

SURVEY AND POPULATION DYNAMIC OF SOME MITES ASSOCIATED WITH CITRUS TREES IN FAYOUM GOVERNORATE

ATA, MARIAM, M.¹, TH.F. SAKKRAN ²,
M.M.H. FAWZY ¹ and G.Z.EL-SHAHAWY²

1. Plant Protection, Research Institute, Fruit mites, ARC, Dokki, Giza, Egypt
2. Faculty of Science, Beni-Suef University, Egypt.

(Manuscript received 28 May 2015)

Abstract

Survey of mite species inhabiting leaves and debris of two varieties of citrus (navel orange and mandarin) in Fayoum governorate. The survey revealed the occurrence of 44 mite species, according to their feeding habits and systematic position. The population dynamic of some mite species inhabiting leaves of the two varieties of citrus (*Eutetranychus orientalis* Klein, *Brevipalpus obovatus* Dennadiu, *Tydius californicus* Banks, *Pronomatus ubiquitous* McGregor and their predators) for two years from May 2011 to April 2013 in Ebshway region, Fayoum governorate. The population dynamic of these mites was studied with the relation of biotic factors (predator mites) and a biotic factor (temperature and relative humidity) with this mite.

Key words: Survey, Population dynamic of mites, Citrus trees.

INTRODUCTION

Citrus is one of the most important fruit crops in Egypt due to its economic important for local consumption and exportation. The cultivated area of citrus at Fayoum governorate about 5081 Fadden during the year 2013. The most phytophagous mites which injurious citrus were Tetranychidae, Tenupalpidae and Eriophyidae which cause great damage to plants that affect crop quantity and quality. Ibrahim (1988) mentioned that citrus varieties, sour, Navel, Acidless orange and Mandarin in two localities in upper and lower Egypt were infested with *Eutetranychus orientalis*, *Brevipalpus obovatus* Donnadiu, *B. phoenicis* and *B. californicus*, also there were found different species of families Phytoseiidae, Cheyletidae, and Stigmaeidae inhabiting different citrus species and studied the population density of phytophagous pests and its predaceous mites and their relationship in two citrus orchards of different ecological factors. Rahil and Abd El-Halim (2000) recorded mites that inhabit leaves and branches on citrus varieties, Lime, Mandarin and Sweet orange in Fayoum governorate, they recorded 33 mite species, there were found that *Eutetranychus orientalis* (Klein) and *Typhlodromus athiasae* in all citrus varieties, with studying the population dynamic of them. In Turkey Cobanglu (1989) surveyed some phytoseiid mites in citrus orchard. These species are *Euseius scutali*, *Amblyseius potentillae*, *Amblyseius stipulatus*, *A. largonsis*, *Typhlodromus athiasae*, *Paraseiulus subsoleiger*, *Anthoseius recki* and *Phytoseius finitimus*. Gangwar and Lal (1988) studied the peak

activity of *Eutetranychus orientalis* it was in early March in mandarins, while the predators were active from February to April. So the present work aims to study the susceptibility of the two citrus varieties (mandarin and navel orange) to mite infestation and the population dynamic of some phytophagous mites, also uncertain mites and their predaceous mites.

MATERIALS AND METHODS

A) Survey studies

Collected samples of 100 leaves and about 500 grams of debris for every citrus variety (navel orange and mandarin) every fifteen days. The samples kept immediately in plastic bags and then transferred to the laboratory for examination; the leaves were directly examined by aid of stereomicroscope, while debris put in modified Tullgren funnels for about 24 hours. The extracted mites were received in Petri dishes filled with water, the collected mites from each leaves and debris cleared in Nesbitt's solution for 24 hours, then the individuals mounted in drop of Hoyer's medium on glass slides. The necessary information (host plant, location and date) was written on labels which stuck on slides of each side, then gently heated to stretch the individuals to get off the air and then microscopically examined to identify the mite species and then write it on other side of slide.

B) Population dynamic

Collect 100 leaves of citrus (mandarin and navel orange) from two orchards in Ibshaway district of Fayoum Governorate every 15 days for two successive years (May 2011 to April 2012 and May 2012 to April 2013) and record the numbers of each phytophagous mites and their predaceous mites on each side of leaves. The record temperature and relative humidity were obtained from weather records Fayoum meteorological Station (Etsa district) throughout the examination periods and determine the peaks of every mites to each year. The correlation between phytophagous mites and its predator, also correlation between phytophagous mites with temperature and relative humidity estimated by calculating the simple correlation values.

RESULTS AND DISCUSSION

A) Survey studies

There for 44 mite species belonging to 18 families and four sub order were recorded on leaves and debris of citrus trees in Fayoum Governorate as shown in Table (1), i.e. Sub order: Prostigmata there were found 10 families and 25 species of it, Sub order: Mesostigmata represented by 5 families belong to them 14 species, Suborder: Astigmata has one family and two species and Sub order: Cryptostigmata includes two families (4 species).

