

12-1-2015

Section: Botany, Microbiology and Zoology

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ElGharabawy, Ali (2015) "SURVEY AND POPULATION STUDIES ON INSECTS BY USING PITFALL AND STICKY TRAPS AT IBEX RESERVE NATIONAL PARK, HUTET BENI TAMIM, SAUDI ARABIA," *Al-Azhar Bulletin of Science*: Vol. 26: Iss. 2, Article 19.

DOI: <https://doi.org/10.21608/absb.2015.23783>

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SURVEY AND POPULATION STUDIES ON INSECTS BY USING PITFALL AND STICKY TRAPS AT IBEX RESERVE NATIONAL PARK, HUTET BENI TAMIM, SAUDI ARABIA

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ABSTRACT

A survey together with studies on the population densities and relative abundance of insects and species richness at Ibex Reserve National Park, Western Hutet Beni Tamim, 180 Km. S. Riyadh in two areas (Protected area and non protected area) during one whole year from May, 2007 to the end of April, 2008, using pitfall and sticky traps.

The survey revealed the presence of fifty three species belonging to thirty six genera, of fifteen families under six orders (Coleoptera, Diptera, Hemiptera, Hymenoptera, Mantodea and Orthoptera). A total number of 1033 insects was obtained throughout the year. The largest numbers were observed during June, December and April. Also the largest number of species was belonging to the order Coleoptera (28 species), followed by the hymenopterans (15 species). Other orders were represented by varying number of species.

The coleopterans were found to be the most abundant and dominant, constituting the majority of the catch (882 individuals, representing 39.9% of the total catch), followed by hymenopterans (121 individuals, constituting 11.7% of the total catch). Insects of the other orders were less abundant and were represented by small numbers of individuals.

Thirty nine species belonging to twenty six genera of eleven families and four orders which were obtained throughout the year were collected from the protected area, while forty species belonging to twenty six genera of ten families and five orders were collected from the non-protected area.

INTRODUCTION

Survey, population densities, fluctuations and relative abundance are of significant value to give guide for further faunal studies. Two of the most convenient methods of carrying out such studies are by pitfall traps and sticky traps.

In Saudi Arabia, Al Maqooshy (1996) surveyed the aphids in Riyadh region, recording 18 species. Also, Al Ahmad (1989) surveyed the scale insects in the same region and studied the population dynamics and natural enemies. Ayoub (1959) discussed the insect pests of Saudi Arabia together with recommendations for their control. Al-Menshawry and Hejazy (2001), Issa and Helal (2000), Ali and El Saedy (1999), Al-Rajwy (1998), Gafaar (1995) and Hamad *et al.* (1965) surveyed the insects in some Arabian regions.

Hanna (1963 and 1969), Al-Akkad *et al.* (1997), Al-Gammal *et al.* (1999) and Badr *et al.*, (2001) reported similar studies about some insect groups. The ecological studies of insects, e.g., Hafez and Bishara (1961); Hanna (1973); Alfieri (1976); Helal (1977); Sharaf El-din (1981); Badr (1985); Salem *et al.* (1985); Shein-

ishen *et al.* (1985); Amin *et al.* (1985); Salem *et al.* (1986); El-Sayed (1987); Ali and Ibrahim (1988); Shah and Garg (1988); Bebars (2000); Abdel-Dayem *et al.* (2003); and Morsi and El-Gharbawy (2006).

The present work was carried out by using pitfall and sticky traps, to survey and study the population density, relative abundance and fluctuation population of insects in two localities at Hutet Beni Tamim, Saudi Arabia.

MATERIALS AND METHODS

This study was conducted for surveying and studying the insect population in Ibex Reserve National Park at Hutet Beni Tamim in central Saudi Arabia throughout a whole year (May, 2007- April, 2008). The major plant species in this area are *Calotropis procera*, *Anvillea radiata*, *Cucumis prophetarum*, *Citrullus colocynthis*, *Fagonia bruguieri*, *Lycium shawii* and *Panicum turgidum*. Two locations were selected for the study (protected and non protected). In each location ten pitfall traps made of water plastic bottles, ca. 1.5 liters, were set up under trees in random at suitable distances and three sticky traps made of yellow

plastic rectangular pieces (45X20 cm), painted with sticky nontoxic glue were hanged on three distant trees. These traps were collected every two weeks.

Insects were removed carefully from the traps, then sorted, identified, counted and recorded. Data of their annual numbers and percentages of abundance were provided. Calculated Meteorological data as shown in table (1).

Table (1) Meteorological data of average monthly temperature and average monthly humidity during the period of the study.

