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University of Benghazi

Faculty of Science

Department of Zoology

**A preliminary Study on the Lady Bugs (Coleoptera:Coccinellidae) of  
Battah and Neighboring Area in North-Eastern Libya**

A Thesis submitted in partial fulfillment of the requirements for the degree of

Master of Science in Zoology

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**Benghazi –Libya**

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## INTRODUCTION

The Coccinellidae comprise a large family in the Coleoptera with about 490 genera and 4200 species (Sasaji, 1971). Ladybeetles are a large and well-known group of the Coleoptera, because of their bright colors, round spotted on the elytra and beneficial roles (they are a very beneficial group, being natural enemies of many insects, especially aphids), these beetles are also commonly called lady bugs, ladybirds and coccinellids. Most Ladybeetles species are carnivores; both adults and larvae are primarily predators of aphids and others vegetarian, that feed on a variety of plants, they are found in many terrestrial habitats. However, numbers and distributions of many Ladybeetles species in natural populations are declining because of habitat destruction and the use of chemical pesticides, many ladybeetles species are polymorphic in terms of the color pattern on the elytra. Since some ladybeetle provide good information for understanding evolutionary processes in action, numerous population studies have focused on the polymorphism that they have. Lady beetles overwinter as adults in protected places and some species are found in aggregations in protected areas in wooded or mountainous areas. They migrate to fields in April and may and locate aphid prey. After feeding for a short period of time, they deposit eggs on plants infested with prey. Eggs hatch in five to seven days, and the tiny larvae begin feeding on small aphids or other soft-bodied prey, when mature, they form a pupa on the plant and adults emerge about a week later, a complete life cycle from egg to adult requires four to six weeks. There are several overlapping generations each season before adults seek overwintering sites.

Although the number of coccinellid species in Europe is known, the data from Libya needs to be improved. There have been several previous attempts to identify the ladybirds of Libya; most of these are short agricultural and faunistic reports. this Study describes preliminary results.

**AIM OF THE WORK:-**

- 1.Revision of relevant literature on the taxonomy and Ecological studies of the family Coccinellidae .
2. Collecting Coccinellid specimens during field trips to different areas in Battah and neighboring area, covering various ecological habitats, using convenient collection methods.
- 3.External morphology of the adult *Coccinella septempunctata* Linnaeus as representatives of these families.
- 4.Determining the most diagnostic characters to elaboration keys on Subfamilies, genera, and species of Coccinellidae.

## REVIEW OF LITERATURE

### 2.1.SURVEY:

**Moreton (1969)** gave a detailed study on the Beneficial Insects and Mites, these studies revealed that the species of Coccinellids are major biological agents of pests such as aphids, mealy bugs, scale insects, thrips and mites in all parts of the world.

**Arshad et al. (2007)** presented a detailed study on Effect of varying temperature on the survival and fecundity of *Coccinella septempunctata* (Coleoptera: Coccinellidae). They provided their study with photoperiod under laboratory condition was made for two successive generations of *Coccinella septempunctata* at varying temperatures .

**Berthiaume et al. (2007)** (Brown and Miller 1998, Galecka 1991, Gurney and Hussey 1970, Ipertti 1999, Obrycki and Kring 1998). indicate the majority of coccinellid species (about 90 %) are beneficial predators (others are phytophagous or mycophagous); consequently coccinellids have played a significant role in the development of biological control .

**Kontodimas et al. (2007)** recorded average longevity constant temperature of  $25 \pm 1^\circ\text{C}$ ,  $65 \pm 2\%$  RH and 16L:8D RH and 16L:8D. Average total fecundity, net reproductive rate and intrinsic rate of increase were found be 1996.8 eggs/female, 1004.1 females/female and 0.118 females /female/day, respectively.

**Šipoš, J. et al. (2012)** studied the differences in the predatory behavior of male and female lady bird beetles (Coccinellidae), they indicated female ladybirds consumed significantly more aphids than males per unit time. In addition the turning rate and time spent resting differed between the sexes.

## **2.2.MORPHOLOGY:**

**Sasaji (1968, 1971)**, Hodek (1973), Kovář (1996), Kuznetsov (1997),

**Vandenberg (2002)** gave an excellent and exhaustive account of coccinellid morphology, with illustrations.

**Rahat Ullah et al. (2014)** gave an excellent detailed study on the external morphology of adult Coccinellidae. He provided his study with many labeled drawings.

## **2.3.TAXONOMY:**

**Redtenbacher (1844)** proposed the first subfamilial classification system for Coccinellidae by recognizing two biologically defined groups, the plant feeders and the aphid feeders. The phytophagous group corresponds to the current subfamily Epilachninae but the aphidophagous group spans the other currently recognized subfamilies.

**Mulsant (1846, 1850)** made an important contribution to coccinellid classification by recognizing supra-generic categories that correspond to the current tribes in Coccinellidae.

**Korschefsky's (1931)** classification of family Coccinellidae into three subfamilies are recognized: Epilachninae, Coccinellinae, and Lithophilinae.

**Sasaji (1968; 1971a, b)** proposed a revised classification based on a careful investigation of larval and adult morphology. His system of six subfamilies (Sticholotidinae, Coccidulinae, Scymninae, Chilocorinae, Coccinellinae and Epilachninae) was widely accepted and remains the primary reference for the family.

**Gorden (1985)** gave an excellent study on Coccinellidae (Coleoptera) of America north of Mexico. He described 57 genera and 475 species of Coccinellidae, provided his study with keys to all taxa, descriptions of the,

species diagnoses, synonymies . Two new tribes are erected, and 25 new species are described for the first time from America north of Mexico.

**Fleming (2000)** reported 4,000 predatory species of Coccinellid including more than 300 species from Indo-Pak Subcontinent.

**Katakura et al.(2001)** worked on the fauna of Indonesian islands, Sumatra and Java, and described 26 species of sub family Epilachninae. from Indonesia. They included eleven species of *Henosepilachna*, thirteen species of *Epilachna*, one species of *Afidenta*. Montgomery and Goodrich (2002) explored the fauna of Illinois State and provided keys for identification with distribution maps. They also reported six species *Brachiacantha decimpustulata*, *B. felina*, *B. quadripunctata quadripunctata*, *B. dentips* and *B. indubitabilis*.

**Vandenberg (2002)** provided an updated key to the 60 genera of the family Coccinellidae occurring in North America, summarizes distributional data, and provides information on morphology, habits and **Poorani (2005)** gave a complete checklist of the coccinellidae of Indian sub region and provides a detailed redescription of three species of the genus *Coccinella* were redescribed from Sindh for the first time, *Coccinella septumpunctata*, *C. undecimpunctata* and *C. transversalis*. He provided his study with structures of genitalia and key to the species of this genus.

**Rafi et al. (2005)** gave taxonomic notes, distribution and list of hosts/preys are provided for 75 species recorded from Pakistan. These species belong to 37 genera 2 subgenera in 14 tribes and five subfamilies. Out of these, 24 species and three subspecies were reported for the first time in Pakistan.

**Özden (2006)** recorded six species belonging to the family Coccinellidae from Cyprus for the first time: *Cheilomenes propinqua*, *Diomus*

*rubidus*, *Nephus hiekei*, *Nephus nigricans*, *Scymnus pallipediformis* and *Scymnus rubromaculatus*.

**Kumar (2006)** worked on the taxonomy of the subfamily coccinellinae from India.

**ITIS (2009)** in his study on the Integrated Taxonomic Information System described two subspecies within the species *Coccinella septempunctata* Linnaeus: *Coccinella septempunctata brucki* Mulsant, 1866 and *Coccinella*

**Muhammed. et al. (2013)** studied the genus *Coccinella* from Gilgit-Baltistan providing their study with two new records from Pakistan, *Coccinella iranica* and *C. redemita*. The authors also gave several general notes on, taxonomy status and regional record of distribution are given for each species.

## MATERIALS AND METHODS

### 3.1. Ecology:

#### 3.1.1. Survey and geographical distribution

Coccinellids were collected from different localities of Battah and neighboring area, which is located at 41m altitude in north-eastern Libya. The specimens were mounted then boiled in 10% KOH for 10-15 minutes. Various body parts were separated and mounted in Canada balsam after a brief dip in Xylol. Different structures including genitalia were studied under a Binocular. Measurements and drawings of the body and other structures were made by using a micro millimeter scale and an ocular grid. The terminologies for various taxonomic structures including genitalia and procedures used by Innayatullah and Siddique (1978) was generally followed. The taxonomic structures especially male and female genitalia after illustration were preserved in micro vial with glycerin and pinned with specimen.

#### Description of the study area

##### Geographical location and astronomer battah area:

Batha located in northeast Libya area within the green mountain area away from the city Marage about 40 km and is bordered by the Mediterranean sea to the north which is about 12 km, from the south side Asitata area, the area is bordered to the west Tmith area, from the south west side is bordered by Ouwaylia, and from the east is bordered by Bayada area. And astronomer located at the intersection of east longitude  $^{\circ}21, '06, ''29$ , with latitude north  $^{\circ}32, '39, ''37$ . (1974, خريطة ليبيا الجيولوجية)

##### Soil :

**Batha area within the red soil alterraroza rail sulaikatah and advantage of being formed out of different materials, include output of the remaining rock and sediment deposits valleys.**



**Height :** The height batha about 350 meters above sea level.(الزوام,1984)

**Population :** population batha area in 2006 (6754 inhabitants) and had in 1973 (2800inhabitants).2006, (النتائج النهائية للتعداد العام للسكان

**Climate:** Batha area controlled by Mediterranean climate of hot dry summer and mild area rainy winter. temperature ,batha area located within the green mountain area, which area is controlled by the Mediterranean climate, where temperatures rise in summer and fall in the winter ,the maximum temperature in the summer rate ranging from °30\_°32 centigrade. but the maximum temperature in winter rate ranging from °14\_°17centigrade .**Rain,**ranging the amount of rain fall on Batha area about 400\_500 milimeters per year. **Winds,** Batha area controlled by adverse winds subject area, which is considered the main source of rainfall in winter but in the summer does not become adverse to the wind any impact on the batha region.(الزوام,1984)

**3.1.2.Seasonal abundance:** A&B areas was selected to study the Seasonal abundance of Coccinellids bugs.

#### **Area A:**

The area about 36 hectares a residential area containing plants and animals .and these plants *Pistacia lentiescus* , *Sinapis alba*,*Limoniastum monopetalm*, *Phlomis floccosa* ,*Ceratonia siliqua* , *Rosmarinus officinalis*, *Allium ampeloprasum* , *Chamomilla auea*, *Urticadioica*, *Sarcopoterium spinosum*, *Chrysanthemum coronarium*,*Gladious segetum*,*Jasminum gracilinum*,Wheat (*Triticum* spp),Barley ( *Hordeum vulgare*),and *Allium cepa*, the animals, there are cows, chickens, sheep and goat.

#### **Area B:**

The area about 20 hectares, In addition to plants in region A there are olive trees, *Junipers phoeniceae*, *Eucalyptus* spp ,and *Arbutus pavarii* , but the animals, there are apiaries for bees only.

### **3.2.External morphology of the adult *Coccinella septempunctata* Linn was studied in detail.**

Coccinellids were collected from different localities of the Battah ara. The specimens were mounted then boiled in 10% KOH for 10-15 minutes. Various body parts were separated and mounted in Canada balsam after a brief dip in Xylol. Different structures including genitalia were studied under a Binocular. Measurements and drawings of the Male genitalia body and other structures were made by using a micromillimeter scale and an ocular grid. The terminologies for various taxonomic structures including genitalia and procedures used by Innayatullah and Siddique (1978).

### **3.3.Taxonomy:**

The pinned specimens were labeled, identified and kept in preservation boxes supplied with some chemical repellents. Specimens were identified by the use of the keys and revisions of Brown (1962), Brown and de Ruelle (1962), Casey (1899), Chapin (1946, 1965a), Dobzhansky (1931, 1941), Gordon (1970a, 1970b), Horn (1895), Leng (1903a, 1903b, 1908, and 1911), McKenzie (1936), Sasaji (1968), Timberlake (1943), and Wingo (1952).

## PRESENT INVESTIGATION AND EXPERIMENTAL RESULTS

### 4.1-SURVEY:

Coccinellids were collected from different localities of the Battah and neighboring area. In present study, a survey was conducted to explore the Coccinellidae ladybird beetles from during 12/7/2013-27/3/2016. covering various ecological habitats, using convenient collection methods(Macphail traps,Nets ,Hand) .

**Table (1) Coccinellids collected from different localities of Battah and neighboring area.**

Date	Species Collected	Plants from which the species were collected
12/7/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
12/7/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Eucalyptus spp</i>
12/7/2013	<i>Hippodamia sinuata</i> Crotch Casey	<i>Allium Cepe</i>
2/8/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Jasminum gracilinum</i>
2/8/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Olive tree</i>
16/8/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Olive tree</i>
16/8/2013	<i>Hippodamia sinuata crotchii</i> Casey	<i>Allium cepe</i>
26/8/1013	<i>Coccinella septempunctata</i> Linnaeus	<i>Coriander spp</i>
19/9/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Gladiolus segetum</i>
24/9/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium Cepe</i>
18/12/2013	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium Cepe</i>
6/1/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
13/2/1014	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
14/3/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Eucalyptus spp</i>
14/3/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Triticumspp</i>
14/3/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Gladiolus segetum</i>
19/3/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Gladiolus segetum</i>
28/3/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium ampeloprasum</i>

**To be continued**

<b>Date</b>	<b>Species Collected</b>	<b>Plants from which the species were collected</b>
28/3/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
4/4/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
4/4/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Chamomilla aurea</i>
4/4/2014	<i>Hippodamia sinuata crotchi</i> Casey	<i>Rosa damascena</i>
11/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
11/4/2014	<i>Hippodamia variegata</i> (Goeze)	<i>Allium cepe</i>
11/4/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>TriticumSpp</i>
11/4/2014	<i>Hippodamia sinuata crotchi</i> Casey	<i>TriticumSpp</i>
11/4/2014	<i>Hippodamia sinuata crotchi</i> Casey	Olive tree
11/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>TriticumSpp</i>
11/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Triticum spp</i>
17/4/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Jasminum gracilinum</i>
17/4/2014	<i>Hippodamia sinuata crotchi</i> Casey	<i>Allium Cepe</i>
17/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium Cepe</i>
17/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Eucalyptus spp</i>
17/4/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Gladiolus segetum</i>
17/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium Cepe</i>
17/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Gladiolus segetum</i>
17/4/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Eucalyptus spp</i>
17/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Allium Cepe</i>
17/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Gladiolus segetum</i>
17/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Rosa damascena</i>
19/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Eucalyptus spp</i>
19/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Allium Cepe</i>
19/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Rosa damascena</i>
19/4/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Allium cepe</i>
19/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Allium cepe</i>
19/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
20/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Allium cepe</i>
20/4/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Eucalyptus spp</i>
20/4/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Allium cepe</i>
20/4/2014	<i>Hippodamia sinuata Crotchi</i> Casey	<i>Gladiolus segetum</i>
20/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Gladiolus segetum</i>
20/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Hordeum vulgare</i>

**To be continued**

<b>Date</b>	<b>Species Collected</b>	<b>Plants from which the species were collected</b>
29/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
29/4/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Gladiolus segetum</i>
29/4/2014	<i>Coccinella quinquesignata</i> (Kirby)	<i>Gladiolus segetum</i>
29/4/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Phlomis floccosa</i>
6/5/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Gladiolus segetum</i>
6/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Gladiolus segetum</i>
6/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Allium cepe</i>
6/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Pistacia lentiescus</i>
6/5/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Gladiolus segetum</i>
19/5/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Rosa damascena</i>
19/5/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
19/5/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
19/5/2014	<i>Hippodamia quinquesignata</i> (Kirby)	<i>Rosa damascena</i>
23/5/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Allium cepe</i>
23/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Allium cepe</i>
23/5/2014	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium cepe</i>
23/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Eucalyptus spp</i>
23/5/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Allium cepe</i>
2/6/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Jasminum gracilinum</i>
2/6/2014	<i>Hippodamia sinuata</i> Crotch Casey	<i>Allium Cepe</i>
2/6/2014	<i>Coccinella undecimpunctata</i> Linnaeus	<i>Jasminum gracilinum</i>
2/6/2014	<i>Coccinella septempunctata</i> Linnaeus	<i>Jasminum gracilinum</i>
18/3/2016	<i>Coccinella septempunctata</i> Linnaeus	Olive tree
18/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Chamomilla auea</i>
19/3/2016	<i>Coccinella septempunctata</i> Linnaeus	Pomegrante
19/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
19/3/2016	<i>Coccinella septempunctata</i> Linnaeus	Grape
20/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>TriticumSpp</i>
20/3/2016	<i>Hippodamia convergens</i> Guérin-Méne	<i>Allium ampeloprasum</i>
22/3/2016	<i>Coccinella septempunctata</i> Linnaeus	Pomegrante
23/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Coriander spp</i>
23/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
24/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Pistacia lentieseus</i>

**To be continued**

Date	Species Collected	Plants from which the species were collected
25/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium ampeloprasum</i>
26/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Allium cepe</i>
26/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Coriander spp</i>
26/3/2016	<i>Coccinella septempunctata</i> Linnaeus	Pomegranate
27/3/2016	<i>Coccinella septempunctata</i> Linnaeus	<i>Triticum spp</i>

**Table ( 2 ) Coccinella species collected from plants in the Study Area:**

PLANTS	SPECIES COLLECTED						Total
	<i>Coccinella septempunctata</i>	<i>Coccinella undecimpunctata</i>	<i>Hippodamia convergens</i>	<i>Hippodamia sinuata crotchii</i>	<i>Hippodamia quinqesignata</i>	<i>Hippodamia variegata</i>	
<i>Allium Cepe</i>	54	0	40	10	0	1	105
<i>Eucalyptus spp</i>	10	7	5	0	0	0	22
<i>Jasminum Gracilinum</i>	14	30	0	5	0	0	49
Olive tree	10	0	0	8	0	0	18
<i>Gladios Segetum</i>	5	11	15	8	2	0	41
<i>coriander spp</i>	5	0	0	0	0	0	5
<i>Triticum spp</i>	22	0	3	8	0	0	33
<i>Rosa damascena</i>	10	0	0	10	1	0	21
<i>Allium Ampeloprasum</i>	14	0	1	0	0	0	15
<i>Chamomilla aurea</i>	7	0	0	0	0	0	7
<i>Hordeum vulgare</i>	11	0	4	0	0	0	15
<i>Phlomis floccose</i>	0	0	5	0	0	0	5
<i>Pistacia lentiescus</i>	7	0	0	10	0	0	17
<i>Pomegranate</i>	16	0	0	0	0	0	16
<i>Grape</i>	5	0	0	0	0	0	5

### Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Plants * Species	374	100%	0	.0%	374	100%

