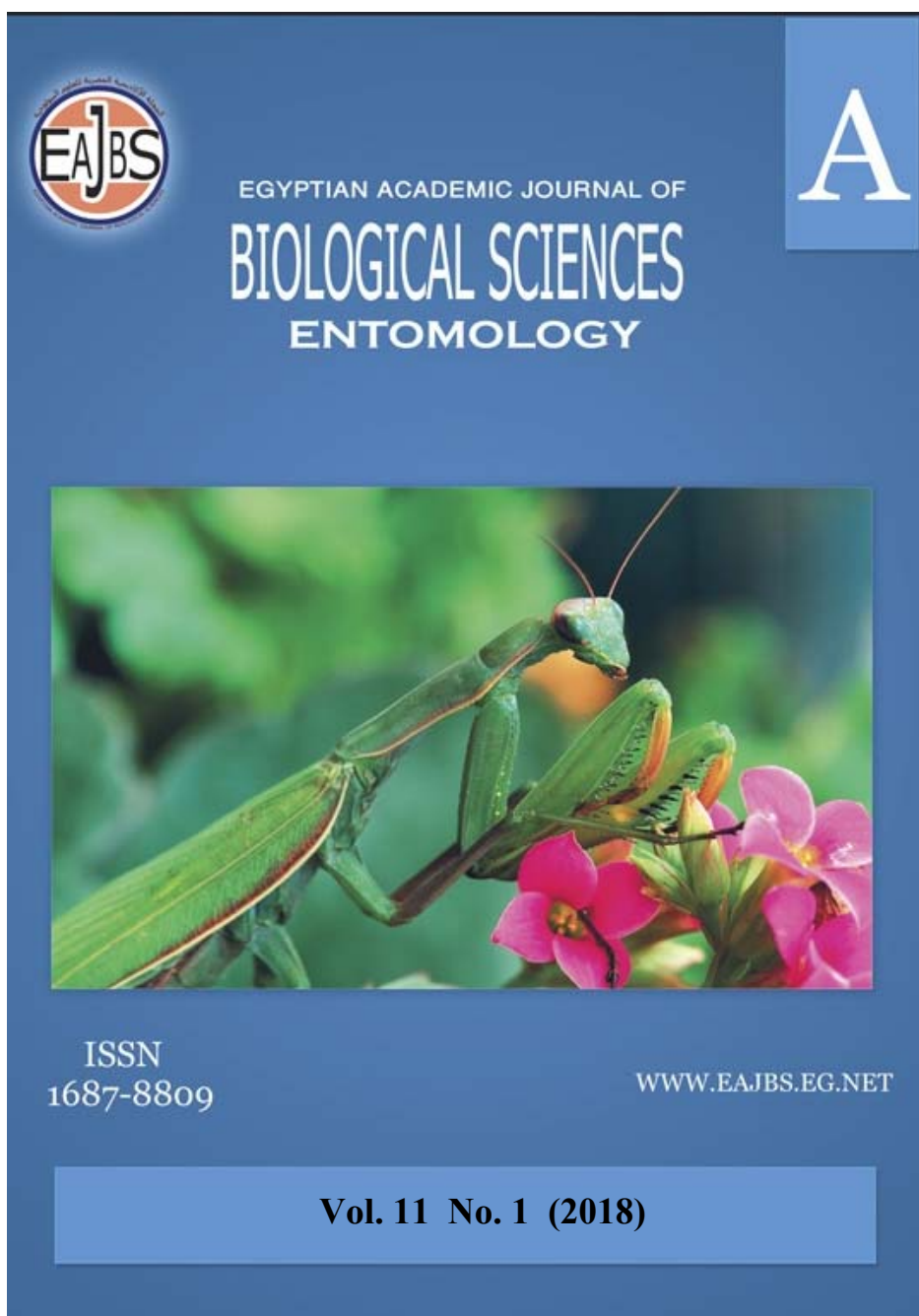


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Population Dynamic of Honeydew Moth, *Cryptoblabes gnidiella* Miller in Vineyards Orchards

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ARTICLE INFO

Article History

Received:10/1/2018

Accepted:12/2/2018

Keywords:

Population dynamic
, *Cryptoblabes gnidiella* Miller ,
a biotic factors,
relative humidity,
air temperature, dew
point

