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Survey and Seasonal Fluctuation of Certain Pests Associated with Grapevine Trees at Assiut Region*

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Key words: Grapevine, survey, population fluctuation, R. syriacus, P. ulmi .

Abstract:

The present study was conducted through two successive seasons of (2007-2009) at Fac. Agric. Exptl. Farm. Assiut Univ. to survey Arthropods associated with three grapevine varieties (Muscat, Thompson seedless and Azmerly) and study the seasonal fluctuations of the most abundant and economically injurious pests: black vine thrips, *Retithrips syriacus* Mayet and European red mite, *Panoychus ulmi* Koch.

Data of the survey study revealed the presence of 20 insect species belonging to 20 genera under 14 families of 8 orders. Moreover, mite species was represented by three species belonging to three genera under two families of two orders. Intensive and extensive observations indicated that the collected insect and mite species can be classified according to their economic importance as pests included 19 insect species and two mite species. Predators included one insect species and one mite species.

In the first season (2007/2008) *R. syriacus* started with low levels in April, increased in May and the maximum number of individuals on leaves was recorded in June and July, for the three grapevine varieties. Then, the number of individuals decline rapidly during the next six months (Aug.-Jan.).

In the second season (2008/2009) the population density of this insect species showed low level of multiplicity on Muscat and Thompson seedless during April and on Azmerly during June. The population increased through July and August to exhibit moderate monthly averages on the three varieties. A quick augmentation respecting the individuals were recorded in September on all grapevine varieties. Through November, December and January, the monthly averages gradually decreased, and the pest completely disappeared in February on all the varieties tested.

On the other hand, population of *P. ulmi* was beginning at low level of abundance during April in the first season or March and April in the second one for the three grapevine varieties. Through May in the first season or May and June in the second one, the population density of this mite species reached its

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utmost levels of abundance. Then, rapid descended in the level of population density was occurred through the next months, till disappeared in February in the first season and from September in the second one on the leaves of grapevine varieties.

Introduction

Grapevine (*Vitis vinifera*) is commonly cultivated as fruit crop all over the world. Vineyards covers an approximate area of 10 million hectares (Pearson and Geheen, 1996). In Egypt, grapevine is an economically important crop for both local consumption and exportation and the cultivated area of grapevine accounted for 140,000 feddan (Mohamed, 1996).Several insects and mite species occur on grapevine in many regions of the world (Rosi et al., 2006). The black vine thrips, *Retithrips syriacus* Mayet is pantropical in distribution, known in Libya, Ghana, Kenya, Somalia, Sudan, Tanzania, Uganda, Israel, Lebanon, Syria, India, Brazil, Puerto Rico, USA(Florida) and Egypt (Wilson, 1975;Medina-Guad and Franqui, 2001).This insect species spread out through the Mediterranean basin countries (Hariri, 1981). Damage associated with different thrips infestations on grapes had been summarized by many investigators (Lopes et al., 2002; Tsitsipis et al. 2003).

On the other hand, several mite species were found to be associated with grapevie in many regions of the world (Tixier et al., 2000). The European red mite, *Panonychus ulmi* Koch is common and one of the most important pest of grapes (Broufas and Koveos, 2000 and Kumral and Bahattin, 2007). In Egypt, grapes were shown to be infested by different tetranychid mites (Zaher et al., 1973). The objectives of the present study was to 1) to survey the arthropods associated with grapevine and 2) to study the incidence and population fluctuations of the most abundant and economically injurious pests of *R. syriacus* and *P. ulmi* on three grapevine varieties.

Materials and Methods

The present study was carried out at Fac. Agric. Exptl. Farm, Assiut Univ. through two successive seasons of (2007-2009) in order to survey the arthropods associated with grapevine trees. Also, study the seasonal abundance of *R. syriacus* and *P. ulmi*.

