INFLUENCE OF HOST PLANTS, TEMPERATURE AND RELATIVE HUMIDITY ON OCCURRENCE AND POPULATION DYNAMIC OF BLACK VINE THRIPS, *RETITHRIPS SYRIACUS* MAYET AT EL QASSASEEN DISTRICT, ISMAILIA GOVERNORATE

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(Manuscript received 15 January 2017)

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This study was conducted at El Qassaseen district, Ismailia Governorate in the farm of El Qassaseen Horticulture Research Station and a surroundin area during the period from 8th Aug., 2013 till 11th Jan., 2016 to determine the specific host plants, occurrence ratios and periods on each host, annual population dynamic on the specific plant hosts; also to clear the effect of certain climatic factors (maximum, minimum temperature and mean of relative humidity (RH%)) on the population fluctuations of black vine thrips, *Retithrips syriacus* Mayet. The obtained results revealed that, this pest is found infesting two hosts: pear (*Pyrus communis*) family: Rosacea and persimmon (*Diospyros kaki* L.) family: Ebenaceae throughout the activity period extended from 8th Aug. 2013 till 9th Jan.2014; then migrate to infest the two permanent evergreen trees (alternative hosts), Leucaena (Legume Forage Tree), (*Leucaena leucocephala*) family: Fabaceae and Brazilian pepper trees (*Schinus terebinthifolius* (Raddi)) family: Anacardiaceae throughout the 2nd period extended from 2nd Jan until 20th Aug. 2014. After that, the thrips return again to infest the main hosts of deciduous fruit trees which raised to four hosts, grapevine (*Vitis vinifera*) family: Vitaceae; jatropha, (*Jatropha curcas*) L. family: Euphorbiaceae, pear (*P. communis*); persimmon (*D. kaki* L.); throughout an activity period extended from 6th Aug. 2014 till 7th Jan. 2015. In the same trend, the thrips insects migrate again to infest the alternative hosts, Leucaena and Brazilian pepper trees throughout the period extended from 7th Jan. until 29th Aug. 2015. After that, it moved again to infest the main four fruit trees hosts throughout an activity period extended from 10th Aug. 2015 till 11th Jan. 2016. The thrips insects moved between main and alternative hosts throughout two overlapped periods observed through January and august months of the three study years. Also, highly significant differences appeared between averages of thrips numbers on different hosts (P< O.O1) with highest average numbers of 11.35, 12.83 and 13.06 individuals /leaf on main host, persimmon; 13.02 and 15.98 individuals /compound leaf of alternative host, Leucaena trees. In the same trend, the highly occurrence ratios of 67.33, 38.02 and 32.62 % were recorded on main host, persimmon; while, of 78.09 and 79.78 % (of the total numbers of thrips on the alternative hosts) were recorded on leucaena trees. The highest population densities of *R. syriacus* were recorded throughout October on main hosts (where the weekly mean of maximum temperature during the two years of 2014 and 2015 ranged 26.44-35.08 C°, weekly mean of minimum

temp. ranged 17.4-22.59 C° and weekly mean RH% ranged 64.99 - 80.36) and throughout March on alternative hosts (where the max. temp. during the two years of 2014 and 2015 ranged, 22.03-34.25 C°, min. temp. ranged 10.68-21.95 C° and mean RH% ranged 62.62-67.59). In accordance to the correlation and regression analysis, the effects of tested climatic factors (Max., min. temp. and mean RH %) varied as activity period and host plant, where the highest combined effect was (EV %) = 83.15%, recorded on Leucaena trees during 2015, while the lowest, EV% =59.98% was recorded on pear trees during 2014.
Key words: *Retithrips syriacus* Mayet, host plants, temperature, RH%

INTRODUCTION

Black vine thrips, *Retithrips syriacus* Mayet (Thysanoptera: Thripidae) is distributed in many countries of the world including Egypt (Fattouh, 1999; Medina-Guad and Franqui, 2001; Al-Zyoud and Elmosa, 2007). *R. syriacus* infests and causes a serious qualitative and quantitative damage as to grapevine (*Vitis* sp.), Japanese persimmon (*Diospyros kaki*), jatropha (*Jatropha curcas*), and pear (*Pyrus* sp.) and prefers leaves of grapevines, and persimmon. However, it can feed on fruit skin on persimmon (Monteiro, 2002; Lopes *et al*., 2002; Al-Zyoud and Elmosa, 2007; Tillekaratne *et al.,* 2007 and Khalil *et al*., 2010). The interaction between *R. syriacus* and hosts is governed essentially by the biochemical profiles of hosts, which tend to be altered subsequent to infestation. Also, Patel *et al.* (2013) reported that the incidence of *R. syriacus* started from February with a peak during November whereas it was nil during July; while, Al-Zyoud and Elmosa (2007) and Mannaa *et al*. (2012) stated that the temperature and relative humidity played important role in regulating the population density of *R. syriacus* which favored the hot, dry climate with clear sky and they added; the thrips remained active during July to October with a peak activity during August to September.

The ecological information of the agriculture pests may contribute in designing successful programs of integrated pest management (IPM), however, up to date and to the best of our knowledge; no research has been undertaken on the effect of abiotic and biotic (plant host) factors on *R. syriacus* under Ismailia region conditions. Therefore, the present study aimed to determine the specific host plants and its effects on occurrence and population dynamics of *R. syriacus*. In addition to figure out the effects of weekly mean temperature and relative humidity (RH %) as abiotic factors on the population dynamic of thrips on the specific plant hosts at El-Qassaseen district, Ismailia governorate. It is hoped that this work could help positively in laying

the foundation for sustainable pest control strategy for *R. syriacus* on specific hosts under Ismailia region condition.

MATERIALS AND METHODS

This study was conducted at El Qassaseen district, Ismailia Governorate during the period extended from August 2013 until January 2016 on the all plants or trees subjected to scouting all insects and animal pests in study area at the farm of El Qassaseen Horticulture Research Station and a surrounding area.