Table 1. Survey of mite species associated with citrus trees in Fayoum Governorate

Family	Mite Species	Habitat	Remark
Sub Order: Prostigmata (Actnedida)			
Cheyletidae	<i>Hemicheyletia bakeri</i> (Ehara) <i>Eucheyletia bakeri</i> (volgin)	Debris of mandarin Debris of mandarin	*** ***
Cunaxidae	<i>Cunaxa capreolus</i> (Berlese) <i>Cunaxa setirostris</i> (Hermann) <i>Pulaeus niloticus</i> (Zaher and El Bishlawy) <i>Cunaxa capreolus</i> (Berlese) <i>Cunaxa simplex</i> (Ewing)	Debris of mandarin Debris of orange Debris of orange Leaves of orange Debris of citrus	** ** * ** **
Bdellidae	<i>Bdellodes longirostris</i> (Hermann) <i>Spinibdella bifurcate</i> (Atyeo) <i>Cyta latirostris</i> (Hermann)	Debris of orange Debris of mandarin Debris of citrus	* *** ***
Eupodidae	<i>Euopodes niloticus</i> Abou- Awad & El-Bagoury	Debris of citrus	*
Raphignathidae	<i>Raphignathus bakeri</i> Zaher & Gomaa <i>Raphignathus niloticus</i> Rakha & Mohamed <i>Raphignathus arabicus</i> Gomaa&Hassan	Debris of citrus Debris of mandarin Debris of orange	*** *** ***
Stigmaeidae	<i>Agistemus exsertus</i> Gonzalez <i>Agistemus vulgaris</i> Soliman & Gomaa	Leaves and debris of citrus Leaves and debris of citrus	*** ***
Tarsonemidae	<i>Steneotarsonemus sayedi</i> Zaher & kanded <i>Daldalotarsonemus rodriguez</i> Zaher & kanded	Debris of citrus. Leaves of citrus.	*** *
Tetranychidae	<i>Eutetranychus orientalis</i> (Klein) <i>Tetranychus urticae</i> Koch	Leaves of citrus Leaves of citrus	*** *
Tenupalpidae	<i>Brevipalpus californicus</i> Banks <i>Brevipalpus obovatus</i> Dennadieu	Leaves citrus Leaves of citrus	* *
Tydeidae	<i>Tydeus californicus</i> Banks <i>Pronematus ubiquitous</i> (McGregor) <i>Tydeus costensis</i> Baker	Leaves and debris of citrus Leaves and debris of citrus Leaves and debris of citrus	*** *** **
Suborder: Mesostigmata (Gumusida)			
Ameroseiidae	<i>Kleemannia Zaheri</i> El-Badry, Hafez& Nasr <i>Kleemannia plumoseus</i> Oudemans	Debris of mandarin Debris of citrus	** **
Ascidae	<i>Blattisocius tarslis</i> (Berlese) <i>Arctoseius citrates</i> (sellinck) <i>Proctolaelaps aegyptiaca</i> Nasr <i>Proctolaelaps orientalis</i> Nasr	Debris of citrus Debris of citrus Debris of citrus Debris of citrus	* * * **
Laelapidae	<i>Laelaspis astronomicus</i> (Koch) <i>Hypoaspis orientalis</i> (Hafez, El-Badry & Nasr	Debris of Citrus Debris of Citrus	* *
Phytoseiidae	<i>Amblyseius swarskii</i> Athias-Henriot <i>Euseius scutalis</i> Athias-Henriot <i>Typhlodromus athiasae</i> Porath&Swirski <i>Typhlodromus siwa</i> (El Badry) <i>Phytoselus persimilis</i> Athias-Henriot	Debris of citrus Leaves of naval orange Leaves of orange Leaves of orange Debris of citrus	** *** *** *** ***
Parasitidae	<i>Vulgarogamasus burchanensis</i> (Oudemans)	Debris of citrus	*
Suborder: Astigmata (Acaridida)			
Acaridae	<i>Tyrophagous Putrescentiae</i> (Schrank) <i>Rhizoglyphus robini</i> Clapareda	Debris of citrus Debris of mandarin	*** ***
Suborder: Cryptostigmata (Oribatida)			
Oribatulidae	<i>Siculobata sicula</i> (Berlese) <i>Zygoribatula sayedi</i> (El-Badry & Nasr)	Debris of citrus Debris of citrus	* *
Oppiidae	<i>Multioppia wilsoni</i> Aoki	Debris of mandarin	*

*** Large number

** Moderate number

* Few number

The obtained results indicated that the phytophagous mite, *Eutetranychus orientalis* was found in a great number in two varieties of citrus but more in navel orange, while *Brevipalpus obovatus* was found in two varieties of citrus but in moderate number in navel orange and few numbers in mandarin. The predaceous mites of family Phytoseiidae were the most abundant on two citrus varieties. The most common species were *Euseius scutalis* Athias-Henriot and *Typhlodromus athiasae* Porath & Swirski.

B) Population dynamic

In this study there were four mite species belonging to three families and their predacious, they were found in considerable numbers associated with the two citrus varieties, these mites were two Tydied mites; *Tydeus californicus* Banks & *Pronomatus ubiquitous* (Mcgregor) in large numbers, the Tetranychid mite, *Eutetranychus orientalis* Klein and Tenupalpid, mite *Brevipalpus obovatus* Dennadieu.