### Bar Chart

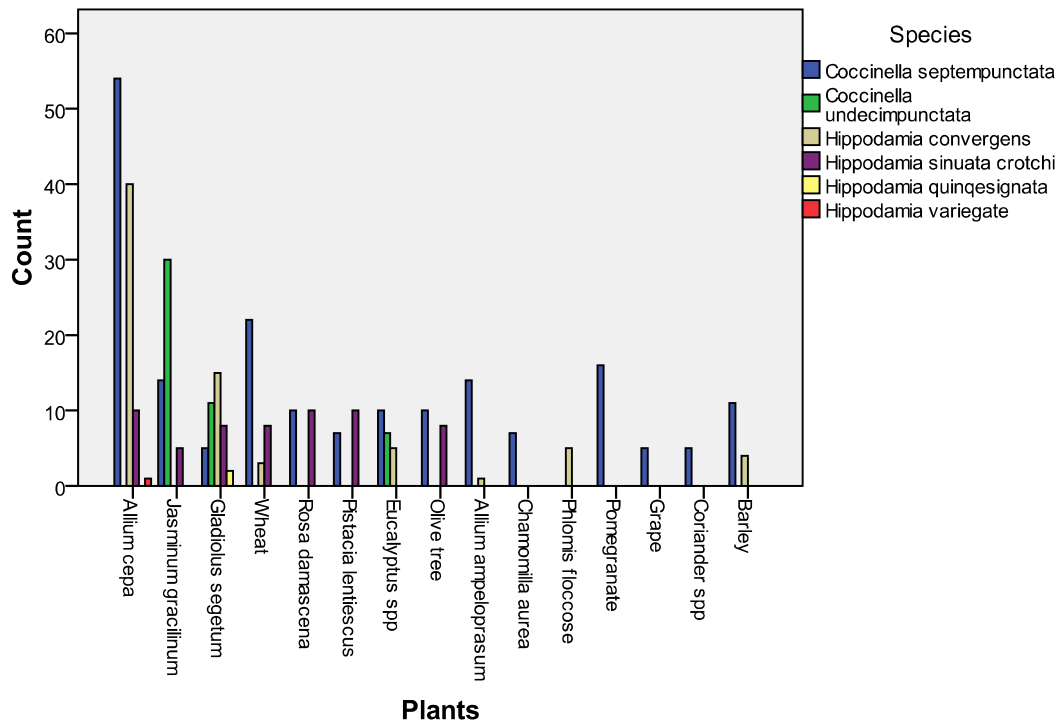


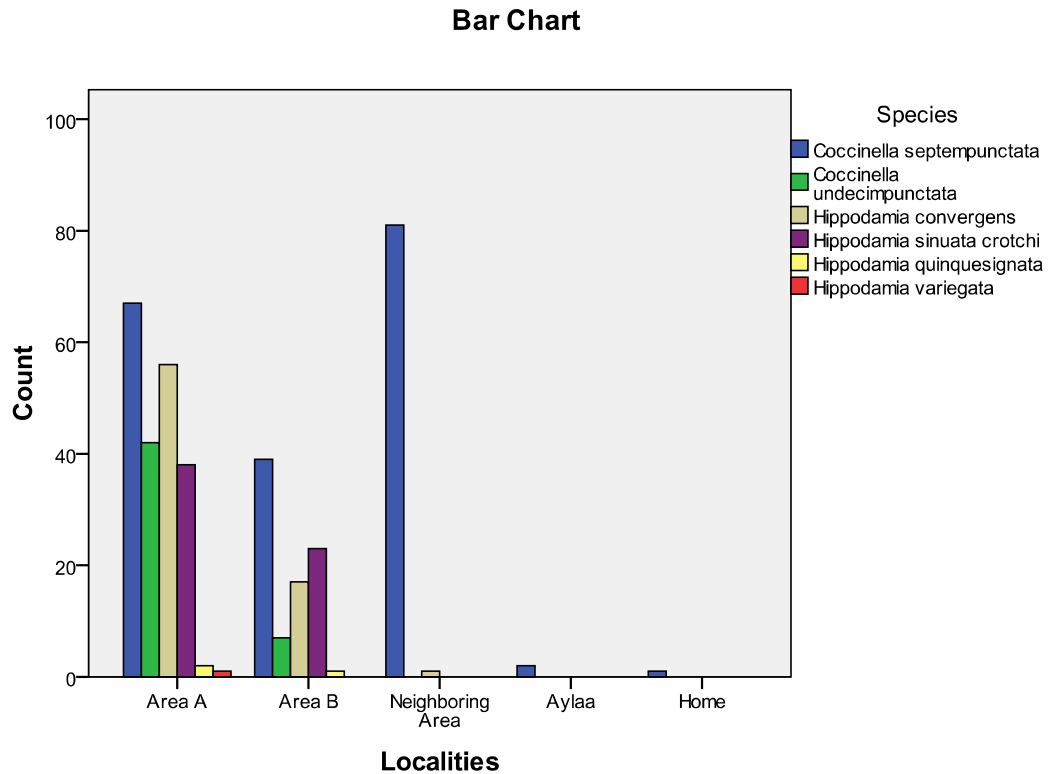
Figure ( 1) Species collected from plants in the Study Area.

**Table ( 3) Species collected from localities in the Study Area:**

Localities	SPECIES COLLECTED						Total
	<i>Coccinella septempunctata</i>	<i>Coccinella undecimpunctata</i>	<i>Hippodamia convergens</i>	<i>Hippodamia sinuata crotchii</i>	<i>Hippodamia quinquesignata</i>	<i>Hippodamia variegata</i>	
Area A	67	41	55	36	2	1	202
Area B	39	7	17	23	1	0	87
Neighboring Area	81	0	1	0	0	0	82
Ouwaylia	2	0	0	0	0	0	2
Home	1	0	0	0	0	0	1
Total	190	48	73	59	3	1	374

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Locality * Species collected	374	100%	0	0%	374	100%





**Figure ( 2 ) Species collected from localities in the Stud Area.**

#### **4.2- SEASONAL ABUNDANCE:**

Seasonal abundance of Coccinellids bugs was recorded in two different localities(A&B areas) belonging to Battah.Observations and collections of the coccinellids species were carried out periodically in the two areas monthly all over the years (July2013- June2014).Several types of insect traps,nets,and some bugs were also collected by hand picking were used. collected bugs were killed in ethyl acetate tubes,counted sorted into species and taken to laboratory for identification.

## **Vegetation:**

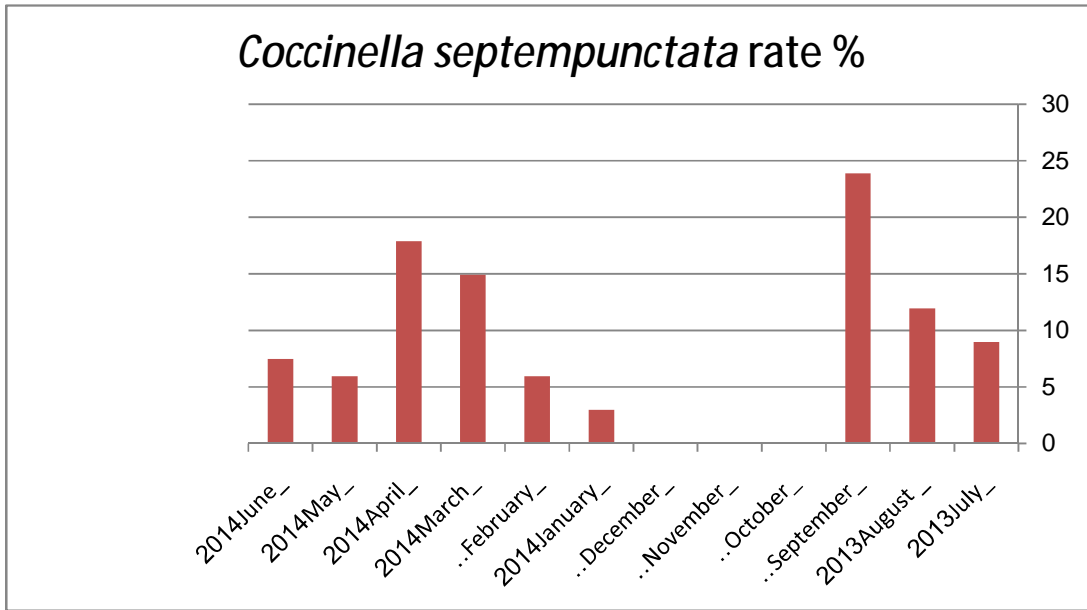
The flora of the study area showed that a cultivated area with *Pistacia lentiescus* , *Sinapis alba*,*Limoniastum monopetalm*, *Phlomis floccosa* ,*Ceratonia siliqua* ,*Rosmarinus officinalis*, *Allium ampeloprasum* , *Chamomilla auea*,*Urtica dioica*,*Sarcopoterium spinosum*,*Chrysanthemum coronarium*,*Gladious segetum*,*Jasminum gracilinum*,Wheat (*Triticum* spp),Barley ( *Hordeum vulgare*),and *Allium cepa*,the animals, there are cows, chickens, sheep and goats in area A. In addition to plants in region A there are olive trees,*Junipers phoeniceae*,*Eucalyptus* spp ,and *Arbutus pavarii* , but the animals, there are apiaries for bees only in area B.

**Area.A****Table (4) Monthly records of Coccinellid Species Collected from Area (A) from (2013/2014):-**

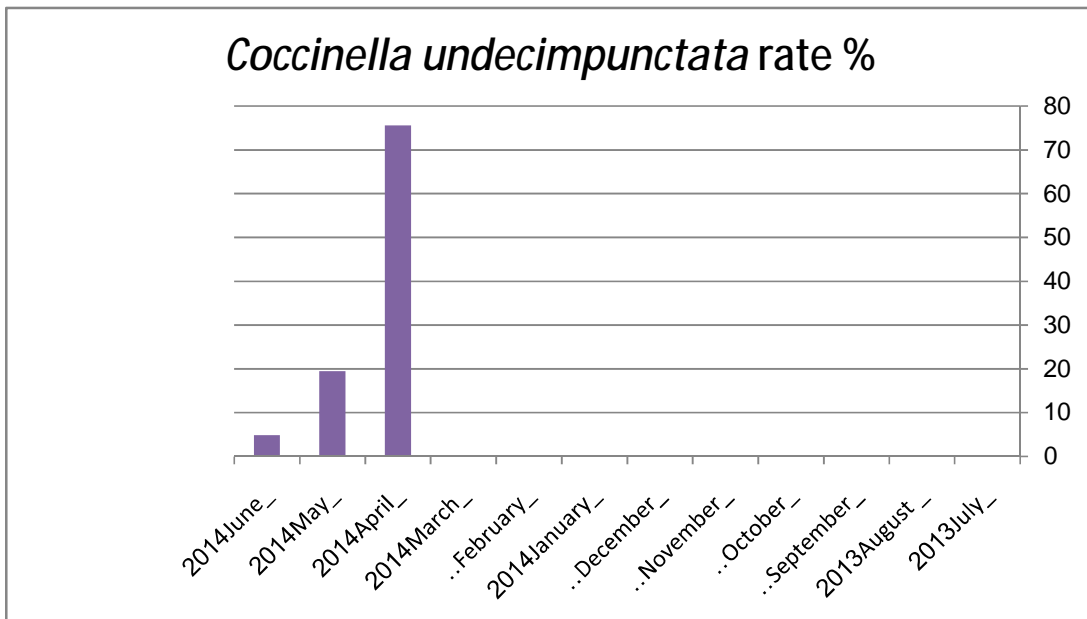
Species	<i>Coccinella septempunctata</i>		<i>Coccinella undecimpunctata</i>		<i>Hippodamia convergens</i>	
	N0	%	N0	%	N0	%
July2013	6	8.96	0	0	0	0
August 2013	8	11.94	0	0	0	0
September2013	16	23.88	0	0	0	0
October2013	0	0	0	0	0	0
November2013	0	0	0	0	0	0
December2013	0	0	0	0	0	0
January2014	2	2.99	0	0	0	0
February2014	4	5.97	0	0	0	0
March2014	10	14.92	0	0	2	3.64
April2014	12	17.91	31	75.61	34	61.82
May2014	4	5.97	8	19.51	19	34.54
June2014	5	7.46	2	4.88	0	0
Total	67	100	41	100	55	100

**Table(5) Monthly records of Coccinellids Species collected from Area(A) from (2013/2014):**

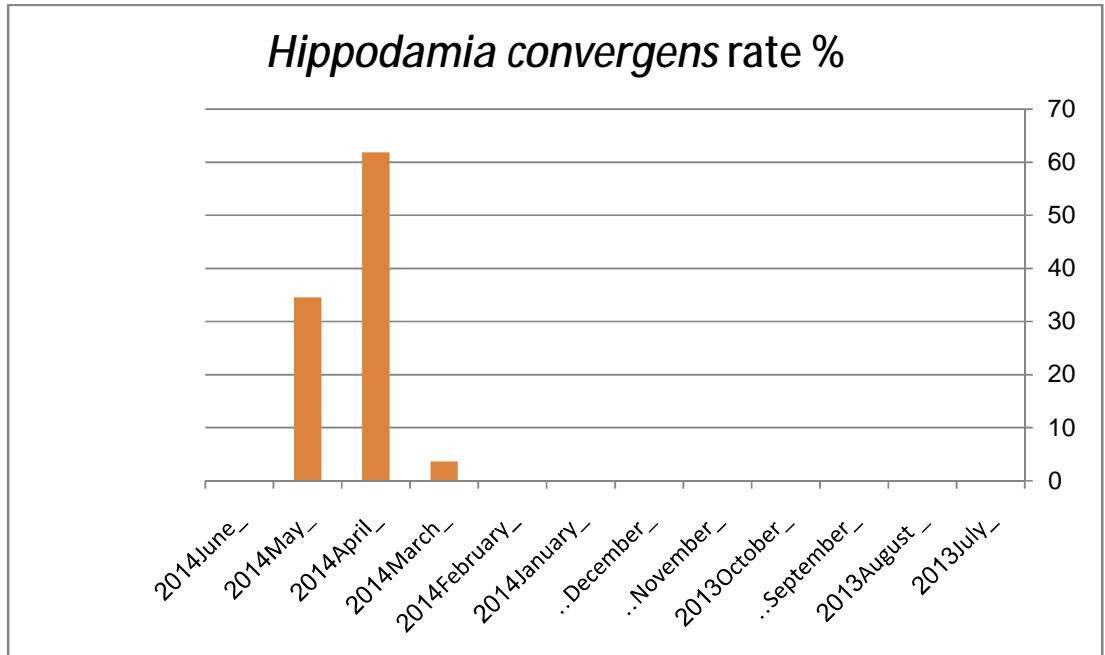
Species	<i>Hippodamia sinuata crotchi</i>		<i>Hippodamia quinquesignata</i>		<i>Hippodamia variegata</i>	
	NO	%	NO	%	NO	%
July2013	0	0	0	0	0	0
August 2013	2	5.56	0	0	0	0
September2013	0	0	0	0	0	0
October2013	0	0	0	0	0	0
November2013	0	0	0	0	0	0
December2013	0	0	0	0	0	0
January2014	0	0	0	0	0	0
February2014	0	0	0	0	0	0
March2014	0	0	0	0	0	0
April2014	25	69.44	0	0	1	100
May2014	6	16.67	2	100	0	0
June2014	3	8.33	0	0	0	0
Total	36	100	2	100	1	100



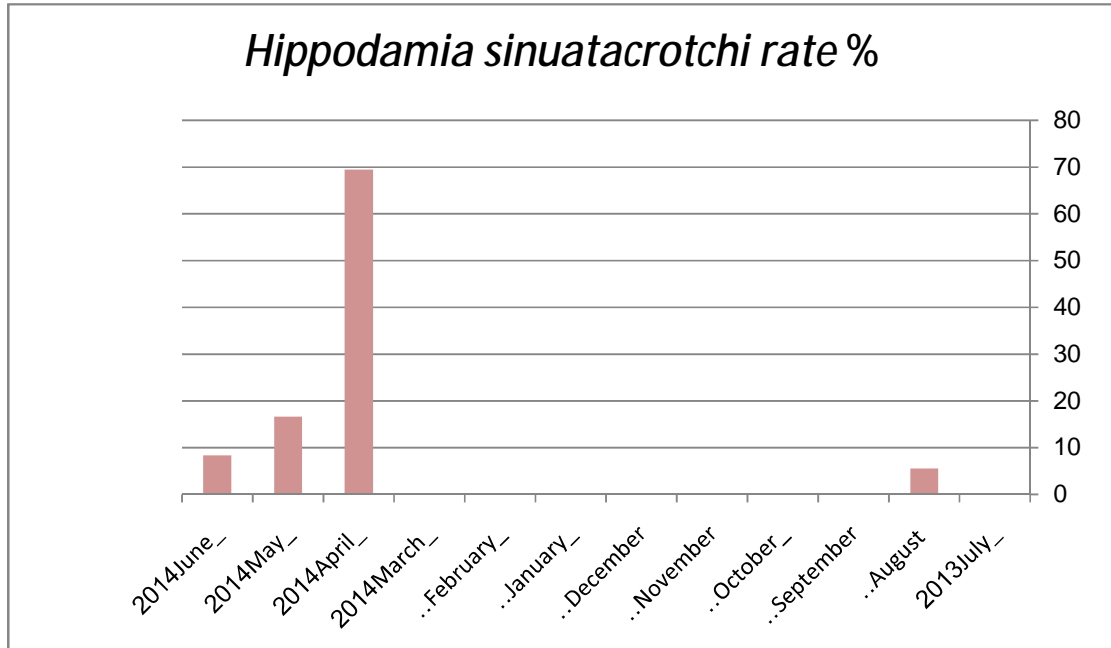
**Figure ( 3 ) Monthly recods of *Coccinella septempunctata* Linnaeus species collected from Area(A) from (2013/2014):**



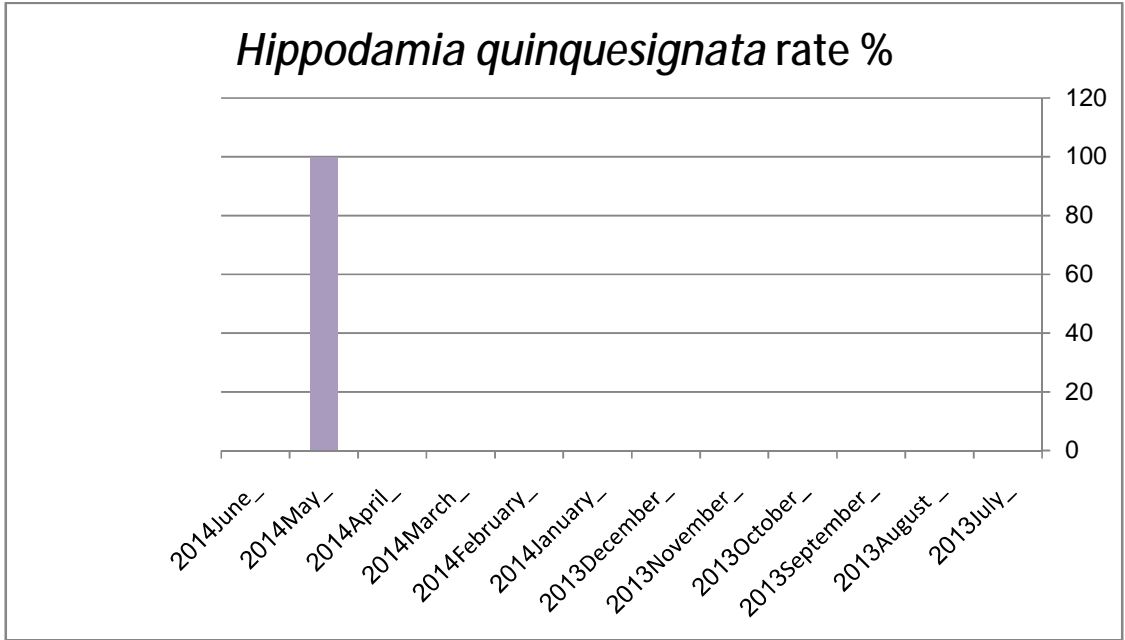
**Figure ( 4 ) Monthly recods of *Coccinella undecimpunctata* Linnaeus species collected from Area(A) from (2013/2014)**