Weekly randomized samples of ten leaves or leaflets (in three replicates, 30 leaves or leaflets/sample) of different inspected plant or tree species presenting different canopy levels and directions for trees. The all trees and plants found in the study area were inspected for black vine thrips, *Retithrips syriacus* Mayet (Thysanoptera: Thripidae) actually in the fields early in the morning using hand lens. The numbers of thrips's individuals (adults and nymphs) on infested hosts, pear (*Pyrus communis*), persimmon (*Diospyros kaki* L.), grapevine (*Vitis vinifera*), jatropha (*Jatropha curcas* L.), Leucaena, (*Leucaena leucocephala*) and Brazilian pepper trees (*Schinus terebinthifolius* (Raddi)) were counted on different simple or compound leaves surfaces and recorded.

The obtained data were subjected to arithmetic curing, population figures illustration (using Excel software computer program) to know the annual population dynamic of black vine thrips, *R. syriacus* on the specific hosts. The occurrence ratios were deduced as percentages of insect's numbers on each host of the total insect's numbers on the all main or alternative hosts as follows: Occurrence ratios (%) = (X/Y)*100 where: X= insect's numbers on each host and Y= insect's total numbers on the all main or alternative hosts

The statistical analysis of simple correlation, partial and multiple regression between thrips numbers as dependent variable and each of weekly mean of maximum, minimum temperature and relative humidity (RH %) as independent variables were computed to understand the effect of tested factors on thrips population. Also, analysis of variance was carried out to determine the significant differences between mean numbers of thrips on specific hosts. Statistical analysis was computed using Costat software computer program as Duncan's multiple range tests (1955) and Little and Hills (1975).

RESULTS AND DISCUSSION

1. Occurrence ratios and periods of Black vine thrips, *Retithrips syriacus* Mayet on specific hosts:

The results in Tables (1 a & b) showed that, the black vine thrips, *R. syriacus* Mayet found colonizing the old leaves of the two fruit host trees, pear (*Pyrus communis* L.) and persimmon (*Diospyros kaki* L.F.) during the study basic year of 2013 raised to six hosts; grapevine (*Vitis vinifera* L.); jatropha, (*Jatropha curcas* L.), pear (*P. communis*); persimmon (*D. kaki* L.); Leucaena, (*Leucaena leucocephala* (Lam.) de Wit) and Brazilian pepper trees (*Schinus terebinthifolius* (Radii) during the following activity periods of 2014 and 2015 years.

In regard to occurrence ratios of *R. syriacus* on specific hosts (Tables 1a & b), the highest ratios of 67.33, 38.02 and 32.62 % were recorded on persimmon trees during 2013, 2014 and 2015 activity periods, respectively; followed by 25.90 % on grape during 2014. The lowest ratio of 15.21 % was recorded on jatropha at 2014. Also, on the two alternative hosts, the highest ratios of 78.09 and 79.79 % were recorded on leucaena trees during 2014 and 2015 activity periods, respectively. As well, the occurrence periods of *R. syriacus* varied in relation to plant hosts, where the activity periods extended from $1^{st}/2^{nd}$ week of Aug. till $1^{st}/2^{nd}$ week of Jan. on the grape, jatropha, pear, persimmon trees and from $1^{st}/2^{nd}$ week of Jan. till $3^{rd}/4^{th}$ week of Aug. on leucaena and Brazilian pepper trees with overlapping periods throughout Jan. and Aug. during study years.

The analysis of variance results in Tables (1a & b) cleared highly significant differences between the average numbers of thrips on specific hosts, where the highest averages of 11.35, 12.83 and 13.06 individuals / leaf were recorded on persimmon trees during the activity period of 2013, 2014 and 2015, respectively; while the highest averages of 13.02 and 15.98 individuals / compound leaf were recorded on leucaena trees during the activity period of year 2014 and 2015, respectively.

The obtained results agree with those of Monteiro *et al.* (1999); Abdurrahman and Mikta (2002) and Tuan *et al,* (2009) who mentioned *R. syriacus* as a pest of *V. vinifera*, pear and collected it from *J. curcas*, Brazilian pepper tree (*Schinus spp.*) and kaki fruit (persimmon) (*D. kaki* L.) on September and April. In Jordan, Al-Zyoud and Elmosa (2007) inspected *R. syriacus* late on mid-July, then the numbers fluctuated until diminished on late September on grape. In the same trend, the results are in harmony with those of De Villiers and Pringle (2007), Hamodi and Abdul-Rassoul

(2009) who observed that the *R. syriacus* numbers started to increase on grapevines from September or October and fluctuated after that. As well Elimem, *et al.* (2011) stated that *R. syriacus* was encountered on two host plants; grapevine during late summer, August, September, October and on persimmon in July and up. Mannaa, *et al.* (2012) in Egypt, recorded *R. syriacus* (Mayet) on *V. vinifera* leaves in September. As well as, Patel *et al.* (2013) who stated the incidence of *R. syriacus* on jatropha plants from February with a peak during November whereas it was nil during July and August. Also, Satyanarayana, *et al.* (2013) recorded *R. syriacus,* on *Jatropha* and added that the insects were active and persisted throughout the winter months till February.

In contrast, the results disagree with those of Lal (1982), Fattouh (1999), Rosi *et al.,* (2006) and Osman, *et al,* (2008) who noticed the population peak of the *R. syriacus* on grapevine and pear during June and July. Also, Medina *et al*. (2001) collected *R. syriacus* from *J. curcas* L. from January until April in San Juan, Puerto Rico.

Generally, the black vine thrips, *R. syriacus* is found infesting the two hosts (pear and persimmon trees) through the study period of 2013 raised to six hosts during study periods of 2014 and 2015; recording two activity periods, the first extended from early August till early January on the main fruit trees (grape, jatropha, pear and persimmon trees) with relatively highest occurrence ratios on persimmon trees and the second extended from early January until end August on the alternative hosts (leucaena and brazilian pepper trees) with relatively highest occurrence ratios on leucaena trees with two overlapped periods throughout August and January where the thrips moved in round trips between the main and alternative hosts.

2. Population dynamic of *R. syriacus* influenced by hosts trees and abiotic factors:

During the basic year of 2013, the data in Table (1a) and fig (1) cleared that, ***R. syriacus*** was observed only on pear and persimmon trees with occurrence periods extended from 8th August, 2013 till 9th January, 2014. The thrips population was oscillated and fluctuated drawing two distinct peaks on each of the two trees hosts, the 1st peak appeared at 10th and 24th October 2013 with mean numbers of 15.67 and 26 individuals / leaf on the two hosts, respectively. The 2nd peak recorded at 28th November and 5th December 2013 with mean numbers of 8.67 and 13.67 individuals / leaf on the two hosts, respectively.

