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PENTATOMIDAE) IN BABYLON
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THE DORMANCY LOCATIONS OF THE SUNN PEST *EURYGASTER* SPECIES (HEMIPTERA: PENTATOMIDAE) IN BABYLON PROVINCE, IRAQ

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Abstract

Through the data collected from the three fields in the Babylon city and during the research period from 15/7/2018 to 15/5/2019 it was found that the insects numbers at its highest culmination in the months of August and then started decreasing in its hibernation areas and that the dead insects numbers increased in the months of October and November due to the increase in rain, which led to the killing of many of them and this indicates that the next season will be less injury than the previous season, Because of the low temperatures in the winter months and the increase in rain which led to the killing of static insects and making them vulnerable to fungi, which led to the death of many of them in hibernation places, The most common places of the insect were in the first place under the Cogon grass plants, in the second place the palm trunks and under leaves falling and in the third-place under the waste of wheat and barley and found under the falling leaves the tree trunks and no presence of the insect was recorded in the animal waste due to the high temperatures in animal waste and an increase in the ammonia ratio.

Key words : Dormancy locations, Sunn Pest *Eurygaster*, hibernation area, high temperature.

Introduction

Wheat is an important grain crop due to the increasing world demand for it as result of the increase in the population of the countries of the world and this crop widely cultivated in Iraq, however, the yield per hectare is low for many reasons, including those related to crop and soil management, including those related to pests and diseases that affect the crop. Wheat is considered the main crop for food in West Asia and the Near East and it is an important strategic crop to close the food gap resulting from the high standard of living on the one hand and an increase in the population on the other hand and Wheat is ranked first in the world for its spread (FAO, 2002). Despite recent agricultural developments, diversification of food crops and changing dietary habits, this did not diminish the importance of wheat as a major crop in nutrition in these areas and efforts have intensified in the past few decades to improve its productivity and quality to secure food for the growing numbers of the population. The wheat crop is considered one of the most

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important strategic crops in the Syrian Arab Republic due to the important role it plays in supporting the national economy, securing food and providing foreign currencies and securing the raw material for some national industries in order to achieve self-sufficiency (Sayed Issa, 2003). The Food and Agriculture Organization (FAO) has indicated that the Sunn pest is the main insect affecting wheat production in West Asia and the Near East. And it causes losses ranging between (20 - 70%) from the total production and the damage can reach (100%) if the necessary control measures are not taken. Sunn pest (*Eurygaster integriceps*) is an important pest infesting wheat and barley plants and it causes great harm to infected plants, yields, quantity and quality. The sunn pest is considered a serious insect and threat to wheat and barley crops in the countries of Western Asia (Afghanistan, Iran, Iraq, Lebanon, Syria and Turkey) as well as in the republics of Central Asia, Bulgaria and Romania (Ibrahim, 1986) Adults insects spend the aestivation period under straw and plant residues or hidden between the folds of living and dead plants and recorded in different places that provide them with protection and

Table 1: The average numbers of insects during July 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	0	0	0	1
	Barley waste	0	0	0	1	1	2
	Summer weds	0	0	1	4	5	3
	Under the palm trunks	0	1	1	1	3	4
	Under piles leave of palm in the orchards	0	0	1	3	4	5
	Cogon Grass plants	0	1	2	4	7	6
	Under the leaves of the falling trees	0	0	2	4	6	7
Because of the high temperatures and the presence of ammonia	Animal waste	0	0	0	0	0	8
			2	7	17	26	Total

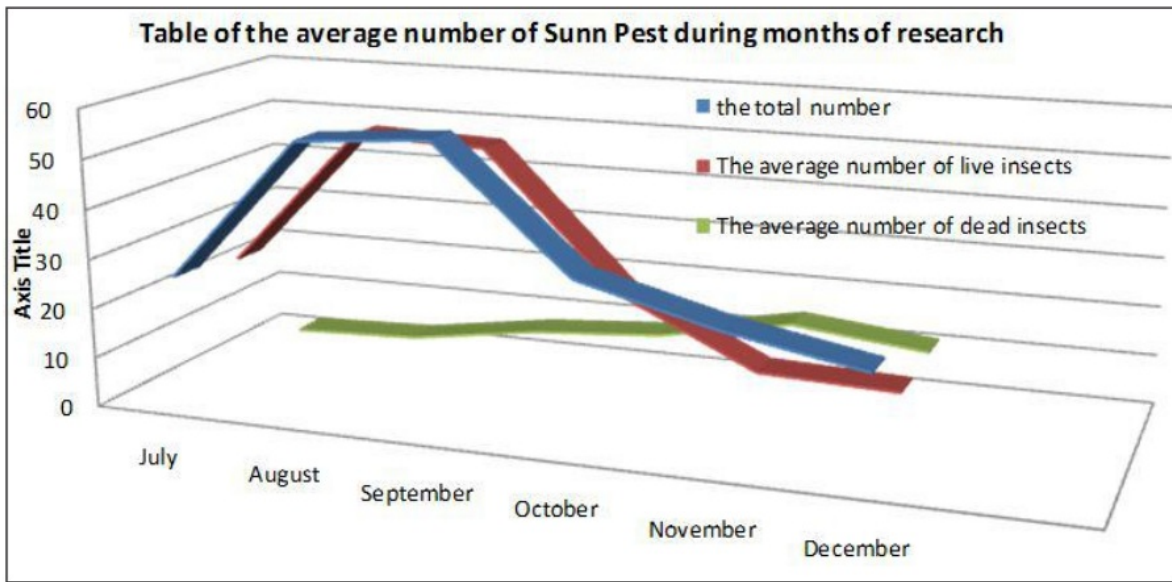
shade sufficient to avoid high temperatures and low relative humidity during the summer months to restore their life cycle again as they spend one generation per year, starting in central Iraq, from March to May, the whole year of the previous year, they lay their eggs on wheat and barley plants after spending the summer and winter hibernation period, where adults hide in their summer aestivation in separate places. The study conducted by Al-Khafaji, (1999) and Al-juhaishy, (2017) indicated that the two species are present in the province of Babylon (*Eurygaster austicus*, *Eurygaster testudinaria*) and they differ from those in northern Iraq. ПРЭСНЫЙ *et al.*, (2016) confirmed in his research that the Sunn pest found in central of Iraq is a settling insect and does not migrate to northern Iraq and its best place for wintering is under the Cogon grass found on the edges of rivers and waterways close to the affected fields of pests for the previous year. Therefore, the research aims to know the whereabouts of the Sunn pest and to know the nature of its life and its extent affected by external conditions.