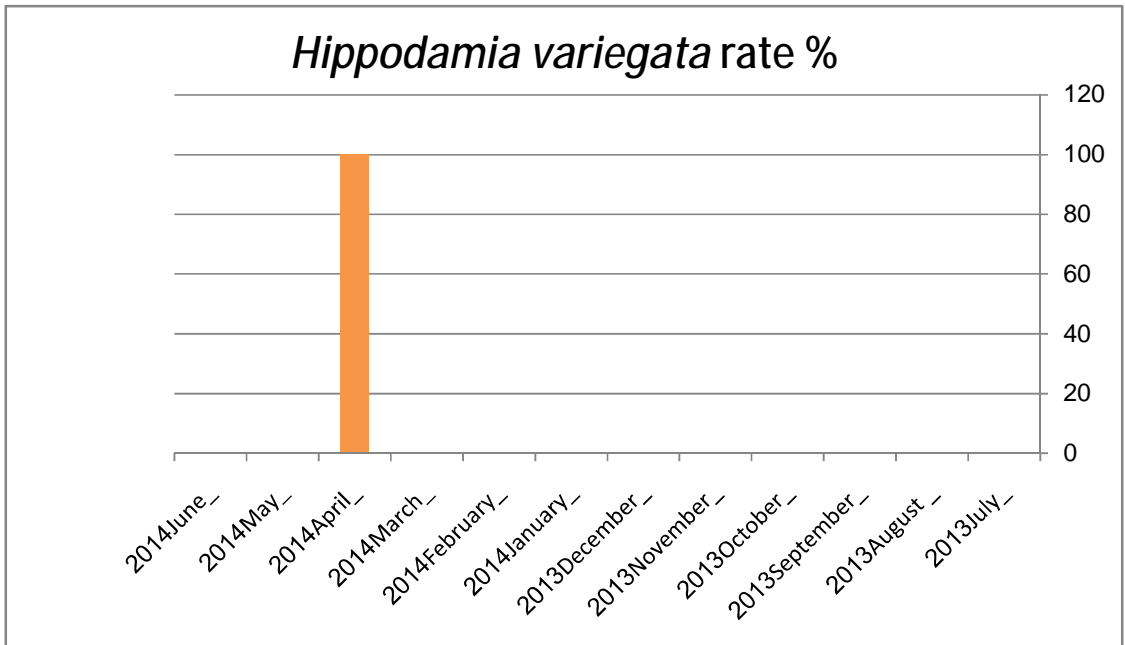
**Figure ( 5 ) Monthly recods of *Hippodamia convergens* Gurin-Meneville species collected from Area(A) from (2013/2014):**



**Figure ( 6 ) Monthly recods of *Hippodamia sinuate crotchi* Casey species collected from Area(A) from (2013/2014)**



**Figure ( 7 ) Monthly recods of *Hippodamia quinquesignata* (Kirb) species collected from Area(A) from (2013/2014):**



**Figure ( 8 ) Monthly recods of *Hippodamia variegata* (Goeze) species collected from Area(A) from (2013/2014):**

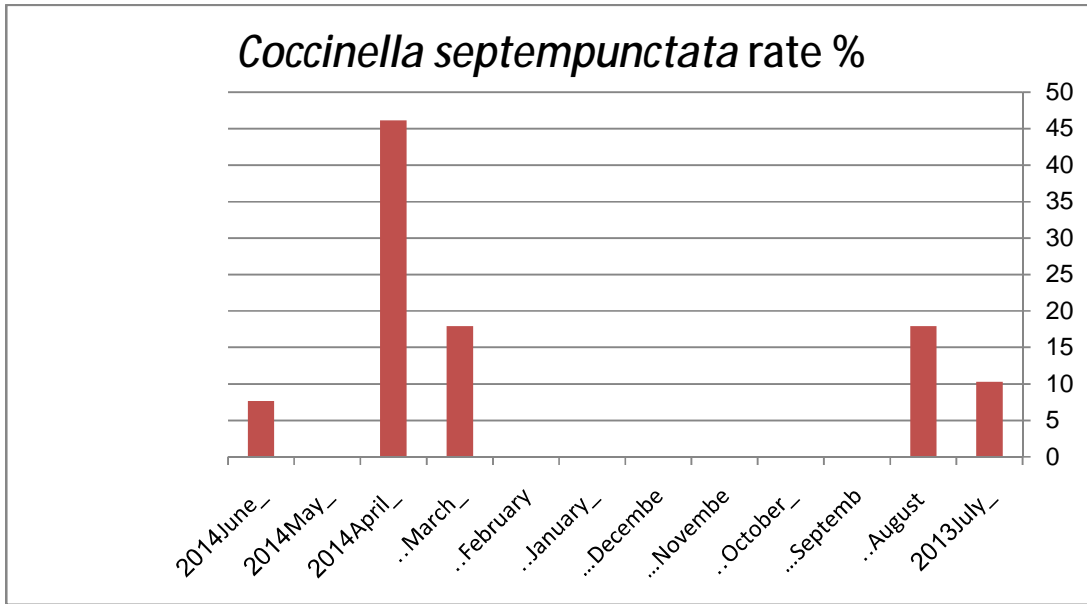
**Table(6) Monthly records of Coccinellid Species Collected from Area (B) from (2013/2014)**

Species	<i>Coccinella septempunctata</i>		<i>Coccinella undecimpunctata</i>		<i>Hippodamia convergens</i>	
	N0	%	N0	%	N0	%
July2013	4	10.26	0	0	0	0
August 2013	7	17.95	0	0	0	0
September2013	0	0	0	0	0	0
October2013	0	0	0	0	0	0
November2013	0	0	0	0	0	0
December2013	0	0	0	0	0	0
January2014	0	0	0	0	0	0
February2014	0	0	0	0	0	0
March2014	7	17.95	0	0	0	0
April2014	18	46.15	4	57.14	17	100
May2014	0	0	3	42.86	0	0
June2014	3	7.69		0	0	0
Total	39	100	7	100	17	100

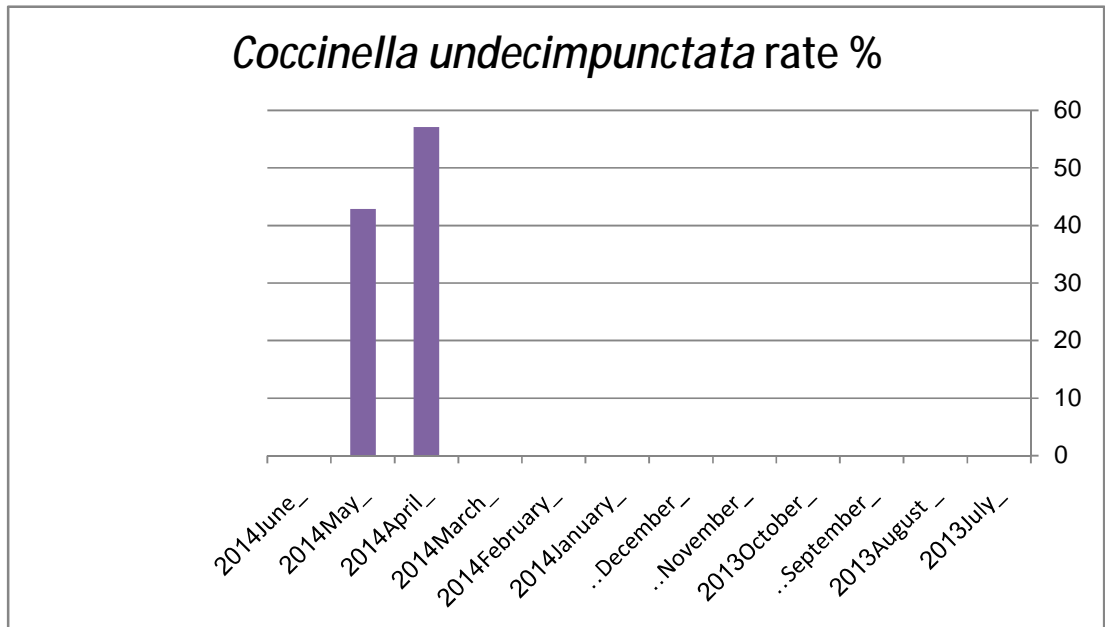


**Table (7) Monthly records of Coccinellid Species Collected from Area(B) from (2013/2014)**

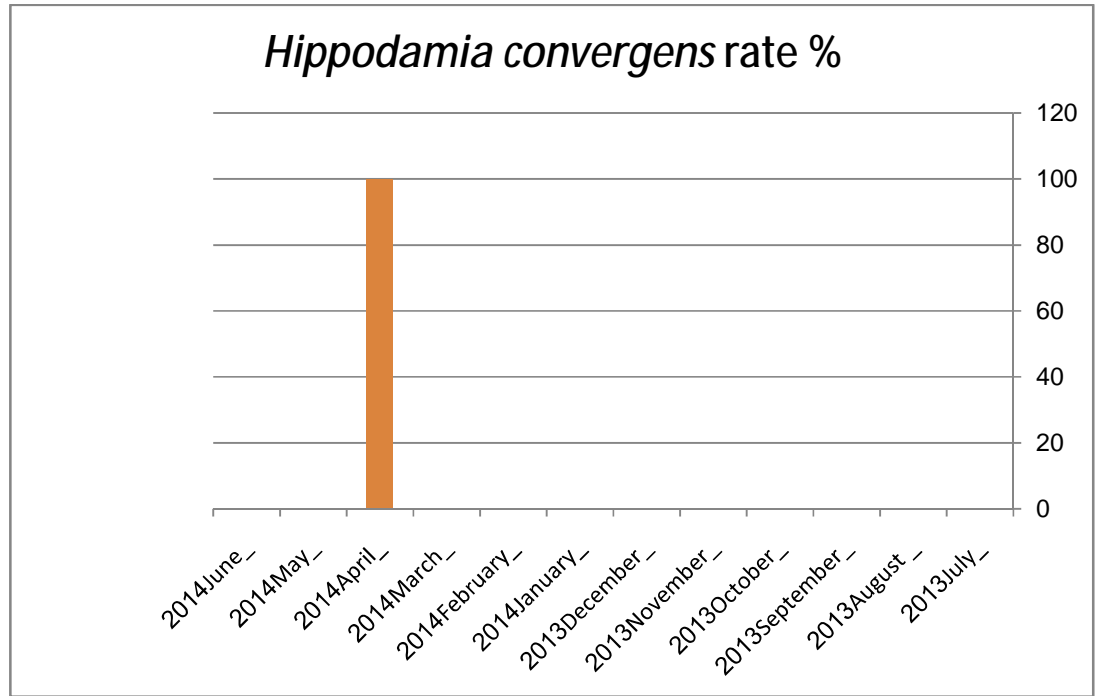
Species	<i>Hippodamia sinuata crotchi</i>		<i>Hippodamia quinquesignata</i>		<i>Hippodamia variegata</i>	
	N0	%	N0	%	N0	%
July2013	0	0	0	0	0	0
August 2013	0	0	0	0	0	0
September2013	0	0	0	0	0	0
October2013	0	0	0	0	0	0
November2013	0	0	0	0	0	0
December2013	0	0	0	0	0	0
January2014	0	0	0	0	0	0
February2014	0	0	0	0	0	0
March2014	0	0	0	0	0	0
April2014	17	73.92	0	0	0	0
May2014	3	13.04	1	100	0	0
June2014	3	13.04	0	0	0	0
Total	23	100	1	100	0	0



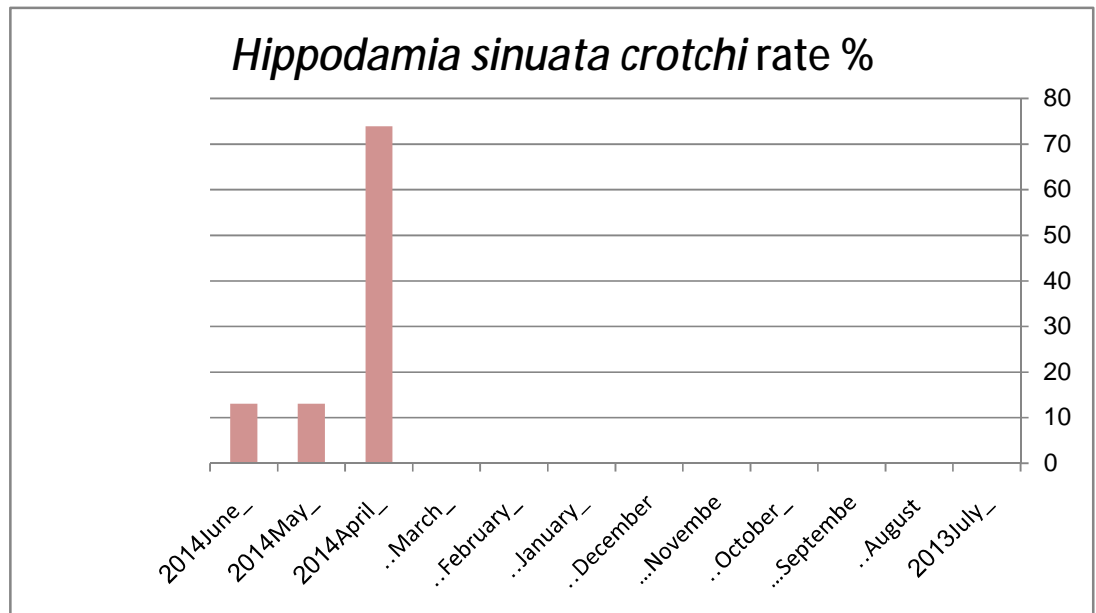
**Figure(9) Monthly abundance of *Coccinella septempunctata* Linnaeus species Collected from Area(B) from (2013/2014)**



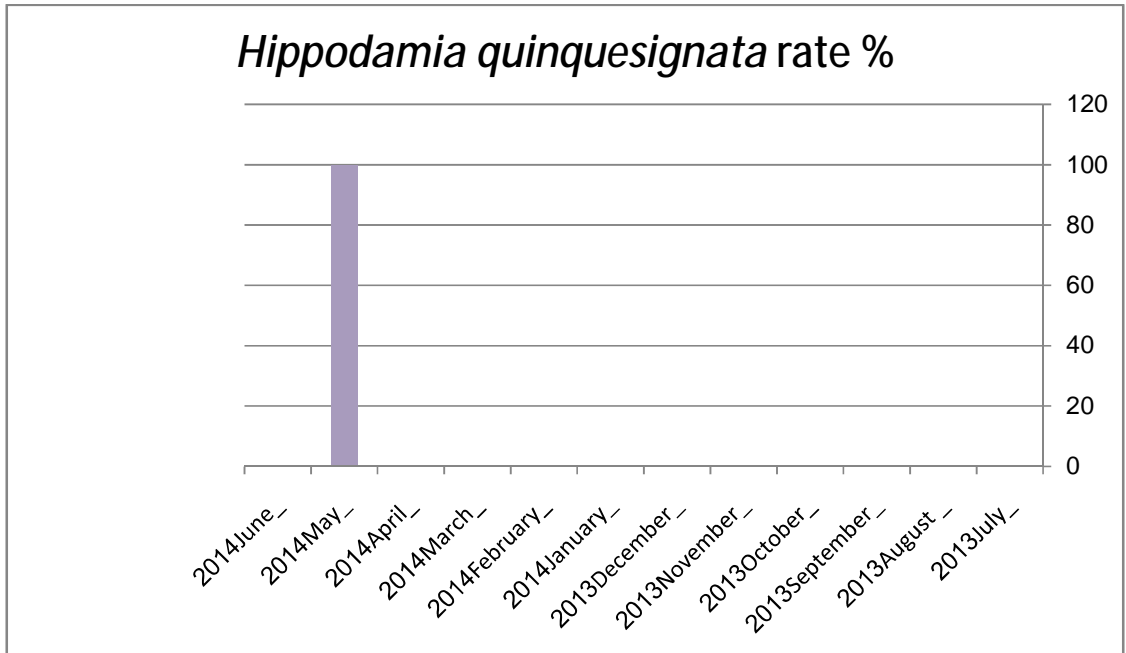
**Figure(10) Monthly abundance of *Coccinella undecimpunctata* Linnaeus species Collected from Area(B) from (2013/2014)**



**Figure(11) Monthly abundance of *Hippodamia convergens* Guer-Meneville species Collected from Area(B) from (2013/2014)**



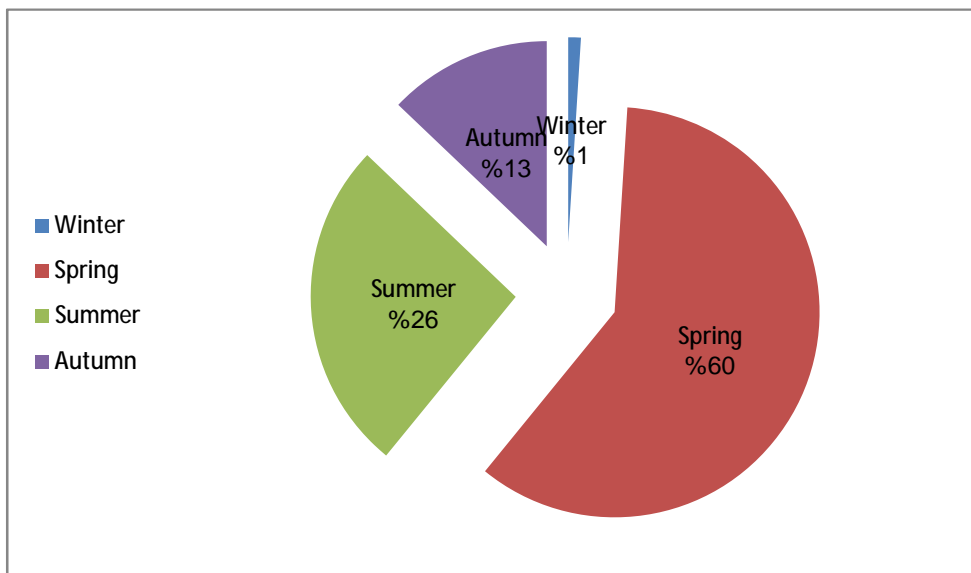
**Figure(12) Monthly abundance of *Hippodamia sinuata crotchi* Casey species Collected from Area(B) from (2013/2014)**



**Figure(13) Monthly abundance of *Hippodamia quinquesignata* (Kirby) species Collected from Area(B) from (2013/2014)**

**Table ( 8):Seasonal abundance of Coccinellid species from Area A:**

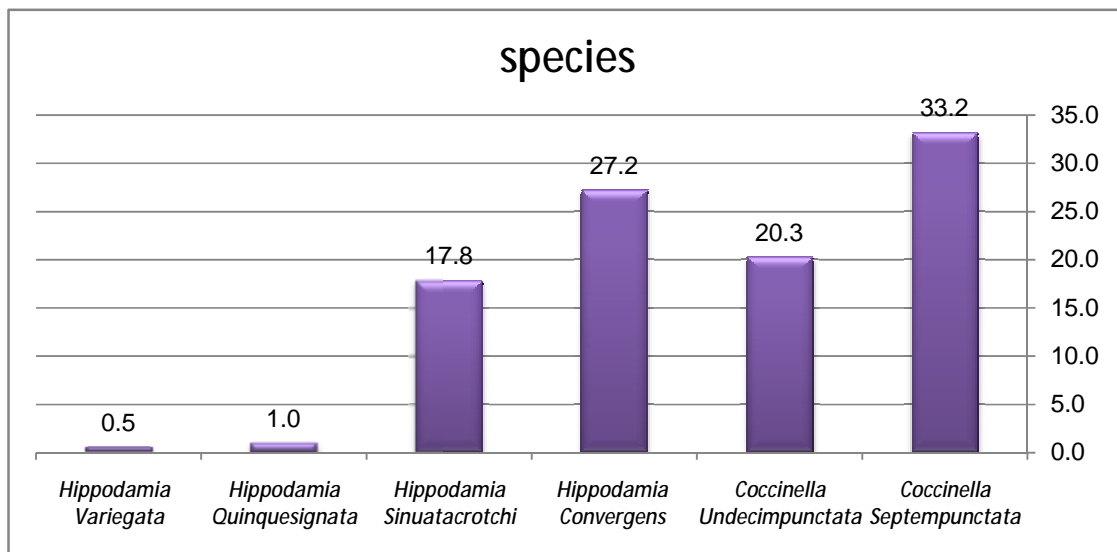
Species	Season							
	Winter		Spring		Summer		Autumn	
	NO	%	NO	%	NO	%	NO	%
<i>Coccinella septempunctata</i>	2	100	26	21.5	15	28.3	24	92.31
<i>Coccinella undecimpunctata</i>	0	0	31	25.6	10	18.9	0	0
<i>Hippodamia convergens</i>	0	0	36	29.8	19	35.8	0	0
<i>Hippodamia sinuata crotchi</i>	0	0	25	20.7	9	17	2	7.69
<i>Hippodamia quinquesignata</i>	0	0	2	1.6	0	0	0	0
<i>Hippodamia variegata</i>	0	0	1	0.8	0	0	0	0
Total	2	100	121	100	53	100	24	100