ABSTRACT

This work was carried out in a private farm of vineyards orchard, at Zagazig district , Sharkia governorate , Egypt, during 2014, 2015 and 2016 seasons . The present study aim to study the effect of temperature , relative humidity and dew point on population dynamic of *Cryptoblabes gnidiella* picked by used sex pheromone traps under field condition . The results showed that average number of adults were increasing gradually from May,10 to August ,23 thenceforth decreased in period after August,23 to Dec.,6 at three seasons. Also, the results recorded 5th, 6th and 6th peaks during 2014, 2015 and 2016 seasons, respectively. Especially , 2014 season, the first peak recorded 4 adults at May,31, the second peak recorded 15.6 adults at July , 12 , the 3rd peak recorded 17.3 adults at August, 23, the 4th peak appear 13 adults at Sept.,20 and the 5th peak recorded 7.6 adults at Oct.,25 , respectively. The *C. ginidiella* adults collected from traps during 2015 season , recorded 6th peaks as follow , 10.3, 8.0, 10.33, 7.66, 9.66 and 12.66 during May,31 , Jun.,28, July, 19, August,23, Sept.,13 and Oct., 18 , respectively . On the other hand , the results during 2016, illustrate that there are highly significant correlation relationship between average number with DP, average number with air temperature, average number with (DP & RH) and average number with (air temp with DP) , but the relation is not significant between average number with RH alone , average number with (air Temp. & RH) . The data illustrate that abiotic factors as (RH, DP and temperature) cause highly significant on average number of *C. gnidiella* , the temperature affect on average number more than DP and RH.

INTRODUCTION

In Egypt, vineyards have undergone sustained plant replacement. In the past 20 years, the area of vineyards of Egypt was 196993 faddan during 2014, 2015 and 2016 seasons , fruity area 178323 faddan , total production 1686706 tons and

production mean per garden (fad.) 9.459 tons per garden during three successive seasons of vineyards a lot of many areas have been replaced by newer, healthier, and higher-quality grapevine cultivars. Eighty-nine percent of the vineyards growing area is concentrated in the Governorate . pests have been a minor problem in Egypt governorate vineyards . eliminating the need for widespread applications of insecticides (Bentancourt and Scatoni 1999. *Cryptoblabes gnidiella* (Millière) (Lepidoptera: Pyralidae) has become a sporadic pest in some governors capable of causing significant damage to some grapevine cultivars in certain years and areas (Bentancourt and Scatoni 2006). This polyphagous moth, is native to the Mediterranean regions of Europe and reported from Africa, Asia, New Zealand, North and South America (Bagnoli and Lucchi 2001, Ioriatti *et al.* 2012). It has been known in Uruguay for 30 years, but only reported the vineyards (Scatoni and Bentancourt 1983). The larvae feed on grape cluster, especially at the end of the season when the fruits already mature. Feeding damage produces conditions conducive to the development of rots. The economic losses become more significant when harvest is delayed, due to an increase in population and a potential additional generation. Also, rainfall and high humidity create conditions suitable for rots causing further deterioration of the clusters (Bentancourt and Scatoni 2006).

Knowing pest phenology is an essential aspect of developing a management program. The identification of the sex pheromone of *C. gnidiella* provided a monitoring tool for adults now widely used (Bjostad *et al.* 1981, Anshelevich *et al.* 1993). Monitoring of adults as well as degree-days (DD) allows the prediction of pest phenological events for management purposes. Numerous reports have correlated species catches with DD for several species of lepidoptera. The thermal constant and lower thresholds of development for *C. gnidiella* were determined by Avidov and Gothilf (1960) for Israel and by Ringenberg *et al.* (2005) for Brazil. There is, however, no information available about the relationship between DD and catch levels. Understanding a pest's phenology and monitoring its populations are essential aspects of integrated pest management. The present study aim to study the effect of temperature , relative humidity and dew point of population dynamic of *Cryptoblabes gnidiella* under field condition .

