

EFFICACY OF *Phytoseiulus persimilis* (A.-H.) IN CONTROLLING THE TWO SPOTTED SPIDER MITE *Tetranychus urticae* KOCH ON YOUNG PEACH TREES AT BEIHERA GOVERNORATE

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ABSTRACT

The predatory mite *Phytoseiulus persimilis* (A.-H.) was released to control the two spotted spider mite *Tetranychus urticae* Koch on young peach orchards at Adam Village, El-Nobaria province, EL-Beheira Governorat. During the season 2005 at the rate of (30 – 40) , (40 – 50) and (50 – 60) predatory mites / peach tree in the three treated area on (Feb. 24th) by bean leaflets harbouring the predator individuals. The reduction percentages of the two spotted spider mites reached 76.36 , 79.60 and 87.01 % for the three tested treatments , respectively.

INTRODUCTION

Peach is one of the most important horticulture crop at Nobaria province, El-Beheira Governorate, Egypt. Agricultural statistics (2004) showed that the total cultivated peach area was (79199) feddans with production 360937 ton .While the production of peach at El-Nobaria province was 155556 ton from 14560 feddan, Summer and Nile Crops (2004).Several major pests infest peach including the spider mite *T. urticae* Koch , *Panonychus ulmi* (koch) and the eriophid mite, *Aculus cornutus* (Banks) which cause great damage to leaves and fruits.. Therefore, the predatory mite *Phytoseiulus persimilis* was released by several authors to control *T. urticae* (Oatman & McMurty, 1966 ; Oatman *et al.* 1967, Dover *et al.* 1992 ; Duso 1992, Heikal and Moafi 1998, Fawzy *et al.* 2004, Heikal *et al.* 2004, Ibrahim *et al.* 2005 and Fawzy *et al.* 2006.

Thus , the present work was conducted to determine the effectiveness of release of the predatory mite, *Phytoseiulus persimilis* in open field with three levels (30 – 40) (A) , (40 – 50) (B) and (50 – 60)(C) individuals as a biocontrol agent of the two spotted spider mite *T. urticae* on young peach trees in 2005 season without using any chemicals.

MATERIALS AND METHODS

Mass rearing the predatory mite *Phytoseiulus persimilis*.

The predatory mite *Phytoseiulus persimilis* was mass reared on bean plants *Phaseolus vulgaris* L infested with the two spotted spider mite *T. urticae* in small green house (6 m wide x 9 m long). Bean leaflets harboring the predatory individuals were collected in paper bags and transferred to the field using an ice box.

Predatory release

An area of about two feddans cultivated with peach trees (Florida prince variety) three years age was chosen and divided into four parts at Adam village , El-Nobaria province, El-Beheira Governorate. Three levels of adult females of the predatory mite *p. persimilis* were released (A)30-40 , (B)

40-50, (C) 50-60/ peach tree and the fourth part was taken as check to compare with the release of predatory mite. Randomize samples of 100 leaves / treatment were taken just before the predator release as pre-count and then at 15 days intervals as post-counts of moving stages of *Phytoseiulus persimilis* and *T. urticae* were estimated in the field by handling lens (20 x) . The equation of Henderson and Tilton (1955) was applied to calculate the reduction percentages of *T. urticae* populations .All obtained data were represented as means \pm S. D. of seventeen replicates as stated in Tables (1, 2 and 3). Data were subjected to one-way analysis of variance (ANOVA) and means were separated by Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSINO

In 2005 season , infestations with two-spotted spider mite, *T. urticae* in the pre-count (Feb. 24th) averaged 2.02 , 3.52 and 3.03 moving stages / leaf in treatments (A, B and C) in Tables (1, 2 and 3) Where the level of its predator release was (30- 40) (A), (40 – 50) (B) and (50- 60) (C) predators / tree , respectively. The pest population on predator release trees continued to decrease during the different post-counts until the last inspection on October 20th to reach 0.40 moving stages / leaf in treatment (30- 40) while it reached 0.64 moving stages/leaf in treatment (40–50) whereas it reached 0.31 moving stages/leaf in treatment(50–60) comparatively high pest population were recorded on the non-release to attain their highest level (9.18 , 7.52 and 7.04 moving stages / leaf on the three treatments mentioned before respectively, in the last inspection, Tables (1, 2 and 3).

