Weather Factors Affecting the Seasonal Population Dynamics of Black Melon Bug *Coridius viduatus* F. in New Valley, Egypt

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ABSTRACT: In New Valley Governorate, a study was conducted in Elkharga District to investigate the effect of max. and min. temperatures, relative humidity, and wind speed on the seasonal abundance and population dynamics of the black melon bug, *Coridius* (*Aspongopus*) *viduatus* F. (Hemiptera: Pentatomidae) infesting cucurbit crops (cucumber, cantaloupe, and watermelon) during two plantation dates (early summer and Nili) in 2020 and 2021. The Nili plantation had a higher population density compared to the summer plantation, particularly during the 2021 season. The population density in the Nili plantation exceeded that of the summer plantation, being approximately 7, 8, and 3.4 times greater for cucurbit, cantaloupe, and watermelon, respectively.

In the early summer of the 2020 and 2021 seasons, the black melon bug (nymphs and adults) emerged in the field on the three cucurbit crops during the second half of March, culminating in a significant peak in the fourth week of May throughout the three crops. The peak occurred in the first half of May for cantaloupe and watermelon. In the Nili plantation during the 2020 and 2021 seasons, the pest first appeared in the field around the latter half of September. It then steadily increased its population, reaching its peak by mid-November and continuing until the first half of December, depending on either cucurbit crop type or the season year.

A strong positive correlation between temperature and the presence of the black melon bug *C. viduatus* was observed in early summer plantations, but a negative correlation was noted in Nili plantations during both the 2020 and 2021 seasons. Conversely, relative humidity correlated negatively in summer plantations and positively in Nili plantations. Wind speed also showed significant negative correlations with population counts in both seasons.

Keywords: Cucumber crops, black melon bug *Coridius* (*Aspongopus*) *viduatus*, seasonal abundance,population dynamics weather factors (temperature, relative humidity and wind Speed).

INTRODUCTION

The insect pest, known as *Coridius (Aspongopus) viduatus* F., is consistently found on plants belonging to the cucurbitaceous family (**Shalaby, 1961)**. The *C. viduatus* is considered a significant pest on cucurbit plants, including melon, squash, marrow, and cucumber (**Bohlen and Freidel, 1979)**. **Walker and Pittaway's 1987** study revealed that *C. viduatus* significantly damages melon harvests. The black melon bug *Coridius* (*Aspongopus*) *viduatus* F. was recorded as a dangerous insect attacking cucurbit plants in Egypt, especially in New Valley Governorate, causing an economic reduction recording 50% in total cucurbit yield if an integrated pest management program is not implemented against it **(Gameel, 2004)**. Also, it has been recorded as a dangerous pest on cucurbit crops in many countries, such as Turkey **(Mariod, 2013)**, Saudi Arabia **(Aljedani, 2018),** and Sudan **(Abdalla, 2010; Alla *et al*., 2015)**. Both adults and nymphs of the pest cause its damage by sucking the sap of the leaves, petioles, and stems, which wither and die **(Mariod *et al*., 2007; Gameel and Sayed, 2008; Gameel, 2013)**.

The *Coridius* spp. was abundant on Cucurbitaceae in summer (March-September) and occasionally in winter (**Sharma, 1990)**. The adults of the black melon bug, *Coridius* (*Aspongopus*) *viduatus,* were seen in the New Valley to be lethargic throughout the winter season. They were located in significant quantities beneath plant waste near the fields, particularly at the base of trees and shrubs (**Bohlen and Freidel, 1979)**. The black melon bug has a consistent migration pattern from plant shelters, mountain crevices, and soil fissures to the field crop, followed by a return to aestivation locations (**Gubartalla *et al*., 2018)**.

The black melon bug (BMB) is capable of completing its whole life cycle on watermelon in a laboratory setting. The duration from egg to adult stage of the squirting cucumber, when served as food at a temperature of 24 ± 2°C, was recorded as

5-6 weeks (**Tarla *et al.*, 2013**). The average number of eggs laid by a single female was 448 ± 0.90 eggs. The insect has five instar nymphal stages over a period of around 40 days. Following the completion of the 5th nymphal stage, the adult bug developed (**Alla *et al.*, 2015**).

Temperature significantly influenced the duration of the black melon bug (BMB) life cycle. The insect took the longest time to complete its life cycle at 24°C, while the shortest duration was at 30°C. The mortality rate in immature stages increased as temperature rose from 24°C to 32°C. The lowest egg incubation time and nymphal duration were at 32°C, while the maximum duration was at 24°C (**Gameel, 2004**).

Limited research studies have been conducted on the impact of temperature, relative humidity, and wind speed on the biology and dynamics of *C. viduatus* in Egypt. This study investigates the influence of temperature, relative humidity, and wind speed on the seasonal abundance and population density of BMB infesting three cucurbit crops during the early summer and the Nili plantations throughout two consecutive seasons, from 2020 to 2021, in the New Valley Governorate.

MATERIALS AND METHODS

The average number of the black melon bug (nymphs and adults) seen each week on three cucurbit crops (cucumber, cantaloupe, and watermelon) was used to look at how four weather factors affect the bug numbers that appear at different times of the year. The daily records of the day's maximum and minimum temperatures, relative humidity, and wind speed, as weather factors, were obtained from the Meteorological Station of El-Kharga City (which is about 1 km from the experimental site).

For insect-pest counting, individual nymphs and adults of the black melon bug, a simple square wooden wire of 0.25 m^2 (50x50 cm) was used as the standard sample size. Both stages of the pest (nymphs, and adults), were counted directly on the plants in a set of four-square wires (one sample =1m^2).

The numbers of nymphs and adults of the black melon insect have been estimated using the direct counting method. The visual counts commenced following the third week of plant emergence and continued through the blooming and fruiting phases until harvest. Bug counts were conducted in both early summer and Nili plantations throughout two consecutive seasons, 2020 and 2021. The inspection period for the summer planting began on March 8 and ended on June 21 in 2020, while in 2021, it began on March 7 and continued on June 20. The inspection period for the Nili plantation began on September 6, 2020, and terminated on December 20, 2020, while for 2021, it spanned from September 5 to December 19. The plants underwent random inspections weekly throughout the inspection period, utilising four replicates of each cucurbit crop.

The seven-day count's data were considered the dependent variable (y), while the reading of corresponding weather factors represented the independent variables (x). The simple correlation values detect any possible relationship between the (y) and (x). Simple correlation (r) was estimated as well as the coefficient of determination (R^2) **(Stell and Torrie, 1960)**.