The results of correlation and regression statistical analysis Table (2) describe and measure the influence of the recorded climatic factors (weekly mean of maximum, minimum temperature and relative humidity) on thrips average numbers on pear and

persimmon trees and exerted insignificant influences on thrips population recorded b1=0.271, b2= -0.049 and b3= -0.012 on pear and highly significant effect, b1=-4.478, b2= 5.42 and b3= 0.563 on persimmon with insignificant correlation, r = 0.302, 0.291 and 0.139 on pear and r=0.016, 0.162 and 0.236, on persimmon for the three studied factors, respectively. The combined effect of the studied factors together as explained variance (EV %) of 60.81% and 78.38% were recorded with highly significant variance for multiple regression (P<0.01) on the two hosts, respectively.

In a new interested observation about population dynamic of *R. syriacus* in the study area, the results in Tables (1a & b) and Fig (2) cleared overlapped period through the 1st and 2nd weeks of January 2014, between the end of thrips activity on the two main deciduous fruit trees hosts (pear and persimmon trees), and start of activity on the two permanent ever green alternative hosts (leucaena and Brazilian pepper trees). The thrips moved from main hosts to infest alternative hosts, exhibited activity period extended from 2nd January until 20th August 2014 and recorded three peaks on each of the two hosts. On leucaena, the three thrips peaks of 30.67, 15.33 and 29.67 individual / compound leaf were recorded at 19th March, 30th April and 2nd July of 2014, respectively. As well as on Brazilian pepper, the three peaks of 10.67, 8.33 and 7.33 individual / compound leaf were recorded at 27th February, 16th April and 2nd July 2014, respectively.

The results of statistical analysis in Table (2) showed positive insignificant correlation, r = 0.254 and r=0.047 between the weekly mean of max. temp. and thrips population on leucaena and Brazilian pepper trees, respectively; while the min. temp. and mean RH% had negative insignificant correlation, r=-0.224 , 0.086 and r= -0.095, -0.168 with thrips population the tow hosts, respectively. The separate effects as partial regression proved b1=0.836, b2= -0.569 and b3= -0.005 on leucaena and b1= 0.374, b2= -0.436 and b3=0.0007 on Brazilian pepper trees for the three factors, respectively. The combined effect of the three studied factors, EV % of 72.29 and 70.24 % was recorded with highly significant variance for multiple regressions (P<0.01) on the tow hosts, respectively.

Throughout overlapped period from the 1st to 3rd weeks of August, 2014 the thrips moved again from leucaena and Brazilian pepper trees to the main hosts, pear, persimmon and two host trees; grape and jatropha were infested too. As the results in Table (1a) and fig (3) the population abundance of *R. syriacus* on the main four hosts trees exhibited activity period extended from 6th August 2014 until 7th January 2015 drown number of peaks varied as hosts. The definite two peaks recorded at 1st October and 3rd December on grape ; at 1st October and 26th November and at 22nd

October, 26th November, with 22.33, 13.67; 20.33, 13.67 individuals/leaf and relatively high peaks average numbers of 36.33, 18.67 individuals/leaf on grape, pear and persimmon trees, respectively. On jatropha, three peaks were recorded at 18th September, 5th November and 17th December with 7.67, 15.33 and 8.33 individuals/leaf, respectively.

The results compiled in Table (2) cleared negative insignificant correlation between max. temp. and thrips population during 2014 activity period on jatropha trees and positive insignificant correlation on grape, pear, and persimmon trees, r = -0.037, 0.238, 0.205, and 0.044 on the four hosts, respectively. The min. temp. had insignificant positive correlation with thrips population on grape, jatropha, pear and persimmon trees, r = 0.295, 0.004, 0.184, and 0.197, respectively. As well as, the mean RH% had positive insignificant correlation, r = 0.17, 0.251, 0.124, and 0.296 with thrips population on the four host trees, respectively. The partial regression results revealed highly significant effect for max., min. temp. and RH % on thrips population b1=-1.853**, =-4.623**; 2.099**, 5.597** and 0.313***, 0.695** on jatropha, and persimmon, respectively. On grape, the max. temp. had insignificant negative effect on thrips population (b1=-0.074), while min. temp. and RH % recorded insignificant positive effect (b2=0.489 and b3= 0.045,). On pear, the max. temp. and RH % had insignificant positive effect on thrips population (b1=0.214 and b3=0.022), while min. temp. recorded insignificant negative effect (b2=-0.003). The three studied factors together resulted highly significant (P<0.01) combined effect as explained variance (EV %) of 65.31, 77.49, 59.98 and 73.78 % on *R. syriacus* population on the grape, jatropha, pear and persimmon trees, respectively.

In the same trend, at the end of *R. syriacus* activity on grape, jatropha, pear and persimmon trees, when the leaves of these trees started to shed; the thrips started to migrate to the alternative hosts, leucaena and Brazilian pepper trees throughout the overlapped period at the last two weeks of December 2014 and first week of January 2015. Data in Table (1b) and fig (4) cleared that the *R. syriacus* was colonized the two alternative hosts trees throughout the period extended from 7th January until 27th August 2015 with relatively high density on leucaena trees. The population of *R. syriacus* started with low numbers and increased gradually to form three peaks on each of the two alternative hosts. The three peaks were recorded at 19th and 26th March; 23rd April and 3rd January; 15th and 2nd July. with average numbers of 11.33 and 35.67; 9.33 and 23.33; 32.67 and 7.67 individuals/compound leaf for the three peaks on Brazilian pepper and leucaena trees, respectively. The population of thrips decreased gradually till end August and start to return again to the main fruit trees hosts throughout the overlapped period throughout August.

Data in Table (2) showed highly significant combined effects of the three studied factors on the population of *R. syriacus* (P<0.01) with explained variance (EV %) of 83.15 and 69.76 % with variance on the tow hosts, respectively. The weekly mean of max. temp. resulted negative influence on thrips population on leucaena (b1= -1.031) and positive influence on Brazilian pepper trees b1=0.162 with positive highly/or significant correlation, r = 0.543** and r=0.388* on the tow host, respectively. In contrast the min. temp. affected thrips population positively b2= 2.222 with highly significant correlation r=-0.565**, on leucaena but on Brazilian pepper trees impacted thrips population negatively b2= -0.054 with positive significant correlation r=-0.377*. The mean RH% influenced thrips population positively b3= 0.108 with insignificant correlation r=-0.17, on leucaena, while on Brazilian pepper trees impacted thrips population negatively b3 = -0.007 with insignificant correlation r=-0.075. Also, highly significant variance was recorded for multiple regression (P<0.01) and the combined effects of the three studied factors (EV %) were 83.15 and 69.76 % on leucaena and Brazilian pepper trees, respectively.