**Figure ( 14 ) Abundance perseason of total number of 6 coccinellid species collected in Area.A**

**Table ( 9 )Relative abundance of Coccinellid species from Area (A):**

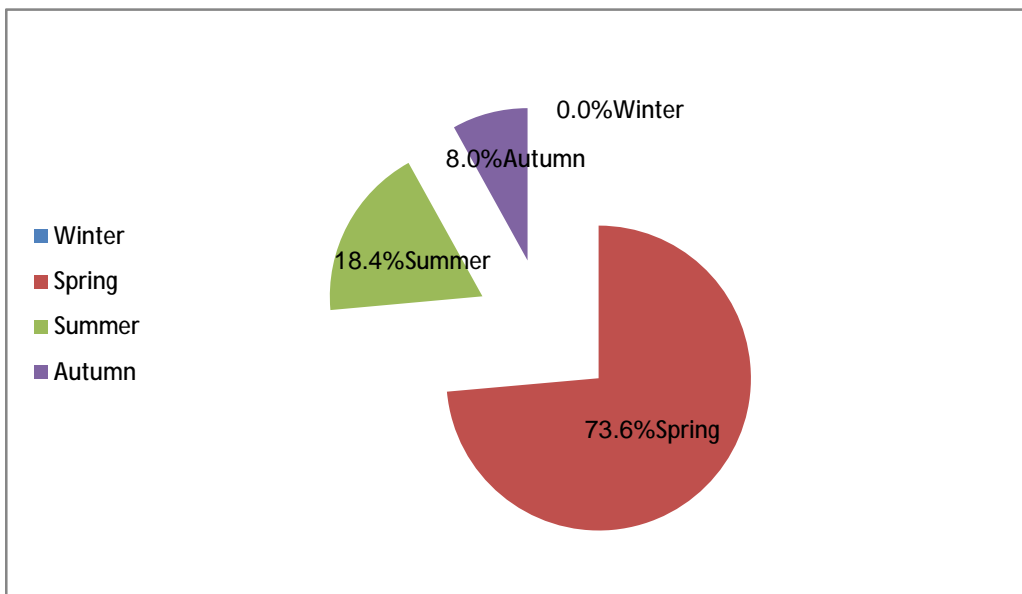
Species	No	%
<i>Coccinella septempunctata</i> Linnaus	67	33.2
<i>Coccinella undecimpunctata</i> Linnaus	41	20.3
<i>Hippodamia convergens</i> Gurin-Meneville	55	27.2
<i>Hippodamia sinuate crotchi</i> Casy	36	17.8
<i>Hippodamia quinquesignata</i> (Kirby)	2	1.0
<i>Hippodamia variegata</i> (Coeze)	1	0.5
Total	202	100



**Figure (15) Abundance of Coccinellid species from Area(A):**

**Table ( 10)Seasonal abundance of Coccinellid species from Area B:**

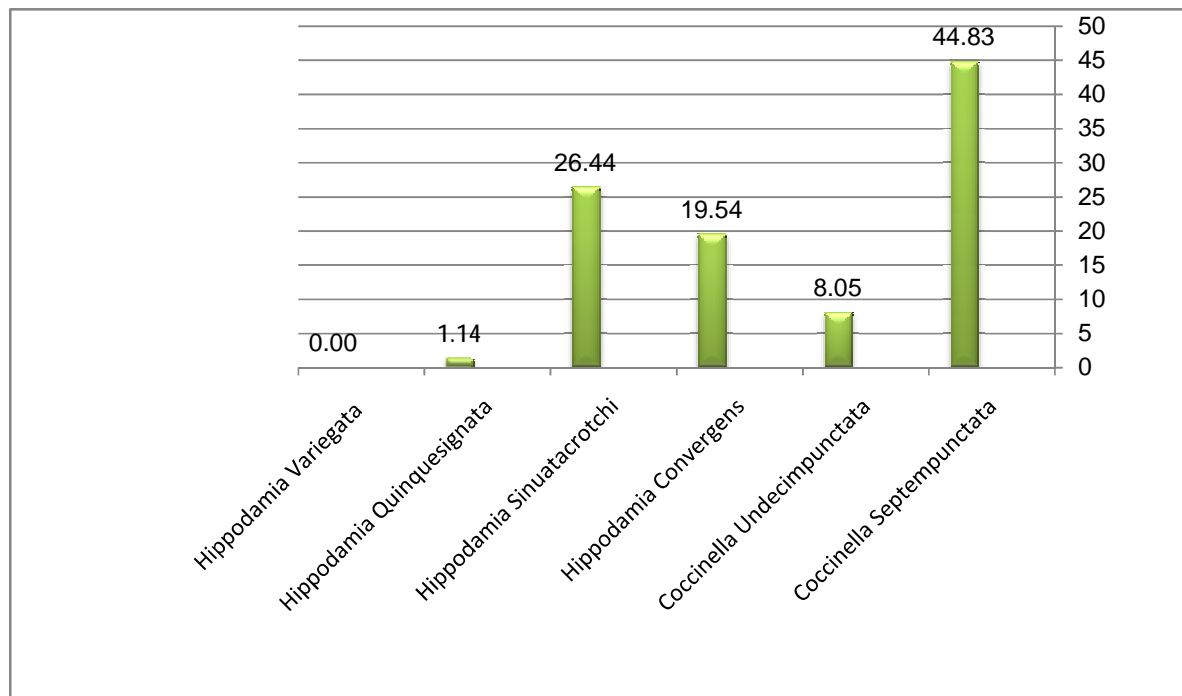
Species	Season							
	Winter		Spring		Summer		Autumn	
	NO	%	NO	%	NO	%	NO	%
<i>Coccinella septempunctata</i>	0	0	25	39.06	7	43.75	7	100
<i>Coccinella undecimpunctata</i>	0	0	4	6.25	3	18.7	0	0
<i>Hippodamia convergens</i>	0	0	17	26.5	0	0	0	0
<i>Hippodamia sinuata crotchi</i>	0	0	17	26.5	6	37.5	0	0
<i>Hippodamia quinquesignata</i>	0	0	1	1.57	0	0	0	0
<i>Hippodamia variegata</i>	0	0	0	0	0	0	0	0
Total	0	0	64	100	16	100	7	100



**Figure ( 16 ) Abundance per season of total number of 6 coccinellid species collected in Area.B**

**Table ( 11 ) Abundance of Coccinellid species from Area (B):**

Species	No	%
<i>Coccinella septempunctata</i> Linnaus	39	44.83
<i>Coccinella undecimpunctata</i> Linnaus	7	8.05
<i>Hippodamia convergens</i> Gurin-Meneville	17	19.54
<i>Hippodamia sinuate crotchi</i> Casy	23	26.44
<i>Hippodamia quinquesignata</i> (Kirby)	1	1.14
<i>Hippodamia variegata</i> (Coeze)	0	0.0
Total	87	100

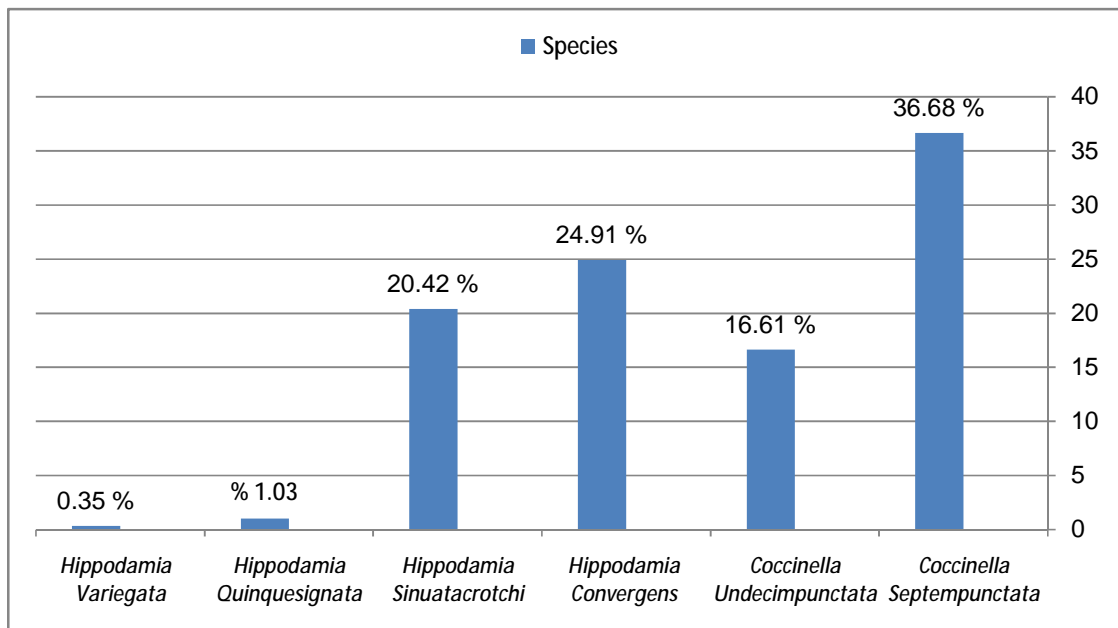


**Figure (17) Abundance of Coccinellid species from Area(B):**



**Table ( 12 )Relative annual abundance of Coccinellid species from Area (A &B)**

Species	number	%
<i>Coccinella septempunctata</i>	106	36.68
<i>Coccinella undecimpunctata</i>	48	16.61
<i>Hippodamia convergens</i>	72	24.91
<i>Hippodamia sinuata crotchi</i>	59	20.42
<i>Hippodamia quinquesignata</i>	3	1.03
<i>Hippodamia variegata</i>	1	0.35
Total	289	100



**Figure (18) Relative annual abundance of Coccinellid species from Area(A&B).**

### 4.3.MORPHOLOGY:-

External morphological of the adult *Coccinella septempunctata* Linnaeus was studied in detail

**Size and general appearance:** Length 5.2-9.0 mm; width 4.0-6.5 mm; The body of *Coccinella septempunctata* Linnaeus is rounded oval, convex and nearly hemispherical.

It is divided into three basic parts ;the head, thorax and abdomen .There is a usually triangular scutellum between the pronotum and elytra. In the dorsal aspect, the pronotum and elytra are broadly and compactly jointed (Figure .19 a) .The head is usually retracted into the anterior margin of pronotum at rest.

**Colour:** Head black, eyes brown, two yellowish spots present near the margin of eyes, mouth parts brown, antennae dark brown in color, pronotum black with two yellow spots laterally. elytra yellow to dark red color, black spots are present on elytra , ventral side and legs are black.

**Head:** (Figure.20a) The head is broader than long (transverse) with yellow hairs except on eye. Antennae clavate,composed from 11 segmented with basal segment longer (Figure.20b).Clypeus anteriorly truncate with small yellow antero-lateral projections. Eyes small with minute facets ,The mouthparts are adapted for biting and chewing ,the consist of a labrum ,a labium ,paired mandibles and maxillae.The labrum is transverse and quadrate with a truncate base and rounded sides .The mandibles are wide and sickle shaped ,the mandibular apex is bifid (Figure.20c).The labium component from a mentum that is trapezoidal and rarely heart shaped and joined with the submentum ,a subquadrate prementum ,a pair of three segmented labial palpi inserted into the prementum (Figure 20e).The maxillae are paired and composed of a basal cardo ,an oblong stipes,an outer galea, an inner lacinia and four segmented maxillary palpus (Figure 20d). The Length of head 1.6

mm;and width 2.2 mm.

**Thorax:**The well developed, large dorsal plate of the prothorax, namely the pronotum , is the dorsally visible part of thorax (Figure 19a), Length of pronotum 2.0-2.5, width 3.0-3.5, anterior margin of pronotum faintly emarginated.The scutellum (a small sclerotized part of mesonotum)is present between the elytral bases and is usually inversely triangular.The prosternum (the area corresponding to the pronotum,on the ventral side (Figure 19b) is medially convex ,with a well developed prosternal intercoxal process.The intercoxal process has a pair of carinae. In (Figure 21a) External to the prosternum ,the hypomeron is present ,reaching to the pronotal side margins.The anterior inner corners of the hypomera are fovea . The mesosternum is broad and short, in front of the middle coxae.The metasternum is large and rectangular and compactly joined with the mesosternum.behind middle coxal cavities (Figure 19b) .

**Wings:**The Elytra ,leathery fore wings completely cover the abdomen . Their basal margin is nearly straight and the apices are usually rounded .Elytra without hairs and finely pitted. with a common spots surrounding scutellum, and each with three roundish spots, one at middle of length and near suture, one near basal third and near lateral margin,and one subapical, near lateral margin. The size of the spots can vary considerably . The hind wings are thin and membranous and form the true functional wings.

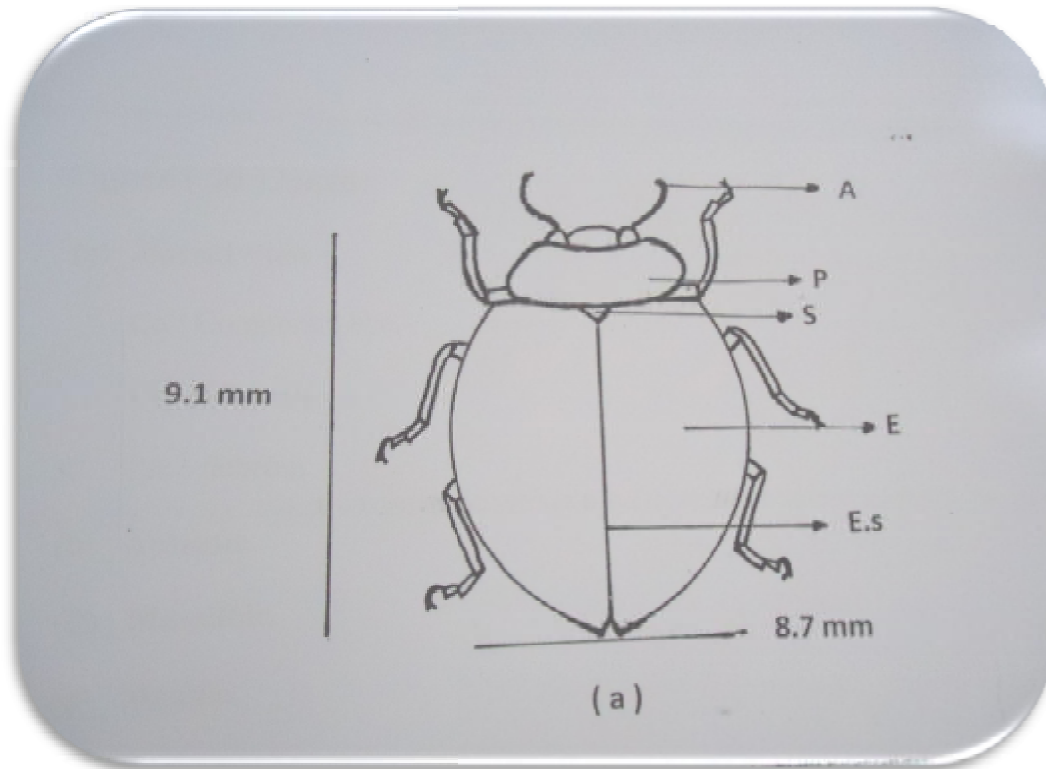
**Legs:** The legs are well developed are adapted for walking and running.Coxal line gently curved, femoral line angulate legs simple, tarsi pseudotrimerous ,the tarsi have four segments ,but the third is very small, last tarsal segment elongate and ends with a pair of claws (Figure 21b).

**Abdomen:**In (figure 22) the abdomen has six visible segments on the ventral side . The length of first abdominal segment 1 mm;and width 5 mm,the number of visible segments are usually the same in both sexes,the last visible abdominal segment is

sexually dimorphic .it is notched to some degree in males (Figure 22b) and rounded in females (Figure 22c),the first visible sternite is the largest and has a pair of postcoxal lines ( also known as postcoxal plates or femoral lines) (Figure 22d).

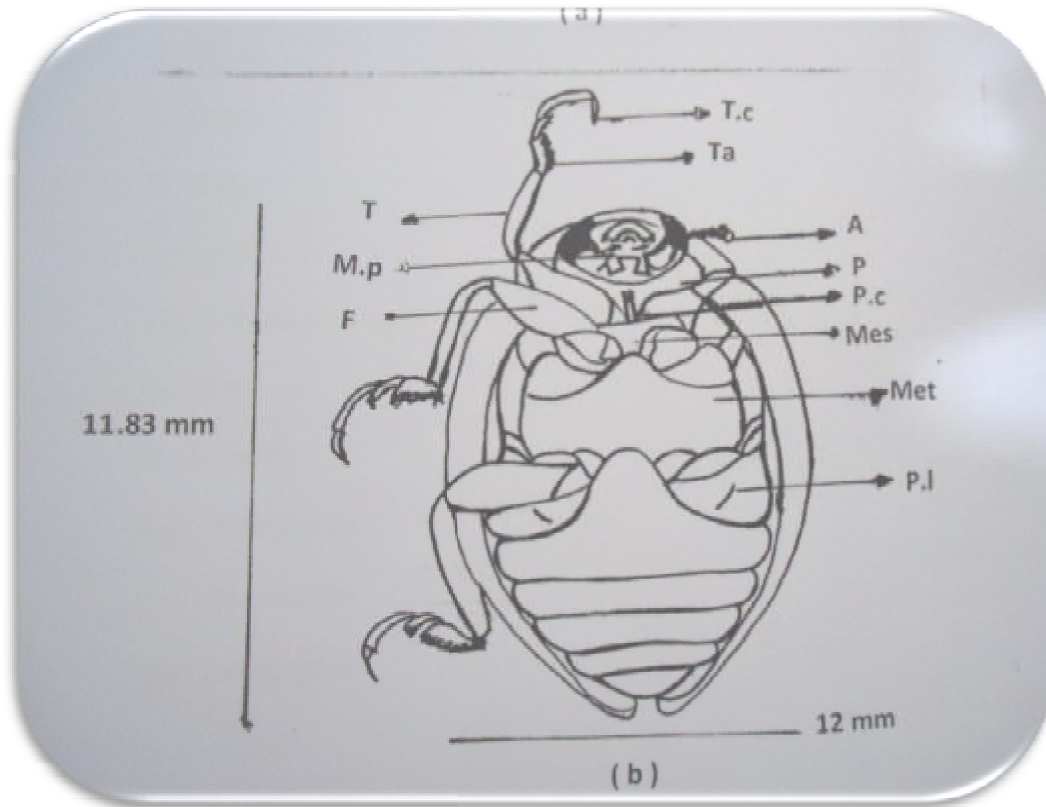
**Male genitalia:** The male genitalia consist of a tegmen and a siphon(Figure 23a,b),the components of tegmen are trabes; short and extremely thick, basal piece lengthened. Median lobe much thick, very broad at base up to  $1/3^{\text{rd}}$  of its length, then abruptly diminishing towards apex, deeply excavated when seen from dorsal side. basal lobe hollow . Parameres relatively shorter than median lobe, covered with densed long hairs on dorsal side(Figure 23a). Siphon; siphonal capsule bulging type and thick, siphonal tube long, the distal end carries sac like structure (Figure 23b).