1. *Eutetranychus orientalis* Klein:

E.orientalis was found to be infested leaves of both navel orange and mandarin. As shown in Tables (2, 3, 4 and 5), the monthly total number of collected mites on navel orange was 417 and 252 individuals during the two successive years, respectively. While in mandarin the individuals collected were 231 and 129 mites in first and second seasons respectively. According to Ibrahim (1988) in upper and lower Egypt navel orange was more infested with mites than mandarin. There were two peaks in navel orange. The population reached its first peak on 15th July there were 90 individuals at temperature 40, 32.6, 25.2 max., mean, min. temperature, respectively and relative humidity 48%, then gradually decreased in August and increased once again till reached the second peak on 15th September 246 with temperature 35.8, 28.8, 21.8 max., mean, min. temperature, respectively and relative humidity 27% Table (2) in the first season 2011/2012. On the second season 2012/2013 Table (3) their was two peaks, the first peak appeared on 15th May 51 mites with temperature 34°C, 27°C, 20°C max., mean, min. temperature respectively and relative humidity 52 %, while the second peak on 30th September (63 individuals) with temperature 35°C, 29.5°C, 24°C maximum, mean, minimum, respectively and relative humidity 52%.

The Population of *E. orientalis* in mandarin was shown in Table (4), in the first season there were two peaks the first on 30th June the number was 108 with 33.2°C, 26.5°C, 19.8°C maximum, mean and minimum temperature and relative humidity 47%, respectively, then decreased gradually till the second peak in 30th August, there founded 63 mites with max. temp. 37°C, 29.4°C mean, min. temperature 20°C and relative humidity 20%. In the second season as show in Table (5) it increase from May till the first peak on the end of May there was 21 individuals with max. 33°C,

26.8°C mean, min. temp. 20.6°C and relative humidity 44% and decrease gradually to reach the second peak in 15th July where there were 69 individuals with 41°C, 29.5°C, 18°C max., mean and min. temp. and relative humidity 34% then it decrease gradually. So this result regard that the host preference to be found in navel orange exhibited the highest population than mandarin. This also agreed with Ibrahim (1988) and Rahil and Abd El-Halim (2000), which found there were two peaks in June and August in first season while two peaks in June and Sep. in second season.

The statistical analysis of data of population density of *Eutetranychus orientalis* in navel orange from Table (6) the effect of predacious mites and maximum temperature was insignificant positive relation during the two years. But the effect of mean and minimum temperature was significant positive correlation, while relative humidity expressed as significant negative for first year and insignificant positive for second year. The amount of explained variance (26.71 and 31.50 %) during the two years respectively, these results indicated that there were other combined factors affecting on the activity of this pest. While in mandarin Table (7) for the first year all tested factors were insignificant positive correlation except mean relative humidity was insignificant but negative correlated. The second season also the same result all weather factors were insignificant positive correlation except the mean relative humidity was highly significant negative correlated. The predator effect was insignificant negative correlated. The amount of explained variance was (19.43% and 50.46 %) during the two years.

2. *Brevipalpus obovatus* Dennadiu

Brevipalpus obovatus was generally found in few numbers on leaves of navel orange Table (2). At the first year the peak was on 15th September with population 33 mites with 35.8°C, 28.8°C, 21.8°C max. temp., mean temp., min temp. and mean relative humidity 27%, respectively, then no recorded on leaves in remind months. In second season 2012-2013 the peak was on 30th September Table (3). While on mandarin in Tables (4 and 5) it was recorded in few numbers.

The statistical analysis for navel orange Table (6) show effect of predacious mites that was significant positive for first year but negative insignificant for the second year, while the effect of maximum temp., mean temp. and min temperature was positive insignificant relationship in the two year except min. temperature in second year it was positive significant correlation with *B. obovatus* numbers and the day relative humidity expressed as insignificant negative relation for first season, But in the second season insignificant positive relation. The percentage of explained variance by the tested factors shown in Table (6) this percentage was 31.71% for first year and 17.71% for the second year .This variance reflects the combined effect of these

five tested factors in influencing the activity and abundance of *Brevipalpus obovatus*, and this indicate that there were another factors affecting the activity of *Brevipalpus obovatus*.

The statistical analysis in mandarin trees as show in Table (7) the effect of predacious mites, max. temp., mean temp. and min. temp. were negative insignificant relation, but mean relative humidity was positive insignificant relation for the first season, while in second season effect of predacious mites was negative insignificant relation, but the temperature was positive insignificant and the daily relative humidity was negative significant correlation. The combined effect of tested factors was 26.01% and 27.88% for two seasons, respectively.