In accordance to the data in Table (1a & b) and fig (5) the thrips start to move again to the main fruit hosts throughout the overlapped period of last three weeks of August. The *R. syriacus* infests the main hosts in low densities and increased gradually to form two peaks on each of grape, pear, persimmon trees at 5th October and 7th December; 5th October and 30th November; 26th October and 7th December with average numbers of 20.33 and 15.67; 20.67 and 15.67; 33.33 and 23.33 individuals/leaf for the two peaks on the three hosts, respectively. Three peaks were recorded on foul shrub, jatropha at 12 October, 23 November 2015 and 4 January 2016 with average numbers of 28.33, 18.33 and 2.55 individuals/leaf, respectively.

The obtained results compiled in Table (2) cleared the effects of studied factors on the thrips numbers and demonstrated that, the max. temp. exerted insignificant negative influence on thrips population b1=-0.855,-1.633, -0.428 and -2.497 with positive insignificant correlation, r = 0.15, 0.176, 0.078, and 0.006 , on grape, jatropha, pear and persimmon trees, respectively. The min. temp. proved positive influence on thrips population b2=1.307, 2.409, 0.63 and 3.337 with positive insignificant correlation too, r = 0.19, 0.224, 0.091, and 0.057 on the four hosts, respectively. The mean RH% had highly significant positive effect (b3= 0.453**) on thrips population on persimmon trees and insignificant positive effect b3= 0.167, 0.265, 0.155 on grape, jatropha, and pear trees with positive highly significant/ significant correlation, r = 0.539**, 0.364*, 0.49**, and 0.361* on the four hosts, respectively. The combined effect of the three factors together on *R. syriacus*

population reached EV% of 68.05, 70.55, 72.39 and 66.51 % with highly significant variance P < 0.01 on the grape, jatropha, pear and persimmon trees, respectively.

Generally, the averages numbers of the black vine thrips, *R. syriacus* varied significantly and recorded relatively highest mean numbers of 11.35, 12.83 and 13.06 individuals /leaf with highly occurrence ratios of 67.33, 38.02 and32.62 % on persimmon trees throughout the activity periods of the three study years of 2013,2014 and 2015, respectively. On the alternative hosts, the relatively highest mean numbers of 13.02 and 15.98 individuals /leaf with highly occurrence ratios of 78.09 and 79.79 % were recorded on leucaena trees during the two activity period of 2014 and 2015, respectively. The tested climatic factors found played an important role in regulating the population changes of *R. syriacus* on different specific hosts.

In the same trend, the interested obtained information about *R. syriacus* cleared that the highest average numbers were recorded throughout October on main hosts where the max. temp. ranged, 26.44-29.64°C (2013), 27.94-31.14°C (2014) and 33.31-35.08°C (2015); min. temp. ranged 17.4-18.91 °C (2013), 19.39-20.41°C (2014) and 18.93-22.59°C (2015) and RH% ranged 64.99-70.76% (2013). 66.49 - 72.26% (2014) and 69.64 - 80.36% (2015). On alternative hosts, the highest numbers of *R. syriacus* were recorded throughout March, where the max. temp. ranged, 22.03-23.48 °C (2014) and 31.82-34.25°C (2015); min. temp. ranged 8.24-12.81°C (2014) and 19.15-21.95°C (2015) and RH% ranged 62.62-65.71 % (2014) and 62.60-67.59% (2015). The obtained results are in agreement with those of Al-Zyoud and Elmosa (2007) who recorded that the temperature and relative humidity play a great role in regulating the population abundance of *R. syriacus*. Also, in this regards, Lal (1982) in India observed negative significant relation between *R. syriacus* population and humidity, but insignificant relation was reported to each of max. and min. temp. While, our results in partially agree with those of Varvara *et al.* (1995) who cleared that min. and max. temp. and RH% have a positive effect on *R. syriacus* population in vineyards at high mean temperature ranged 28.3-30.2°C) and moderate RH (45.3- 48.8%) which occurred from May to August and June to November seem to be favorable for *R. syriacus.* In the same trend the obtained results are found in harmony with those of Mannaa, *et al.* (2012) in Egypt who stated that, the high min. temp. and moderate RH% played an important role in regulating the population and seem to be favorable for *R. syriacus* on grapevine. Also, *R. syriacus* individuals started to appear in April with very low numbers increased gradually until August; peaked in September; then decreased until completely disappeared after January on grapevine.

Table (1a) The Average Numbers of Black Vine Thrips, *Retithrips syriacus* Mayet Infested Main Plant Hosts during the activity Periods of 2013, 2014 and 2015 years at El Qassaseen District Ismailia Governorate