**Female genitalia:** the female genitalia consist of pair of genital plates, a spermatheca ,a sperm duct and an accessory gland (Figure 23c,d). A typical spermatheca is differentiated into a cornu lobe like; ramus shorter; nodulus narrow and longer (Figure 23d),Short sperm duct and accessory gland are connected. The infundibulum is usually elongate cylindrical, genital plates oval with long, narrow anterior portion almost vertical to the basal portion (Figure 23c) .



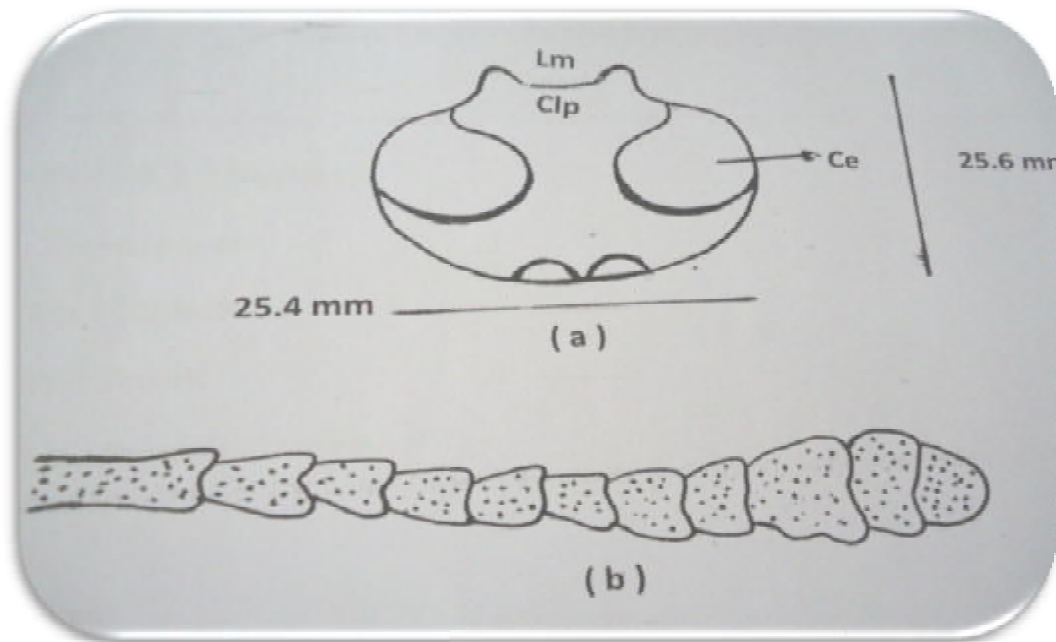
**Figure (19,a ) General appearance of adult *Coccinella septempunctata* Linn (Dorsal View):**

A : Antenna .    P : Pronotum.    S : Scutellum.    E : Elytron.  
E.S : Elytral Suture.



**Figure (19,b ) General appearance of adult *Coccinella septempunctata* Linn (Ventral View):**

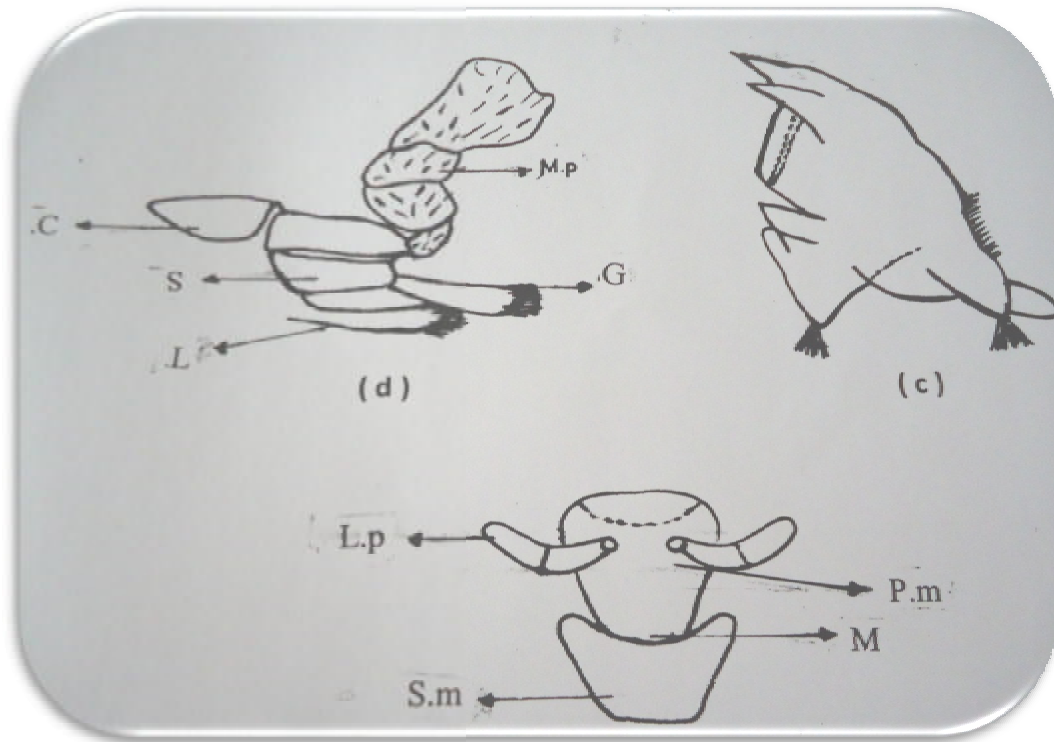
T.c :Tarsal claw. Ta : Tarsus. A : Antenna. P : Prosternum.  
 P.C: Prosternal carina. Mes : Mesosternum. Met : Metasternum.  
 P.L : Postcoxal Line. T : Tibia. M.P : Maxillary Palpus. F : Femur.



**Figure ( 20,a ) Head ( Dorsal View):**

Ce : Compound eye. Clp : Clypeus. Lm : labrum.

**Figure ( 20,b ) Head ( Antenna).**



**Figure ( 20,c ) Head ( Mandible).**

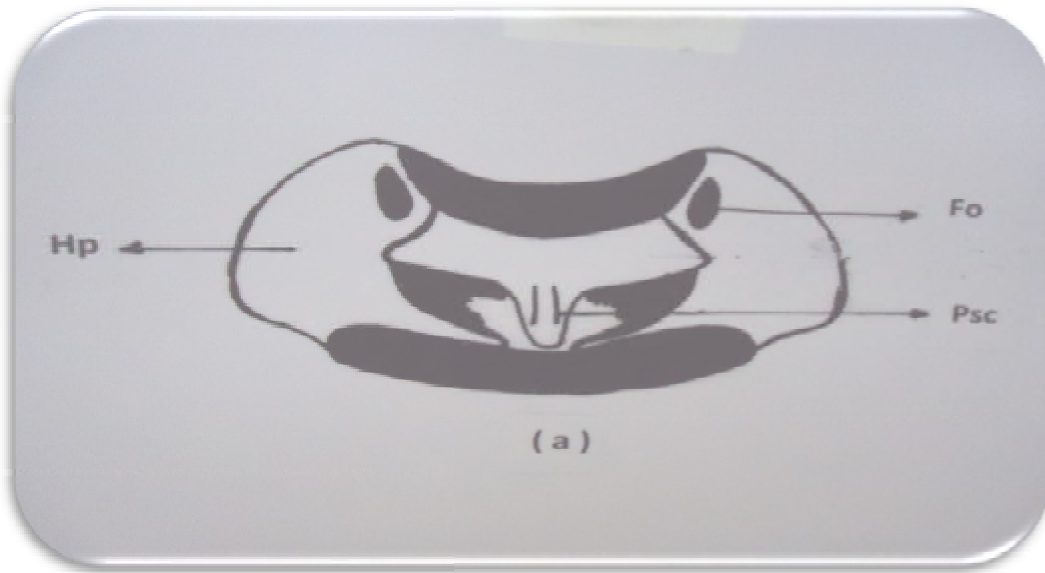
**Figure ( 20,d ) Head ( Maxilla):**

C : Cardio.    S : Stipe .    G : Galea.    L : Lacinia.    M.p : Maxillary palpus.

**Figure ( 20,e ) Head ( Labium):**

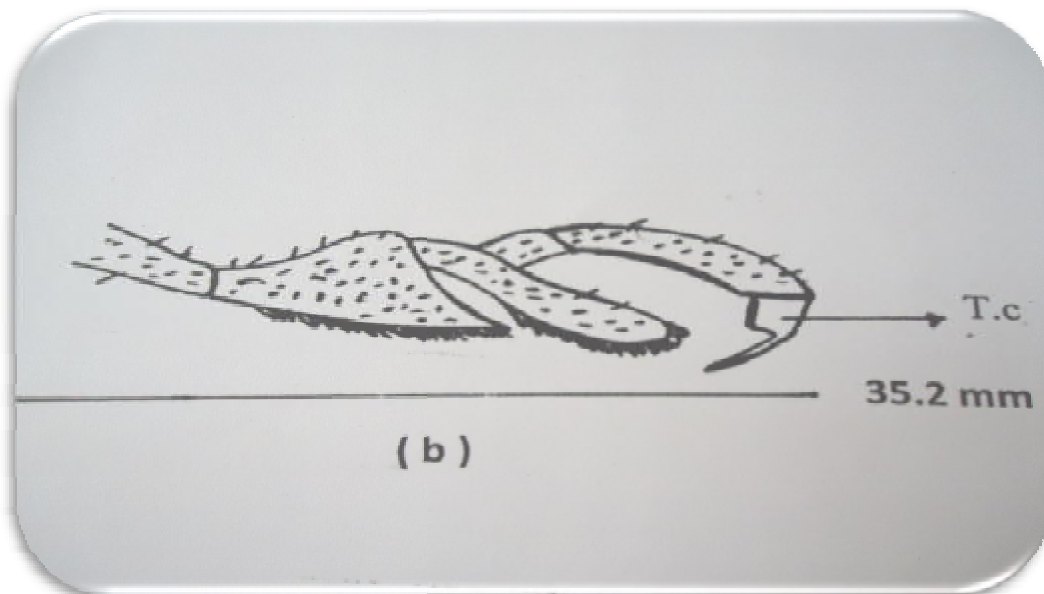
M : Mentum.    S.m : Submentum.    P.m : Prementum.    L.p : Labial palpi.





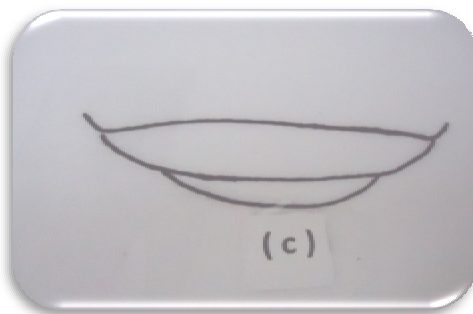
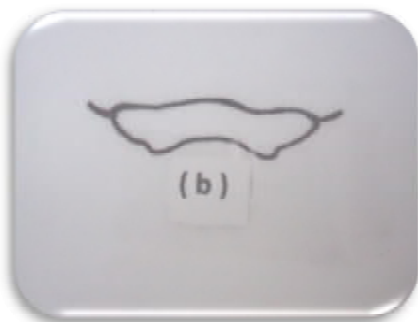
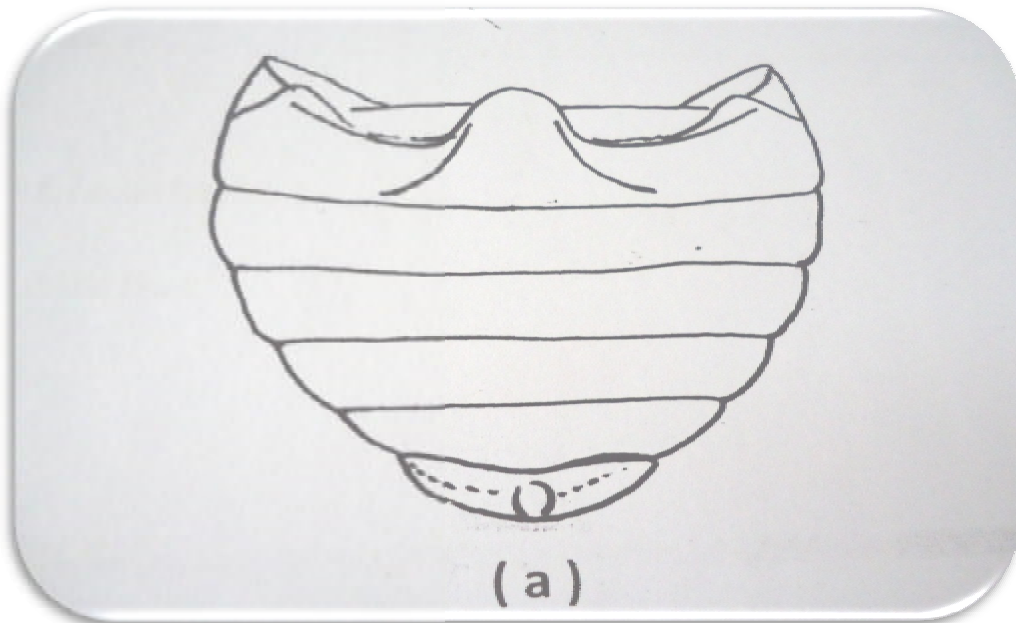
**Figure ( 21,a ) Thorax (Prosternum):**

Hp : Hypomeron. Fo : Fovea. Psc : Prosternal carina.



**Figure ( 21,b ) Thorax ( Tarsi):**

T.c : Tarsal claw.

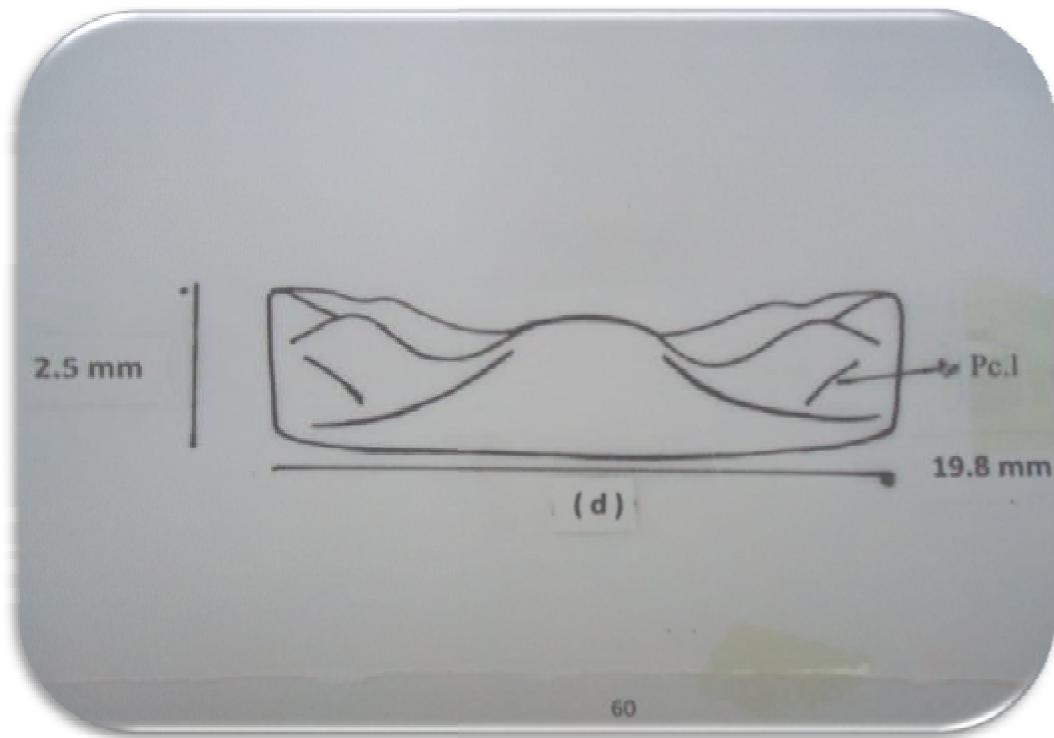


**Figure ( 22 ) Abdomen :**

**a \_ General appearance.**

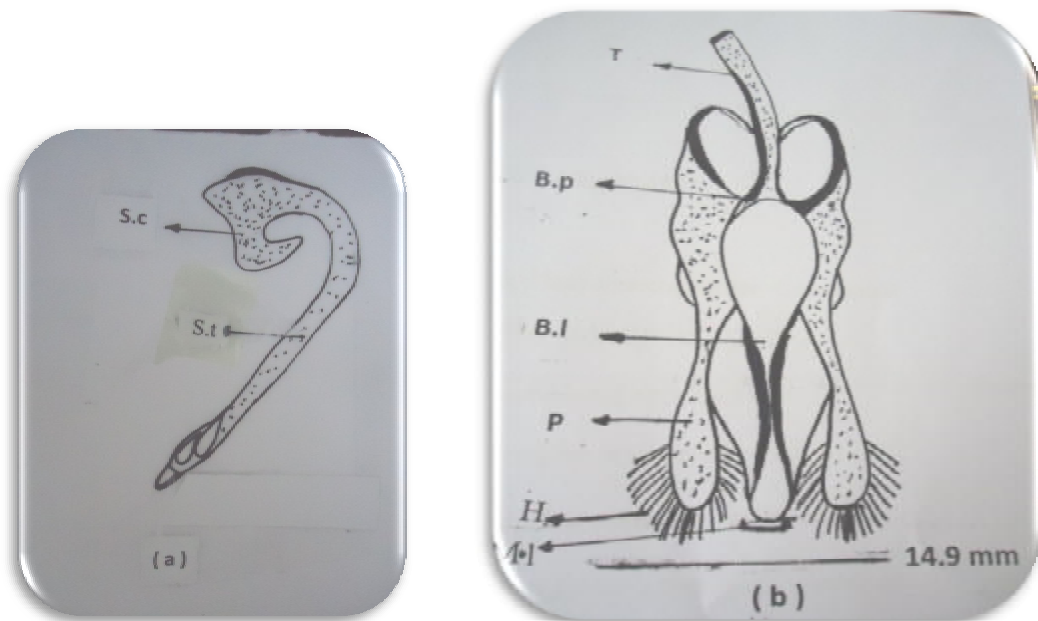
**b \_ Terminal segment, male.**

**C\_ Terminal segment, female.**



**Figure ( 22,d ) Abdomen( First abdominal sternite) :**

Pc.1 : Postcoxal line.