Survey of arthropods associated with grapevie trees:

Three grpavines varieties (Muscat,Thompson seedless and Azmerly) were chosen to carry out the survey study through the two successive seasons of (2007-2009). Random samples, each of 25 leaves, were taken at weekly intervals. Samples were randomly collected from each variety, early in the morning, kept separately in polyethylene bags and carefully transferred to the laboratory for later examination with the aid of stereomicroscope. Upper and lower surfaces of each leaf were carefully examined.

The number of insects and mites on both surfaces were recorded.

Population fluctuations of *R. syriacus* and *P.ulmi* on Grapevine leaves:

1- Black vine thrips, *R. syriacus* adult and nymph were counted.

2- European red mite, *P. ulmi* adult and nymph were counted.

Populations were determined by examining the random selected leaves from each variety, then counting the number of a live individuals (nymphs and adults), on both surface.

Results and Discussions :

Survey of arthropods associated with grapevines trees:

Survey of the arthropods associated with grapevine trees is shown in Table (1). Data of the survey study revealed the presence of 20 insect species belonging to 20 genera under 14 families of 8 orders. Moreover, mite species was represented by three species belonging to three genera under two families of two orders. Intensive and extensive observations indicated that the collected insect and mite species can be classified according to their economic importance as pests included 19 insect species and two mite species. Predators included one insect species and one mite species.

Population fluctuations of *R. syriacus* and *P.ulmi* :

This part of the current investigation concentrate on the population fluctuations of the most two ingurious and abundant pests of grapevines (Black vine thrips, *R. syriacus*t and European red mite, *P. ulmi*, all the year round of (2007-2009) seasons, on three grapevine varieties, as shown in Tables (2and3) and illustrated graphically in Fig. (1and2).

During the first season (2007/2008):

The population density of *R. syriacus* (Table 2; Fig. 1) was at low levels of abundance (monthly avgs. 0.46, 2.24 and 1.72 individuals/leaf) at the beginning of the season (April), then increased to moderate levels (monthly avgs. 5.34, 13.97 and 10.31 individuals/ leaf) during May on Muscat, Thompson seedless and Azmerly varieties, respectively (Table 2 and Fig.1). The highest levels of population density were recorded through June and July, (monthly avgs. 32.56, 30.37; 37.73, 36.81 and 33.18, 31.45 individuals/leaf) on the three above mentioned grapevine varieties, respectively. Afterwards, the number of *R. syriacus* rapidly declined during the next six successive months (Aug.-Jan.), and completely disappeared during February and March.

Table (1): Apartial taxonomic list of arthropods associated with grapevine trees, Fac. Agric. Exptl. Farm. Assiut (2007/08-2008/09) seasons.

Order	Family	Scientific name	Order	Family	Scientific name
Insects			**Mites**		
Isopteraa	Termitidae	Ancanthotermes ochraceus Burm.	Prostigmata	Tetranychidae	Panonychus ulmi (Koch)
Thysanoptera	Thripidae	Retithrips syriacus Mayet			Tetranychus urticae Koch
		Thrips tabaci L	Mesostigmata	Phytoseiidae	*Amblyseius hutu (Pichard and Baker)
		*Scolothrips longicornis Priesner			
Hemiptera-Homoptera	Cicadellidae	Empoasca lybica Bergevin			
	Aphididae	Aphis gossypii Glover.			
	Pseudococcidae	Planococcus spp.			
	Asterolecanidae	Russellaspis pustulans Cock			
	Margarodidae	Icerya purchasi Mask.			
	Diaspididae	Aonidiella aurantii Mask.			
		Chrysomphalus ficus Riley			
		Lepidosaphes beckii Newm.			
Lepidoptera	Tortícidae	Lobesia botrana Schiff.			
	Noctuidae	Spodoptera littoralis Boisd.			
Hemiptera-Heteroptera	Pentatomidae	Nezara viridula L.			
Orthoptera	Acrididae	Schistocerca gregaria Forsk			
		Anacridium aegyptium L.			
Diptera	Drosophilidae	Drosophila melanogaster Meig.			
Coleoptera	Scarabaeidae	Pachnoda fasciata F.			
		Tropinota squalida Scop.			

