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Study of the Insects Diversity in Morzok

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Abstract. The survey was conducted to study the diversity and population of insects in the farm at East part of Morzok city - Libya. The field works were carried out by used light trap, from Maris 2009 to September 2009. The results showed that 12 species of insects from 4 families were present there. 17010 individuals were collected; the most dominant species was *Euserica murzka* with 5519 individuals, *Ochrilidia Gemculata* with 3223 individuals and *Charysopa Spp* with 3039 individuals. Most of them were trapped in August 2009. A high density of Insects was also found and trapped in August 2009, contain of 3252 individuals. Analysis of the data showed that the diversity, evenness and richness of the insect community are not low. The other insect species found were *Macxomia Magnifica , Chaerocaunpa Celerio , Ostrinica Mrebilalis , Thyanta Custaror, Phyllognatus Excavates, Horistontus Uhlerii , Phonopat frontalis, Forticula auricularia, Carpophius hemipterus, Allonemobius fasciatus,*.The list of the insect species found in this farm indicated that this farm is suitable habitat of the insect species.

Keywords: Insect, dominance, diversity, evenness

1. Introduction

Light traps have been used widely in studies of abundance of agricultural pest species, community structure, population variability, and incidence of density dependence [1]-[6]. Density dependence is central to understanding population persistence and fluctuations [7]-[9]. Temporal population variability is also a potentially useful measure of population stability [10]. However measured population variability is difficult to interpret because time series of animal abundance usually contain both sampling error and variation in population size due to real changes in abundance Gas [11] [12]. Daily changes in insect captures are more representative of changes in flight activity than changes in abundance [13]-[16]. Environmental conditions are also likely to influence light trap catches by altering trap efficiency [6]. Changes in flight activity and trap efficiency in response to weather also cause light trap catches to vary with weather conditions [6]. Measured changes in moths abundance caused by changes in trap efficiency and flight activity would lead to misleading estimates of population growth and decline [6]. [17] interpret the effect of weather on light trap catches as sampling error. No studies of weather population dynamics have included the effect of weather on catches, possibly because effects vary between species [17] [13] [6]. The aim of this study to compare and analyses the effect of the climate and seasons of the year on the individual numbers caught in light trap of 15 species and we analysis the data of Insects were collected by using light trap in the farm at East part of Morzok city – Libya from January 2009 to December 2009.

2. Material and Methods

2.1. Study site

The study site is the farm in Morzok city this study site fall in the East of Morzok-Libya. It was 3 km from the (ACDRDDC) Arab Centre for Desert Research and Development of Desert Communities, were the mean temperature recorded. The main temperature in the summer season is start from April to October the

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main temperature is 22.3C^0 to 33.5C^0 and the main temperature at winter which extend from November to Maris is 10C^0 to 21C^0.

2.2. Sampling

Insects were sampled using a light trap in the farm at the east part of Muzuk city – Libya are *Euserica murzka, Macxomia Magnifica , Chaerocaunpa Celerio , Ostrinica Mrebilalis , Thyanta Custaror , Ochrilidia Gemculata, Phyllognatus Excavates, Horistontus Uhlerii, Phonopat frontalis, Forticula auricularia, Carpophius hemipterus, Allonemobius fasciatus, Charysopa Spp*.

The field works were carried out by used light trap, from Maris 2009 to September 2009. The results showed that 12 species of 17580 insects from 4 families were collected.

2.3. Analysis methods

- Dominance. The Dominance value was calculated using Simpson's index:
- $D = \sum (ni / N)$ *(1)*
- Where ni= important value for each component, and N= total of importance value.
- **Diversity index.** The diversity index was calculated using Shannon and Weaver index:
- $H = -\sum ni / N \log ni / N$
- Where ni= important value for each component, and N= total of importance value.
- **Evenness.** Evenness or equitability of species was calculated using Margalef's equation:
- $J = H / LnS$
- Where H= Shannon and Weaver diversity index, S= number of species.

3. Results

3.1. Population and density

Table 1 gives the insect species population and density of the insects in the seven months. All of the 12 species of insects are found in all of the study period of 17010 individuals. The density of insects per every month were 3252, 2961, 2895,2509 , 2124,1826 and 1403 in August, July, September, Jun , May, April and September respectively. Maximum density of insects were in August, *Euserica murzka* has the highest number of individuals flowed by *Ochrilidia Gemculata* in July , *Charysopa Spp* in August and *Chaerocaunpa Celerio* in August with 950, 705, 621 and 420 respectively.

Table 1: Total density of insect species in the study period.