Table 2: The average numbers of insects during August 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	2	8	10	1
	Barley waste	0	1	1	6	8	2
	Summer weds	0	0	2	4	6	3
	Under the palm trunks	0	1	2	2	5	4
	Under piles leave of palm in the orchards	0	0	4	6	10	5
	Cogon Grass plants	0	1	2	5	8	6
	Under the leaves of the falling trees	0	0	2	6	8	7
Because of the high temperatures and the presence of ammonia	Animal waste	0	0	0	0	0	8
			3	15	37	55	Total

Materials and Methods

Three regions that severely infecting annually, were selected from the wheat and barley fields in Babylon province, which were distributed in the center, north and south of the city, which is the (Rasheed) region, north of Babylon, (Albadea) region, in the middle of Babylon and the (Ibrahimi) region, south of Babylon and samples are taken manually, for the purpose of determining the highest insect density and the favorite places for Nymphs in the summer and winter hibernation. The eight different locations were selected in the three fields (wheat fields waste, barley waste, summer weeds, near of palm trunks and under leaves falling from different trees, Under piles leaves of palm in the orchards, in Cogon grass weeds and in animal waste). The insect was observed during the summer season and depending on the type and form of protection that the insect provides. The insect number was measured in square meters (using a square of wood) and during the period from 15/7/2018 to 2/15/2019. This process is done weekly so that static insects are collected in different places of the experiment and according to



the species and collected manually and placed in bags and brought to the laboratory for the purpose of classification according to the type of sunn. The preparation of dead insects and their percentages for each site and the sexual ratio of living and dead insects were recorded. The study data was analyzed statistically by Randomized Complete Block Design (R.C.B.D.). To determine the significant differences between the sites and according to the SPSS statistical program and at the level of 0.05%.

Results and Discussion

Through the study and analysis of samples taken from the three fields and in each research period (from July 2018 to December 2019) after harvesting the whole wheat and barley yield, the insect moved to obtain its the summer hibernation places under the leaves of green plants to

protect from High temperature and natural enemies and by recording average insect presence, It was found that the highest recording of insect numbers was in the months of July, August and September. Upon entering the winter, the numbers of the pest began to gradually decrease due to the heavy rains for this year, which led to a large numbers mortality of them, where the average presence of the insect.

Through the following diagram, it was shown that the number of insects reaches its highest point in August and September and then began decreasing for this year in its the hibernation region and that the numbers of mortality insects increased in the month of October and November, due to increasing the rain which led to infection with fungi and killing many of insects and this indicates that the next season will be less infected than before due to the decrease in temperatures in the winter

Table 3: The average numbers of insects during September 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	2	3	5	1
	Barley waste	0	1	1	3	4	2
	Summer weds	0	0	3	7	10	3
	Under the palm trunks	0	1	2	3	6	4
	Under piles leave of palm in the orchards	0	1	4	5	10	5
	Cogon Grass plants	2	1	3	6	12	6
	Under the leaves of the falling trees	1	0	2	7	10	7
Because of the high temperatures and the presence of ammonia	Animal waste	0	0	0	0	0	8
		3	4	17	34	57	Total

Table 4: The average numbers of insects during October 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	1	2	2	1
	Barley waste	0	0	0	0	0	2
	Summer weds	0	0	0	0	0	3
	Under the palm trunks	0	1	1	1	3	4
	Under piles leave of palm in the orchards	0	1	0	3	4	5
	Cogon Grass plants	2	2	3	7	14	6
	Under the leaves of the falling trees	1	2	2	5	10	7
Because of the high temperatures and the presence of ammonia	Animal waste	0	0	0	0	0	8
		3	6	7	17	33	Total