*Predator

Table (2): Monthly mean numbers of *R. syriacus* and *P. ulmi* on three grapevine varieties, Fac. Agric. Exptl. Farm, Assiut,2007/2008 season.

Month	Mean number of individuals/leaf						Grand Mean	
	Muscat		Thompson seedless		Azmerly			
	R. syriacus	*P. ulmi*	*R. syriacus*	*P. ulmi*	*R. syriacus*	*P. ulmi*	*R.syriacus syriacus*	*P. ulmi*
Mar., 2007	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr.	0.46	3.04	2.246	1.62	1.72	0.58	1.47	1.75
May	5.34	35.53	13.97	31.75	10.31	10.12	9.87	25.80
Jun.	32.56	12.19	37.73	7.21	33.18	18.45	34.49	12.62
Jul.	30.37	1.33	36.81	0.57	31.45	0.63	32.88	0.84
Aug.	16.21	2.05	16.38	1.00	15.71	0.30	16.10	1.12
Sept.	2.79	1.47	2.57	0.98	2.52	0.73	2.63	1.06
Oct.	3.36	1.96	5.95	0.21	10.25	0.30	6.52	0.82
Nov.	2.68	1.72	3.18	0.06	7.44	0.06	4.43	0.61
Dec.	1.12	0.09	1.26	0.19	1.76	0.016	1.38	0.10
Jan., 2008	0.66	0.09	1.41	0,0	0.61	0.016	0.89	0.03
Feb.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yearly grand total	95.58	59.50	121.54	43.62	115.01	31.24	110.71	44.79
Yearly grand mean	7.96	4.96	10.13	3.64	9.5844	2.608	9.22	3.73