Months	Temperature (Avg.)	Humidity(Avg.)
December 2006	19.4	59.94 %
January 2007	19.5	59.92 %
February 2007	19.04	31.11%
March 2007	26.3	30.13%
April 2007	28.4	31.23 %
May 2007	44.3	20%
June 2007	48.4	11.12 %
July 2007	47	10.02 %
August 2007	35.1	21.11 %
September 2007	32.5	19.23%
October 2007	27.6	22.16 %
November 2007	22.3	47.09 %

All taxa (Families, Genera and species) were arranged alphabetically according to their taxonomic position. Insects were identified based on identification keys, materials kept in the insect collection of the Plant Protection Department, College of Food and Agriculture Science, King Saud University and the collection of Regional Centre for Research on Agriculture and Water Ministry of Agriculture, KSA, and by special taxonomists in UK, USA and Egypt.

The obtained materials from this study were deposited in the King Saud University Museum of Arthropods (KSMA), Department of Plant Protection, College of food and Agricultural Sciences, King Saud University.

RESULTS AND DISCUSSION

The present survey of the insects throughout a full year (May 2007- April 2008) using pitfall traps (PT) and sticky traps (ST) revealed the presence of fifty three insect species within thirty six genera of fifteen families in six orders. These species are alphabetically arranged according to orders, families and species and they are listed with the locality in table (2).

From this table, the order Coleoptera formed the largest number of species (twenty eight species within six families), order Hymenoptera (fifteen species of three families), order Diptera (four species of three families), order Hemiptera (four species of one family) Orthoptera (one species of one family) and Mantodea (one species of one family)

In the protected area (P), 683 insects represented thirty nine species, twenty eight genera, eleven families and four orders were collected, while in non-protected area (NP) 350 insects represented forty species, twenty six genera, ten families and five orders. The total number of trapped insects by sticky traps was 27 individuals, represented ten species, eight genera, five families and three orders. The trapped insects by pitfall traps collected were 1006 individuals, represented forty three species, twenty eight genera, ten families and four orders.

The data indicated that the total number of insects was 1033 individuals, the largest number of insects was obtained during June, December and May (191, 125 and 105 individuals, respectively), while the relatively lowest numbers were during January, February, March and October (28, 37, 46 and 60 individuals, respectively). Relatively large numbers of insects were collected during April, November and May (107, 92 and 86 individuals, respectively). Relatively small numbers were collected during, September and August (75 and 81 individuals, respectively).

The largest number of individuals attributed to order Coleoptera (882 individuals, representing 85.38% of the total annual catch), these insects were highly active and most abundant during the period from March to November with two major peaks of abundance during April and June (104 and 176 insects, respectively), followed by insects of order Hymenoptera (121 individuals, constituting 11.71% of the total catch). The majority of these insects were trapped during June to November with two major peaks of abundance during July and November (39 and 21 insects, respectively). Orders: Hemiptera, Diptera, Orthoptera and Mantodea were represented by smaller number of individuals (21, 4, 3 and 2 in-

Table (2): Monthly Catches of Insects collected by Pitfall and Sticky traps at Ibez Reserve National Park, PT: Pitfall Trap; ST: Sticky Trap; P: Protected Area and NP: Non Protected Area