MATERIALS AND METHODS

This work was carried out in a private farm of vineyards orchard, at Zagazig, Sharkia, Governorate. The honeydew moth, *Cryptoblabes gnidiella* Miller (Lepidoptera: Pyralidae) is a polyphagous serious pest in grapevine orchards. The traps used to moths picked. The sex pheromone traps were used and randomly distributed on each area of orchard at a rate of three traps / faddan to study the population dynamics of moths. The traps were examined weekly in grapevine under field conditions. Weekly examined were beginning from May,10 to December,6 2014, 2015 and 2016 years. The picked adults of *Cryptoblabes gnidiella* Miller were recorded per week . Daily records of average means of air temperature, relative humidity and dew point were obtained from the Agro-meteorological Zagazig station, Sharkia governorate which is located closely to experimental area during three successive seasons. The correlation and regression between mean number of weekly adults and mean of air temperatures, mean relative humidity and mean of dew point were calculated . Analysis were conducted using the statistical package JMP 7.0.1 (SAS Institute , 2007)

RESULTS AND DISCUSSIONS

Population dynamic during 2014 season:

Figure 1. indicated that average number of *Cryptoblabes gnidiella* Miller which picked inter traps during 2014. The results showed that average number of adults were increasing gradually from May,10 to August ,23 thenceforth decreased in period after August,23 to Dec.,6 . The data recorded 5th peaks, the first peak recorded 4th adults at May,31, the second peak recorded 15.6 adults at July , 12 , the 3rd peak recorded 17.3 adults at August, 23, the 4th peak appear 13 adults at Sept.,20 and the 5th peak recorded 7.6 adults at Oct.,25 , respectively.

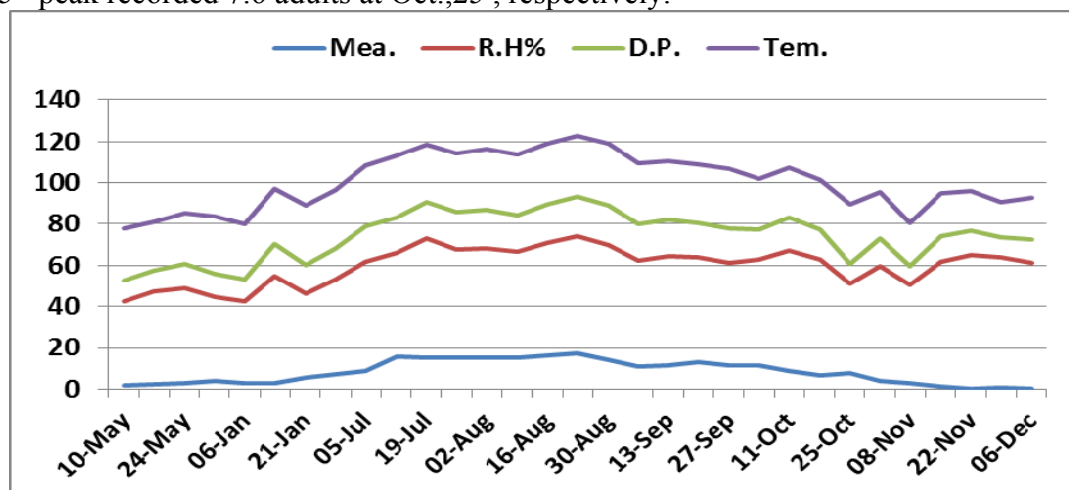


Fig. 1 Average number of *Cryptoblabes gnidiella* (Miller) /trap/week in vineyard orchard during 2014

Table.1. showed correlation between average number of adults and some abiotic factors such air temperature, relative humidity (RH) and dew point (DP). The results illustrate that there are highly significant correlation between average number with DP, air temperature, air temperature with DP, significant relation between average number of adults with air temperature and RH but the relation not significant between average number with RH alone and between average number with DP and RH accumulate. In the same table, especially regression the data illustrate that abiotic factors (RH, DP and temperature) affect on average number of *C. gnidiella* by 18.0, 76.5 and 67.4 %, respectively. Also, there are highly significant efficacy on population dynamics.

Table .1. Correlation and regression between average number of *Cryptoblabes gnidiella* adults, air temperature, relative humidity and dew point during 2014 season.