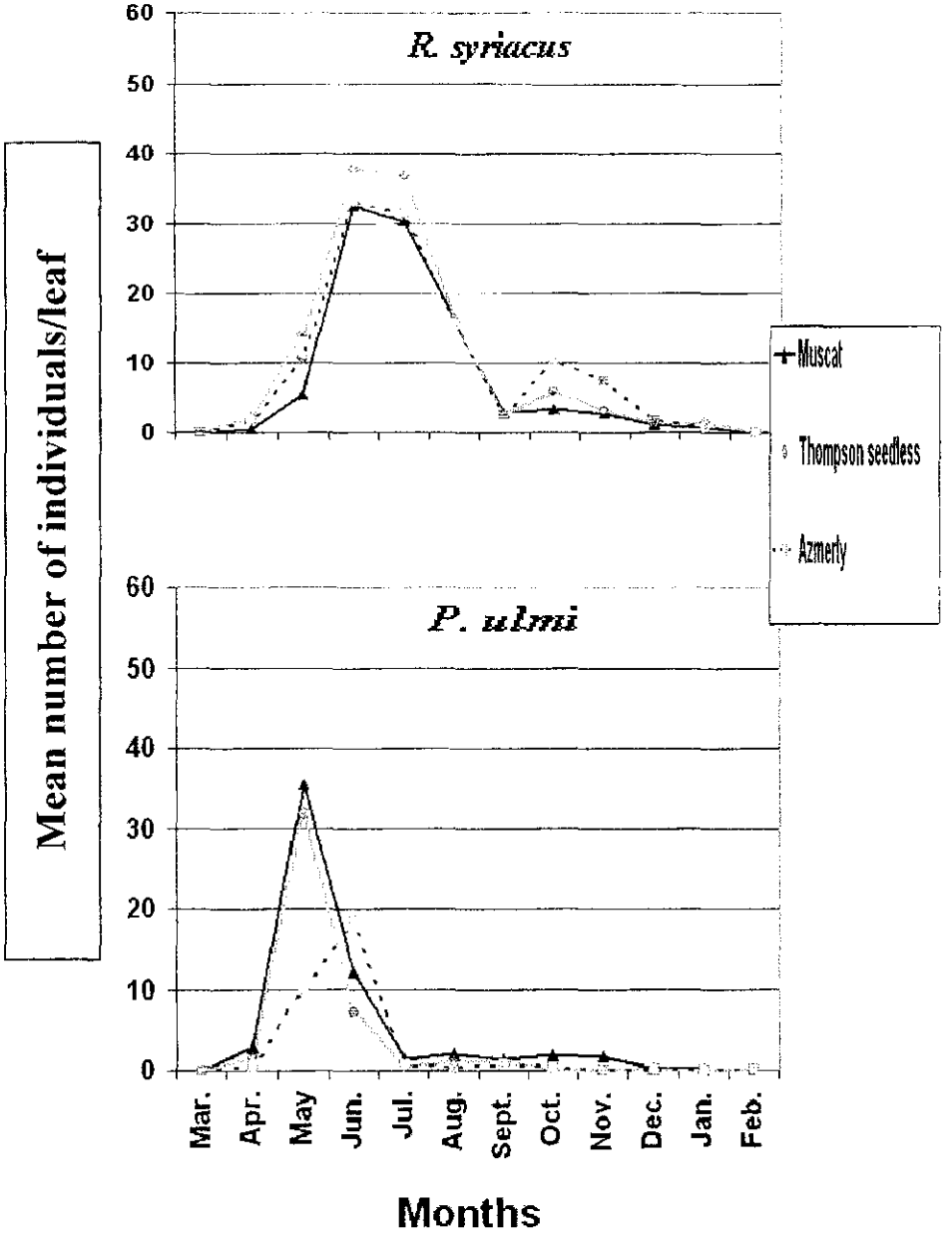

Fig. (1): Seasonal abundance of *R. syriacus* and *P. ulmi*, on Muscat, Thompson seedless and Azmerly grapevine varieties. Assiut (2007/2008) season.

The results concerning *P. ulmi* (Table 2; Fig.1) show low level of plenty (initial infestation) during April (monthly avgs .3.04, 1.62 and 0.58 individuals/leaf) on Muscat, Thompson seedless and Azmerly, respectively. The population of this mite species rapidly ascended during May on Muscat (monthly avg. 35.53 individuals/leaf) and Thompson seedless (monthly avg. 31.75 individuals/leaf), and during June on Azmerely (monthly avg. 18.45 individuals/leaf). Then, asharp descended occurred through the following months, and the red mite disappeared in February and March.

It should be mentioned that during the first season (2007/2008) the population density of *R. syriacus* was more abundant with grand means of 7.96, 10.13 and 9.58 individuals/leaf than *P.ulmi* (4.96, 3.64 and 2.60 individuals/leaf) on the three tested grapevine varieties.

2) During the second season (2008/2009):

The population density of *R. syriacus*, (Table 3 and Fig.2) showed low level of multiplicity during April on Muscat and Thompson seedless with monthly averages of 0.03 and 0.01 individuals/ leaf, respectively, and during June with monthly average of 3.09 individuals/ leaf on Azmerly. Through July and August the population increased through to exhibit moderate monthly averages with grand mean of 8.60 and 10.36 individuals/leaf, regardless of varieties, respectively. A quick augmentation respecting the individual numbers were recorded in September with monthly averages of 19.27, 42.29 and 40.50 individuals/leaf on Muscat, Thompson seedless and Azmerly varieties, respectively. Through the three succive moths of November, December and January, the monthly averages were gradually decreased, and the pest was completely disappeared in February on all the varieties tested.

On the other hand, the population of European red mite (Table 3 and Fig. 2) was at the lowest monthly averages of 0.45, 0.16 and 0.13 individuals/leaf during March, on Muscat, Thompson seedless and Azmerly varieties, respectively. Generally, the levels of abundance rapidly increased during May and June on Muscat, Azmerly and Thompson seedless varieties, reached the utmost levels of abundance with grand averages of 39.09 and 38.11 individuals/leaf, regardless of varieties, respectively. Then, sharply dropped during July and August, and disappeared from September to February.