Table (1): Population density and reduction percentage of *Tetranychus urticae* Koch, after release of the predatory mite *Phytoseiulus persimilis* (A.H.) at (30- 40) (A) adult female / tree of peach tree at El-Behaira Governorate

Sampling dates	Number and reduction % motile stages of <i>T. urticae</i> / 100 leaves			Untreated check number		<i>P.persimilis</i> number	
	Total	X / leaf	Reduction %	Total	X / leaf	Total	X / leaf
Feb.24 th 2005	202	2.02	-	810	8.10	-	-
March 10 th	68	0.68	70.04	911	9.11	18	0.15
March 24 th	66	0.66	70.59	898	8.98	18	0.18
April 7 th	65	0.65	71.04	905	9.05	20	0.2
April 21 th	64	0.64	71.17	985	8.95	21	0.21
May 5 th	62	0.62	72.68	914	9.14	20	0.20
May 19 th	60	0.60	72.97	890	8.90	22	0.22
June 2 nd	59	0.59	73.71	902	9.02	25	0.25
June 16 th	56	0.56	74.77	889	8.89	30	0.30
June 30 th	55	0.55	79.95	885	8.85	31	0.31
July 14 th	53	0.53	76.12	887	8.87	35	0.35
July 28 th	49	0.49	78.17	902	9.02	40	0.40
Aug. 11 th	47	0.47	79.29	908	9.08	41	0.41
Aug. 25 th	44	0.44	80.67	913	9.13	44	0.44
Sep.8 th	45	0.45	80.62	926	9.26	50	0.50
Sept. 22 nd	42	0.42	81.70	916	9.16	54	0.54
Oct. 5 th	41	0.41	82.14	921	9.21	60	0.6
Oct. 20 th	40	0.40	82.57	918	9.18	62	0.62
Mean	5800	0.58	76.366				

Means of the post population in the three treatments were 0.58, 0.91 and 0.55 moving stages/leaf with significant between the treatments A and B and between B and C while no significant differences were observed between the first treatment and the third once. Significant differences between the first treatment and the third once were noticed at 0.05 level.

Moderate to high reductions of the pest population were obtained in the different inspections, which attain 70.04, 77.03 and 82.03% in the first count of releasing and 82.57, 82.36 and 90.67 in the last inspection in the previous order of treatments mentioned before, respectively, Tables (1, 2 and 3).

Table (2): Population density and reduction percentage of *Tetranychus urticae* Koch, after release of the predatory mite *Phytoseiulus persimilis* (A.H.) at (40- 50) (B) adult female /peach tree at El-Beheira Governorate

Sampling dates	Number and reduction % motile stages of <i>T. urticae</i> / 100 leaves			Untreated check number		<i>P. persimilis</i> number	
	Total	X / leaf	Reduction %	Total	X / leaf	Total	X / leaf
Feb. 24 th 2005	352	3.52	-	730	7.30	-	-
March 10 th	86	0.86	77.03	780	7.8	22	0.22
March 24 th	85	0.85	77.30	778	7.78	25	0.25
April 7 th	83	0.83	77.84	795	7.75	27	0.27
April 21 th	79	0.79	78.68	792	7.72	30	0.30
May 5 th	80	0.80	78.9	775	7.75	30	0.30
May 19 th	77	0.77	79	764	7.64	32	0.32
June 2 nd	82	0.82	79.03	777	7.77	34	0.34
June 16 th	77	0.77	79.22	769	7.69	35	0.35
June 30 th	76	0.76	79.27	762	7.62	38	0.38
July 14 th	75	0.75	79.76	768	7.68	40	0.40
July 28 th	73	0.73	80.30	766	7.66	44	0.44
Aug. 11 th	72	0.72	80.36	763	7.63	50	0.50
Aug. 25 th	74	0.74	80.45	781	7.81	54	0.54
Sep. 8 th	70	0.70	81.11	765	7.65	55	0.55
Sept. 22 th	69	0.69	81.18	759	7.59	60	0.60
Oct. 5 th	67	0.67	81.54	755	7.55	60	0.60
Oct. 20 th	64	0.64	82.36	752	7.52	65	0.65
Mean	9100	91	79.60				

Reduction percentages of the two spotted spider mite indicated that the three levels of the predator release affected the pest population. Heikal *et al.* (2004) found that 6 or 9 predators / bit were effective when released on bean plants to control *T. urticae* when releasing the predator using bean leaflets harboring the predator individuals populations on post population affected greatly and reduced pest population in the different post-counts. This might be attributed to the additional numbers of uncounted predator eggs on bean leaflets and this agree with Heikal *et al.* (2004), Ibrahim *et al.* (2005) and Fawzy *et al.* (2006). In this experiment, the means of reduction was significant at the predator release at rate (50- 60) predator / tree and this rate was the best rate while the rates (30-40) and (40 -50) have moderate effect on the mean of reduction of the pest 76.36 and 79.6 %, respectively. There was a significant reduction between the mean of all levels of predator released where the L. S. D. at 0.05 level was 2.17, Table (4), and the means were 87.01, 79.6 and 76.36 %, respectively. Finally predator can be use to

control the two spotted spider mite on young peach trees at level (50-60) predator / tree. Additional studies in a wide range should be carried to support the previous results.