Average No. and some abiotic factors	Correlation				Regression			
	r	Slope	SE	P	R ²	affect	SE	P
Average No. with RH	0.086	0.101	0.185	Ns	0.180	18	2.81	***
Average No. with DP	0.874	0.512	0.089	***	0.765	76.5	0.748	***
Average No. with Temp	0.762	0.492	0.120	***	0.674	67.4	0.974	***
DP with RH	0.292	0.145	0.177	Ns				
Temp with RH	-0.443	-0.243	0.166	*				
Temp with DP	0.693	0.764	0.133	***				

Population dynamic of *C. gnidiella* during 2015 season:

The *C. gnidiella* adults collected from traps during 2015 season(Fig.2), recorded 6th peaks as follow, 10.3, 8.0, 10.33, 7.66, 9.66 and 12.66 males during May,31, Jun.,28, July, 19, August,23, Sept.,13 and Oct., 18, respectively.

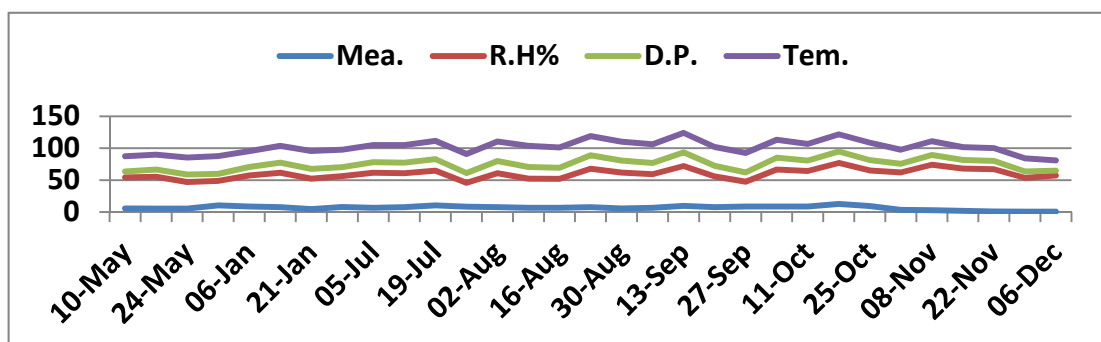


Fig. 2. Average number of *Cryptoblabes gnidiella* (Miller) /trap/week in vineyard orchard during 2015.

The results from Table (2) , illustrate that there are highly significant correlation between average number with air temperature and average number with air temperature with DP, significant relation between average number of adults with DP and average with temperature and RH but the relation not significant between average number with RH alone . On the other hand , regression, the data illustrate that abiotic factors (RH, DP and temperature) affect on average number of *C. gnidiella* by 22.1, 33.4 and 69.9 % , respectively.

Table .2. Correlation and regression between average number of *Cryptoblabes gnidiella* adults , air temperature, relative humidity and dew point during 2015 season.

Average No. and some abiotic factors	Correlation				Regression			
	r	Slope	SE	P	R ²	affect	SE	P
Average No. with RH	-0.280	-0.781	0.178	Ns	0.221	22.1	4.73	***
Average No. with DP	0.544	0.615	0.155	**	0.334	33.4	1.77	***
Average No. with Temp	0.713	0.964	0.130	***	0.699	69.9	1.42	***
Temp with RH	-0.458	-0.222	0.166	**				
Temp with DP	0.729	0.873	0.126	***				

Population dynamic of *C. gnidiella* during 2016 season:

The results in Figure 3. show average number *C. gnidiella* Miller which picked by using traps during 2016. The results show that average number of adults were increasing gradually from May,10 to Sept ,13 recorded 4th peaks thenceforth decreased in period after Sept.,13 to Dec.,6, recorded two peaks .

