00 (0.99)	0.76 (0.86)	0.58 (0.75)	0.49 (0.69)
Quinalphos 25% EC	750	1.23	0.56 (0.74)	0.39 (0.61)	0.86 (0.91)	0.63 (0.78)	0.40 (0.62)	0.88 (0.92)	0.52 (0.71)	0.40 (0.63)	0.35 (0.58)
Fipronil 5% SC	50	1.40	0.74 (0.85)	0.52 (0.71)	0.97 (0.96)	0.73 (0.84)	0.56 (0.73)	0.94 (0.95)	0.71 (0.83)	0.52 (0.71)	0.44 (0.65)
Diafenthiuron 50% WP	300	1.35	0.79 (0.87)	0.60 (0.76)	1.11 (1.04)	0.86 (0.91)	0.70 (0.82)	1.09 (1.03)	0.87 (0.92)	0.65 (0.79)	0.57 (0.74)
Control	---	1.47	1.83 (1.34)	1.73 (1.30)	1.82 (1.33)	1.69 (1.29)	1.72 (1.30)	1.89 (1.36)	1.68 (1.28)	1.73 (1.30)	1.75 (1.31)
SeM			0.040	0.101	0.052	0.061	0.077	0.088	0.068	0.080	0.041
CD at 5 %		NS	0.124	0.307	0.160	0.182	0.232	0.261	0.208	0.237	0.122

Figures in parenthesis are square root transformed values
DBS: Days before spraying, DAS: Days after spraying

Table 4: To evaluate bio-efficacy of Quinalphos 25% EC against natural enemies in Chilli (Kharif 2016-17).

Treatments	Dosage (g.a.i/ha)	Green chilli yield (q/ha)
Quinalphos 25% EC	250	12.36
Quinalphos 25% EC	325	15.25
Quinalphos 25% EC	375	19.88
Quinalphos 25% EC	750	21.25
Fipronil 5% SC	50	18.56
Diafenthiuron 50% WP	300	19.10
Control	---	10.12
SeM		0.240
CD at 5 %		0.729

Figures in parenthesis are square root transformed values
DBS: Days before spraying, DAS: Days after spraying

Table 5: Phytotoxicity of Quinalphos 25% ECon chilli during 2016-17

Treatment	Dosage (g.a.i/ha)	Score values																											
		1 DAA						3 DAA						5 DAA						7 DAA						10 DAA					
		A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F	A	B	C	D	E	F
Quinalphos 25% EC	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quinalphos 25% EC	325	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quinalphos 25% EC	375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Quinalphos 25% EC	750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fipronil 5% SC	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diafenthiuron 50% WP	300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Untreated check	---	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DAA: Days after application
A) Leaf chlorosis B) Leaf necrosis C) Leaf epinasty D) Leaf hyponasty E) Vein clearing F) Wilting and rosetting.

Conclusion

The study indicated that Quinalphos 25% EC is effective against aphids (*Aphis gossypii*) thrips (*Scirtothrips dorsalis*), mites(*Polyphagotarsanemus latus*) and fruit borer (*H. armigera*) in chilli @ 375 g a.i./ha. The study showed no build-up of resistance / resurgence of target sucking pests like aphids, jassids, mites and thrips. Application of insecticide Quinalphos 25% EC at various dosages (250-750 g a.i./ha) is quite safer to natural enemies of pests of chilli.

Test insecticide Quinalphos 25% EC is not phytotoxic to chilli crop @ 375-750 g a.i./ha.

References

1. Anonymous. Asian Vegetable Research and Development Center. Progress Report, 1987, 77-79.
2. Dey PK, Sarkar PK, Somchoudhury AK. Efficacy of different treatment schedules of profenofos against major pests of chilli. Pestol. 2001; 25(11):26-29.
3. Reddy DNR, Puttaswamy. Pest infesting chilli (*Capsicum annuum L.*) in the transplanted crop. Mysore J. Agric. Sci. 1984; 19:236-237.
4. Srinivasa prasad P. Evaluation of the efficacy of certain pesticides against sucking pests of chilli. Msc thesis in Acharya N.G. Ranga Agricultural University, Rajendranagar, Hyderabad, 1988.
5. Sujay YH, Giraddi RS. Role of intercrops for the management of chilli pests. karnataka j. Agric. Sci., 2015; 28(1):53-58.
6. Venkat reddy, Srihari G, Kiran kumar A. Evaluation of certain new insecticides against chilli thrips (Scirtothrips dorsalis) and mites (*Polyphagotarsonemus latus*). The Asian Journal of Horticulture. 2007; 2(2):8-9.