Species	T. No.	Mar	Apr	May	Jun	Jul	Aug	Sep
Euserica murzka	5579	680	620	752	848	889	950	840
Macxomia Magnifica	252	34	55	67	12	32	22	30
Horisantus Uhlerii	168	25	34	16	33	21	19	20
Ostrinica Merbilalis	712	37	64	87	111	115	137	161
Thyanta Custaror	1627	125	128	265	281	228	310	290
Ochrilidia Gemculata	3223	147	264	376	461	705	690	580
Chaerocaunpa Celerio	1716	139	189	123	119	336	420	390
Phyllognatus Excavatus	26	2	3	1	2	4	8	6
Forticula auricularia	148	17	30	28	19	21	18	15
Carpophius hemipterus	238	33	53	42	33	29	26	22
Allonemobius fasciatus	282	32	66	45	42	38	31	28
Charysopa Spp	3039	132	320	352	548	553	621	513
Density	17010	1403	1826	2124	2509	2961	3252	2895

3.2. The Percentage of species in the study site

Table 2 Gives the percentage of the insect species in all of the study period. *Euserica murzka* has the highest percentage at all of the study period, *Ochrilidia Gemculata* has 23.84% in July, *Chaerocaunpa Celerio* 21.91% in August, *Charysopa Spp* has 21.84% in Jun, and *Phyllognatus Excavatus* have the lowest percentage of 0.04% in May.

Table 2: The percentage of species in the different months.

Species	Mar	Apr	May	Jun	Jul	Aug	Sep
Euserica murzka	48.56	33.95	34.9	33.7	92.92	29.21	29.01
Macxomia Magnifica	2.42	3.01	3.11	0.47	1.09	0.67	1.03
Horisantus Uhlerii	1.78	1.86	0.74	1.31	0.70	0.58	0.69
Ostrinica Merbilalis	2.63	3.50	4.03	4.42	3.87	4.21	5.56
Thyanta Custaror	8.90	7.00	12.30	11.19	7.67	9.53	10.01
Ochrilidia Gemculata	10.47	14.45	17.45	18.37	23.72	21.21	20.03
Chaerocaunpa Celerio	0.14	10.35	7.70	4.74	11.30	21.91	13.47
Phyllognatus Excavatus	9.90	0.16	0.04	0.07	0.13	0.24	0.20
Forticula auricularia	1.21	1.64	1.29	0.75	0.70	0.55	0.51
Carpophius hemipterus	2.35	2.90	1.94	1.31	0.97	0.79	0.75
Allonemobius fasciatus	2.28	3.61	2.08	1.67	1.27	0.95	0.96
Charysopa Spp	9.40	17.52	16.34	21.84	18.6	19.09	17.72

3.3. Dominance and evenness values

The highest value of Dominance (*D*) in August is 2.00 Table 3. The highest values of Shannon diversity index (*H*) and the evenness (*J*) values were 10.679, 1.616 respectively in Jun and Maris Table 2.These values indicated that the insect species were evenly distributed at the time of this study.

Table 3: Dominance, diversity and evenness of insects in different months.

Months	*S*	*D*	*H*	*J*	*J*
Maris	1403	1.121	11.711	1.616	1.616
April	1826	1.746	8.803	1.172	1.172
May	2124	1.559	9.314	1.215	1.215
Jun	2509	1.401	10.679	1.422	1.422
July	2961	1.814	8.126	1.016	1.016
August	3252	2.00	-1.023	-.719	-.719
September	2892	1.89	8.081	1.013	1.013

S. number of species; D. Simpson dominance index; J. Index of evenness or equitability, *H*. Shannon diversity index; *R*. Richness index.

4. Discussion

About (17010) individuals of 12 insect species were collected during 7 months are *Euserica murzka, Macxomia Magnifica , Chaerocaunpa Celerio , Ostrinica Mrebilalis , Thyanta Custaror , Ochrilidia Gemculata, Phyllognatus Excavates, Horistontus Uhlerii, Phonopat frontalis, Forticula auricularia, Carpophius hemipterus, Allonemobius fasciatus, Charysopa Spp*. The data indicate that the insect densities are high in August with 3252 individuals. But we consider that some of the insects could not be included the trapping, due to the physical and chemical effects like, light effect and use of scale of pesticides.

The analysis of dominance, diversity and evenness indices provide valuable quantitative information in the different months. Diversity index has two components, species richness and equitability, this index is better understood along with Margalef's evenness component. Species richness depends largely in the structural diversity of the animal and equitability component is dependent on the stability of the physicochemical conditions [18]. This study indicates that the number of insect species were higher (more diversity) in August, but the maximum value of the diversity index was obtained in Maris flowed by other months. This anomaly is understood by the analysis of evenness components *(J)* value and Dominance *'D'*. The *'J'* value was maximum in Maris and minimum in August by 1.616 and -0.71.

The changes and the different in the species numbers from month to other month due to the physical and chemical effects like, daily variation in weather, environmental parameters, light effect on the light trap and use of scale of pesticides.

Interpretation of light trap catches of insects is effected by daily variation in weather that alters flight activity and numbers caught. Light trap efficiency is also modified by wind, fog, and daily weather may affect numbers actually present [6].

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