RESULTS AND DISCUSSION:

A) The seasonal abundance and dynamics of the black melon bug in the early summer and Nili plantations during two successive seasons of 2020 and 2021:

The seasonal abundance of the black melon bug, *C. viduatus* (including both nymphs and adults), was investigated among three cucurbit crops (cucumber, cantaloupe, and watermelon) on two planting dates (early summer and Nili) during the 2020 and 2021 growing seasons. Table 1 and Figures 1 and 2 illustrate the population of black melon bug (BMB) on three different cucurbit crops during early summer and on Nili plantations in 2020.

Season 2020:

Early summer and Nili plantations 2020:

In the Early summer plantation 2020, recorded data in Table 1 and illustrated in Figure 1 revealed that the black melon bug, nymphs and adults, began to appear in the field on the three cucurbit crops in the third week of March, on March 22nd (2.00, 5.50, and 1.00 individuals/m²) on cucumber, cantaloupe, and watermelon, respectively. This date coincided with max. & min. temp. 25.50°C & 10.40°C, RH = 37.50%, and wind speed = 8.48 km/h.

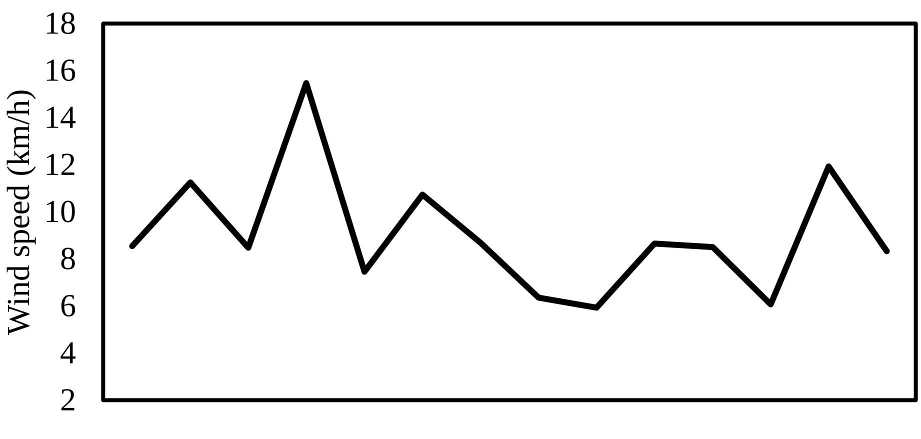
However, the population density of the BMB fluctuated in scarce numbers, attaining the first peak at the end of May on cantaloupe and watermelon (152.00 and 137.00 individuals/m²) and at the first week of April on cucumber (32.00 individuals/m²). The weather factors of this period were 31.33°C and 17.65 for max. and min. temp., RH = 28.25%, and wind speed = 6.35 km/h. Then numbers of the pest decreased in the next week and increased gradually in the third week of May (111.25, 428.75, and 239.00 individuals/m²), respectively, on the three cucurbit crops to build a big peak. The recorded weather factors were max. temp. = 44.40°C, min. temp. = 25.13°C, RH = 22.00%, and wind speed = 6.07 km/h when the plants were in the ripening stage. After that, the population density decreased at the end of May and the beginning of June.

In the Nili plantation 2020, as recorded in Table 1 and shown in Figure 2, the nymphs and adults of BMB began to appear in the second half of September, recording (0.25 and 0.25 individuals/m²) on cucumber and/or watermelon. On cucumber and cantaloupe, the number of individuals increased gradually to build up three peaks at the beginning and half of November and at the first week of December (81.00, 100.00, and 67.00 individuals/m²), respectively. During this time, the highest temperature, lowest temperature, relative humidity, and wind speed were recorded to be 38.7°C, 21.27°C, 27.35%, and 8.23 km/h at the first peak; 30.33°C, 16.95°C, 44.75%, and 8.53 km/h at the second peak; and 23.73°C, 9.27°C, 55.00%, and 3.83 km/h at the third peak. Two peaks of black melo bug showed on watermelon at the beginning and half of November (107.00 and 253.50 individuals/m²). The recorded weather conditions for the first and second peaks were 38.7°C, 21.27°C, 27.35%, and 8.23 km/h, and 30.33°C, 16.95°C, 44.75%, and 8.53 km/h, respectively. After that, the population density of the BMB declined during the growth stage of tested cucurbit crops.

Table 1: Mean of population density of *C. viduatus* (adults and nymphs) on three cucurbit crops during early summer and Nili plantations in 2020.

Early summer 2020				**Nili 2020**			
Inspection date	**Cucumber**	**Cantaloupe**	**Watermelon**	**Inspection date**	**Cucumber**	**Cantaloupe**	**Watermelon**
March 8	0.00	0.00	0.00	**Sep.6**	0.00	0.00	0.00
15	0.00	0.00	0.00	**13**	0.00	0.00	0.00
22	2.00	5.50	1.00	**20**	0.25	0.00	0.25
29	6.50	13.00	3.25	**27**	1.25	1.75	1.00
April 5	7.00	25.50	9.00	**Oct. 4**	5.75	21.75	13.50
12	8.25	18.00	9.25	**11**	7.50	19.25	8.50
19	18.75	54.00	2.50	**18**	15.75	26.00	15.00
26	24.50	152.00	137.25	**25**	26.00	67.50	60.75
May 3	32.00	43.25	31.75	**Nov. 1**	81.00	200.50	107.00
10	27.75	64.25	42.00	**8**	10.75	146.75	87.00
17	74.25	202.75	101.25	**15**	100.00	353.50	253.50
24	111.25	428.75	239.00	**22**	72.25	244.25	173.75
31	45.50	107.00	62.75	**29**	28.25	193.25	163.50
June7	14.00	37.00	25.50	**Dec. 6**	67.00	228.75	112.25
14	---	---	---	**13**	33.25	108.00	41.50
21	---	---	---	**20**	10.75	28.50	17.75

It is obvious that the population densities of the black melon bug among the cultivated cucurbit crops had two peaks represented in the last weeks of April and May in the summer plantation, and one peak on the second week of November in Nili plantation.