3. *Tydius californicus* Banks

From Table (2) *Tydius californicus* begin to appears of navel orange in May 2011 of the first season then decreased in numbers until July then population increased gradually reaching the highest density on 15th January 2012 were its peak with the population 1650 mites/ 100 leaf square inches with max. 20.1°C, mean 13.3°C and min. temp. 6.5°C and relative humidity 68% then population decreased slowly, while in the second season 2012/2013 Table (3) the population of it reached its peak on 28th February with 1785 mites/100 leaf at max. 29.0°C, mean 20.4°C and min. temp. 11.8°C and relative humidity 47% then decreased slowly. In the two seasons there found in all months and in first season there were 7881 mites and in second season there were 7365 mites. In mandarin trees from Table (4) during the first seasons the population of *Tydius californicus* gradually increased from May 2011 with raising of temperature degree till reaching the first peak on 30th October with max. temp. 26°C, mean temp. 20.4°C and min temp. 14.8°C and relative humidity 53% while second peak on 15th December there were 204 mites /100 leaf at mean relative humidity 74% and max. 24.1°C, mean 15.6°C and min.temp. 9.4°C, then decreased gradually, while in second seasons it has two peaks the first in 15th February with max., mean, min. temp. 23°C, 17.5°C, 12.0°C, respectively and mean relative humidity 51 % and the other in 30th March 2013 with max., mean, min. temp. 32.0°C, 22.5°C, 13.0°C, respectively, and mean relative humidity 46% as shown in Table (6) the whole numbers of mites in first season were 809 mites while in second seasons were 420 mites.

The statistical analysis Table (6) show the change of population of *T. californicus* in relation to changes in predacious mites it was insignificant positive relation for two seasons, while the effect max., mean and min. temperature with respect to activity of *T.californicus* were negative highly significant relation during the two seasons, the effect of the daily relative humidity was positive highly significant relation for the first

seasons but positive insignificant relation for the second season. Also the explained variance percentage was high during the first season 81.27%, while in second seasons it was 46.76%.

The statistical analysis on mandarin as show in table (7) the effect of predacious mites on *T. californicus* was negative insignificant correlation for first year but positive significant for second seasons ,while the effect of maximum and mean temperature for two seasons were negative insignificant correlation but minimum temperature was positive insignificant for first seasons and negative significant correlation for second seasons, effect of relative humidity was positive significant for first seasons but negative insignificant correlation for second seasons. The combined effect of predacious mites and weather factors on activity of *T.californicus* was small in first seasons 14.79% ,while in second seasons was 33.29%. From regarding host preference it was found that navel orange exhibited the highest population density of *T.californicus* than mandarin.

4. *Pronomatus ubiquitous* (McGregor)

Novel orange from Table (2) in the first season *P. ubiquitous* found in large number 1920 mites and the peak on 15th Januray at max., mean, min.temperature and mean relative humidity 20.1°C, 13.3°C,6.5 °C and 68%; respectively, while in second season from Table (3) there were 2085 mites, while the peak become on 15th march at max., mean, min.temperature and mean relative humidity 38°C, 27.2°C, 16.4 °C and 42%, respectively.

In mandarin Table (4) the number was little than navel orange. In first season there were 390 mites, the peak was on 30th December but in the second season become on 15th February Table (4) The number of it becomes 255 mites decrease than first season.

The statistical analysis of navel orange show that the effect of predacious mite on *P. ubiquitu* was positive insignificant correlation for the two year, while the effect of max., mean and min temperature were negative and highly significant correlation for the first season but in the second season were negative significant except max. temp. negative insignificant, but R.H positive insignificant .the explained variance were 66.78% and 39.20% , for two season respectively, while mandarin in Table (7) the effect of predacious mites were negative insignificant but max. temp. was negative highly significant , mean and min. temperature were negative significant relation and R.H was positive highly significant for first season , while in second season the effect of predacious mites was positive significant. Max., mean and R.H. were negative insignificant, but min. temperature was negative significant. The combined effect of tested factors were 51.68% and 28.78% for two seasons, respectively.

SURVEY AND POPULATION DYNAMIC OF SOME MITES ASSOCIATED
WITH CITRUS TREES IN FAYOUM GOVERNORATE

Table 2. Population dynamic of mite species associated with leaves of navel orange and its predators of Fayoum Governorate from May 2011 to April 2012.

Months	<i>Eutetranychus orintalis</i> Klein	<i>Tydeus californichus</i> Banks	<i>Pronomatus ubiquitous</i> McGregor	<i>Brevipalpus obovatus</i> Dennadieu	Number of collected Predator	Weather factors			
						Max Temp	Mean Temp.	Min Temp.	Mean RH%
May 15	12	36	9	3	69	28.0	21.1	14.2	50
30	3	12	3	12	33	31.0	24.7	18.4	48
June 15	6	3	3	0	3	35.8	28.8	21.8	45
30	0	15	6	3	12	33.2	26.5	19.8	47
July 15	90	3	0	6	9	40.0	32.6	25.2	48
30	0	6	0	0	3	39.6	31.8	24.0	48
Aug. 15	30	33	6	0	0	39.0	30.8	24.0	24
30	0	27	9	0	3	37.0	29.4	20.0	20
Sept. 15	246	48	12	33	27	35.8	28.8	21.8	27
30	21	57	6	0	12	34.8	27.6	20.4	51
Oct. 15	0	72	12	0	6	31.2	24.9	18.6	55
30	0	114	24	0	0	26.0	20.4	14.8	53
Nov. 15	0	240	54	0	6	25.8	18.3	10.8	45
30	0	510	78	0	21	24.9	15.0	7.8	75
Dec. 15	0	900	222	0	12	24.1	15.6	9.4	74
30	3	726	168	0	12	15.4	11.8	7.2	85
Jan. 15	0	1650	388	9	24	20.1	13.3	6.5	68
30	3	546	204	0	9	20.8	14.2	8.7	62
Feb. 15	0	714	51	0	6	15.7	11.0	6.2	87
29	0	633	150	0	0	34.8	24.4	14.0	36
March 15	0	480	78	0	3	23.0	16.3	9.6	57
30	0	663	147	0	9	29.0	22.0	15.0	56
April 15	3	333	90	0	3	32.4	25.1	17.8	52
30	0	60	3	0	3	30.0	24.2	18.4	48
Total	417	7881	1723	66	285	-	-	-	-