2013			2014					2015				
Date	Pear	Persimmon	Date	Grape	Jatropha	Pear	Persimmon	Date	Grape	Jatropha	Pear	Persimmon
Aug. 8/013	1.33	1	Aug. 6/014	1	1	0	1	Aug. 10/015	0	2	1.33	0
Aug. 15	1	1	Aug. 13	2.33	0	1	2.33	Aug. 17	1.33	2.67	2.67	1.33
Aug. 22	2.67	1.67	Aug. 20	4.67	1	2.33	1.67	Aug. 24	3.67	3.33	4.33	1.67
Aug. 29	2.33	4	Aug. 27	4	1.67	4.33	4.67	Aug. 31	4	5.67	3.33	2.33
Sep. 5	5.67	4.67	Sep. 4	8.33	3.33	7.67	6.67	Sep. 7	6.33	6.33	7.67	4.67
Sep. 12	6.33	6.33	Sep. 11	10.67	4.33	8.33	8.33	Sep. 14	9.67	9.33	9.33	7.33
Sep. 19	9	9.67	Sep. 18	16.33	7.67	9.67	9.33	Sep. 21	13.33	11.67	9.67	10.33
Sep. 26	12.33	12.67	Sep. 25	19	6	15.33	13.67	Sep. 28	16	13.33	13.33	13.67
Oct. 3	14	17.33	Oct. 1	22.33	4.67	20.33	19.33	Oct. 5	20.33	16.67	20.67	21.33
Oct. 10	15.67	22.67	Oct. 8	17	3.33	17.33	26.67	Oct. 12	14	28.33	18.33	29.67
Oct. 17	10.33	25.33	Oct. 15	15.33	6.67	12.33	33.33	Oct. 19	12.33	23.67	15.33	31.33
Oct. 24	7.67	26	Oct. 22	12.33	9.67	7.67	36.33	Oct. 26	10.33	20.67	11.67	33.33
Oct. 31	4.33	24.33	Oct. 29	9.67	12.33	4.67	24.33	Nov. 2	7.67	12.33	8.33	26.33
Nov. 7	3	20.67	Nov. 5	5.33	15.33	3.33	20.33	Nov. 9	5.33	9.33	3.33	22.33
Nov. 14	2.33	19.33	Nov. 12	6.67	9.33	5.67	15.33	Nov. 16	7.67	12.33	5.67	15.33
Nov.21	5.33	14.67	Nov.19	9.33	5.33	7.33	14.67	Nov. 23	11.33	18.33	9.33	11.67
Nov. 28	8.67	10.67	Nov. 26	11.67	3.67	13.67	18.67	Nov. 30	13.67	13.67	15.67	18.33
Dec. 5	5	13.67	Dec. 3	13.67	2.67	8	13.33	Dec. 7	15.67	10.67	12.33	23.33
Dec. 12	4.33	11.33	Dec. 10	5.67	5.67	5.33	11.33	Dec. 14	7.67	5.67	9.33	11.67
Dec. 19	2	8.33	Dec. 17	3.33	8.33	2.67	7.33	Dec. 21	2.33	3.33	6.67	9.33
Dec. 26	1	2.67	Dec. 24	1.33	3.67	2	3.67	Dec. 28	1.33	1.67	5.33	2.67
Jan. 2 /o14	1	2	Dec. 31	1	1.33	1.67	1.67	Jan. 4/016	1	2.33	4.67	1.33
Jan. 9	1.33	1	Jan. 7/015	0	1	1.33	1	Jan. 11	1	1.33	1.33	1
Mean*	5.51 b	11.35 a	mean	8.74 b	5.13 bc	7.04 bc	12.83 a	mean	8.09 c	10.20 bc	8.68 c	13.06 ab
Occurrence ratios (%)	33.67	67.33	Occurrence ratios (%)	25.91	15.21	20.87	38.02	Occurrence ratios (%)	20.20	25.48	21.69	32.62
F values	8.052 ***		F values	10.404***				F values	10.542***			
LSD	4.12		LSD	3.827				LSD	4.234			

TABLE (1b) The Average Numbers of Black Vine Thrips, *Retithrips syriacus* Mayet infested alternative Plant Hosts during activity Periods of 2014 and 2015 Seasons at El Qassaseen District Ismailia Governorate

2014			2015		
Date	Leucaena	Brazilian-Pepper	Date	Leucaena	Brazilian-Pepper
Jan. 2/014	0	1	Jan. 7/015	1	1
Jan. 9	2.33	0	Jan. 14	3.33	0
Jan. 16	4	2	Jan. 21	4.67	1.33
Jan. 23	4.67	2.67	Jan. 28	6.67	0
Jan. 30	4.67	2.67	Feb. 5	7.67	2.33
Feb. 6	6.33	3.67	Feb. 12	9.33	2.67
Feb. 13	8.33	4.33	Feb. 19	11.33	4.33
Feb. 20	12.67	6.67	Feb. 26	14.67	6.33
Feb. 27	13.67	10.67	Mar. 5	15.67	4.67
Mar. 5	18.33	6.33	Mar. 12	18.33	7.67
Mar. 12	25.67	3.67	Mar. 19	25.33	11.33
Mar. 19	30.67	2.33	Mar. 26	35.67	8.67
Mar. 26	22	2.33	Apr. 2	30.33	5.33
Apr. 2	17.33	4.67	Apr. 9	26.33	3.33
Apr. 9	12.33	6.33	Apr. 16	22.33	6.67
Apr. 16	10	8.33	Apr. 23	20.33	9.33
Apr. 23	11.67	4.33	Apr. 30	16.67	8.33
Apr. 30	15.33	3	May. 7	15.67	5.67
May. 7	13.67	2.67	May. 14	11.67	4
May. 14	12	2.33	May. 21	14.33	2.33
May. 21	10.33	1	May. 28	18.33	1.67
May. 28	6.33	2.33	Jun. 3	23.33	1
Jun. 4	10	2.67	Jun. 10	19.67	2.67
Jun. 11	12.67	3.67	Jun. 18	12.67	2.67
Jun. 18	18.33	4.33	Jun. 25	15.33	3.33
Jun. 25	27.33	6	Jul. 2	26.67	4.33
Jul. 2	29.67	7.33	Jul. 9	32.67	5
Jul. 9	22.33	5.33	Jul. 15	24.33	7.67
Jul. 16	19.67	3.67	Jul. 22	19.33	4.33
Jul. 23	15.67	2.33	Jul. 30	15.67	3.33
Jul. 30	14.33	1.33	Aug. 6	12.33	2.33
Aug. 6	5.33	1.33	Aug. 13	7.33	1.67
Aug. 13	3.33	1	Aug. 20	3.33	1.33
Aug. 20	2	2	Aug. 27	1	1
Mean*	13.02 a	3.65 c	Mean*	15.98 a	4.04 d
Occurrence ratios (%)	78.09	21.91	Occurrence ratios (%)	79.79	20.21

* This table follows Table (1a) in the results of analysis of variance as letters on means values

Table 2. Partial, Multiple Regression and Simple Correlation Values between ***Retithrips syriacus*** Mayet averages numbers on Different Plant Hosts and Tested Climatic Factors under El Qassaseen district, Ismailia Governorate Conditions During the activity Periods of 2013, 2014 and 2015.