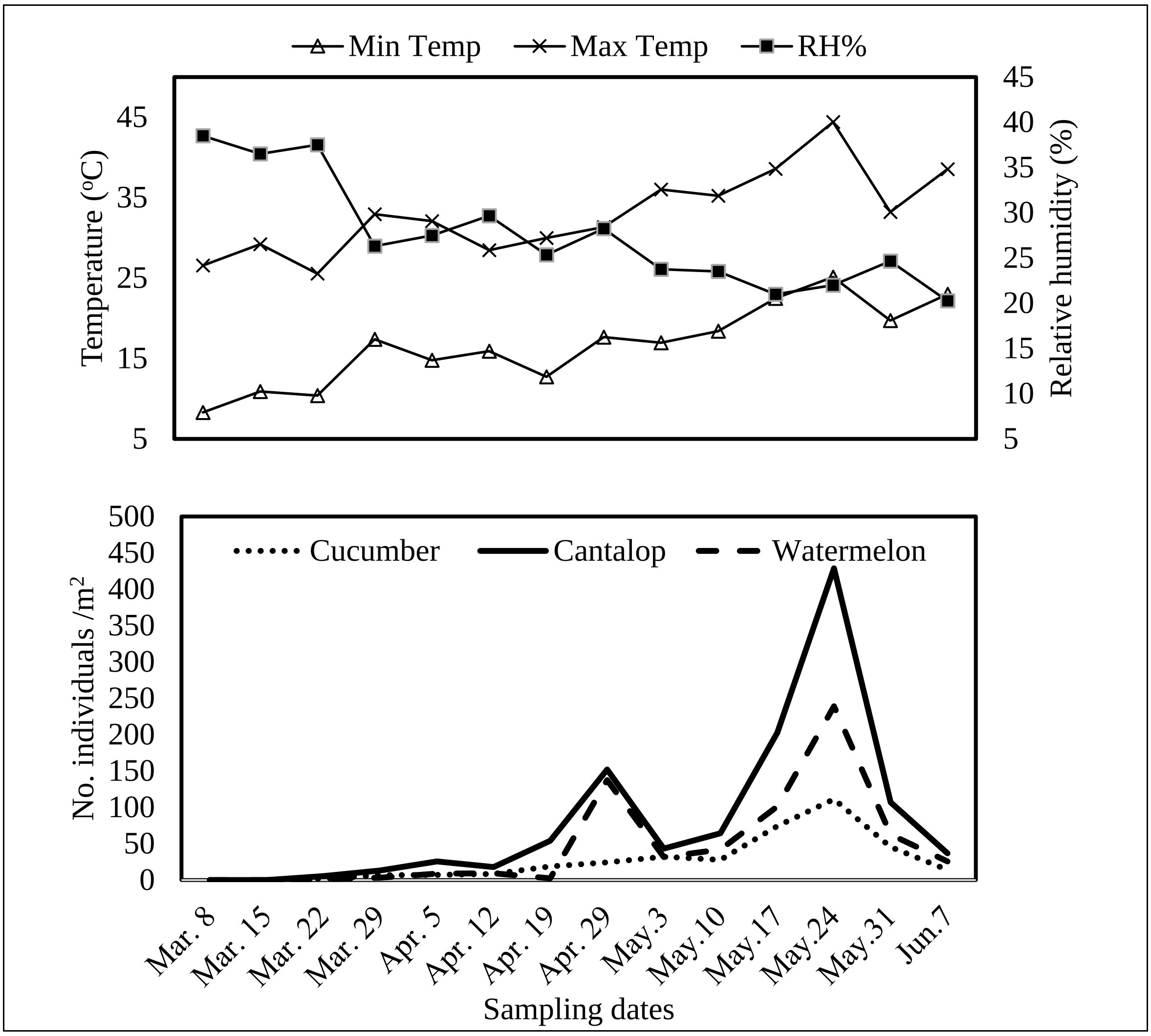
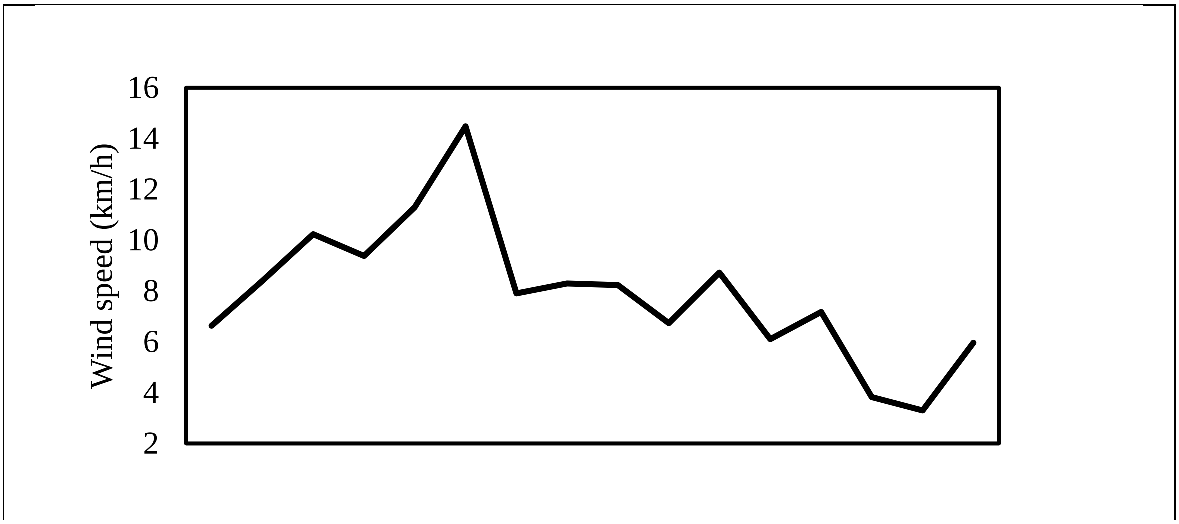


Fig. (1): Seasonal abundance of *C. viduatus* (nymphs and adults) on three cucubit crops during early summer palantation, 2020.