Table 5: The average numbers of insects during November 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	0	0	0	1
	Barley waste	0	0	0	0	0	2
	Summer weds	0	0	0	0	0	3
	Under the palm trunks	1	1	0	0	2	4
	Under piles leave of palm in the orchards	1	1	1	2	5	5
	Cogon Grass plants	3	5	2	2	12	6
	Under the leaves of the falling trees	2	1	2	2	7	7
Because of the high temperatures and the presence of ammonia	Animal waste	0	0	0	0	0	8
		7	8	5	6	26	Total

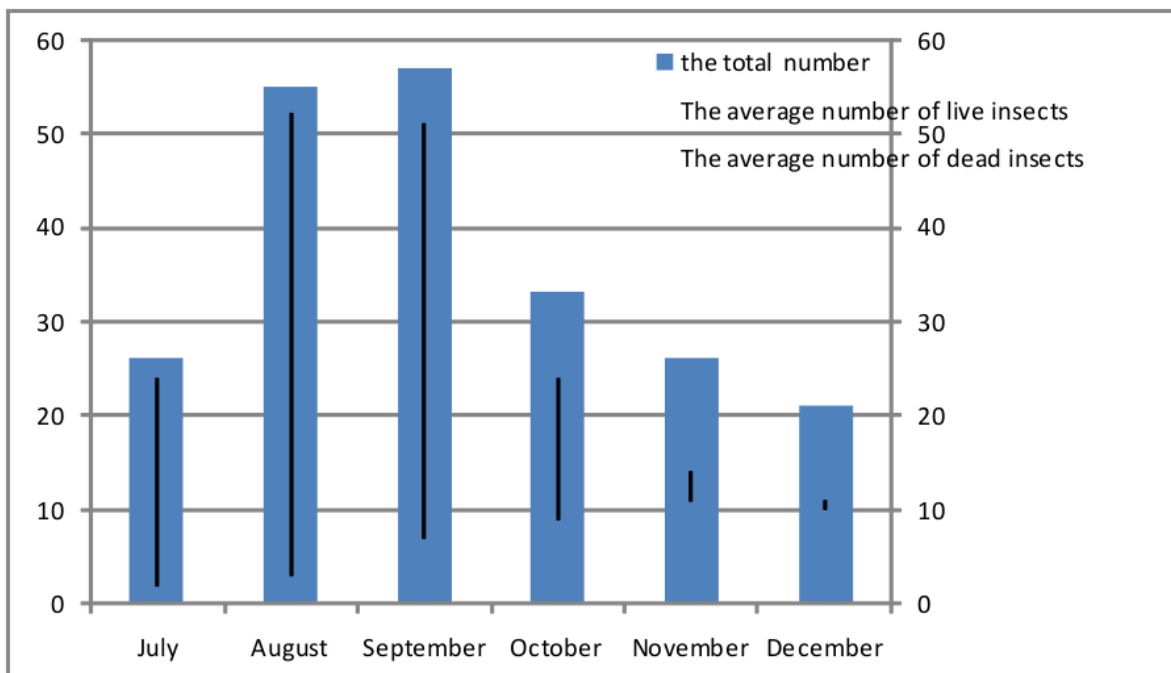
Table 6: The average numbers of insects during December 2018.

Notes	Their locations	The number of dead insects		The number of live insects		The total Number	No.
		Male	Female	Male	Female		
	Wheat waste	0	0	0	0	0	1
	Barley waste	0	0	0	0	0	2
	Summer weds	0	0	0	0	0	3
	Under the palm trunks	0	0	0	0	0	4
	Under piles leave of palm in the orchards	1	1	1	2	5	5
	Cogon Grass plants	2	4	2	2	10	6
	Under the leaves of the falling trees	2	1	1	2	6	7
	Animal waste	0	0	0	0	0	8
		5	6	4	6	21	Total

months and increased rains, which led to killing static insects and making them vulnerable to fungi, which led to the death of many near them in places of hibernation, the most common places of the insect were in the first place under the plants of Cogon grass, in the second place the palm trunks and Under piles leaves of palm and in the third-place under the residue of wheat and barley and found under the falling leaves near the tree trunks

and there was no record of the presence of the insect in the animal waste due to the high temperatures in animal excrement and an increase Ammonia gas ratio.

Through the average rate of insect presence, it was found that the Sunn pest enters the summer hibernation after the end of the wheat season and the completion of harvesting. The insects are transferred to the weeds plants and herbs and when the heat rises, Insects go to



A chart showing the average number of insects present in insect hibernation during the months of research

wet and warm places, such as Cogon grass, herbs and under the shade of trees and palms, to get rid of the increase of temperatures and these insects also remain in the winter season in a still manner under the falling leaves and dense and dry plants in the winter to protect them from enemies and environmental conditions and that the numbers of the pest reaches its culmination in the month of August and September and begins to decrease in the month of October and November until it reaches the lowest appearance in December and by recording the numbers of dead insects in the research period the highest incidence of dead insects in the winter months as compared to numbers them for a Summer season due to increased humidity and fungi infection.

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