No.	Order	Family	Species	methods	Month												P.	NP.	Total
					Jan. 2008	Feb. 2008	Mar. 2008	Apr. 2008	May 2007	Jun. 2007	July 2007	Aug. 2007	Sep. 2007	Oct. 2007	Nov. 2007	Dec. 2007			
1	Coleoptera	Carabidae	<i>Anthia duodecimguttata</i>	PT	0	0	0	1	4	2	1	1	1	0	0	0	6	4	10
2	Coleoptera	Elateridae	<i>Octocryptus wittmeri</i>	PT	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
3	Coleoptera	Meloidae	<i>Mylabris grattiosa</i>	PT	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1
4	Coleoptera	Scarabaeidae	<i>Eremazus unistriatus</i>	PT	0	0	0	0	0	0	0	0	4	0	0	4	0	0	4
5	Coleoptera	Scarabaeidae	<i>Rhyssalus granosus</i>	PT	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
6	Coleoptera	Silvanidae	<i>Oryzaephilus mercator</i>	PT	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1
7	Coleoptera	Tenebrionidae	<i>Adesmia cancellata</i>	PT	0	2	12	35	3	9	0	0	0	1	0	0	16	46	62
8	Coleoptera	Tenebrionidae	<i>Akis elevata</i>	PT	1	0	0	0	0	1	1	0	0	0	0	3	1	0	7
9	Coleoptera	Tenebrionidae	<i>Alphitobius diaperinus</i>	PT	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
10	Coleoptera	Tenebrionidae	<i>Alphitobius laevigatus</i>	PT	0	0	0	1	1	0	0	0	0	0	0	0	1	1	2
11	Coleoptera	Tenebrionidae	<i>Blaps kollari</i>	PT	3	2	1	1	0	0	0	0	0	0	11	16	11	23	34
12	Coleoptera	Tenebrionidae	<i>Drocochrus costatus costatus</i>	PT	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
13	Coleoptera	Tenebrionidae	<i>Gonocephalum setulosum</i>	PT	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1
14	Coleoptera	Tenebrionidae	<i>Mesostena puncticollis</i>	PT	1	0	12	35	57	98	46	18	6	3	3	1	218	62	280
15	Coleoptera	Tenebrionidae	<i>Oxycara buetikeri</i>	PT	2	14	11	2	2	1	0	0	12	6	9	25	79	5	84
16	Coleoptera	Tenebrionidae	<i>Oxycara saudi-arabicum</i>	PT	7	5	2	0	2	0	0	0	6	8	25	64	110	9	119
17	Coleoptera	Tenebrionidae	<i>Pimelia arabica</i>	PT	3	1	1	4	0	0	1	0	3	3	2	7	1	24	25
18	Coleoptera	Tenebrionidae	<i>Scleron sulcatum</i>	PT	2	0	0	0	0	0	0	0	0	0	0	0	1	1	2
19	Coleoptera	Tenebrionidae	<i>Thraustocolus arabicus</i>	PT	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1
20	Coleoptera	Tenebrionidae	<i>Thraustocolus rugosus</i>	PT	1	0	0	0	0	0	0	0	0	0	0	2	3	0	3
21	Coleoptera	Tenebrionidae	<i>Thripiera crinita</i>	PT	0	1	2	7	3	15	3	4	18	7	1	0	50	11	61
22	Coleoptera	Tenebrionidae	<i>Trachyderma andersi</i>	PT	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1
23	Coleoptera	Tenebrionidae	<i>Trachyderma lima</i>	PT	0	0	0	3	0	0	0	0	0	0	8	0	8	3	11
24	Coleoptera	Tenebrionidae	<i>Trachyderma philistina</i>	PT	0	0	1	12	9	15	10	35	18	10	1	1	69	43	112
25	Coleoptera	Tenebrionidae	<i>Zophosis complanata</i>	PT	0	0	0	0	0	2	0	0	0	0	0	0	0	2	2
26	Coleoptera	Tenebrionidae	<i>Zophosis farinosa</i>	PT	0	0	0	0	1	22	0	4	2	1	0	5	2	33	35

27	Coleoptera	Tenebrionidae	<i>Zophosis sp.</i>	PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	5
28	Coleoptera	Tenebrionidae	<i>Zophosis spp.</i>	PT	0	0	2	1	1	8	1	0	2	0	0	0	0	0	0	0	3	12	15
29	Diptera	Muscidae	<i>Musca sorbens</i>	ST	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
30	Diptera	Sarcophagidae	<i>Wohlfahrtia nuba</i>	ST	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1
31	Diptera	Ulidiidae	<i>Physiphora demandata</i>	ST	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1
32	Diptera	Ulidiidae	<i>Physiphora smaragdina</i>	ST	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1
33	Hemiptera	Lygaeidae	<i>Leptodemus minutus</i>	ST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
34	Hemiptera	Lygaeidae	<i>Nysius spp.</i>	ST	0	7	0	0	0	0	0	0	0	4	1	2	14	16	0	0	0	0	0
35	Hemiptera	Lygaeidae	<i>Spilostethus longulus</i>	ST	0	0	1	0	0	1	0	0	0	0	1	0	2	3	0	0	0	0	0
36	Hemiptera	Lygaeidae	<i>Spilostethus pandurus pandurus</i>	ST	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
37	Hymenoptera	Apidae	<i>Melecta sinaitica</i>	ST	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1
38	Hymenoptera	Apidae	<i>Xylocopa pubescens</i>	ST	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	1	1
39	Hymenoptera	Formicidae	<i>Camponotus adenensis</i>	PT	4	3	1	0	0	0	0	0	0	0	0	1	6	4	10	0	0	0	0
40	Hymenoptera	Formicidae	<i>Cataglyphis abyssinicus</i>	PT	0	1	0	0	0	3	0	4	0	15	19	0	36	6	42	0	0	0	0
41	Hymenoptera	Formicidae	<i>Cataglyphis arenarius</i>	PT	0	0	0	0	0	1	1	0	0	0	0	1	1	2	0	0	0	0	0
42	Hymenoptera	Formicidae	<i>Cataglyphis invidus</i>	PT	0	0	0	0	0	0	2	2	1	1	0	3	3	6	0	0	0	0	0
43	Hymenoptera	Formicidae	<i>Cataglyphis niger</i>	PT	0	0	0	3	0	4	33	4	0	0	0	36	8	44	0	0	0	0	0
44	Hymenoptera	Formicidae	<i>Cataglyphis nodus</i>	PT	0	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0
45	Hymenoptera	Formicidae	<i>Cataglyphis semitonsus</i>	PT	0	0	0	0	0	1	0	1	0	0	0	1	1	2	0	0	0	0	0
46	Hymenoptera	Formicidae	<i>Messor ebininus</i>	PT	0	0	0	0	0	0	1	2	1	0	0	1	3	4	0	0	0	0	0
47	Hymenoptera	Formicidae	<i>Messor sp.</i>	PT	0	0	0	0	0	0	1	1	0	0	0	1	1	2	0	0	0	0	0
48	Hymenoptera	Formicidae	<i>Monomorium niloticum</i>	PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Hymenoptera	Formicidae	<i>Monomorium sp.</i>	PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	Hymenoptera	Mutellidae	<i>Pseudophotopsis continua</i>	PT	0	0	0	0	0	1	0	0	0	0	1	0	1	2	0	0	0	0	0
51	Hymenoptera	Mutellidae	<i>Tricholabiodes niloticus</i>	PT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	Mantodea	Eremiaphilidae	<i>Eremiaphila gene</i>	PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
53	Orthoptera	Pyrgomorphidae	<i>Poekilocerus vittatus</i>	PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Total					28	37	46	107	86	191	105	81	75	60	92	125	683	350	1033				