**Figure ( 23 ) Genitalia :**

**(a, b)\_ Male genitalia:**

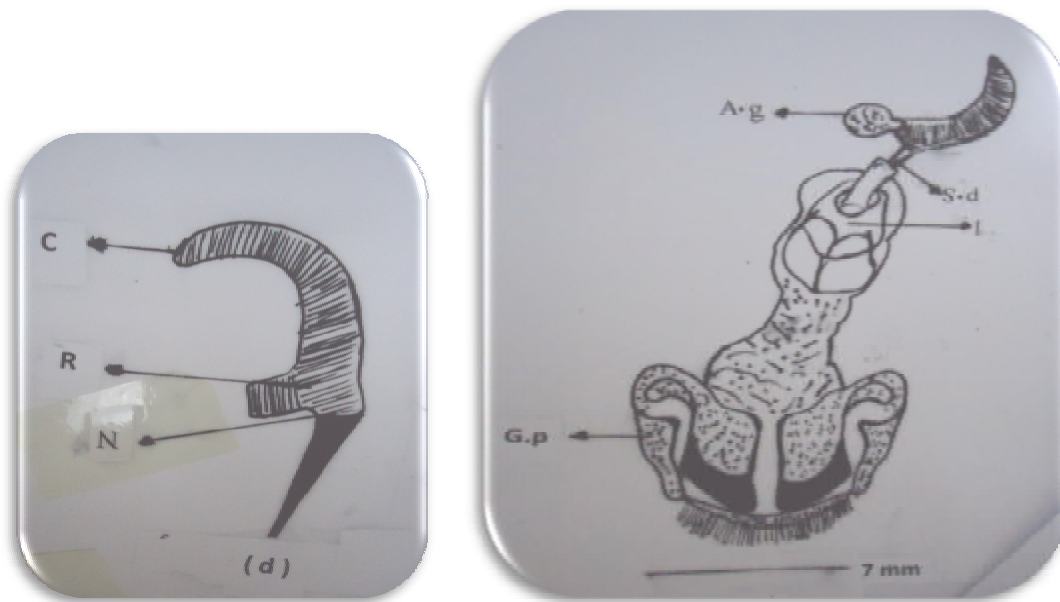
**(a)\_ Siphon :**

**S.c : Siphonal capsule. S,t : Siphonal tube.**

**(b)\_ Tegmen :**

**T : Trabes. B.p : Basal piece. B.l : Basal lobe. P : Paramere.**

**M.l : Mediam lobe. H : Hair.**



**Figure ( 23 ) Genitalia :**

**(c, d) Female genitalia :**

**G.p : Genital plate. I : Infundibulum. S.d : Sperm duct.**

**A.g : Accessory gland.**

**(d)\_Spermatheca:**

**C : Cornu. R : Ramus. N : Nodulus.**

#### 4.4-TAXONOMY

##### Family Coccinellidae Latreille.1807

##### Scientific classification:-

Kingdom Animalia ,Phylum Arthropoda,Subphylum Hexapoda,Class Insecta ,Order Coleoptera , Suborder Polyphaga ,Superfamily Cucujoidea ,Family Coccinellidae

##### Key to the subfamilies of Coccinellidae Latreille.1807

1(2) Terminal segment of maxillary palpi elongate conical or elongate oval; mentum very narrowly articulated with submentum; the 9th sternite of male flat triangular; head capsules sometimes projecting anteriorly. Antennae inserted usually more or less dorsally and rarely laterally;mandibles simple or bifid at apex; inner process of hypomera of prothorax relatively short (anterior coxal cavities broadly open behind); middle coxal cavities broadly separated by compact and broad articulation of meso and metasterna; tarsi usually cryptoter tamerous and rarely trimerous; coxite of female very elongate; tegmen of male genitalia with elongate process at its basal piece, siphon relatively weakly curved and without distinct capsule. Body minute or small in size.....**Sticholotinae Weise**

2( 1) Terminal segment of maxillary palpi strongly divergent apically or nearly parallel sided, rarely slightly convergent apically; mentum usually not very narrowly articulated with submentum; the ninth sternite of male linear or calvate; head capsule not projecting anteriorly.

3(6) Antennae relatively short, at most about two-thirds as long as head width. often very short, and strongly modified and inserted frontally. laterally or ventrally; the terminal segment of maxillary palpi usually nearly parallel-sided, never strongly divergent apically; clypeus sometimes strongly expanded laterally and sometimes normal; meso-and metasterna usually

broadly and compactly articulated and middle coxal cavities usually broadly separated; femora usually broadly separated; femora relatively stout or sometimes strongly depressed.

4(5) Clypeus strongly expanded laterally; anterior margin of pronotum deeply and trapezoidally concave and lateral portions of pronotum very strongly descending below; clytral base distinctly broader than pronotal base; metasternum distinctly impressed for the reception of middle femora: elytral epipleura relatively broad and or its inner carina reaching elytral apex: tibiae often unguulate externally.....**Chilocorinae Mulsant**

5(4) Clypeus not strongly expanded laterally; anterior margin of pronotum not deeply or not trapezoidally concave, and lateral portions descending below but not very strongly; elytral base slightly broader than pronotal base; elytral epipleura very narrow and its inner carina not reaching the elytral apex but ending near two-thirds of elytra length from base.....**Scymninae Mls**

6(3) Antennae relatively long at least about one-half as long as width, usually longer than two-thirds of that and inserted frontally, laterally or dorsally; the terminal segment of maxillary palpi usually strongly divergent apically; clypeus never strongly expanded apically; meso and metasterna always feebly and narrowly articulated, separating middle coxal cavities narrowly; femora relatively slender, never strongly depressed.

7(8) Cavities of female genitalia always very elongate; dorsum weakly or moderately convex and always pubescent; compound eyes sometimes coarsely faceted; antennae eight to eleven segmented and laterally inserted; tarsal formula true tetramerous, cryptotetramerous or true trimerous; abdomen composed of five or six visible segments .....**Coccidulinae Mls**

8(7) Coxites of female genitalia not always very elongate; but oval or transverse; dorsum glabrous or pubescent; if dorsum pubescent, it is strongly

convex; compound eyes never coarsely faceted; antennae always eleven segmented and more or less dorsally inserted; tarsal formula always crypto tetramerous abdomen always composed of six visible segments.

9(10) Dorsum glabrous; mandible with a bifid or multidenticulate tip and also with a basal tooth; mesepimeron nearly triangular, its posterior margin almost straight or slightly angulate, mentum relatively narrowly articulated with submentum and distinctly divergent apically; inner margin of coxite of female genitalia without a small emargination and with a stylus being near the inner corner of coxites; siphon of male genitalia rather long and usually strongly curved with a well developed capsule, median piece of tegmen usually not very slender.....**Coccinellinae Latreille**

10(9) Dorsum pubescent; mandible with a multi denticulate tip and without a basal tooth; mesepimeron quadrate, its posterior margin distinctly angulate; mentum very broadly articulated with submentum and convergent apically; maxillary galea broad and quadrate in shape and bearing numerous thin hairs; antennal insertions more between than before the eyes; anterior margin of clypeus truncate; inner margin of coxite of female genitalia usually with a small emargination and a stylus being at far outward from the inner corner of coxite; siphon of male genitalia rather short and weakly curved without a well developed capsule, median piece of tegmen tubular and slender.....**Epilachninae Mulsant**

**Family Coccinellidae Latreille,1807**

**Subfamily : Chilocorinae Mulsant 1846**

**Diagnosis:** Body oval or rounded broadly. Eyes and dorsal surface non pubescent. Clypeus clearly broader, expanded on both lateral sides covering bases antennae. Antennae relatively short, 7 to 11 segmented. Pronotum



deeply emarginated on anterior side, sides descending vertically. Elytra completely black or with red spots. Elytral base broad than pronotal base. Epipleura well developed, without foveae, strongly infolded, reaching apex of elytra. Tibiae expanded, denticular on lower margin. Tarsal claws with or without tooth. Abdomen with 5 visible sternites

**Tribe : Chilcorini Mulsant 1846**

Dorsum usually glabrous; cardo of maxilla not expanded laterally; femora normal; abdomen composed of five visible segments in female, and six in male but sixth of male is very short in external aspect.

**Key to the genera of Tribes Chilcorini Mulsant 1846**

1. Body glabrous, Pronotal carinae absent.....2
- 2 Anterior tibia with a tooth on outer margin. Pronotum and elytra smooth and shining between spots.....***Chilcorus* Leach**
3. Anterior tibia without a tooth on outer margin. Pronotum and elytra coarse and reticulate between spots..... ***Exochomus* Redtenbacher**

**Genus: *Chilcorus* Leach, in Brewster, 1815**

*Chilcorus* Leach, in Brewster, 1815: 116.

**Type species:** *Coccinella cacti* Linnaeus, 1767 monobasic.

**Diagnostic characters:** Body oval. Eyes and dorsal surface glabrous. Antennae relatively short with clypeus broad, laterally expanded on each side, in front of eyes in form of broad plates, covering basis of antennae. Anterior margin of pronotum deeply emarginated, sides descending vertically. Elytron entirely black or with red spots. Elytral base distinctly wider than pronotal base. Epipleura relatively broad, reaching apex of elytra. Tibiae expanded, denticulate on lower margin.

***Chilocorus bipustulatus* (Linnaeus, 1758)**

*Coccinella bipustulata* Linnaeus, 1758: 367. *Chilocorus bipustulatus*: Mulsant, 1846: 170.-Crotch, 1874: 185.-Jakobson, 1916:990.

**Diagnostic characters:**

Length 2.5-3.5 mm.) In sandy places or on fir trees .Glabrous above except for scattered setae near the lateral pronotal margins and on the head ; epipleurae descending well beyond the median level of the metasternum and only shallowly foveolate ; prosternal carinae absent .Anterior tibiae with a tooth on outer margin ; abdominal plates reaching almost to apex of first abdominal segment ; pronotum and elytra smooth and shining between punctures .Elytra with a palely testaceous transverse band on each, sometimes interrupted, just anterior to the midline ; generally smaller ; head finely reticulate between punctures. Suboval ; underside usually black with sides and ultimate abdominal segment testaceous.

**Diet:** found throughout the Palearctic region preying on a wide variety of coccids, particularly armored scales (Hodek, 1973, Yinon, 1969), The latania scale, *Hemiberlesia lataniae* (Signoret)- Diaspididae(Mona.M, and S. Abd-Rabou,2011) ,and regularly feed on Diaspididae, Coccidae (*Saissetia oleae*) (Nora observation)

**Distribution:** All of Europe (except northern parts), Mediterranean Region; Belgium, France, Greece, Italy, Netherlands, Turkey, Palaeartic Asia and U.S.A, India, Pakistan. China, Mongolia, Russia, and Libya. In Libya, only one species is represented in the Omer Almuktar collection. This species was recorded from Libya in Barga area by E.Zavattari,1934.

**Genus: *Exochomus* Redtenbacher, 1844**

**Type genus:** *Exochomus* Redtenbacher, 1844: 11.-Mulsant, 1850: 465, 476, 481.-Crotch, 1874: 192; Korschefsky, 1932: 252 (cat.).-Chapin, 1965a: 247 (rev.).

**Type species:** *Coccinella quadripustulata* Linnaeus, 1758: 367, by subsequent designation of Thomson, 1859: 160.

*Exochomus* (*Exochomus*): Barovsky, 1922: 291.-Chapin, 1965a: 248.

*Exochomus* (*Parexochomus*) Barovsky, 1922: 292. Type species: *Exochomus pubescens*

Küster, by subsequent designation of Chapin, 1965a: 250.

*Exochomus* (*Anexochomus*) Barovsky, 1922: 292. Type species: *Exochomus undulatus*

Weise, by subsequent designation of Chapin, 1965a: 250.

*Exochomus* (*Xanthocorus*) Miyatake, 1970a: 312. Type species *E. (X.) nigromarginatus*

Miyatake, by original designation.

***Exochomus nigripennis* (Erichson, 1843)**

*Exochomus nigripennis* Erichson 1843

*Chilocorus nigripennis* Erichson, 1843: 267.

*Exochomus nigromaculatus* var. *nigripennis*: Rotch, 1874:192.

*Exochomus flavipes* ab. *nigripennis*: Korschefsky, 1932: 255.

**Diagnostic characters:** Body oval and highly convex, Head yellowish. Pronotum reddish yellow laterally expanded pubescent. Elytra deeply black shiny without any spot. Epipleura developed. Scutellum small and black.

**Male genitalia** Parameres very thick, width throughout same, apex rounded and provided with short hairs. Median lobe; short, both sides parallel, distally narrowed, apex rounded. Siphonal capsule normal, tube broadly curved,

semicircular at base, subapical portion unique provided with 6 to 7 constrictions, apex swollen and appears ruptured.

**Diet:** Feed on the green shield scale, *Pulvinaria psidii* Maskell (Hemiptera: Coccidae) on guava trees in Gahrbiya (Abd-Rabou, S.; Ahmed, N. and Moustafa, M. 2012)

**Distribution:** Africa, Northwestern India, Palaearctic, Pakistan and Libya, this species was recorded from Libya (Barga) by Zavattari, 1934. But it is not in any Libyan collection.

**Remarks:** Edoardo Zavattari (1934) recorded *Exochomus nigripennis* Erichson 1843 from Libya as *Exochomus flavipes nigripennis* Korschefsky, 1932 as shown in the above synonymy,

***Exochomus (Parexochomus) lugubrivestis* Mls**

**Distribution:** Europeo-Mediterranean and Libya, this species was recorded from Libya, (Barga) by Zavattari, 1934. But it is not represented in any Libyan collection.

***Exochomus (Parexochomus) pubescens gestroi* Fairmair, 1855**

**Distribution:** Mauritania and Libya, this species was recorded from Libya, (Barga, Gaibub) by Zavattari, 1934. But it is not represented in any Libyan collection.

**Subfamily :Coccidulinae Mulsant 1846**

Coccidulinae Sasaji, 1968, p. 22.

Body weakly or moderately convex, pubescent. Head capsule normal with truncate apex and clypeus not expanded. Antennae eight to eleven-segmented, laterally inserted. Compound eyes sometimes coarsely faceted. Mandibles bifid apically and toothed basally. Terminal segments of maxillary palpi strongly divergent and securiform. Elytral epipleura usually broad and entire without distinct foveae for reception of femoral tips. Mesosternum and

metasternum narrowly articulate. Abdomen composed of 5 or 6 visible sterna. Tarsal formulae obviously tetramerous, cryp totetramerous , or true trimerous. Three of the four tribes included in this subfamily occur in North America.

**Key to the tribes of the Coccidulinae Mulsant 1846**

1. Antennae eight-segmented; l abrum distinctly broader than clypeus; tarsi cryptote trimerous . . . . . **Noviini Mulsant**  
2-Antennae eleven- segmented ; labrum narrower than clypeus ; tarsi true trime rous . . . . . **Coccidulini Mulsant**

**Tribe:Noviini Mulsant ,1850**

**Genus: *Rodolia* Mulsant, 1850**

Synonym: *Macronovius* Ws. (Ann. Belg. 1895, 149 — Sicard,Bull. Ann. Soc. ent. France, 1907, 68).

*Rodolia* Mulsant, 1850, Spec. Trim. Securipalp. :902.

**Type species:** *Rodolia ruficollis* Mulsant, 1850, By subsequent designation of Crotch (1874. Revis. Coccinellidae :280).

***Rodolia cardinalis*(Mulsant,1850)**

*Vedalia cardinalis* Mulsant, 1850: 906 (Type material: HEC, OU).

*Novius cardinalis*: Crotch, 1874: 283.

*Eurodolia cardinalis*: Weise, 1895c: 150; 1916: 50.

*Rodolia (Macronovius) cardinalis*: Weise, 1905: 220.

*Macronovius cardinalis*: Weise, 1922: 104.

*Rodolia cardinalis*: Korschefsky, 1931: 99 (cat.).-Rao & Cherian, 1944: 1-20.

**Diagnostic characters :**The adult has a semispherical body, 2 – 4 mm long, covered with dense, short hairs. It is reddish-purple with black spots localized in several parts of its body, forming a net of contours between the spots. The head, posterior part of the prothorax across the full width, and the scutellum are all black. There are typically five black spots on the elytron. Four of those

are arranged on the dorso-lateral part of the elytron. The two anterior spots form an roughly half-moon shaped oval with the convexity directed towards the suture of the elytron. The two posterior ones make a more irregular shape, formed by the intersection of two circular spots. Finally, the fifth spot covers the length of the elytron's suture, enlarging towards the posterior stretch. The antenna are short and slightly clubbed, composed of 8 items, of which the proximal is markedly pulled aside. The legs have an extended and irregularly flattened tibia, forming a space housing the tarsus when at rest. The tarsus is composed of 3 tarsomers. The larva is around 5mm long, coloured the same red as the mature beetle, with black spots on the thorax. The left side has a series of tubercles, each with short bristles on. The pupa is 4-5mm long. It is a red which darkens with age in as the abdomen darkens.

**Diet:** *Rodolia cardinalis* (Mulsant, 1850) regularly feed on aphids and small mites, which makes them good as biological control agents. They are only predatory to things smaller than them. Most of their food is herbivores, as carnivores are more likely to injure them as they are slow. Their flying capacities are limited so hunting in the air is not possible (Abd-Rabou, S.; Ahmed, N. & Moustafa, M. 2012), and coccidophagous (Mona.M, & S. Abd-Rabou. 2011), and control cottony cushion scale, *Icerya purchasi*, which threatened the citrus industry, is widely regarded the most successful instances of biological pest control .

**Distribution:** Mauritania ,India, Sri Lanka, Australia, New Zealand, Australia, California & Egypt, Argentina, Chile, Cyprus, Ecuador, Australia, Bahamas,, France, India, Italy, Japan, Malta, Morocco, New Zealand, Palestine, Peru, Portugal, Puerto Rico, Samoa, South Africa, Tunisia, Turkey, Uruguay, North America, Russia., Venezuela, Libya, Greece, Tunisia, Spain

**Remark:** This species was reported from Libya (Tripoli) by John R. Leeper, 1976 and this species has also been reported in other areas of Libya: in Braga (E.Zavattari,1934 ) as *Novius cardinalis* Crotch. Only one specimens represented in Omer AlMaktar collection.

***Rodolia rufipennis* Pic.**

**Distribution:** In Libya, this species was recorded from Libya from Derna by Mader.V.L,11955. But it is not represented in any Libyan collection.

**Tribe Coccidulini Mulsant 1846**

**Genus: *Rhizobius*, Stephens, 1832**

*Rhizobius* Stephens, 1831, 111. Brit. Entomol. Mand. 4:396.

Type species: *Nitidula litura* Fabricius, 1787, Mant. Ins. 1:52, 75. Monobasic.

*Rhizobius chrysomeloides* (Herbst, 1792): Wachsman (1906) – szalagos félböde

*Rhizobius litura* (Fabricius, 1787): Kuthy (1897) – félholdas félböde

*Lindorus* Casey, 1899, J.N. York Entomol. Soc. 7:162.

***Rhizobius litura* (Fabricius, 1787)**

*Rhizobius litura* (Fabricius, 1787): Kuthy (1897) – félholdas félböde

*Scymnus ventralis* Erichson, 1843, Arch. Naturgesch. 9:239.

*Rhizobius ventralis*: Mulsant, 1850, Spec. Trim. Securipalp.:1005.

*Rhizobius ventralis* Erichson; Swezey, 1906, Proc. Hawaii. Entomol. Soc.

*Lindorus* sp.; Fullaway, 1923, Proc. Hawaii. Entomol. Soc. 5(2): 181.

*Lindorus ventralis* (Erichson); Timberlake, 1927, Proc. Hawaii. Entomol.

Soc. 6(3):532. *Rhizobius ventralis* (Erichson); Illingworth, 1928, Proc.

Hawaii. Ento.

**Diagnostic characters** : Size: 2.5–3 mm (1/8 in). Legs: dull orange. Pronotum: Dull orange-brown with fine down. The elytra are of a similar dull orange background colour but there is a constant large U-shaped dark brown mark in the middle. This marking is characteristic of this species. There is a fine white down on the elytra.

**Habitat:** Said to be associated with grassland and nettle beds from April to July at least, but we have found it in hedgerows with mixed deciduous trees and shrubs. We have also found it on larch *Larix sp.* Over-wintering sites: Usually low down in dense vegetation or amongst plant roots.

**Diet:** Coccidophagous, aleyrodophagous; (Mona.M,&S.Abd-Rabou.2011)

**Distribution.** Europe, Mediterranean Region and Canary Islands.

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934.

### ***Rhizobius lophanthae* Blaisdell, 1892**

*Lindorus lophanthae* (Blaisdell) .*Scymnus lophanthae* Blaisdell, 1892,  
Entomol. News

3:51. **Type locality:** Colorado, California. *Lindorus lophanthae*: Fullaway, 1919, Proc. Hawaii. Entomol. Soc., *Rhizobius lophanthae* (Blaisdell, 1892), Entomol. News.

**Diagnostic characters** : *Rhizobius lophanthae* (Blaisdell) has a reddish head, underside and a grayish back densely covered with tiny hairs. Elytra densely pubescent, Elytral pubescence of two lengths: short, fine golden-brown setae and longer erect setae.

**Diet:** Coccidophagous, aleyrodophagous; (Mona and Abd- Rabou.2011)



**Distriution:** Subcosmopolitan, Mediterranean; Belgium, Denmark, Germany, Greece, Italy, Netherlands, Portugal, Switzerland, Turkey, Russia, Australia, California & Canary Islands, Madeira, India, Chile, New Zealand, Egypt and Libya. In Libya, this species was recorded from Libya by Zavattari, 1934, in Barga Area.