Moreover It is also evident from the results of the second season (2008/ 2009) that the population density of *R. syriacus* was higher on Thompson seedless and Azmerly varieties with yearly grand means of 8.70 and 11.42 individuals/leaf than *P. ulmi*

Table (3): Monthly mean numbers of *R. syriacus* and *P. ulmi* on three grapevine varieties, Fac. Agric. Exptl. Farm, Assiut, 2008/2009 season.

Month	Mean number of individuals/leaf						Grand Mean	
	Muscat		Thompson seedless		Azmerly			
	R. syriacus	*P. ulmi*	*R. syriacus*	*P. ulmi*	*R. syriacus*	*P. ulmi*	*R.syriacus syriacus*	*P. ulmi*
Mar., 2008	0.0	0.45	0.03	0.16	0.0	0.13	0.010	0.24
Apr.	0.03	0.76	0.01	0.72	0.0	0.06	0.01	0.51
May	0.82	47.25	0.54	55.05	0.0	14.97	0.45	39.09
Jun.	4.51	48.45	8.98	34.24	3.09	31.63	5.53	38.11
Jul.	7.18	0.67	12.16	0.98	6.47	0.34	8.60	0.66
Aug.	6.57	3.15	15.13	1.78	9.38	1.32	10.36	2.08
Sep.	19.27	0.0	42.29	0.0	40.50	0.0	34.02	0.0
Oct.	9.21	0.0	14.25	0.0	39.59	0.0	21.01	0.0
Nov.	5.05	0.0	7.11	0.0	28.72	0.0	13.63	0.0
Dec.	2.92	0.0	3.24	0.0	7.46	0.0	4.54	0.0
Jan., 2009	0.21	0.0	0.68	0.0	1.79	0.0	0.89	0.0
Feb.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yearly grand total	55.8	100.74	104.48	92.95	137.03	48.47	99.10	80.72
Yearly grand mean	4.65	8.4	8.70	7.74	11.42	4.04	8.26	6.72