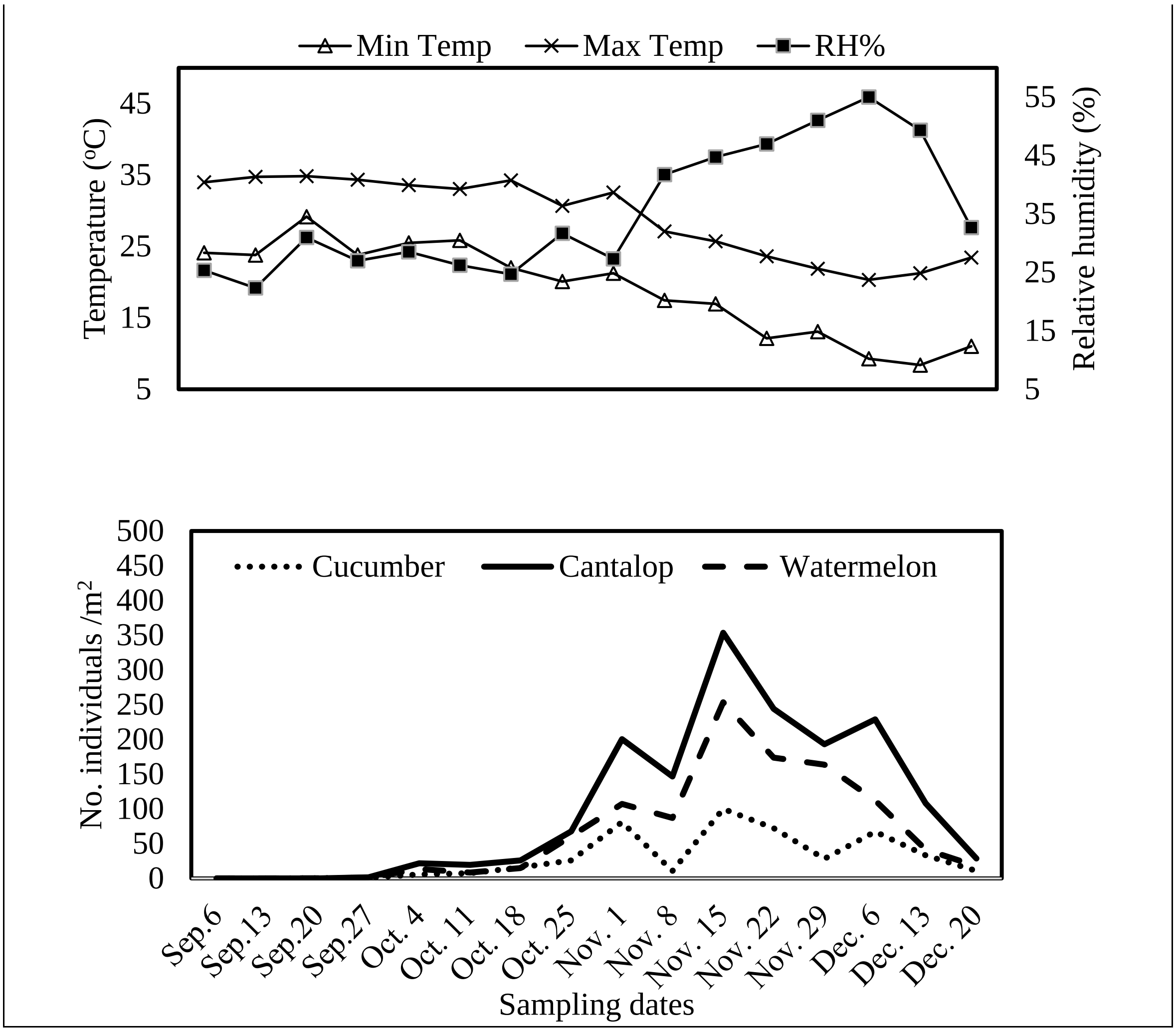


Fig. (2): Seasonal abundance of *C. viduatus* (nymphs and adults) on three cucubit crops during Nili palantation in 2020.

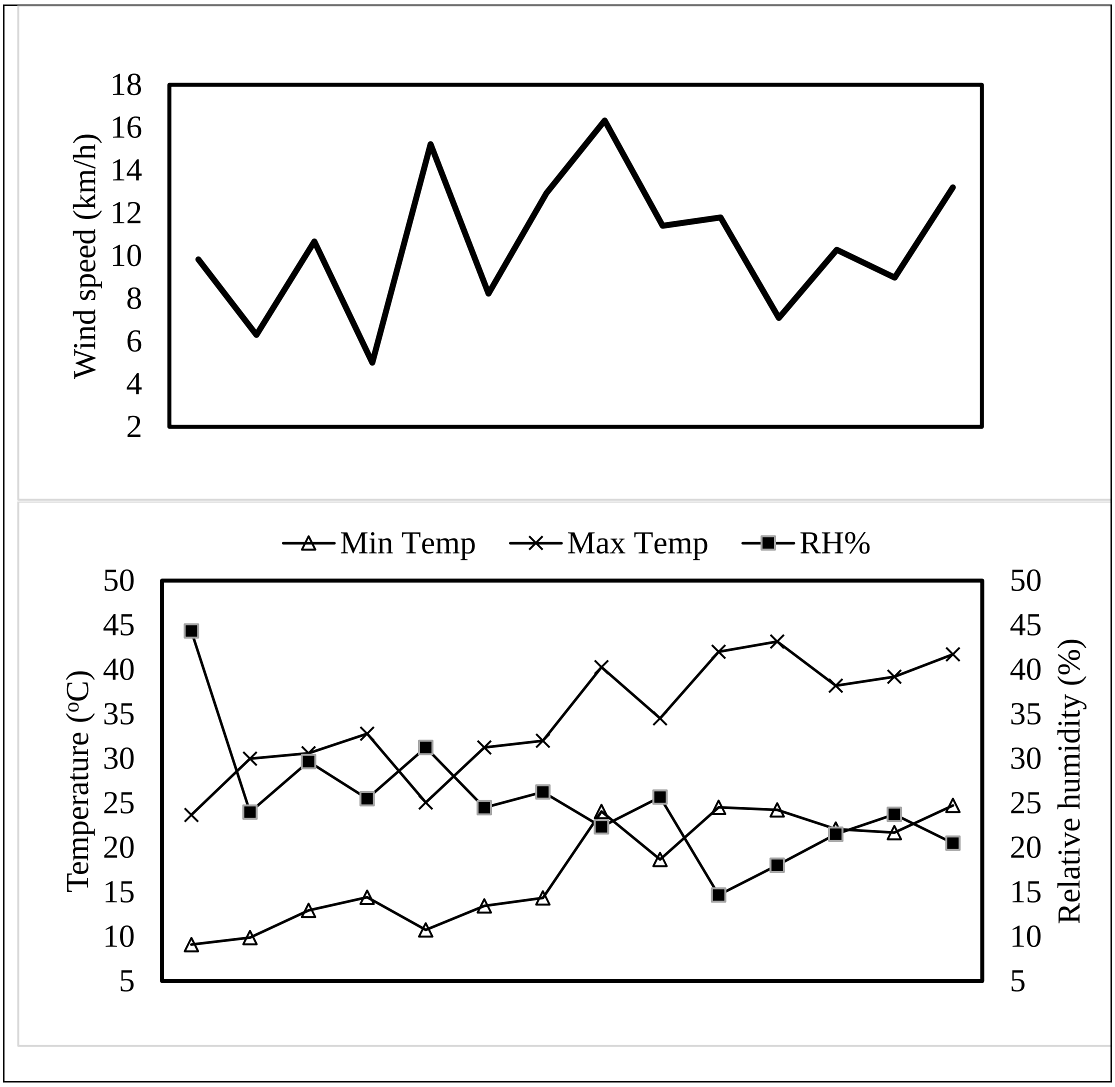
Season 2021:

Data in Table 2 and shown in Figures 3 and 4 indicate the population density of the black melon bug on three cucurbit crops during early summer and Nili seasons in 2021.