Tested variables	Parameters	Years	2013		2014						2015					
		Hosts	Pear	Persimmon	Grape	Jatropha	Pear	Persimmon	Leucaena	Brazilian Pepper	Grape	Jatropha	Pear	Persimmon	Leucaena	Brazilian Pepper
MAX. TEMP. weekly mean	Partial Reg.	b1	0.271	-4.478	-0.074	-1.853	0.214	-4.623	0.836	0.374	-0.855	-1.633	-0.428	-2.497	-1.031	0.162
		se	0.725	1.092	1.014	0.486	0.902	1.338	0.781	0.229	0.723	0.885	0.691	1.259	0.995	0.359
		t	0.374	-4.098	-0.073	-3.607	0.237	-3.454	1.071	1.635	-1.183	-1.84	-0.619	-1.983	-1.035	0.452
		p	ns	***	ns	**	ns	**	ns	ns	ns	ns	ns	ns	ns	ns
	Simple corr.	r	0.302	0.016	0.283	-0.037	0.205	0.044	0.254	0.047	0.15	0.176	0.078	0.006	0.543	0.388
		p	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	**	*
MIN. TEMP. weekly mean	Partial Reg.	b2	-0.049	5.42	489	2.099	-0.003	5.597	-0.596	-0.436	1.307	2.409	0.63	3.337	2.222	-0.054
		se	0.866	1.304	1.199	0.575	1.067	1.583	0.847	0.248	1.02	1.249	0.975	1.776	1.401	0.506
		t	**-0.057**	4.156	0.407	3.646	**-0.002**	3.536	-0.703	-1.75	1.281	-1.84	0.646	1.878	1.586	-0.108
		p	ns	***	ns	**	ns	**	ns	ns	ns	ns	ns	ns	ns	ns
	Simple corr.	r	0.291	0.162	0.295	0.004	0.197	0.184	0.224	-0.095	0.19	0.224	0.091	0.057	0.565	0.377
		p	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	**	*
RH % weekly mean	Partial Reg.	b3	-0.012	0.653	0.045	0.313	0.022	0.695	-0.005	0.0007	0.167	0.265	0.155	0.453	0.108	-0.007
		se	0.101	0.152	0.148	0.071	0.132	0.196	0.153	0.044	0.086	0.106	0.083	0.15	0.124	0.045
		t	**-0.121**	4.29	0.305	4.39	0.171	3.542	-0.035	0.017	1.928	2.503	1.882	3.008	0.876	-0.165
		p	ns	***	ns	***	ns	**	ns	ns	ns	ns	ns	**	ns	ns
	Simple corr.	r	0.139	0.236	0.17	0.251	0.124	0.296	0.086	-0.168	0.364	0.49	0.361	0.539	0.17	0.075
		p	ns	ns	ns	ns	ns	ns	ns	ns	*	**	*	**	ns	ns
All tested variables	Multiple Regression	EV %	60.81	78.38	65.31	77.49	59.98	73.78	72.29	70.24	68.05	70.55	72.39	66.51	83.15	69.76
		F	12.89	28.801	15.46	27.39	12.49	22.57	30.57	27.75	17.33	19.37	21.103	16.23	56.93	27.14
		P	***	**	***	***	***	**	**	**	***	***	***	***	***	***

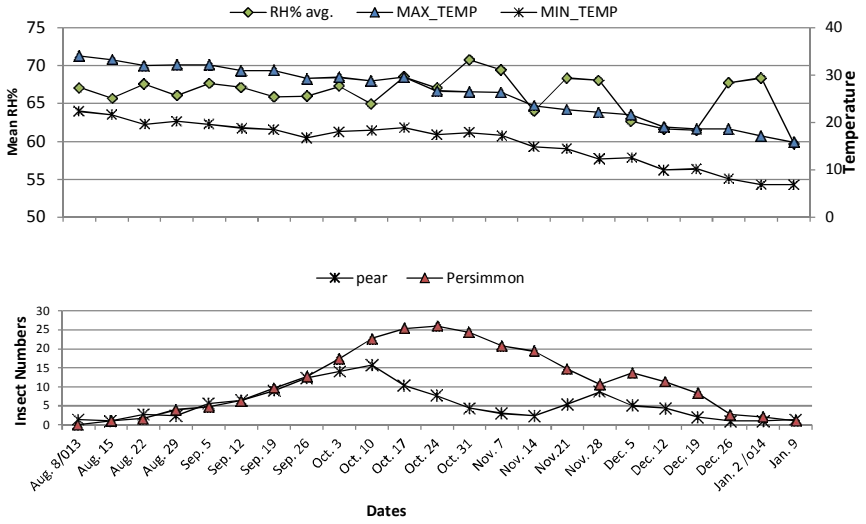

Fig (1) Population Fluctuation of Black Vine Thrips, *Retithrips syriacus* Mayet on Main Specific Hosts Trees in Relation to the Tested Climatic Factors During 2013 Activity Period.

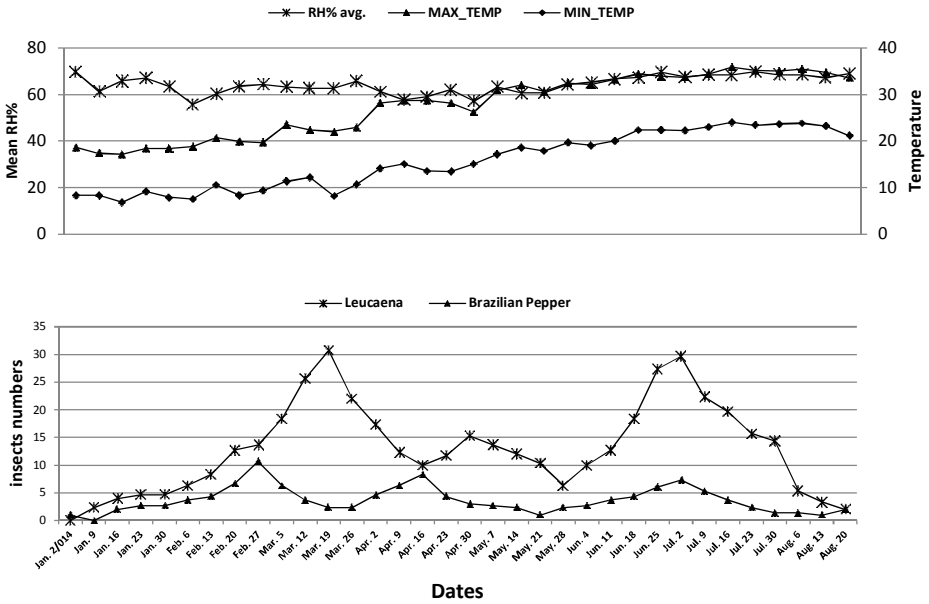

Fig (2) Population Fluctuation of Black Vine Thrips, *Retithrips syriacus* Mayet on Alternative Hosts Trees in Relation to the Tested Climatic Factors During 2014 Activity Period.