- No. of mites /100 leaf

Table 3. Population dynamic of mite species associated with leaves of navel orange and its predators of Fayoum Governorate from May 2012 to April 2013.

Months	<i>Eutetranychus orintalis</i> Klein	<i>Tydeus californichus</i> Banks	<i>Pronomatus ubiquitous</i> McGregor	<i>Brevipalpus obovatus</i> Dennadieu	Number of collected Predator	Weather factors			
						Max Temp	Mean Temp.	Min Temp.	Mean RH%
May 15	51	18	May 15	0	9	34.0	27.0	20.0	52
May 30	36	6	May 30	3	6	33.0	26.8	20.6	44
June 15	9	3	June 15	0	0	39.0	31.0	23.0	45
June 30	0	0	June 30	0	0	38.5	30.8	23.0	47
July 15	3	18	July 15	3	3	41.0	29.5	18.0	34
July 30	3	15	July 30	6	3	39.4	32.1	25.2	50
Aug. 15	6	0	Aug. 15	0	0	38.0	31.0	24.0	52
Aug. 30	39	30	Aug. 30	0	12	37.0	30.0	23.0	47
Sept. 15	24	3	Sept. 15	3	6	38.8	30.4	22.0	44
Sept. 30	63	0	Sept. 30	18	0	35.0	29.5	24.0	52
Oct. 15	0	45	Oct. 15	0	21	37.0	30.7	24.4	48
Oct. 30	3	9	Oct. 30	0	48	35.4	27.2	19.0	46
Nov. 15	0	69	Nov. 15	0	30	29.0	22.1	15.2	45
Nov. 30	6	3	Nov. 30	0	6	22.0	16.5	11.0	45
Dec. 15	6	12	Dec. 15	0	24	19.0	14.0	9.0	49
Dec. 30	0	645	Dec. 30	3	33	24.0	17.1	9.8	52
Jan. 15	0	756	Jan. 15	0	21	24.0	17.0	10.0	50
Jan. 30	0	837	Jan. 30	0	42	21.0	16.2	10.8	57
Feb. 15	0	1206	Feb. 15	0	12	23.0	17.5	12.0	51
Feb. 28	0	1785	Feb. 29	0	30	29.0	20.4	11.8	47
March 15	0	1191	March 15	0	18	38.0	27.2	16.4	42
March 30	0	528	March 30	0	0	32.0	22.5	13.0	46
April 15	0	180	April 15	0	108	34.0	24.3	14.6	45
April 30	3	6	April 30	0	30	38.4	28.0	17.5	45
Total	252	7365	Total	36	462	-	-	-	-

- No. of mites /100 leaf

SURVEY AND POPULATION DYNAMIC OF SOME MITES ASSOCIATED
WITH CITRUS TREES IN FAYOUM GOVERNORATE

Table 4. Population dynamic of mite species associated with leaves of mandarin and its predators of Fayoum Governorate from May 2011 to April 2012.

Months	<i>Eutetranychus orintalis</i> Klein	<i>Tydeus californichus</i> Banks	<i>Pronomatus ubiquitous</i> McGregor	<i>Brevipalpus obovatus</i> Dennadieu	Number of collected Predator	Weather factors			
						Max Temp	Mean Temp.	Min Temp.	Mean RH%
May 15	6	3	0	0	6	28.0	21.1	14.2	50
30	3	9	0	1	12	31.0	24.7	18.4	48
June 15	0	15	0	0	0	35.8	28.8	21.8	45
30	108	39	6	0	12	33.2	26.5	19.8	47
July 15	0	0	0	0	0	40.0	32.6	25.2	48
30	9	3	3	2	12	39.6	31.8	24.0	48
Aug. 15	12	33	0	0	27	39.0	30.8	24.0	24
30	63	30	9	0	3	37.0	29.4	20.0	20
Sept. 15	9	18	0	0	0	35.8	28.8	21.8	27
30	0	36	9	1	3	34.8	27.6	20.4	51
Oct. 15	6	0	0	0	3	31.2	24.9	18.6	55
30	0	89	33	0	6	26.0	20.4	14.8	53
Nov. 15	0	6	0	0	0	25.8	18.3	10.8	45
30	6	33	15	0	6	24.9	15.0	7.8	75
Dec. 15	0	204	45	0	0	24.1	15.6	9.4	74
30	0	144	165	0	6	15.4	11.8	7.2	85
Jan. 15	0	12	6	6	6	20.1	13.3	6.5	68
30	0	18	6	0	0	20.8	14.2	8.7	62
Feb. 15	0	15	42	0	3	15.7	11.0	6.2	87
29	0	45	33	0	3	34.8	24.4	14.0	36
March 15	0	0	0	0	3	23.0	16.3	9.6	57
30	0	33	15	0	0	29.0	22.0	15.0	56
April 15	3	9	0	0	9	32.4	25.1	17.8	52
30	6	15	3	0	3	30.0	24.2	18.4	48
Total	231	809	435	10	123	-	-	-	-

- No. of mites /100 leaf

Table 5. Population dynamic of mite species associated with leaves of mandarin and its predators of Fayoum Governorate from May 2012 to April 2013.