During early summer plantations in 2021, data revealed that BMB appeared in the field in the second week of March on the three cucurbit crops (1.75, 2.50, and 0.50 individuals/m2), respectively. The weather factors, max. and min. temp., RH, and wind speed were 30.00°C, 9.87°C, 24.00%, and 6.30 km/h, respectively. Population density of the pest was increased gradually during the fourth week of April to build a small peak on cantaloupe and watermelon (46.00 and 50.75 individuals/m²). The recorded max. and min. temp., RH, and wind speed were 40.27°C, 24.07°C, 22.33%, and 16.33 km/h. On cucumber, one peak was formed at the second week of May (76.25 individuals/m²). Recorded weather factors max., min. temp., RH, and wind speed were 43.15, 42.23, 18.00%, and 7.10 km/h. The second peaks on cantaloupe and watermelon were formed during the first half of May (158.25 and 180.00 individuals/m²), respectively, whereas max. and min. temp., RH, and wind speed were 38.18°C, 22.08°C, 21.50%, and 10.28 km/h. After that, the population density of the pest decreased at the end of May and beginning of June, at the last growth stage of the cucurbit crops.

Table 2: Mean of population density of *C. viduatus* on three cucurbit crops during early summer and Nili plantations in 2021.

Early summer 2021				Nili 2021			
Inspection date	**Cucumber**	**Cantaloupe**	**Watermelon**	**Inspection date**	**Cucumber**	**Cantaloupe**	**Watermelon**
Mar. 7	0.00	0.00	0.00	**Sep. 5**	0.00	0.00	0.00
14	1.75	2.50	0.50	**12**	0.00	0.00	0.00
21	1.75	3.75	1.50	**19**	0.00	0.25	0.50
28	4.25	13.75	4.75	**26**	12.00	14.50	16.00
Apr. 4	7.00	15.00	7.50	**Oct. 3**	15.25	22.50	37.00
11	10.75	22.25	8.75	**10**	14.00	61.75	68.75
18	18.75	21.50	22.75	**17**	44.50	55.75	49.50
25	26.75	46.00	50.75	**24**	32.50	58.75	56.50
May 2	47.50	38.00	33.75	**31**	36.50	49.50	27.50
9	48.25	142.75	95.75	**Nov.7**	43.25	54.75	40.50
16	76.25	73.00	54.75	**17**	41.50	123.00	38.50
23	68.25	158.25	180.00	**21**	171.00	167.50	100.25
30	51.25	150.75	78.75	**28**	217.50	397.00	244.50
Jun.6	18.75	24.50	32.75	**Dec. 5**	497.00	760.00	518.25
13	---	---	---	**12**	279.75	1308.00	619.00
20	---	---	---	**19**	96.25	351.50	260.75