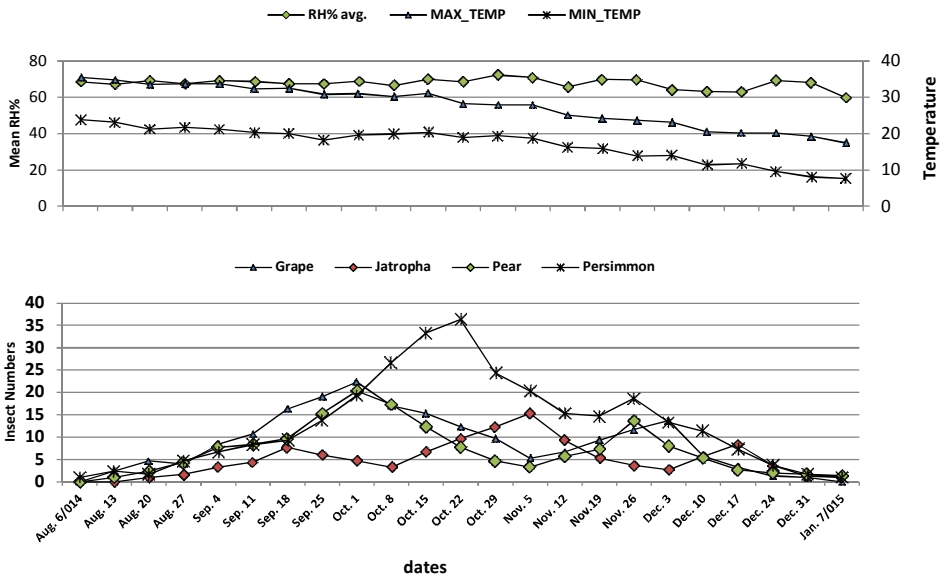

Fig (3) Population Fluctuation of Black Vine Thrips, *Retithrips syriacus* Mayet on Main Specific Hosts Trees in Relation to the Tested Climatic Factors During 2014 Activity Period.

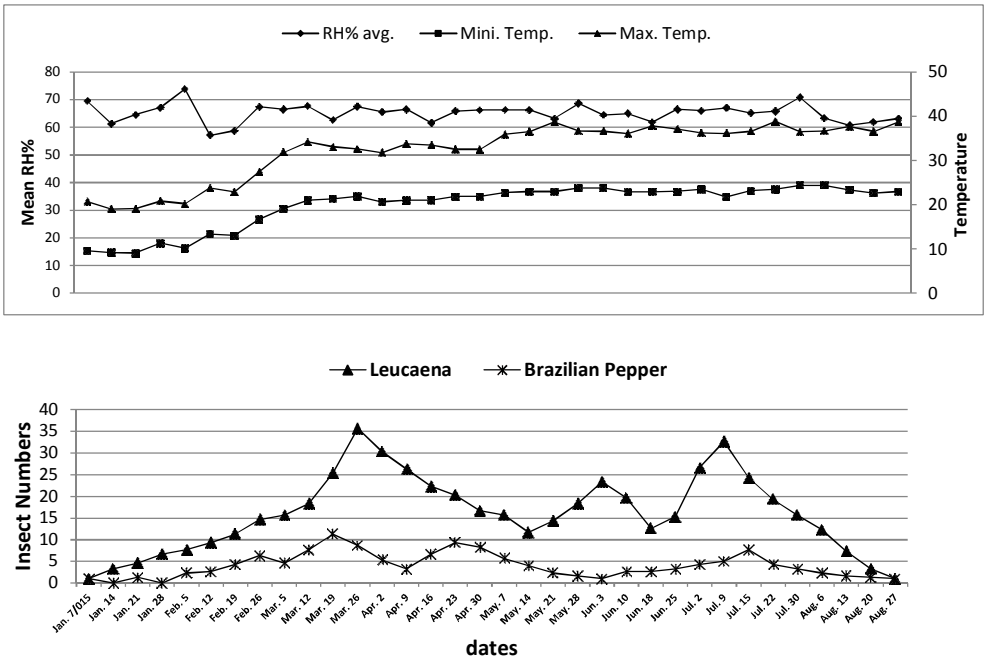

Fig (4) Population Fluctuation Of Black Vine Thrips, ***Retithrips syriacus* Mayet** on Alternative Hosts Trees in Relation to the Tested Climatic Factors During 2015 Activity Period.