dividuals, constituting 2.03%, 0.39%, 0.29 and 0.19% of the total catch, respectively).

The beetle species, *Mesostena puncticolis*, was the most abundant and dominant of all species, with a total annual number of 280 individuals, constituting 27.11% of the total annual catch. Individuals of this species were largely active and most frequent during May and June (57 and 98 individuals, respectively). *Oxycara saudiarabicum* came next in abundance (119 individuals), active and most frequent during November and December (25 and 64 individuals, respectively).

From the previous data, it is suggested that, the increase of the individuals in June probably due to prevailing climatic conditions were suitable in this month, but they were harsh during other months.

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حصر ودراسة عشائر الحشرات باستخدام المصائد الارضية واللاصقة في المحمية الوطنية لحماية الوعول- حوطة بني تميم- المملكة العربية السعودية

على عبد الله الغرباوى

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قسم علم الحيوان، كلية العلوم، جامعة الأزهر، مدينة نصر، القاهرة، مصر

تم رصد ودراسة كثافة عشائر الوفرة النسبية للحشرات في المحمية الوطنية لحماية الوعول، غرب حوطة بني تميم، 180 كم جنوب الرياض بالمملكة العربية السعودية باستخدام المصائد الأرضية والمصائد اللاصقة. تم اختيار منطقتين لاجراء البحث، الاولى منطقة محمية بها حدود جبلية بالاضافة الى سياج من الاسلاك لحمايتها من الصيد الجائر، المنطقة الثانية وهي غير محمية بتلك السياج. تم زيارة منطقة العمل كل اسبوعين على مدى عام كامل بدءا من مايو 2007 حتى نهاية ابريل 2008.

تم حصر 53 نوعا تابعة لـ 36 جنسا في 15 فصيلة من ست رتب حشرية، هي غمدية الأجنحة، ذات الجناحين، نصفية الأجنحة، غشائية الأجنحة، رتبة فرس النبي ومستقيمة الأجنحة. وكان العدد الإجمالي 1033 فردا، تم جمع العدد الأكبر خلال أشهر يونيو، ديسمبر وابريل علي التوالي. وكان العدد الأكبر من الأنواع لرتبة غمدية الأجنحة (28 نوعا)، يليها غشائية الأجنحة (15 نوعا).

كانت حشرات رتبة غمدية الأجنحة هي الأكثر نشاطا ووفرة (882 فرداً بنسبة 39,9 % من العدد الكلي للحشرات المجموعه)، يليها حشرات رتبة غشائية الأجنحة (121 فرداً بنسبة 11,7 %).

تم تسجيل تسعة وثلاثين نوعا تتبع ست وعشرين جنسا في احدى عشر فصيلة من أربع رتب في المنطقه المحمي، بينما تم تسجيل أربعين نوعا تتبع ست وعشرين جنسا و عشرة فصائل من خمس رتب في المنطقة الغير محمية.