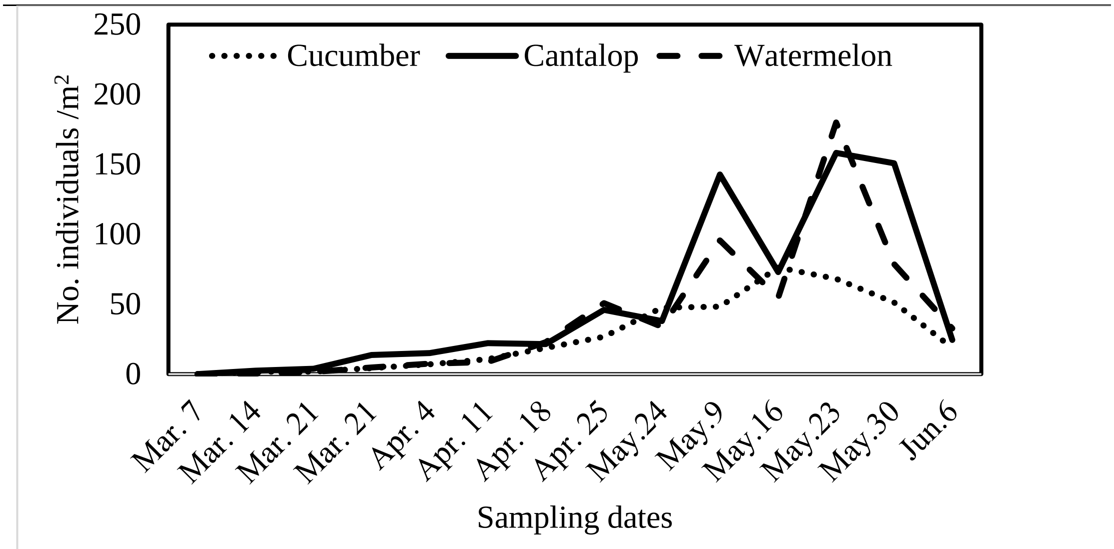
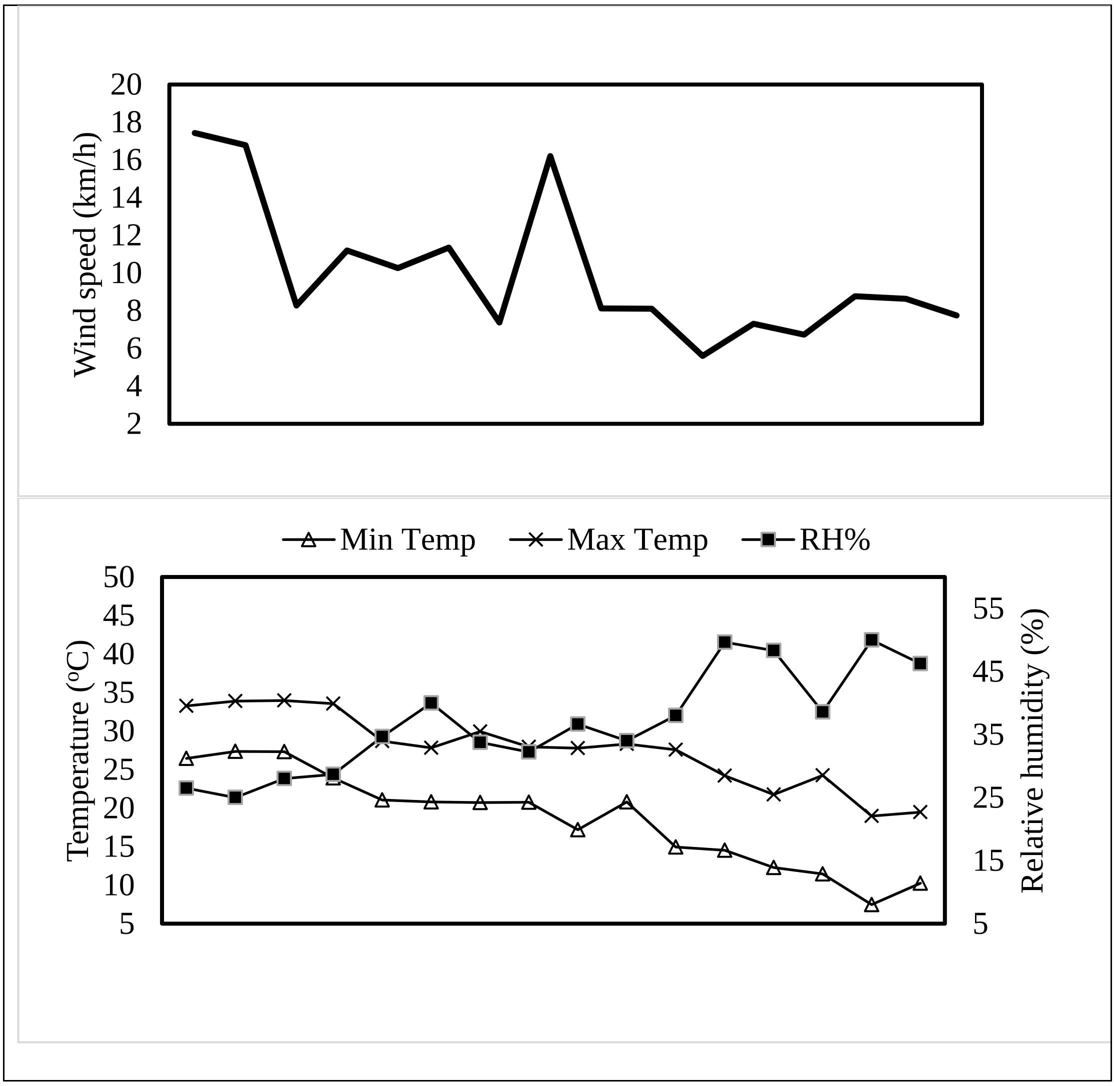


Fig. (3): Seasonal abundance of *C. viduatus* (nymphs and adults) on three cucubit crops during early summer palantation in 2021.



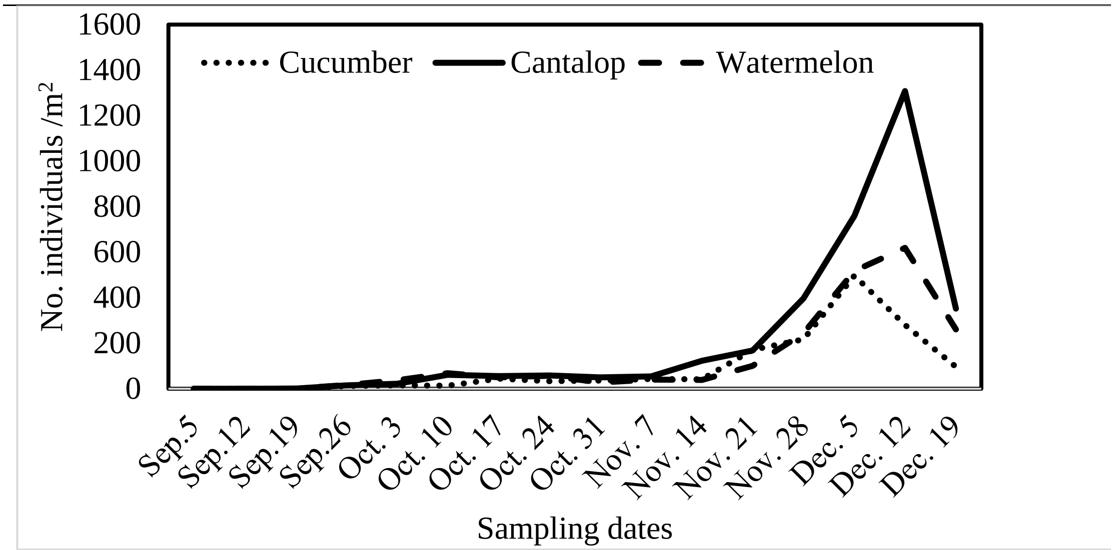


Fig. (4): Seasonal abundance of *C. viduatus* (nymphs and adults) on three cucubit crops during Nili palantation in 2021.

B) The correlations between weather factors and seasonal abundance of the black melon bug in the early summer and Nili plantations during two successive seasons of 2020 and 2021:

Early summer and Nili, Season 2020:

In early summer 2020, data from Tables 3 and 4 indicate substantial positive correlations between temperature (both maximum and minimum) and the population density of the black melon bug across three cucurbit crops, with correlation coefficients of r = (0.665 and 0.616) for cucumber, (0.705 and 0.657) for cantaloupe, and (0.588 and 0.571) for watermelon, respectively. However, a negative connection with relative humidity was observed, with values of r = -0.496, -0.465, and -0.389. Additionally, there exists a negative correlation with wind speed, r = (-0.288, -0.379, and -0.381). The coefficients of determination (R^2) for the preceding weather factors were 21.4%, 20.1%, 23.1%, and 17.5% for cucumber; 39.1%, 34.3%, 45.5%, and 27.0% for cantaloupe; and 42.4%, 36.1%, 54.4%, and 27.9% for watermelon, respectively.