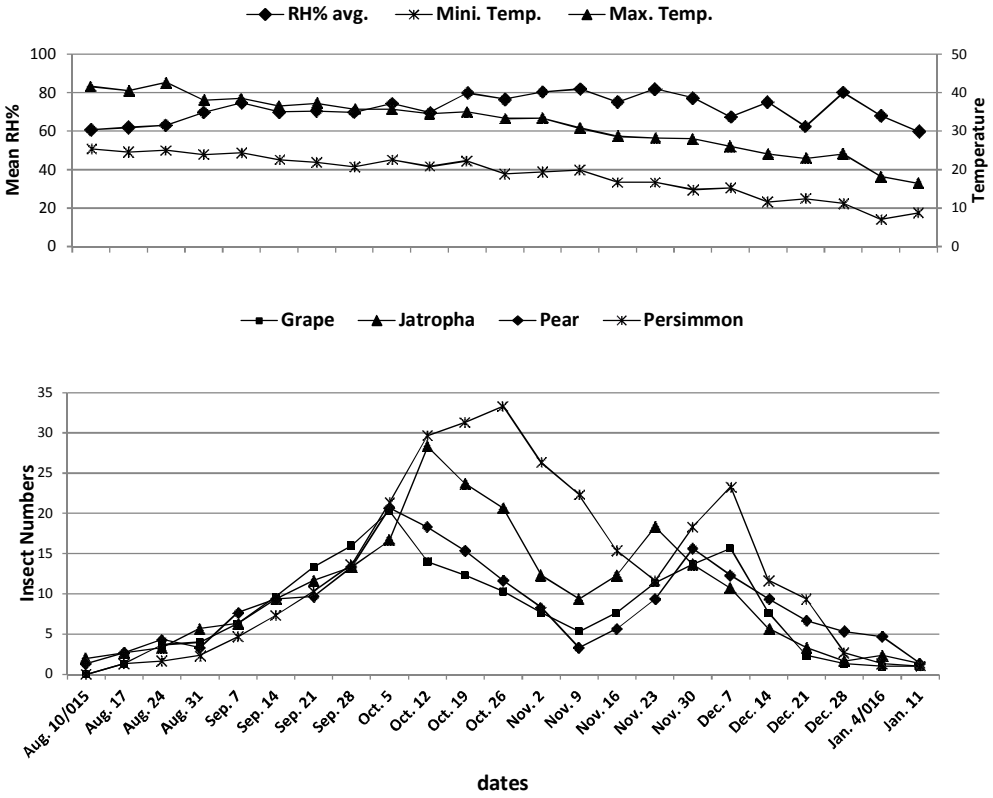

Fig (5) Population Fluctuation of Black Vine Thrips, *Retithrips syriacus* Mayet on Main Specific Hosts Trees in Relation to the Tested Climatic Factors During 2015 Activity Period.

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العوائل النباتية والحرارة والرطوبة المؤثرة علي تواجد وحركة مجموع تربس العنب الاسود ***Retithrips syriacus* Mayet** في القصاصين محافظة الاسماعيلية

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أجريت هذه الدراسة في القصاصبن محافظة الاسماعيلية (في مزرعة محطة القصاصين لبحوث البساتين والمنطقة المحيطة بها) خلال الفترة من الثامن من أغسطس ٢٠١٣ إلي الحادي عشر من يناير ٢٠١٦ وذلك لتحديد العوائل النباتية ونسب وفترات التواجد وحركة المجموع عليها بالاضافة إلي دراسة تأثير العوامل غير الحيوية (الحرارة القصوى والدنيا والرطوبة النسبية) علي تقلبات مجموع حشرات تربس العنب الاسود . وأظهرت النتائج أن تربس العنب الأسود وجد علي عائلين اثنين من الأشجار المثمرة وهي أشجار الكمثرى وأشجار الكاكا خلال فترة نشاط امتدت من الثامن من أغسطس ٢٠١٣ وحتى التاسع من يناير ٢٠١٤ وبعد ذلك ارتحلت لتصيب عائلين بديلين من الاشجار مستديمة الخضرة وهي اشجار الويسيانا و الفلفل المالطي عريض الأوراق وذلك خلال فترة نشاط استمرت من الثاني من يناير وحتى العشرين من أغسطس ٢٠١٤ ، بعد ذلك عادت حشرات التربس لتصيب العوائل الأساسية من أشجار الفاكهة المتساقطة الأوراق والتي زادت إلي أربعة عوائل واصبحت تمثل الكمثرى والكاكا والعنب وشجيرات الجاتروفا وذلك خلال فترة نشاط امتدت من السادس من أغسطس ٢٠١٤ وحتى السابع من يناير ٢٠١٥ . وفي نفس الاتجاه وعند تساقط الأوراق لهذه العوائل ارتحلت حشرات التربس مرة أخرى لتصيب العائلين البديلين من الأشجار مستديمة الخضرة وهي أشجار الويسيانا و الفلفل المالطي عريض الاوراق وذلك خلال فترة نشاط استمرت من السابع من يناير وحتى التاسع والعشرون من أغسطس ٢٠١٥ ، وبعد ذلك عادة مرة أخرى لتصيب العوائل الأساسية الأربعة خلال فترة نشاط امتدت من العاشر من أغسطس ٢٠١٥ وحتى الحادي عشر من يناير ٢٠١٦ . ووجد أن حشرات التربس تتحرك بين العوائل الأساسية والبديلة خلال فترتين تداخل لوحظتا خلال شهري أغسطس ويناير من سنوات الدراسة . سجلت النتائج وجود اختلافات معنوية جدا بين متوسطات تعداد تربس العنب الأسود علي العوائل المحددة (P< O.O1) مع وجود أعلي متوسطات للتعداد ١١,٣٥، ١٢,٨٣ و١٣,٠٦ فرد/ ورقة من أشجار الكاكا ، بينما سجل ١٣,٠٢ و١٥,٩٨ فرد / ورقة مركبة من أشجار الويسيانا وفي نفس الاتجاه سجل أعلي نسب تواجد ٦٧,٣٣، ٣٨,٠٢ و ٣٢,٦٢% على الكاكا من العوائل الأساسية وسجل ٧٨,٠٩ و ٧٩,٧٨ % علي الويسيانا من العوائل البديلة . سجل أعلى تعداد لحشرات التربس علي العوائل الأساسية خلال شهر أكتوبر حيث متوسط إسبوعي للحرارة القصوى تراوح ما بين ٢٦,٤٤–٣٥,٠٨ درجة مئوية ومتوسط اسبوعي للحرارة الدنيا تراوح ما بين ١٧,٤ – ٢٢,٥٩ درجة مئوي ومتوسط اسبوعي للرطوبة النسبية تراوح ما بين ٦٤,٩٩– ٨٠,٣٦ % خلال سنتي الدراسة كما سجل اعلي تعداد علي العوائل البدية خلال شهر مارس حيث متوسط أسبوعي للحرارة القصوى تراوح ما بين ٢٢,٠٣–٣٥,٢٥ درجة مئوية ومتوسط أسبوعي للحرارة الدنيا تراوح ما بين ١٠,٦٨ – ٢١,٩٥ درجة مئوية ومتوسط أسبوعي للرطوبة النسبية تراوح ما بين ٦٢,٦٢– ٦٧,٥٩ % خلال سنتي الدراسة . وبناء علي نتائج التحليل الإحصائي لمعاملي الارتباط والانحدار ، وجد أن تاثير العوامل الجوية المختبرة قد اختلف باختلاف فترة النشاط والعائل النباتي حيث سجل أعلي تأثير مشترك للعوامل الثلاث EV% = ٨٣,١٥ % علي حشرات التربس علي Hشجار الويسيانا خلال ٢٠١٥ بينما سجل Hقل تاثير EV% = ٥٩,٩٨ % علي حشرات التربس علي أشجار الكمثرى خلال ٢٠١٤ .