Months		<i>Eutetranychus orintalis</i> Klein	<i>Tydeus californichus</i> Banks	<i>Pronomatus ubiquitous</i> McGregor	<i>Brevipalpus obovatus</i> Dennadieu	Number of collected Predator	Weather factors			
							Max Temp	Mean Temp.	Min Temp.	Mean RH%
May	15	3	0	0	0	0	34.0	27.0	20.0	52
	30	21	18	12	3	0	33.0	26.8	20.6	44
June	15	9	12	3	0	0	39.0	31.0	23.0	45
	30	0	6	0	0	0	38.5	30.8	23.0	47
July	15	69	42	6	3	0	41.0	29.5	18.0	34
	30	3	3	0	0	3	39.4	32.1	25.2	50
Aug.	15	0	0	0	0	6	38.0	31.0	24.0	52
	30	3	0	0	0	3	37.0	30.0	23.0	47
Sept.	15	3	3	3	0	0	38.8	30.4	22.0	44
	30	3	0	0	0	0	35.0	29.5	24.0	52
Oct.	15	3	9	3	3	0	37.0	30.7	24.4	48
	30	0	0	0	0	3	35.4	27.2	19.0	46
Nov.	15	6	3	3	3	3	29.0	22.1	15.2	45
	30	0	0	0	0	3	22.0	16.5	11.0	45
Dec.	15	0	3	3	0	6	19.0	14.0	9.0	49
	30	0	6	0	0	3	24.0	17.1	9.8	52
Jan.	15	3	21	6	0	24	24.0	17.0	10.0	50
	30	0	0	0	0	0	21.0	16.2	10.8	57
Feb.	15	0	90	66	0	9	23.0	17.5	12.0	51
	28	0	51	45	0	15	29.0	20.4	11.8	47
March	15	0	21	9	0	0	38.0	27.2	16.4	42
	30	0	93	75	0	9	32.0	22.5	13.0	46
April	15	0	36	18	0	9	34.0	24.3	14.6	45
	30	3	3	3	0	3	38.4	28.0	17.5	45
Total		129	420	255	12	99	-	-	-	-

- No. of mites /100 leaf

SURVEY AND POPULATION DYNAMIC OF SOME MITES ASSOCIATED
WITH CITRUS TREES IN FAYOUM GOVERNORATE

Table 6. Relationship between some biotic and a biotic factors on the population density of some phytophagous mites on Novel orange trees during two years 2011/2012 and 2012/2013 at Fayoum Governorate

year	Factors	<i>Eutetranychus orintalis</i>			<i>Tydeus californicus</i>			<i>Pronomatus ubiquitous</i>			<i>Brevipalpus obovatus</i>		
		r	p	E.V. %	r	p	E.V. %	r	p	E.V. %	r	p	E.V. %
2011/2012	Predators	0.20851	0.3282	26.71	0.00758	0.972	81.27	0.07169	0.7392	66.78	0.40942	0.0469	31.71
	Max. temp.	0.33049	0.1147		-0.6862	0.0002		-0.5329	0.0073		0.17881	0.4032	
	Mean temp.	0.34648	0.0972		-0.7929	<.0001		-0.6568	0.0005		0.17473	0.4142	
	Min temp.	0.36153	0.0826		-0.8405	<.0001		-0.7157	<.0001		0.17876	0.4033	
	Mean RH%	-0.3728	0.0728		0.6156	0.0014		0.43162	0.0352		-0.2904	0.1687	
2012/2013	Predators	-0.3175	0.1306	31.5	0.1609	0.4526	46.76	0.10654	0.6203	39.2	-0.2528	0.2334	17.71
	Max. temp.	0.21192	0.3202		-0.4076	0.048		-0.2391	0.2604		0.17719	0.4075	
	Mean temp.	0.33039	0.1148		-0.4973	0.0134		-0.3498	0.0938		0.26174	0.2166	
	Min. temp.	0.44915	0.0277		-0.5674	0.0038		-0.4564	0.025		0.34594	0.0977	
	Mean RH%	0.15605	0.4665		0.16696	0.4355		0.00206	0.9924		0.12736	0.5531	