In Tables 3 and 4, statistical analysis indicated that during the Nili season 2020 plantation, there is a negative correlation between BMB size and temperature max. and min. r= (-0.463, -0.448 & -0.625, -0.586, and -0.651, -0.601). Wind speed also showed a negative correlation (r = -0.418, -0.520, and -0.528) on the population density of the BMB on the three tested cucurbit crops. Whereas a positive significant correlation effect with relative humidity and pest population density, r = (0.481, 0.675, and 0.738). The coefficient of determination (R^2) of the previous weather factors were (44.2, 38.0, 21.6, and 8.3%) respectively on cucumber, (49.7, 43.1, 21.6, and 14.4%) on cantaloupe, and (34.6, 32.6, 15.1, and 14.5%) on watermelon.

Early summer and Nili seasons in 2021:

Tables 3 and 4 indicate significant positive correlations between temperature extremes (maximum and minimum) and the population density of the BMB across all three cucurbit crops in the early summer 2021, with correlation coefficients of r = (0.636, 0.657, 0.517, 0.545, and 0.517, 0.545), respectively. However, a negative correlation exists between relative humidity and pest population density (r = -0.524, -0.443, and -0.443) across all investigated crops. No substantial impact of wind speed on the population of insect pest. The coefficients of determination (R^2) for the preceding weather factors were 40.4%, 43.2%, 27.5%, and 0.00% for cucumber; 26.7%, 29.7%, 19.6%, and 0.00% for cantaloupe; and 23.0%, 28.4%, 16.6%, and 0.06% for watermelon.

Table 3: Simple correlation and coefficient of determination analysis between four weather factors and the population density of *C. viduatus* in two planting dates recovered from three cucurbit crops during 2020 and 2021.

Cucurbit crops	Weather Factors	2020				2021			
		Early summer		Nili		Early summer		Nili	
		r	R^2	r	R^2	r	R^2	r	R^2
Cucumber	**Max. temp.**	0.665^{**}	0.442	-0.463^{**}	0.214	0.636^{**}	0.405	-0.548^{**}	0.300
	Min. temp.	0.616^{**}	0.380	-0.448^{**}	0.201	0.657^{**}	0.432	-0.616^{**}	0.379
	RH.	-0.496^{**}	0.246	0.481^{**}	0.231	-0.524^{**}	0.275	0.484^{**}	0.234
	Wind speed	-0.288^{*}	0.083	-0.418^{**}	0.175	-0.000^{ns}	0.00	-0.286^{*}	0.082
Cantaloupe	**Max. temp.**	0.705^{**}	0.497	-0.625^{**}	0.391	0.517^{**}	0.267	-0.548^{**}	0.313
	Min. temp.	0.657^{**}	0.431	-0.586^{**}	0.343	0.545^{**}	0.297	-0.616^{**}	0.343
	RH	-0.465^{**}	0.216	0.675^{**}	0.455	-0.443^{**}	0.196	0.484^{**}	0.230
	Wind speed	-0.379^{**}	0.144	-0.520^{**}	0.270	0.004^{ns}	0.00002	-0.286^{*}	0.043
Watermelon	**Max. temp**	0.588^{**}	0.346	-0.651^{**}	0.424	0.517^{**}	0.235	-0.559^{**}	0.396
	Min. temp.	0.571^{**}	0.326	-0.601^{**}	0.361	0.545^{**}	0.284	-0.586^{**}	0.429
	RH	-0.389^{**}	0.151	0.738^{**}	0.544	-0.443^{**}	0.166	0.480^{**}	0.276
	Wind speed	-0.381^{**}	0.145	-0.528^{**}	0.279	0.004^{ns}	0.006	-0.207^{ns}	0.057

*** = Significant at 5 % level of probability, ** = High significant at 1 % level of probability**
r = Simple correlation. R^2 = Coefficient of determination

Table 4: Simple correlation and coefficient of determination analysis between the population density of *C. viduatus* and four weather factors during two planting dates regardless the effect of cucurbit crops during 2020 and 2021.

Weather Factors	2020				2021			
	Early summer		Nili		Early summer		Nili	
	r	R^2	r	R^2	r	R^2	r	R^2
Max. temp.	0.587^{**}	0.344	-0.533^{**}	0.284	0.493^{**}	0.243	-0.517^{**}	0.267
Min. temp.	0.553^{**}	0.306	-0.499^{**}	0.249	0.525^{**}	0.276	-0.547^{**}	0.299
RH.	-0.395^{**}	0.156	0.582^{**}	0.339	-0.416^{**}	0.173	0.442^{**}	0.195
Wind speed	-0.326^{**}	0.106	-0.444^{**}	0.197	0.000^{ns}	0.000	-0.207^{**}	0.043

*** = Significant at 5 % level of probability. ** = High significant at 1 % level of probability**
r = Simple correlation. R^2 = Coefficient of determination

In the Nili plantation in 2021, a significant negative correlation exists between the temperature (both maximum and minimum) and the number of BNB, with correlation coefficients of r = -0.548, -0.616, -0.548, -0.616, -0.559, and -0.586, respectively. Furthermore, a highly significant negative correlation is found between wind speed and the population density of the BMB (r = -0.286 for both cucumber and cantaloupe). No significant findings on watermelon. Conversely, a strong positive connection was observed between relative humidity and insect population density, with values of r = 0.484, 0.484, and 0.480. The coefficients of determination (R^2) for the previous weather factors were 30.0%, 37.9%, 23.4%, and 8.2% for cucumber; 31.3%, 34.3%, 23.0%, and 8.3% for cantaloupe; and 39.6%, 43.9%, 27.6%, and 5.7% for watermelon (Tables, 3 and 4).

It is concluded that the weather changed in early summer and in Nili plantations and how cucurbit crops affected the changing populations of back melon bugs (nymphs and adults) in 2020 and 2021 when data from two seasons with two different planting dates were compared.

At first, the results indicated two peaks in the black melon bug population during the latter weeks of April and May in the summer plantation and one peak at the end of November in the Nili plantation. In the 2021 season, the Nili plantation had a higher population density compared to the summer plantation. The summer plantation had 76.25, 158.25, and 180.00 nymphs and adults per square meter, while the Nili plantation had 497.00, 1308.00, and 619.00 nymphs and adults per square meter. This means the Nili plantation had population densities about 7, 8, and 3.4 times more for cucurbit, cantaloupe, and watermelon, respectively.