***Rhyzobius rufipennis* Pic**

This species was recorded from Libya by Mader, V.L. 1955. But it is not represented in any Libyan collection.

**Diet:** Coccidophagous, aleyrodophagous; (Mona and Abd-Rabou. 2011)

***Rhyzobius chrysomeloides* (Herbst 1792)**

***Rhyzobius chrysomeloides*** (Herbst 1792: 180)

Syn.: *testacea* Fabricius 1792: 446 ; *litura* var. *beta* Illiger 1798: 419 ; *litura* var. *gama* Illiger 1798: 419 ; *litura* var. *linaeatellus* Mulsant 1846: 263 ; *subdepressus* Seidlitz 1872: 193.

**Diet:** Aphidophagous, coccidophagous, aleyrodophagous; (Mona and Abd-Rabou. 2011)

**Remark:** This species was recorded from Libya in Braca area by Zavattari, 1934, as synonym *Rhyzobius subdepressus* Seidlitz 1872: 193. But it is not represented in any Libyan collection.

**Tribe Tetrabrachini Ganglbauer, 1899**

**Note:** Kapur (1948a) used *Tetrabrachys* as a replacement name for *Lithophilus* and. Chazeau et al. (1989; 1990) also list this genus.

**Genus *Tetrabrachys* Kapur, 1948**

= *Lithophilus* Frölich, 1799, not Schneider, 1791

*Tetrabrachys connatus* (Creutzer, 1796): MERKL (1987) – pusztai földiböde

***Tetrabrachys cordicollis* Guer**

**Distribution:** Egiziane and Libya. In Libya, this species was recorded from Libya (Tripoli) by Zavattari, 1934. and Mader, V.L. 1955 under synonym *Litophilus cordicollis*. But it is not in any Libyan collection.

***Tetrabrachys Festai* Dod.**

**Distribution:** In Libya, this species was recorded from Libya (Barca) by Zavattari, 1934. as *Litophilus feste* and from Derna by Mader, V.L., 1955. But it is not represented in any Libyan collection.

**Subfamily : Coccinellinae Latreille, 1807**

**Diagnosis:** Body medium to large, dorsally glabrous. Antenna 11 segmented, club well developed, antennal insertion between mandibular bases and eyes. Terminal segment of maxillary palpi securiform and obliquely truncate. Pronotum not joining elytral bases completely. Epipleura broad, reaching anterior margins. Elytral punctuation simple.

**Tribe : Coccinellini Latreille, 1807**

**Genus *Cheilomenes* Chevrolat, In Dejean, 1837**

Type species: *Coccinella lunata* Fabricius, type by subsequent designation by Crotch 1874, therefore isogenotypic with *Cydonia* Mulsant).

***Chilomenes cuppigera* (Crotch, 1874).**

*Cydonia cujypigera*, Mulsant

*Cydonia nilotica*, Mulsant

*Chilomenes osiris*, Mulsant. (Crotch, 1874)

The yellow body length between (4.6 mm\_5mm) and weight from (2.5mm-3mm) Body less elongate ,usually round, without hair. fusiform Antenna .

Elytra and pronotum without black spots.

Abdomen with six visible sternites. Coxal arc on first abdominal sternite fails to reach posterior margin of segment and runs parallel to apical margin almost to lateral margin, enclosed area with oblique line. Tibial spurs present on middle and hind legs. Tarsus 4-segmented. Claws with triangular basal tooth. Male genitalia: aedeagus symmetrical; female genitalia: receptaculum with neither nodulus nor ramus developed, cornu stout, infundibulum absent.

**Deit:** Fed on soft scales infesting citrus, mango and ledge plants in Mansoura region were *Cydonia vicina isis* Cr., *Cydonia. vicina. nilotica* Muls.( Abd Allah 1988)and soft scale insects predators(Abd-Rabou, et al. 2012).

**Distribution:** :Egypt, India, China , islands of the Pacific. (Chapin,1965) and Libya ( Only one specimens in Omer Almoktar collection).

*Chilomenes isis* Crotch,1874

*Cydonia isis* Crotch,1874

Body broadly oval, almost circular, moderately convex, glabrous.

Black; legs, body beneath, and epipleurse of the elytra testaceous;

thorax with the anterior margin narrowly, the sides broadly

yellow, disc with two converging lines.maybe a dark variety, but with

the lines on the thorax more oblique, the sides more broadly yellow, and the elytra entirely black.

Male genitalia: aedeagus symmetrical; female genitalia: receptaculum with neither nodulus nor ramus developed, cornu stout, infundibulum absent.

(Chapin,1965)

**Deit:** Feed on soft scales infesting citrus, mango and ledge plants in Mansoura region were *Cydonia vicina isis* Cr., *Cydonia. vicina. nilotica* Muls.( Abd Allah, 1988) and soft scale insects predators (Abd-Rabou, et al. 2012).

**Distribution:** :Egypt and Libya. Only one specimen in Omer Almoktar collection.

**Genus: *Coccinella* Linnaeus, 1758**

*Coccinella* Linnaeus, 1758, Syst. Nat. 10:364. **Type species:** *Coccinella septempunctata* Linnaeus, 1758, by subsequent designation (Latreille, 1810)

**Key to the species of the genus *Coccinella*, 1758**

1- Elytra yellowish brown with 7 or 11 black spots; metacoxal line slightly or deeply curved meeting the posterior margin of 3rd sternite; spermatheca with pointed cornum..... 2

-Elytra dull orange to yellowish brown with 6 transverse patches plus a longitudinal band on the inner junction; metacoxal line v-shaped not reaching the anterior margin of 2nd sternite; spermatheca with broader cornum..... ***Coccinellia novemntata* Herbst**

2- Head with a pair of large triangular white spots adjacent to eyes; pronotum with a small quadrate white spot on each anterior angle; prosternal process narrower; 8th sternite in male with four groups of long setae; siphonal capsule with anterior angle; prosternal process narrower; 8th sternite in male with four groups of long setae; siphonal capsule with adjacent arm; siphon broader terminally; basal piece with deep emarginations at the anterior margin; basal lobe broadest proximally and tapering distally..... ***Coccinellia septumpunctata* Linnaeus**

3- Head with a pair of small, spherical, white spots adjacent to eyes; pronotum with a large antero-lateral yellow spot on each anterior angle; prosternal process rectangular much elevated; 8th sternite in male surrounded by long

setae entirely; siphonal capsule without adjacent arm; siphon pointed terminally; basal piece with slight emargination at anterior margin; basal lobe medially expanded.....*Coccinella undecimpunctata* Linnaeus

***Coccinella septempunctata* Linnaeus, 1758**

*Coccinella* 7'-punctata, Linn. Syst. Nat. p. 365 8 (1758).

*Coccinella* 7'-punctata, Muls. Secur. p. 79. 3 (1846).

*Coccinella* divaricata, Olio. Ent. VI. p. 1001. 21, pi. v. 67 (1808).

*Coccinella* divaricata, Muls. Spec. p. 112. 21 (1850).

**Diagnostic characters** : Length 5.2-9.0 mm; width 4.0-6.5 mm; body rounded oval, convex and nearly hemispherical. The *Coccinella septempunctata* Linnaeus or seven spotted lady beetle is midsized the head black with a large triangular whitish spot adjacent to each eye. The head ,length 1.4 mm-1.6 mm; width 2.0 mm-2.2 mm; eyes small with minute facets, antennae contain from 11 segmented with basal segment longer, and it is clavate antennae, labrum with anterior margin emarginated, tormaе somewhat triangular; distigalea beak like; anterior margin of ligula straight. thorax ,Length of pronotum 2.0-2.5, width 3.0-3.5, and black with a small quadrate pale spot in each anterior angle; anterior margin of pronotum slightly emarginated; prosternal process narrower bearing relatively longer and well marked carina; posterior portion of basisternum of mesothorax having vertical mesal sides; mesocoxal line curved. Postcoxal line slightly curved meeting the posterior margin of 3<sup>rd</sup> sternite more towards laterally; 8<sup>th</sup> sternite in male bears four groups of very long setae on the anterior, posterior and on either sides of the depression. elytra yellow to dark red with 3 black spots on each elytron plus one at the anterior connection , and without hairs and finely pitted.

**Genitalia:** Male genitalia Siphon sharply curved; siphonal capsule consisting of a larger slightly lobed opposite and a sharply curving, blunt adjacent arm bearing a ventral hook at its base, distally siphon flattened bearing a triangular process; basal piece cup shaped with deep emarginations at the anterior margin; basal lobe hollow, blunt apically, lateral sides bent ventrad and then narrowing down gradually diverge and merge with dorsal margin; trabes narrow proximally, curved, flattened and pointed distally. Female genitalia Lateral plates with deeply curving mesad; genital plates oval with long, narrow anterior portion almost perpendicular to the basal portion and outer s-shaped margin; thick walled spermathecal capsule annulated, deeply curved appearing as a sign of interrogation; cornu lobe like; ramus shorter; nodulus narrow and longer; base of infundibulum well sclerotized and rounded.

**Deit:** It is a general predator and was collected feeding on aphids, scale insects, psyllids and mealy bugs in the region (Moreton 1969).

**Distribution:** India, Pakistan, Sri Lanka, Palaearctic, North America and Libya. In Libya, this species was recorded from Barga by E. Zavattari, 1934

**Remarks:** This is commonly occurring species and was collected from majority locations of the study area. This is widely distributed species in the world and hence in the study area. It is very active among all coccinellid species and can be found in all habitats and agro-ecosystems.

### ***Coccinella undecimpunctata* Linnaeus, 1758**

*Coccinella undecimpunctata* Linnaeus, 1758: 366 (lectotype: LSL); Mulsant, 1846: 71; 1866: 85; Iablokoff-Khnzorian, 1979: 66; 1982: 351; Pope, 1989: 651 (rev.).

*Coccinella (Dobzhanskia) undecimpunctata*: Iablokoff-Khnzorian, 1982: 71 (rev.).

**Diagnostic characters:**The length of the species *Coccinellia undecimpunctata* Linnaeus or eleven spotted lady beetle is 4.5-5.5 mm; width 2.7-4.1 mm; body elongate, oval, convex Adult length (4.5-5.5 mm; width 2.7-4.1 mm); body elongate, oval, convex. Head black with a small oval pale spot contiguous to each eye ,Length 1.2-1.3 mm; width 1.5-1.7 mm; eyes large with minute facets; labrum with anterior margin emarginated; tormae rather elongated; distigalea blunt; anterior margin of ligula slightly pointed.Thorax , Length of pronotum 1.7-1.9 mm; width 3.2-3.5 mm; the pronotum dark black with a larger pale spot in both anterior angle; anterior margin of pronotum deeply emarginated; prosternal process rectangular, much elevated with narrow carina; mesocoxal line vertical mesad. Abdoman ,Postcoxal line deeply curving meeting the posterior margin of 3<sup>rd</sup> sternite, more toward centre;entire depression on 8<sup>th</sup> sternite in male surrounded by setae.( Ali et al,2012) elytra yellow to red with five black spots plus a common scutellar black spot.

**Genitalia :** Male genitalia, Siphon faintly curved, distally bifid; siphonal capsule just flattened; basal piece lengthened with slight emargination ;basal lobe well thickened, broadest proximally, expanded medially and tapering distally;trapes little hollow with folded margins, left margin thick medio-distally,female genitalia, Lateral plates slightly curving mesad and narrow caudad; genital plates somewhat quadrangular, broadest posteriorly with narrow slightly curving laterad anterior portion; spermathecal capsule smooth, slightly curving; ramus broader and longer; nodulus short and thickened; base of infundibulum funnel shaped.

**Diet:**In this study, it was collected while feeding on aphids and scale insects on alfalfa and wheat.*Coccinella undecimpunctata* Lis one of the most important predators as a potential agent for biological control of aphids,cotton

,whites and other soft bodied insects(AbdelSalam and AbdelBaky, 2000),and was recorded seven species of predators attacked, the guava soft scale, *Pulvinaria psidii* (Maskell) (Hemiptera : Coccidae)(Abd Allah ,1988).

**Distribution:** Egypt , North Africa ,Europe, Asia, and Libya. In Libya, this species was recorded from Trioli ,and Barga by ( E.Zavattari,1934)

### ***Coccinella undecimpunctata aegyptiaca*Reiche,18661**

*Coccinella undecimpunctata aegyptiaca* Reiche18661: 86.

*Coccinella aegyptiaca* Reiche, 1861: 212.-Mulsant, 1866: 86.

*Coccinella undecimpunctata* ab. *aegyptiaca*: Korschefsky, 1932: 501.

**Distribution:** India ,Canada , eastern United States, and Libya. In Libya, this species was recorded from Barga by (Zavattari,1934),but it is not represented in any Libyan collection.

### ***Coccinella novemntata* Herbst,1793**

The *Coccinella novemntata* Herbst ninespotted lady beetle is midsized (4.7-7mm) and pale orange to red-orange with nine black spots, four on each elytron and one central spot near the pronotum. This species has a black along the mid-elytral suture which distinguishes it from most other *Coccinella* species. *Coccinella alta* has the black suture, but only five black markings on its elytra.. Elytra dull orange to yellowish brown with 6 transverse patches plus a longitudinal band on the inner junction; metacoxal line v-shaped not reaching the anterior margin of 2nd sternite; spermatheca with broader cornum.

**Diet:** feeding on aphids and scale insects (AbdelSalam and AbdelBaky. 2000)

**Distribution:** North America ,Iran,Turkya,Pikestan, and Libya. In Libya, only one species is represented in the Omer Almoktar collection.



### **Tribe Hippodamiini.**

#### **Genus: *Hippodamia* Chevrolat in Dejean, 1836**

*Hippodamia* Dejean, 1835, Cat. Col. :460.

**Type species:** *Coccinella tredecimpunctata* Linnaeus, 1758, Syst. Nat. ed. 10:366. By subsequent designation of Crotch (1874, Revis.

Coccinellidae:94

*Hippodamia* Chevrolat, in Dejean, 1836 (Canepari, 1990; Pope, 1992)

*Hippodamia* Chevrolat, in Dejean, 1836: 456. Type species: *Coccinella tredecimpunctata*

Linnaeus, 1758, by subsequent designation of Thomson, 1859.

*Hippodamia* (*Hippodamia*): Iablokoff-Khnzorian, 1982: 308.

*Hemisphaerica* Hope, 1840: 157.-Mulsant, 1850: 16.-Korschefsky, 1932: 439.-

Synonymised by Belicek, 1976: 338. Type species: *Coccinella quinquesignata*

Kirby, by monotypy. *Adonia* Mulsant, 1846: 39; 1850: 36.-Synonymised by Belicek, 1976: 338. Type species: *Coccinella mutabilis* Scriba (1790), a synonym of *Adonia variegata* (Goeze, 1777), by monotypy. *Hippodamia* (*Parippodamia*) Iablokoff-Khnzorian, 1979: 65; 1982: 308. Type species: *Coccinella arctica* Schneider, by original designation. *Hippodamia* (*Adonia*): Iablokoff-Khnzorian, 1982: 308.

#### ***Hippodamia convergens* Guerin-Meneville, 1842**

*Hippodamia convergens* Guerin, 1842, Icon. Regne Animal 7:321.

*Hippodamia convergens* Guerin; Lopez 1931, Proc. Hawaii. Entomol. Soc. 7(3):345.

**Length :** The length of the species *Hippodamia convergens* Guerin-Meneville or convergent lady beetle is midsized (4.2-7.3mm) and orange with black

markings and distinctly elongate. Pronotum black area with a pair of convergent pale spots (sometimes reduced to a pair of small, rounded spots) Elytra usually with six small spots plus a scutellar spot but number of spots may be reduced (especially humeral and basolateral spots may be very small or absent) or elytra immaculate in some individuals; male genitalia with subapical lobes of siphon ovate and rounded apically, basal lobe subparallel medially.

**Genitalia :** The male genitalia of these beetles consist of a collar of distorted cylindrical form (the phallobase) with projections, and an unequal-armed U-shaped tube (the siphon or median lobe) whose distal end rests in or is thrust through the collar. The median projection from the phallobase (called the aedeagus) bears toward its tip knife like transverse keel or carina which slopes toward the base of the structure, as the visor over the vertical windshields of automobiles of the late twenties sloped downward. This keel is wanting in *Coccinella*. Beside the aedeagus are two movable appendages, the paramera or lateral lobes. At the proximal end of the phallobase, there is a triangular projection which, in the absence of any name proposed by entomologists, is here called simply the basal triangle. This triangle differs in width and in height in the two species.

**Diet:** feeding on aphids and scale insects (Abdel Salam and Abdel Baky. 2000)

**Distribution:** Central and southern regions of North America, Canada, Columbia. (Marriott et al, 2009) United States, and Libya.

***Hippodamia (Adonia) variegata* (Goeze, 1777)**

*Coccinella variegata* Goeze, 1777: 246.

*Adonia variegata*: Mulsant, 1846: 39.-Korschefsky, 1932: 346 (cat.).-Kapur, 1942: 50-53 (biol., immature stages desc.); 1957: 269.

*Hippodamia variegata*: Belicek, 1976: 338.

*Hippodamia (Adonia) variegata*: Iablokoff-Khnzorian, 1982: 326.

**Length :** The variegated lady beetle is midsized (4.4-5mm) Body slightly elongated and oval in shape and creamish red, head brown with prominent black eyes. Body with a prominent black and white pattern behind the head and black spots on red forewings. Polymorphism is common, number of spots vary; from 13 to only a few; commonly six along with one spot on the mid-dorsal line of junction of elytra near the scutellum. The elytra are without hairs and finely pitted. Light yellow to orange yellow and provided with brownish black spots of various sizes. The white lines that converge behind the head are common in all the individuals. Its pronotum always has a fine, raised margin along its basal edge. Scutellum brownish black. Head triangular. Eyes large. Mouthparts and antennae brown yellow. Antennae about 1.2 mm long and 11 segmented. Terminal segment is nearly rounded in shape. Maxillary palpi 4 segmented. Terminal segment widening apically and longer than other segments. Labial palpi 3 segmented Basal segment is very small. Venter black. Tibia tarsi brownish-yellowish; femora dark and abdomen black .

**Diet:** it was feeding on various insect and mite pests, i.e., *Adelges joshhi* (Adelgidae: Homoptera), *Anuraphis helichrysi* Katt, *Acrythosiphon pisum* Harris, *Aphis craccivora* Koch, *Therioaphis trifolii* Monell, (Aphididae: Homoptera) *Schizaphis graminum* Rond, *Macrosiphum graminum* (Hby), *R. maidis* Fitch, *Hasura* sp. (Asterolecaiiidae: Homoptera), *Drosihca magneferae* (Green) (Margoridae: Homoptera), *Dioryctria abietella* (Schiff.), (Pyralididae: Lepidoptera), *Tetranychus atlanticus* Mcg. And *Tetranychus* sp. (Tetranychidae: Acari) Irshad (2001)

**Genitalia:** Phalobase: Trab short, highly thick, expanded distally with deeply concaved apex. Basal piece large, oblong. Parameres slightly shorter than

median lobe, moderately thick, slightly compressed at base with tips rounded and provided with short hairs on apex and dorsal side.

**Distribution:** India, Nepal, Pakistan, Afghanistan, Tibet, Mongolia, China , Northern and eastern Africa.

***Hippodamia quinquesignata* (Kirby)**

**Length :** The length of the species *Hippodamia quinquesignata* (Kirby) or Five-spot lady beetle, **adult** is a midsized **in length about (4.0 to 7.0 mm)** Elytron with a transverse sub-basal group that is continuous with apex of the scutellar spot with a transverse postmedial spot (may be reduced to two small spots on some specimens), and a subapical spot.