P: Probability

r: coefficient correlation

E.V. %: Explained variance

Max. temp. : maximum temperature

Mean.temp. : mean temperature

Min.temp. : minimum temperature

RH% : Relative humidity

* Significant at 5% level of probability

Table 7. Relationship between some biotic and a biotic factors on the population density of some phytophagous mites/culring 2011/2012 and 2012/2013 years at EL-Fayoum Governorate

year	Factors	<i>Eutetranychus orientalis</i>			<i>Tydeus californicus</i>			<i>pronomatus ubiqutius</i>			<i>Brevipalpus obovatus</i>		
		r	p	E.V. %	r	p	E.V. %	r	p	E.V. %	r	p	E.V. %
2011/201	Predators	0.26253	0.2152	19.43	-0.0669	0.7561	14.79	-0.0595	0.7826	51.68	-0.0013	0.9949	26.01
	Max. temp.	0.27721	0.1897		-0.3372	0.1071		-0.5393	0.0065		-0.1488	0.4875	
	Mean temp.	0.2923	0.1657		-0.3277	0.118		-0.4651	0.022		-0.2511	0.2369	
	Min temp.	0.27446	0.1943		0.29701	0.1587		-0.4206	0.0407		-0.2993	0.1553	
	Mean RH%	-0.3337	0.111		0.37495	0.071		0.54584	0.0058		0.1628	0.4470	
2012/201	Predators	-0.2182	0.3057	50.46	0.43899	0.0319	33.29	0.4452	0.0293	28.76	-0.2663	0.2083	27.88
	Max. temp.	0.31472	0.1342		-0.1429	0.5053		-0.2183	0.3054		0.1682	0.4319	
	Mean temp.	0.24029	0.2581		-0.2557	0.2279		-0.3013	0.1525		0.1802	0.3994	
	Min temp.	0.1264	0.5562		-0.3672	0.0775		-0.3716	0.0738		0.1799	0.4002	
	Mean RH%	-0.6676	0.0004		-0.1993	0.3505		-0.0379	0.8604		-0.4591	0.0240	

P: probapility

R: coeffient correlation

E.V. %: Explaind variance

Max. temp.: maximum temperature

Mean.temp.: mean temperature

Min.temp.: minimum temperature

RH% : Relative humidity

* Significant at 5% level of probability

5. The predator mites:

Euseius scutalis Athias- Henriot and *Typhlodromus athiasae* Porath & Swirski were most abundant than other predators species on all citrus species. There found 285 individuals in first season and 462 in second season of navel orange, the numbers of predators increase in May then decrease gradually till the first peak on 15th September and decrease gradually till the second peak on 30th November and also there were third peak on 15 January in first season, while in the second season the peak become on 30th October, second peak on 30th January and third peak become on 15th April. In mandarin the numbers of predators were 123 predators mites for first season and 99 for second season less than navel orange. There was a peak at mid of August in first season, while in second season the peak become in mid of January.

REFERENCES

1. Chiaradia, L. A.; Souza, L. C. 2001. Population fluctuation of "Leprosis mite"*Brevipalpus phoenicis* (Geijskes, 1939) (Acari, Tenuipalpidae) in citrus orchards of the west of Santa Catarina. (Portuguese). *Pesquis Agropecuaria Gaucha*. 7 (2); 201-209.
2. Cobanoglu, S. 1989. Some phytoseiid mite species (Acarina: Phytoseiidae) determined in citrus orchards in some regions of Turkey. *Turkiye-Entom. Dergisi*, 13:3, 163-179.
3. Gangwar, S. K. and Lal, L. 1988. Population levels of *Eutetranychus orientalis* (Klein) and its predators on Citrus reticulata Blanco at higher altitudes. *Indian J. of Ecol.* 15 (2): 156-158.
4. Ibrahim, S.M. 1988. Ecological and biological studies on some predaceous mites associated with citrus trees in Egypt. Ph.D Thesis. Fac.Agric. Cairo Univ. 148 pp
5. Karmaker, K. and Saha, G. 2005. Population dynamic of false spider mite, *Brevipalpus phoenicis* (Geijskes) (Acari:Tenuipalpidae) on Mikania micrantha Kunth. In relation to weather parameters. *J. crop and Weed.* 1(2): 68-70.
6. Rahil, A.A.R. and Abd-El-Halim, Salwa, M. (2000). Survey and population studies of dominant mites associated with three citrus species at Fayoum Governorate. *Minufiya J. Agric. Res.* 25(5): 1241-1253.
7. Rezk, H.A. and Gad-El-Hak, G, G. 1996. Relationship between phytophagous and predatory mites in citrus orchards and the effect of acaricides on their population. *Alex.J.Agric.Res.*41 (2):217-224.

حصر وتذبذب تعداد بعض الأكاروسات المصاحبة لأشجار الموالح في محافظة الفيوم

مريم محمد عطا^١ ، ثابت فراج سكران^٢ ، مجدي محمد حسين فوزي^١ ، جمال زيدان الشهراوي^٢

١ . معهد بحوث وقاية النباتات - مركز البحوث الزراعية

٢ . كلية العلوم جامعة بني سويف

يصاب محصول الموالح بالعديد من الأكاروسات نباتية التغذية التي تسبب نقصا في الجوة والكمية ويصاحب هذه الأكاروسات مفترسات أكاروسية والتي تلعب دورا مهما في مكافحة الحيوية . وقد وجد نتيجة الحصر أربعة واربعون نوعا من الأكاروسات المختلفة التغذية على الأوراق وفي المواد المتساقطة لنوعي الموالح أبوسرة و اليوسفي وقد اجريت الدراسة أيضا لمعرفة التذبذب العددي لأكثر الأنواع تواجدا وهي :

Eutetranychus orientalis Klein, *Brevipalpus obovatus* Donnadieu

Tydius californicus Banks and *Pronomatus ubiquitous* McGregor مع دراسة

تأثير العوامل الحيوية من مفترسات أكاروسية وايضا تأثير بعض العوامل الجوية كالحرارة والرطوبة النسبية علي تعداد هذه الأكاروسات السابقة علي نوعي الموالح محل الدراسة وقد وجد ان صنف البرتقال أبو سره اكثر حساسية للاصابة من صنف اليوسفي للاصابة بهذه الأكاروسات .