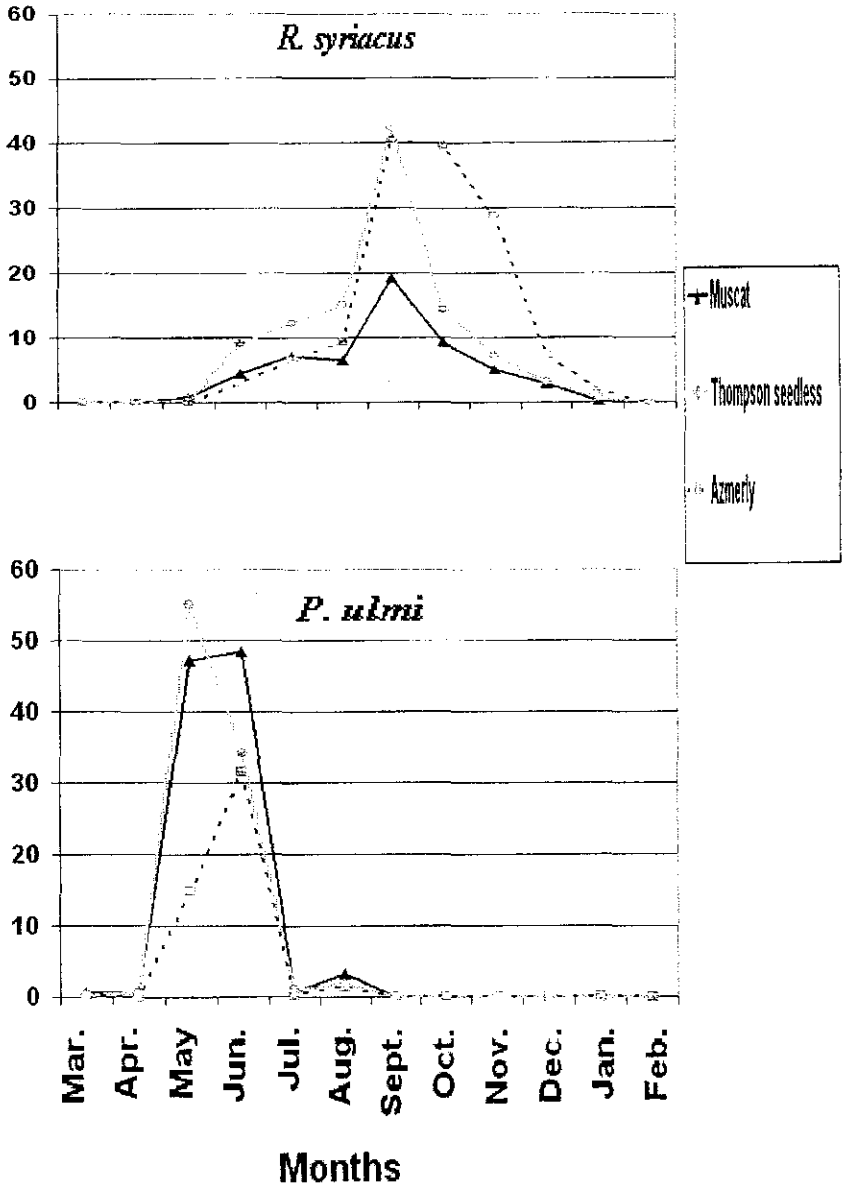

Fig. (2): Seasonal abundance of *R. syriacus* and *P. ulmi*, on Muscat, Thompson seedless and Azmerly grapevine varieties. Assiut (2008/2009) season.

(7.74 and 4.04 individuals/ leaf), respectively. While, for Muscat variety the opposite was true, where, *P. ulmi* was higher with yearly grand mean of (8.4 individuals/leaf) than *R. syriacus* (4.65 individuals/ leaf).

Discussing the data obtained, it is clear that thrips were found to be fluctuated through all over the year. The peak was recorded during June and September for the first and the second seasons on the three grapevine varieties, respectively. The results of this study are in agreement with those obtained by Lal (1982) in India, who found low level of *R. syriacus*, between June and July, and showed marked increase after that. Also, Fattouh (1999) in Eypt, found that this thrips species attacked grapevine leaves from spring until autumn amd attacked flowers during spring and summer. Rosi *et al.* (2006) showed that population fluctuation of thrips achieved a maximum of adults in early May, whereas the maximum population of larvae attained at the beginning of June. Meanwhile, De Villiers and Pringle (2007) who observed that thrips numbers were started to increase from about September or October, reached a peak during November. Although, the population fluctuation of *P. ulmi* differed during the two studied seasons, but the peak of the population was recorded during May or June according to the grapevine variety. While, Zaher et al. (1973) found that tetranychid mites infested grape in relatively few numbers throughout a period extended from July to December with peak in August. Whereas, Jubb Jr. *et al.* (1985) showed that *P. ulmi* reached its peak in the absence of predatory mites from early to mid-September in commercial Concord grape vineyards in Pennsylvania, USA.