Regarding the effect of variations in temperature, it was found that the maximum and minimum temperatures had strong positive correlations with the number of black melon bugs that appeared in the early summer plantations of 2020 and 2021. Simple correlation values equal (0.587 and 0.553) and (0.493 and 0.252), respectively, during early summer plantations in 2020 and 2021. Meanwhile, during the Nili plantation in 2020 and 2021, opposite results were obtained regarding the effect of temperatures and BMB population size, which had a high negative correlation with pest size. Simple correlation values were (-0.533 and -0.499) and (-0.517 and -0.547), respectively.

Concerning the effect of relative humidity during early summer plantations in 2020 and 2021, there were high negative simple correlations between the pest population numbers and the mean relative humidity (r = -0.395 and -0.416), respectively. During Nili plantations, there were high positive simple correlations (r = 0.582 and 0.442), respectively.

With regards to the influence of wind speed, all instances except early summer 2021 exhibited negative significant correlations between wind speed and the population counts of *C. viduatus* (r = -0.326, -0.444, and -0.207) during early summer and Nili 2020 and Nili 2021, respectively.

Also, the coefficients of determination (R^2) for the maximum and minimum temperatures in early summer and the Nili plantation in 2020 and 2021 were 34.4 and 30.6%, 28.1 and 24.9%, 24.3 and 27.6%, and 26.7 and 29.9%, respectively. During the early summer and the Nili plantations in 2020 and 2021, the recorded values of the coefficient of determination with relative humidity were 15.6, 33.9, 17.3, and 4.3%, respectively. The coefficients of determination of wind speed were (10.6, 19.7, 0.0, and 4.3%) in early summer and Nili plantation 2020 and 2021, respectively.

The data from the two years indicated minor fluctuations in the populations of nymphs and adults of *C. viduatus* during the early vegetative development stage of the three cucurbit plants. The overall count of both stages climbed steadily during the flowering stage, culminating at the peak number coinciding with the fruit setting and ripening stages. Subsequently, the pest population density diminished to a minimal level as the plants reached the conclusion of the ripening period. The population density of the BMB was much greater in 2021 than in 2020. The interaction of temperature and relative humidity exerts a greater influence on the activity of the black melon insect than wind speed.

Regarding the population dynamic of the black melon bug population, the results indicated two peaks during the latter weeks of April and May in the summer plantation, and one peak at the end of November in the Nili plantation. This tendency was noted throughout the 2020 and 2021 growth seasons. Furthermore, the population density in the Nili plantation exceeded that of the summer plantation, being approximately 7, 8, and 3.4 times greater for cucurbit, cantaloupe, and watermelon, particularly during the 2021 season.

Ultimately, these findings largely align with those discovered by **Gameel (2004)** reported that the population density of *C. viduatus* (both adults and nymphs) increased consistently as the flowering phase of sweet melon plants completed. It attained its height when the plants commenced fruiting. **Bohlen and Freidel (1979)** noted that adult *Aspongopus viduatus* in the New Valley exhibited lethargy during the winter season. They were found in substantial amounts beneath plant detritus near the fields, especially at the base of trees and shrubs. Researchers identified a small quantity of insects in the newly cultivated fields in March. **Walker and Pittaway (1987)** revealed that in Saudi Arabia, the BMB vacates the wild, desiccated members of the melon family during summer and shifts to cultivated melon crops, typically puncturing the young stems, resulting in their collapse. **Sharma (1990)** documented that *Coridius spp*. was prevalent on Cucurbitaceous plants during the summer months (March-September) and sporadically in winter; the insects exhibited activity in the morning and evening. Intense sunlight drove the pest into concealment among the foliage. With few contrary findings, **Gameel and Sayed (2008)** found that *C. viduatus* had a higher propensity to infest snake cucumber compared to cantaloupe or watermelon. Cucumber and squash were subsequently listed, followed by cantaloupe and watermelon. **Abdalla *et al*. (2021)** examined various aspects of the black melon bug's aestivation, including the population density of aestivating insects. The study revealed a decrease in both male and female population density as the aestivation period progressed.

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الملخص العربي

العوامل الجوية المؤثرة على ديناميكية التجمعات الموسمية لبقة البطيخ السوداء *Coridius viduatus* في الوادي الجديد بمصر

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اجريت هذه الدراسة في منطقة الخارجة – بمحافظة الوادي الجديد لدراسة تاثير درجات الحرارة العظمى والصغرى والرطوبة النسبية وسرعة الرياح علي الوفرة الموسمية وديناميكية عشائر حشرة بقة البطيخ السوداء التي تصيب المحاصيل القرعية (الخيار والكنتالوب والبطيخ) خلال موسمين زراعة (عروة صيفية مبكرة و عروة نيلية) في عامي 2020 و2021.

وجد أن الكثافة العددية للحشرة كانت مرتفعة في العروة النيلية مقارنة بالعروة الصيفية المبكرة في موسم 2021. حيث إزدادت الكثافة العددية في العروة النيلية بمقدار 7 و 8 و 3.4 ضعف عن العروة الصيفية على كل من الخيار والكنتالوب والبطيخ على الترتيب.

بدأ ظهور الحوريات والحشرات البالغة لبقة البطيخ السوداء في العروة الصيفية المبكرة لعامي 2020 و2021 علي المحاصيل القرعية الثلاثة خلال النصف الثاني من شهر مارس، وبلغت ذروتها منذ النصف الأول من مايو وإستمرت حتى الاسبوع الرابع من شهر مايو على الكنتالوب والبطيخ.

بينما بدأ ظهور الحوريات والحشرات البالغة لبقة البطيخ السوداء في العروة النيلية لعامي 2020 و2021 في النصف الاخير من شهر سبتمبر، ثم زادت اعدادها بشكل مطرد، وبلغت ذروتها في منتصف شهر نوفمبر، واستمرت حتي النصف الاول من ديسمبر اعتمادا علي كل من نوع المحصول وعام الموسم الزراعي.

لوحظ وجود ارتباط موجب قوي بين درجة الحرارة وتواجد بقة ورق البطيخ السوداء في العروة الصيفية المبكرة، بينما كانت علاقة الإرتباط سالبة في العروة النيلي خلال عامي الزراعة 2020 و2021. وعلي العكس تماما في حالة الرطوبة النسبية حيث كانت علاقة الإرتباط سالبة في العروة الصيفية المبكرة وموجبة في العروة النيلية. ومن جهة أخرى اظهرت سرعة الرياح اعلاقة إرتباط سلبية كبيرة علي الكثافة العددية للحشرة خلال كلتا العروتين.