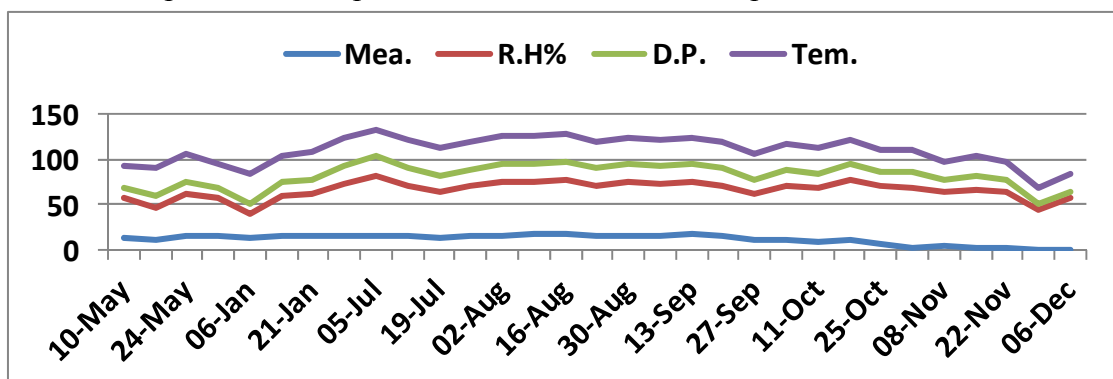


Fig. 3. Average number of *Cryptoblabes gnidiella* (Miller) /trap/week in vineyard orchard during 2016.

The results from Table (3) , illustrate that there are highly significant correlation between average number with DP, air temperature, DP with RH and air temp. with DP, but the relation is not significant between average number with RH alone and with Temp. and RH . In addition , regression, the data illustrate that abiotic factors (RH, DP and temperature) affect highly significant on average number of *C. gnidiella* by 6.3, 32.9 and 79.7 % , respectively. These results agreement with Vidart *et al.* (2013), found that *C. gnidiella* three generations per year and overwinters without diapause as larvae on dried grapes remaining after harvest. Using the proportion of cumulative male moths caught from December to May from 2003–2007 on the four cultivars and the sum of effective temperatures above two previously-published lower-threshold temperatures for development, 12.26°C and 13°C, statistically significant logistic models were estimated. Yehuda *et al.* (1991) found that the moth overwintered in avocado orchards on fresh or dry fruits remaining on the trees or on leaves infested with *Protopulvinaria pyrifomis*, on the weed *Paspalum dilatatum* and on various other plants. Adult moths were caught in pheromone traps in March-April (5%), June-September (75%) and October-December (20%).

Table .3. Correlation and regression between average number of *Cryptoblabes gnidiella* adults , air temperature, relative humidity and dew point in 2016 season.

Average No. and some abiotic factors	Correlation				Regression			
	r	Slope	SE	P	R ²	affect	SE	P
Average No. with RH	-0.220	-0.361	0.181	Ns	0.063	6.3	5.15	***
Average No. with DP	0.571	0.415	0.152	***	0.329	32.9	1.93	***
Average No. with Temp	0.877	0.606	0.088	***	0.797	79.7	1.00	***
DP with RH	0.568	0.252	0.152	***				
Temp with RH	-0.279	-0.118	0.178	Ns				
Temp with DP	0.593	0.624	0.149	***				

Acknowledgments:

We express our thanks to prof . Dr. Mohamed Hassan Abd-Elrahman soliman, plant protection research institute, ARC,to help me, engineer Sameh Ibrahim Ahmed director of control general administering and the farmer have a private orchard to help me at carried out this research .

REFERENCES

- Anshelevich L.; Kehat M.; Dunkelblum E. and S. Greenberg. 1993. Sex pheromone traps for monitoring the honeydew moth, *Cryptoblabes gnidiella*: effect of pheromone components, pheromone dose, field aging of dispenser, and type of trap on male catches. *Phytoparasitica*. 21:189–198.
- Avidov, Z. and S. Gothilf. 1960 . Observations on the honeydew moth (*Cryptoblabes gnidella* Milliere) in Israel: biology, phenology and economic importance. *Ktavim*. 10(3–4):109–124.
- Bagnoli, B. and A. Lucchi. 2001. Bionomics of *Cryptoblabes gnidiella* (Millière) (Pyralidae Phycitinae) in Tuscan vineyards. *IOBCwprs Bulletin*. 24:79–83.
- Bentancourt, C.; I. Scatoni and y. Guía .1999. ácaros de importancia agrícola y forestal en el Uruguay. Montevideo: Facultad de Agronomía - PREDEG/GTZ; p. 435.
- Bentancourt,C. and I. Scatoni. 2006. Lepidópteros de importancia económica, reconocimiento, biología y daños de las plagas agrícolas y forestales. Montevideo: Hemisferio Sur-Facultad de Agronomía; 2006. p. 437.