Finally from the previous results (Tables 2 and 3), it could be generally concluded that the yearly grand total of *R. syriacus* population recorded through the first season was higher than that recorded through the second one for only the two grapevine varieties of Muscat and Thompson seedless. In addition, comparing the population of *P. ulmi*, it is clear that the population was lower during the first season than in the second one for the three grapevines varieties. These variations between the two seasons may be attributed to the weather conditions prevailing through the investigated seasons, as the variation among varieties to infestation may be ascribed to certain biochemical and/or morphological characteristics of plant. Metcalf and William, (1975) stated that the plant resistance to insects, generally, derives from certain biochemical and/or morphological characteristics of plants, which affect the behaviour and/or the metabolism of insect, as to influence the relative degrees of damage caused by these insects. Also, the variation may be ascribed to some factors such as the variety used, locality

and the environmental conditions prevailing in the area under study, particulary humidity and temperature. Duso and Vettorazzo (1999) studied mite populations in two vineyards, each had two grape varieties with different leaf hair density. Relative abundance of the mite species were found to differ on different varieties in the same vineyards accompanied with different leaf hair

References

Broufas, G.D. and D.S. Koveos .2000.: Threshold temperature for post-diapause development and degree-days to hatching of winter eggs of the European red mite (Acari: Tetranychidae) in Northern Greece. Laboratory of Applied Zoology and Parasitology, Aristotle Univ. of Thessaloniki, Greece.

De Villiers, M. and K.L. Pringle .2007.: Seasonal occurrence of vine pests in commercially treated vineyards in the Hex River Valley in the Western Cape Province, South Africa. African Entomol., 15: 241-260.

Duso, C. and E. Vettorazzo .1999.: Mite population dynamics on different grape varieties with or without phytoseiids released (Acari: Phytoseiidae). Exptl. App. Acarology, 23: 741-763.

Fattouh, A.A. 1999.: Ecological studies on certain economically important insect pests of grapevine orchards. M.Sc. Thesis, Fac. of Agric., Cairo Univ., Egypt.

Hariri, G. 1981.: Economic insects in Syria and neighbouring countries. Fac. of Agric., Aleppo Univ., Syria. (In Arabic).

Jubb Jr., G.L.; E.C. Masteller and R.D. Lehman .1985.: Survey of arthropods in vineyards of Erie County, Pennsylvania: Acari. Intl. J. Acarology, 11: 201-207.

Kumral, N.A. and K. Bahattin .2007.: Susceptibility of female populations of *Panonychus ulmi* (Koch) (Acari: etranychidae) to some acaricides in apple orchards. J. Pest Sci. 80: 131-137.

Lal, S.S. 1982.: Influence of weather factors on the population of spider mites (Acari: Tetranychidae) and thrips (Thysanoptera) on cassava in Kerala. Indian Journal of Acarology, 7 (1): 5-10.

Lopes, R.B.; M.A. Tamai; S.B. Alves; S.S. Neto and S. De Salvo .2002.: Occurrence of thrips on Niagara table grape and its control with the insecticides thiacloprid and methiocarb associated with Metarhizium anisopliae. Rev. Bras. Frutic. 24: 269-272.

Metcalf, R. L. and L. M. William .1975.: Introduction to Insect Pest Management. New York, pp. 103.

Medina-Guad, S. and R.A. Franqui .2001.: *Retithrips syriacus* (Mayet), the black vine thrips (Insecta: Thysanoptera: Thripi-

dae) new to Puerto Rico. J. Agric. Univ. P.R. 85: 85-89.

Mohamd, A. E. 1996.: Biological control of grapevine moth in Egypt. Ph. D. Thesis. Dept. Agric. Sci., Inst. Environ. St. Res., Ain Shams Univ. Egypt.

Pearson, R.C. and A.C. Geheen 1996.: A brief on grape disease. (Arabic translation). Academic Library. Egypt, 156-218.

Rosi, M.; S. Karl-Josef; L. Friedrich and P.W.Z. Claus .2006.: Neue Erkenntnisse zum Artenspektrum und zur Bekampfung von Thripsen (Thysanoptera: Thripidae) auf Reben in Rheinland-Pflaz. MITT. DTSCH. GES. ALLG. ANGEW. Ent. 15: 277-280.