- وقد وجد من دراسة ديناميكية التعداد للاكاروسات المتواجدة علي البرتقال أبو سره أن اعلي قمة لتعداد الأكاروس *E. orientalis* كانت في شهر سبتمبر خلال كلا الموسمين . ولقد وجد من التحليل الإحصائي أن هناك علاقة غير معنوية بين تعداد هذا الأكاروس وكل العوامل المناخية والمفترسات المدروسة في خلال كلا الموسمين. أما في اليوسفي كانت أعلي قمة *E. orientalis* في نهاية شهر يونيو للموسم الأول بينما كان في منتصف شهر يوليو في الموسم الثاني. وكانت العلاقة بين تعداد هذا الأكاروس وكل العوامل المختبرة علاقة غير معنوية في موسمي الدراسة ماعدا الرطوبة النسبية في الموسم الثاني كانت العلاقة معنوية.

- أوضحت الدراسة ان أكاروس *B. obovatus* كان له أعلي ذروة قمة سنوية خلال شهر سبتمبر للموسمين موضوع الدراسة. وتشير النتائج التحليلية إلي أن تأثير المفترس الأكاروسي علي كثافة هذا الأكاروس كان تأثيرا معنويا في الموسم الأول فقط أما باقي العوامل فكانت العلاقة غير معنوية في كلا الموسمين. أما علي اوراق اليوسفي كان تعدادها منخفض جدا في كل شهور الدراسة وكانت العلاقة بين تذبذب التعداد لهذا الأكاروس وكل العوامل المختبرة علاقة غير معنوية في موسمي الدراسة ماعدا الرطوبة النسبية في الموسم الثاني كانت العلاقة معنوية.

- ولقد كانت أعلي ذروة سنوية لديناميكية التعداد لأكاروس *T. californicus* علي أوراق البرتقال خلال كلا الموسمين في نصف شهر يناير و فبراير علي التوالي . ولقد كان تأثير كل العوامل الجوية علي تعداد هذا الأكاروس تأثيرا معنويا في كلا الموسمين ' لكن تأثير المفترس كان غير معنويا

في كلا الموسمين. أما علي اليوسفي سجلت أعلى قمة *T. californichus* في منتصف شهر ديسمبر في الموسم الأول و كانت في نهاية شهر مارس في الموسم الثاني. وأظهرت نتائج التحليل الإحصائي أن للمفترس تأثير ايجابي معنوي علي تعداد هذا الاكاروس في الموسم الثاني، بينما كان تأثير العوامل المناخية كان غير معنوي علي تعداد هذا الاكاروس.

- وقد وجد أن *Pronornatus upiquitus* كانت له ذروة سنوية في منتصف شهر يناير من الموسم الأول، لكن في الموسم الثاني كانت اكبر كثافة عددية في منتصف شهر مارس. وكانت من نتائج التحليل الإحصائي أن العلاقة بين تعداد هذا الأكاروس وكل العوامل الجوية علاقة معنوية في الموسم الأول ولكن في الموسم الثاني كانت العلاقة معنوية فقط مع درجة الحرارة الصغرى ' لقد سجلت أعلى ذروة ل *p. ubiquitous* في اليوسفي في نهاية شهر ديسمبر و نهاية شهر مارس للموسمين المتتالين علي الترتيب و أظهرت النتائج ان المفترس الاكاروسي كان له تأثير ايجابيا معنويا علي تذبذب تعداد الاكاروس في الموسم ٢٠١٢ / ٢٠١٣، أيضا تأثيرا معنويا لدرجات الحرارة والرطوبة النسبية في الموسم ٢٠١٢ / ٢٠١١ .

- لقد سجلت أعلى قمة عددية للمفترسات الأكاروسية في منتصف شهر مايو ومنتصف أبريل للموسمين علي التوالي. وقد أظهرت نتائج التحليل الإحصائي للنتائج المتحصل عليها أن العلاقة بين تعداد المفترس وكل العوامل المناخية علاقة غير معنوية في كلا الموسمين، أما في اليوسفي كانت أعلى قمة تعداد للمفترسات الأكاروسية في منتصف شهر أغسطس و منتصف شهر يناير للموسم الأول و الثاني علي التوالي. و كانت العلاقة بين تعداد هذه المفترسات و درجة الحرارة العظمي في الموسم الأول علاقة معنوية موجبة التأثير، بينما كانت في الموسم الثاني علاقة معنوية سلبية التأثير مع كل درجات الحرارة .