- Bjostad, L.B.; E.Gurevitz ; S. Gothilf and W.L. Roelofs . 1981. Sex attractant for the honeydew moth, *Cryptoblabes gnidiella*. *Phytoparasitica*. 9:95–99.
- Ioriatti, C.; A. Lucchi and L. Varela . 2012. Grape berry moths in western European vineyards and the recent movement into the new world, pp 339-359. In: Bostanian NJ, Vincent C, Isaacs R, editors. *Arthropod Management in Vineyards : pest, approaches, and future directions*. London: Springer; 2012. p. 505.
- Ringenberg, R.; M. Botton; M.Silveira and Nondillo A. 2005. Biologia comparada e exigências térmicas de *Cryptoblabes gnidiella* em dieta artificial. *Pesq Agropec Bras*. 2005;40:1059–1065.
- SAS/STAT 9.2 2007. User's Guide. Cary, North Carolina: SAS Publishing;. p. 584.
- Scatoni I, Bentancourt C. 1983. *Cryptoblabes gnidiella* (Millière), una nueva lagarta de los racimos en los viñedos de nuestro país. *Rev. A. I. A. (Uruguay)* ;1:266–268.
- Vidart, V. María; M. V. Mujica; M. V. Calvo ; F. Duarte; C.M. Bentancourt; J. Franco and I.B. Scatoni. 2013. Relationship between male moths of *Cryptoblabes gnidiella* (Millière) (Lepidoptera: Pyralidae) caught in sex pheromone traps and cumulative degree-days in vineyards in southern Uruguay. *Springer Plus* : 2:258- 266.
- Yehuda, S. B.; M. Wysoki and D. Rosen 1991. Phenology of the honeydew moth, *Cryptoblabes gnidiella* (Lepidoptera : Pyralidae), on Avocado in Israel. *Israel Journal of Entomology* ; XXV-XXVI : 149-160.

ARABIC SUMMARY

ديناميكية تعداد فراشة الندوة العسلية في حدائق العنب

هبة محمد النجار

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الجيزة – مصر

نفذت التجربة في حديقة عنب خاصة في مركز الزقازيق ، محافظة الشرقية، مصر ، خلال المواسم 2014، 2015، 2016 على التوالي . تهدف الدراسة الى دراسة تأثير الحرارة والرطوبة النسبية ونقطة الندى على ديناميكية تعداد فراشة الندوة العسلية الملتقطة باستخدام مصائد الجذب الجنسي تحت ظروف الحقل. أوضحت النتائج ان متوسط تعداد الفراشات الملتقطة بواسطة المصائد تتزايد تدريجياً من 10 مايو الى 23 أغسطس ثم تتناقص في الفترة من بعد 23 أغسطس الى 6 ديسمبر خلال مواسم الدراسة . ايضاً، سجلت نتائج الدراسة 5 ، 6 ، 6 قمم خلال مواسم الدراسة 2014 ، 2015 ، 2016 ، على التوالي. بخصوص موسم 2014 سجلت القمة الاولى 4 افراد في 31 مايو والقمة الثانية سجلت 15.6 فرد في 12 يوليو والقمة الثالثة سجلت 17.3 فرد في 23 أغسطس والقمة الرابعة سجلت 13 فرد في 20 سبتمبر والقمة الخامسة سجلت 7.6 فرد في 25 أكتوبر على التوالي. فراشات الندوة العسلية التي التقت باستخدام مصائد الجذب الجنسي في موسم 2015 سجلت 6 فورانات حيث كان متوسط التعداد 10.3 ، 8.0 ، 10.33 ، 7.66 ، 9.66 ، 12.66 فرد في 31 مايو، 28 يونيو، 19 يوليو، 23 أغسطس، 13 سبتمبر، 18 أكتوبر على التوالي. على الجانب الاخر، بينت النتائج لموسم 2016 وجود علاقة ارتباط عالية المعنوية بين متوسط تعداد افراد فراشة الندوة العسلية مع نقطة الندى ، متوسط تعداد الافراد مع درجة حرارة الهواء ، متوسط تعداد الافراد مع (حرارة الهواء ونقطة الندى) ، ولكن العلاقة كانت غير معنوية بين متوسط التعداد مع (حرارة الهواء والرطوبة النسبية) . ووضحت النتائج ان العوامل الغير حية سببت معنوية عالية على متوسط التعداد وايضا اثرت الحرارة تأثير عالي على متوسط التعداد مقارنة بتأثير نقطة الندى والرطوبة النسبية.