Tixier, M.; S. Kreiter and P. Auger .2000.: Colonization of vineyards by phytoseiid mites: their dispersal patterns in the plot and their fate. Exptl. and Applied Acarology. 24: 191-211

Tsitsipis, J.A.; N. Roditakis; G. Michalopoulos; N. Palivos; D. Pappas; K.D. Zappas; G. Jenser and J. Vaggelas .2003: A novel scaring symptom on seedless grapes in the Corinth region (Peloponnese, Southern Greece) caused by western flower thrips, *Frankliniella occidentalis* and pest control tests. IOBC/ WPRS Integrated protection and production in viticulture, Volos, Greece, 59.

Wilson, Thomas H. 1975: A monograph of the subfamily Panchaetothripinae (Thysanoptera: Thripidae). Memoirs of the American Entomolgoical Inst. 23: 1-354.

Zaher, M.A.; Z.R. Soliman and G.S. El-Safi (1973): Survey and population studies on mites associated with deciduous fruit trees in Giza, Egypt. Bull. Soc. ent. Egypt, L VII: 425-433.

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الحصر والتذبذب الموسمي لبعض الآفات المصاحبة لأشجار العنب في منطقه أسيوط

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أجريت هذه الدراسه لحصر مفصليات الأرجل التي تتواجد علي أوراق العنب وكذلك دراسه التذبذب الموسمي لأكثر الآفات تعداداً وضرر إقتصادياً وهي تربس العنب ***Retithrips syriacus*** **Mayet**، العنكبوت الأحمر ***Panonychus ulmi*** **Koch** علي ثلاثه أصناف من العنب (مسكات- طومسون سيدليس- أزميرلي) في مزرعه كليه الزراعه- جامعه أسيوط خلال الموسمين (2008/2007)، (2009/2008).

وقد أوضحت نتائج دراسة الحصر تعرض أشجار العنب للأصابه بـ 20 نوعاً حشري تابعه لـ 20 جنساً تنتمي إلي 14 عائله و ثمانية رتب. بالأضافه إلي حصر ثلاثه أجناس من الأكاروس تابعه لـ عائلتين، ورتبتين. كذلك أظهرت نتيجه تصنيف هذه الأفات حسب الأهميه الأقتصاديه إلي وجود عدد 19 آفه حشريه و أفتين أكاروسيه، ووجود مفترس حشري ومفترس أكاروسي واحد.

وأوضحت دراسة التذبذب الموسمي لحشره تربس العنب خلال الموسم الأول (2008/2007) أن الكثافه العدديه لهذه الحشره كانت منخفضه في أبريل، وبدأت الأعداد تتزايد في شهر مايو حتى بلغت أقصي تعداد لها في شهري يونيو ويوليو علي أوراق أصناف العنب الثلاثه. وبعدها تناقصت الأعداد بشده خلال السته أشهر التاليه (أغسطس- يناير).

وفي الموسم الثاني (2009/2008) كانت الكثافه العدديه لتربس العنب منخفضه علي المسكات والطومسون سيدليس خلال أبريل وعلي الأزميرلي خلال يونيو. وبدأت الأعداد تتزايد في شهر يوليو وأغسطس علي الثلاثه أصناف. وسجل أقصي تعداد للتربس في سبتمبر علي الأصناف الثلاثه المختبره. وبدأت المتوسطات الشهريه لأعداد التربس في الأنخفاض خلال شهور نوفمبر وديسمبر ويناير وأختفت الحشره تماماً خلال شهر فبراير علي الثلاثه أصناف موضع الدراسه.

ومن ناحيه أخري أوضحت نتائج دراسه التذبذبات الموسميه لأكاروس العنكبوت الأحمر الأوروبي أن الأعداد بدأت بمستويات منخفضه في أبريل للموسم الأول، وخلال مارس و أبريل للموسم الثاني على الثلاث أصناف. وسجل أقصي تعداد للأكاروس خلال شهر مايو و يونيو. ثم حدث أنخفاض شديد لأعداد الأكاروس خلال السته أشهر التاليه حتي أختفت الأعداد في فبراير للموسم الأول و سبتمبر للموسم الثاني.