Table (3): Population density and reduction percentage of *Tetranychus urticae* Koch, after release of the predatory mite *Phytoseiulus persimilis* (A.H.) at (50- 60) (C) adult female / peach tree at El-Beheira Governorate

Sampling dates	Number and reduction % motile stages of <i>T. urticae</i> / 100 leaves			Untreated check number		<i>P.persimilis</i> number	
	Total	X / leaf	Reduction %	Total	X / leaf	Total	X / leaf
Feb.24 th 2005	303	3.03	-	642	6.42	-	-
March 10 th	55	0.55	82.03	649	6.49	27	0.27
March 24 th	52	0.52	83.01	646	6.46	30	0.30
April 7 th	50	0.50	83.60	650	6.50	35	0.35
April 21 th	48	0.48	84.83	653	6.53	40	0.40
May 5 th	46	0.46	85.12	652	6.52	42	0.42
May 19 th	45	0.45	85.95	655	6.55	50	0.50
June 2 nd	44	0.44	85.77	658	6.58	55	0.55
June 16 th	42	0.42	86.55	660	6.60	55	0.55
June 30 th	40	0.40	87.19	663	6.63	50	0.50
July 14 th	38	0.38	87.83	665	6.65	55	0.55
July 28 th	37	0.37	88.89	708	7.08	59	0.59
Aug. 11 th	35	0.35	88.91	667	6.67	62	0.62
Aug. 25 th	36	0.36	89.07	695	6.95	60	0.60
Sep.8 th	33	0.33	89.54	669	6.69	65	0.65
Sept. 22 th	34	0.34	89.68	699	6.99	60	0.60
Oct. 5 th	32	0.32	90.28	701	7.01	62	0.62
Oct. 20 th	31	0.31	90.67	704	7.04	50	0.50
Mean	5500	55	87.01				

Table (4): The mean reduction of *T.urticae* as a result of the predatory mite *P. persimilis* release .

Treatment	A	B	C	L.S.D. at 0.05 Level
Mean reduction %	76.36	79.6	87.01	2.17
Pest population %	0.58	0.91	0.55	5.42

A= (30 – 40 individuals) B = (40 – 50 individuals) C = (50 – 60 individuals)

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مكافحة العنكبوت الأحمر العادي *T.urticae* Koch على أشجار الخوخ الصغيرة
بمحافظة البحيرة باستخدام المفترس الأكاروسى *P. persimilis* (A.-H)
منى سليمان الغباشى
معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - الجيزة

في تجربة حقلية تم إطلاق المفترس الأكاروسى *Phytoseiulus persimilis* (A.-H) ضد العنكبوت الأحمر العادي *Tetranychus urticae* Koch على أشجار الخوخ الصغيرة عمر ثلاث سنوات صنف (فلوريدا برنس) في مساحة فدانين بقرية أدم بمنطقة النوبارية بمحافظة البحيرة بثلاث مستويات من الإطلاق بمعدل (٣٠ - ٤٠) و (٤٠ - ٥٠) و (٥٠ - ٦٠) مفترس لكل شجرة على التوالي عند متوسط إصابة ٢,٠٢ و ٣,٥٢ و ٣,٠٣ فرد / ورقة على التوالي وبعد ثمانى أشهر من إطلاق المفترس قل متوسط الإصابة إلى ٠,٤ و ٠,٦٤ و ٠,٣١ فرد / ورقة على التوالي وأدى المفترس إلى متوسط خفض في الإصابة وصلت إلى ٧٦,٣٦ و ٧٩,٦ و ٨٧,٠١ % على التوالي بالنسبة لأشجار الخوخ الصغيرة العمر ولا يزيد ارتفاعها عن ١,٥ متر وكان أفضل مستوى للإطلاق هو المستوى الثالث (٥٠ - ٦٠ فرد مفترس / شجرة) مما يوضح إمكانية استخدام المفترس الأكاروسى بنجاح في خفض تعداد العنكبوت الأحمر العادي في بساطين الخوخ.