**Diet:** it was feeding on various insect and mite pests(Tetranychidae: Acari) Irshad (2001)

**Genitalia:** ; Male genitalia with siphon subapically lacking lobes and laterally widened with inner face concave .The male genitalia of *Hippodamia quinquesignata* (Kirby consist of a collar of distorted cylindrical form (the phallobase) with projections, and an unequal-armed U-shaped tube (the siphon or median lobe) whose distal end rests in or is thrust through the collar. The median projection from the phallobase (called the aedeagus) bears toward its tip sharp knife like transverse keel or carina which slopes toward the base of the structure, as the visor over the vertical windshields of automobiles of the late twenties sloped downward. Beside the aedeagus are two movable appendages, the paramera or lateral lobes, these are somewhat heavier , there is little difference in their length in the two species. At the proximal end of the phallobase, there is a triangular projection which, in the absence of any name proposed by entomologists, is here called simply the basal triangle. This triangle differs in width and in height in the two species.

**Distribution:** North America, and Libya.

*Hippodamia sinuata crotchi* Casey

**Length :** The length of the species *Hippodamia sinuata crotchi* Casey, and it has three, two or no black markings on each elytron. Individuals with the vittate form (far left) are easily recognized. Others are similar to **Hippodamia convergens** because of the convergent white marks on the pronotum and dissection of males may be needed to positively identify .

Adult length (4.3 to 5.8 mm). Black area of pronotal disc with a pair of convergent pale spots (sometimes reduced to a pair of small, rounded spots) Elytron with an elongate scutellar spot plus four spots (subhumeral, medial, apicolateral and subapical) which may be variously compound or rarely lacking making elytron immaculate; male genitalia with siphon subapically with a pair of broad, apically truncate projections, basal lobe very broad and obtusely angled apically.

**Diet:** it was feeding on various insect and mite pests (Tetranychidae: Acari) Irshad (2001)

**Distribution:** In Canada.

*Hippodamia tredecimpunctata* Linnaeus, 1758

*Coccinella tredecimpunctata* Linnaeus, 1758: 366 (LSL).

*Hippodamia tredecimpunctata*: Mulsant, 1850: 10; 1866: 8.-Korschefsky, 1932:331 (cat.).-Kotwal *et al.*, 1984: 1011-1012 (dist.).

*Hippodamia tredecimpunctata* (Linnaeus) or thirteen spotted lady beetle is a mid-sized (4.5-6.4mm) orange lady beetle with thirteen black spots, Upper surface glabrous; eyes finely faceted Elytra slightly sinuate in outline a little before middle ; anterior median process of first abdominal segment narrow, arched at apex and bordered by a coarse, strongly raised ridge;

pronotum broadest at or in front of middle, Mesosternum acuminate between midcoxae ; abdominal plates very faintly marked or absent ; hind pronotal angles quite rounded ; tarsal claws bifid, the internal tooth much smaller than the external one; (Oblong, somewhat depressed; coloration normally with pronotum yellow laterally, black in the middle; elytra with orange ground on which there are 13 black spots, one scutellar and common to both elytra, the rest distributed 6 to each elytron ; both the above colour patterns are very variable-numerous ,varieties have been figured Usually in marshy areas

**Male genitalia** with alae of basal lobe deeply emarginated apically, paramere in lateral aspect ovate with point of maximum width at or distad of middle,sipho with subapical process backwardly hooked.

**Diet:** it was feeding on various insect and mite pests (Tetranychidae: Acari)  
Irshad (2001)

**Distribution:** Holarctic and Palaearctic region. ,India, Nepal, Tibet, Canada

#### **Subfamily :Scymninae Mulsant 1846**

1846 Mulsant, M.E. Securipalpes. Histoire Naturelle des Coleopteres de France. 4(1): 210112

**Diagnostic characters** :Body small to medium size. Eyes and dorsum of body with dense pubescence. Antenna short, nine to eleven segmented, with distinct club.

Terminal segment of maxillary palpus with truncate apex, cylindrical. Mentum and submentum relatively widely articulated. Mandibles with one, usually bifid tooth at apex. Pronotum anteriorly narrowed. Tarsi cryptotetramerous.

1-Anterior margin of prosternum roundelay convex anteriorly; prosternal carina absent; terminal segment of maxillary palpi slightly convergent apically with a truncate apex; lateral wings of mesosternum strongly

approaching metasternum and inner side of mesepimeron very short. Tegmen of male genitalia very thin and elongate; coxite of female always very elongate. Body very small ..... **Tribe Stethorini Weise, 1899**

2- Anterior margin of prosternum flat or slightly concave, very rarely convex anteriorly; prosternal carinae present or absent; terminal segment of maxillary palp parallel sided or slightly divergent apically; lateral wings of mesosternum broadly separated from metasternum and inner side of mesepimeron rather long; Coxites of female elongate triangular or transverse, body usually small to moderate in size.....3

3- Eyes usually moderate in size with or without a moderately deep or shallow post antennal emargination. Antennae nine to eleven segmented and usually relatively short, at most shorter than two-thirds of head width. Labrum rather short; Coxites of female usually elongate, rarely transverse with a stylus on each ..... **Scymnini Mulsant, 1846**

**Tribe: Scymnini Mulsant, 1846**

Small; elongately oval, moderately convex; dorsal surface pubescent; coloration variable; head with clypeus straight anteriorly, with minute emarginations; antennae short, 8–11 segmented, terminal segments forming distinct club; eyes small, coarsely faceted, pubescent; maxillary palp with terminal segment cylindrical narrow or weakly expanded toward distal end; anterior pronotal margin weakly excavated; anterior margin of prosternum flat, straight never concealing mouth parts, prosternal process with or without longitudinal carinae; elytral epipleura very narrow, without any distinct foveae; tibial spurs present; tarsi trimerous or cryptotetramerous; abdomen with six visible sternite in male and female.

**Genitalia:** Male genitalia with tegmen short, narrow to broader, siphon elongated, narrow with hammer shaped siphonal capsule; female genitalia with genital plate long, narrow, or short, nearly round; spermatheca present, sign of interrogative shaped

**Key to the Genera of the Tribe Scymnini Mulsant,1846**

1. Antennae 10 or 11 segmented; prosternum with carinae; tarsus four-segmented; postcoxal line incomplete or complete; infundibulum present  
.....*Scymnus* Kugelann,1794

2– Antennae pseudo-11-segmented; prosternum without carinae; tarsus three-segmented; postcoxal line incomplete; infundibulum absent  
.....*Nephus*Mulsant Mulsant,1846

**Genus *Scymnus* Kugelann ,1794**

*Scymnus* (Kugelann 1794: 545; Mulsant 1846: 219, 1850: 965; Crotch 1874: 239; Korschefsky 1931: 115).

**Type species:** *Scymnus nigrinus* (Kugelann 1794: 548), by subsequent designation of Korschefsky (1931, Col. Cat. 118:115).

**Diagnostic characters: Coloration:**Dorsal surface moderately pubescent; elytra coloration variable. **Size and general shape:** Adult length 1–3 mm; width 1–2 mm; body oval, moderately convex.**Head:** Clypeus with anterior margin truncate or slightly convex, emargination without setae; antennae 10 or 11-segmented, basal segment stout, about twice as long as wide, slightly curved, second segment slightly shorter than broad but equal in width to basal; third segment slender, about twice as long as broad, fourth and sixth



about equal, either shorter than fifth but all about the same width, seventh and eighth segments slightly longer and broader, ninth segment much wider at apex than at base, 10th segment a little broader than long, 11th segment as long as 10th, rounded at apex, the last three or four segments forming a compact club; maxillary palpus with apical segment cylindrical, apex obliquely truncate. **Thorax:** Pronotum with posterior margin medially deeply emarginated; prosternum straight anteriorly, carinate; elytral epipleura weakly narrow distally; tibial spurs absent; tarsal claws with an acute basal tooth. **Abdomen:** Abdomen with six visible sternites; postcoxal line incomplete (subgenus *Scymnus*) str. or complete (subgenus *Pullus*).

**Genitalia: Male genitalia:** Median lobe symmetrical or asymmetrical, mostly shorter than paramere; siphon with siphonal capsule not complete hammer shaped, with adjacent arm shorter than opposite arm; trabes curved, mostly broader apically. **Female genitalia:** Spermatheca hook shaped, elongated, basally rounded with very small accessory gland with short narrow duct.

### Key to the Subgenera of the Genus *Scymnus*

1. Antennae 10 segmented; postcoxal line incomplete, curved forward apically; male 5th and 6th abdominal sterna truncate or emarginate apically  
 ..... *Scymnus (Scymnus)* Kugelann

2– Antennae 11-segmented; postcoxal line complete, recurved apically, reaching base of first abdominal sternum; 5th and 6th abdominal sterna moderately to strongly emarginate and impressed posteriorly.....  
 ..... *Scymnus (Pullus)* Mulsant

**Subgenus *Scymnus* (*Scymnus*) Kugelann, 794**

**Diagnostic characters:** **Head:** Antenna 10 or 11 segmented. **Thorax:** Prosternum with two strong carinae. **Abdomen:** Postcoxal line incomplete, curved forward apically; male 5th and 6th abdominal sterna truncate or emarginate apically.

**Subgenus *Scymnus* (*Pullus*) Mulsant, 1846**

*Scymnus* (*Pullus*) Mulsant, 1846, Hist. Nat. Coleopt. France Securipalp. :241.

**Type species:** *Scymnus subvillosus* Goeze, 1777, Entomol. Beytr. 1:247.

(= *Scymnus fasciatus* Fourc, 1785, Entomol. Paris 1:149). By subsequent designation of Korschefsky (1931, Col. Cat. 118:116 & 137).

**Diagnostic characters:** **Head:** Antennae 11 segments. **Thorax:** Prosternum with distinct carinae. **Abdomen:** Postcoxal line complete, recurved apically, reaching base of first abdominal sternum; 5th and 6th abdominal sterna moderately to strongly emarginate and impressed posteriorly

***Scymnus* (*Pullus*) *subvillosus* Goeze, 1777**

**Diagnostic characters:** **Length 1.9-2.5 mm,** **Head:** Antennae 11 segmented. **Thorax:** Prosternum with distinct carinae. **Abdomen:** Postcoxal line complete, recurved apically, reaching base of first abdominal sternum; 5th and 6th abdominal sterna moderately to strongly emarginate and impressed posteriorly.

**Deit:** coccidophagous and aleyrodophagous (Moulay. et al,2009).

**Distribution:** All of Europe (except North), North Africa, Middle East, Siberia and the Afrotropical region.

**Remark:** Edoardo Zavattari, 1934 described *Scymnus (Pullus) subvillosus* Goeze, 1777 from Libya in Barga area as *Pullus subvillosus Juniperi*. But is not in any Libyan collection

***Scymnus (Pullus) syriacus* (Marsuel 1868)**

**Diagnostic characters:**  
**Coloration:** Body reddish brown, pubescent, head, mouth parts, ventral side all black, each elytron with a large longitudinal black spot attached with one small brownish patch on each side.  
**Size and general shape:** Adult length 2–2.3 mm; width 1–1.2 mm; rounded-oval, convex.  
**Head:** Labrum with anterior margin slightly notched; ligula with straight margin; terminal segment of labial palp small pointed and converged.  
**Thorax:** Anterolateral margin of pronotum without hairs; prosternal process with well-developed carinae, narrow anteriorly, reaching the anterior margin; scuto-scutellar suture curved posteriorly; tibia with dorsal margin distally bearing long hairs.  
**Abdomen:** Second to fourth segments equal in size except the terminal segment; postcoxal line complete, strongly v-shaped; postcoxal process with anterior margin broader, straight; terminal sternite bearing long setae medially while short setae laterally in male.

**Diet:** *Scymnus (Pullus) syriacus* (Marsuel) was recorded as predators of armored scale insects (Abd-Rabou et al, 2012)

**Genitalia: Male genitalia:** Siphon narrow, distally flat, pointed, siphonal capsule with opposite arm long, curved while adjacent arm short, pointed; basal piece triangular, broader than long; median lobe thick, slightly longer than paramere; paramere narrow proximally, expanded distally; trapes curved, expanded medially, terminal end bearing fin shaped process.  
**Female genitalia:** Genital plate long, broader; lateral plate triangular, deeply curved

inside; 10th tergite broader medially, narrow laterally; spermatheca with base rounded-oval, cornu long, narrow deeply curved.

**Distribution:** Eastern Mediterranean region especially Jordan, Lebanon, Turkey, Iran, Libya, Yemen, Egypt, Iran, Afghanistan and Pakistan. This species was reported from Libya by N. SAMIN & M. SHOJAI 2013.

***Scymnus (Pullus) belophallus* Capra.**

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934. and Mader. V.L. 1955, but it not represented in any Libyan collection.

***Scymnus (Pullus) dorsalis* Fisch**

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934. and Mader. V.L. 1955, but it not represented in any Libyan collection

***Scymnus (Pullus) pallidiventris* Mls**

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934. and Mader. V.L. 1955, but it not represented in the Libyan collection

***Scymnus (Pullus) nanus* Mls**

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934. and Mader. V.L. 1955, but it not represented in the Libyan collection

***Scymnus (Pullus) pubescens* Panz.**

**Remark:** This species was recorded from Libya (Braca) by Zavattari, 1934. and Mader. V.L. 1955, but it is not represented in the Libyan collection

**Genus *Nephus* Mulsant, 1846**

**Type species:** *Scymnus (Nephus)* (Mulsant 1846: 237)., *Nephus* (Motschulsky 1866: 425)., *Coccinella quadrilunulatus* Illiger, 1798, by subsequent

designation of Korschefsky (1931)., *Sidis* (Mulsant 1850: 975). *Scymnus* (*Sidis*) *binaevatus* Mulsant, by subsequent designation of Korschefsky (1931)., *Nephus* (*Bipunctatus*) (Fürch 1987: 66). *Scymnus bipunctatus* Kugelann, 1794., *Nephus* (*Geminosipho*) (Fürch 1987: 68). *Nephus bielawskii* Fürsch 1965. *Nephus* (*Parascymnus*); Fürch, 1987: 66 (*Parascymnus* Chapin, 1965b downgraded). *Parascymnus palauensis* Chapin, by original designation. *Aponephus Boothi* † *Aponephus lentiformis* by original designation. Syn. nov.

**Diagnostic characters: Coloration:** Dorsal surface pubescent, brownish black, sometime with spots. **Size and general shape:** Adult length 1.6–1.8 mm; width 1.2–1.4 mm oval, moderately convex. **Head:** Clypeus with anterior margin slightly truncate, emarginations with minute setae; antenna pseudo-11 segments or 10 segments, first and second segments completely tightly jointed together, basal segment moderately stout, curved, second segment separated from first by a false suture, not always visible, half as long as broad but equal in width to basal, third segment a little longer than broad, fourth, fifth, and sixth segments of same width, the fifth slightly shorter than fourth or sixth, seventh, eighth, and ninth segments progressively slightly longer and wider, 10th segment slightly longer than broad but nearly quadrate, 11th segment half as long as 10th, almost hemispherical; maxillary palpus with apical segment cylindrical, apex obliquely truncate. **Thorax:** Pronotum with posterior margin medially deeply emarginated; prosternum slightly produced anteriorly; prosternal process with carinae; elytral epipleura weakly narrow distally; tarsi three segmented; tibial spurs absent; claw with acute basal tooth. **Abdomen:** Abdomen with six visible segments; postcoxal line incomplete.

**Genitalia :****Male genitalia:** Median lobe symmetrical distinctly narrow, shorter than paramere; siphon with siphonal capsule hammer shaped but opposite arm distinctly broader; trapes slightly expanded apically.**Female genitalia:** Spermatheca weakly hook shaped, deeply elongated with cornu and basal part distinctly separated with very small accessory gland with very short duct.

*Nephus (Nephus) ludyi* (Weise, 1879)

**Distribution:** Mediterranean Region ,Libya. In Libya, this species was recorded from Libya ( Braca )byZavattari,1934. ,but it is not represented in the Libyan collection

Note: This species was recorded by Claudio Canepari ,2011 living on *Quercus* sp.

*Nephus (Nephus) tamaricis.*

**Distribution:** Mauritania,and Libya, In Libya, this species was reported from East Libya (Giabub Oasis) by Zavattari.1934,andMader.V.L.1955 but it is not represented in the Libyan collection.

*Nephus stramineus*

**Distribution:** Endemic ,In Libya, this species was reported from East Libya (Giabub Oasis) by Zavattari.1934, and Mader.V.L.1955 but it is not represented in the Libyan collection.

**Tribe: Stethorini Weise, 1899**

*Stethorini* Dobzhansky , 1924, p. 20.

Body very small. Dorsum pubescent. Antennae eleven-segmented . Terminal segments of maxillary palpi slightly convergent apically with truncate apices.Prosternum roundly convex anteriorly, partly

concealing mouthparts, prosternal lobe without carinae. Inner side of mesepimeron very short. Abdomen with 6 visible sterna. This tribe contains a single genus.

**Genus: *Stethorus* Weise , 1885**

*Scymnus* (*Stethorus*) Weise, 1885 Best.-Tab. Europ. Col. 2 (ed. 2):65.

*Stethorus* Weise, 1899, Arch. Naturg. 65(1):64.

**Type species:** *Coccinella minimus* Rossi, 1794 (preoccupied). (= *Stethorus punctillum* Weise, 1891, Cat. Col. Europ. :781). By subsequent designation of Sicard(1909), Ann.Soc . Entomol. France 78:146).

**Diagnostic characters:** Length = 1.3 to 1.6 mm. Body small, elongate-oval, pubescent. Eyes large , moderately coarsely faceted. Antennae short, eleven-segmented, inserted between eyes and lateral margins of clypeus; antennal bases exposed , but clypeus not emarginate around them. Clypeus short before eyes , truncate with rounded angles. Mandibles each with subapical tooth. Prosternum produced and broadly rounded anteriorly, at least partly concealing mouthparts and antennae when head in repose; distal maxillary palpomere oblong and obliquely truncate apically; prosternum medially without a pair of longitudinal carinae; postcoxal line forming a short but complete arc; color black with legs at least partly yellow to brownish yellow

***Stethorus punctillum* Weise, 1891**

**Diagnostic characters:** *Stethorus punctillum* Weise is a tiny (1.3-1.6 mm), oval, convex, shiny black lady beetle, covered with sparse, fine yellowish to white hairs. Postcoxal arc short, posterior edge of arc not reaching middle of sternum 1; punctures on base of elytron larger than adjacent pronotal punctures; pronotum with lateral margin broadly and evenly arcuate; male

genitalia with paramere slender and evenly tapering apically, basal lobe with apex slightly broadened and arrow-head shaped .

**Life cycle :** *Stethorus punctillum* Weise overwinters in the adult stage beneath leaves and other organic matter under fruit trees and in other protected habitats near the orchard, such as fence rows or adjacent wooded areas. The white, oval eggs are less than 0.5 mm long, and turn blackish just before the larvae emerge. They are laid singly, usually on the underside of leaves near the primary vein, on their sides and adhere tightly to the leaf. The newly hatched larva is gray to blackish and has many long-branched hairs and black patches. As it matures, it becomes reddish, at first on the edges of the body, and just prior to pupation the entire larva turns reddish. The larva has 13 segments, plus the head. The pupae are black and flattened, somewhat pointed on the posterior end, with the entire body covered with yellow hairs. Emerging adults are reddish-orange for a few hours after emerging from the pupal case before turning black. Adults can be found in the leaf litter immediately surrounding the trunks of fruit trees, in large numbers along the herbicide strip (the area under the tree canopy that is often cleared by use of herbicides) and occasionally in the drive row.

**Genitalia:** Tegmen of male genitalia very thin and elongate; coxite of female always very elongate.

**Diet:** is strictly a predator of plant-feeding mites, particularly the spider mites such as the European red mite and the twospotted spider mite, and especially the eggs and acaridophagous.

**Distribution:** Europe, Korea, North Africa and North America



**Subfamily :Hyperaspidae Duverger,1989**

**Tribe: Hyperaspini Mullsant, 1846**

**Genus: *Hyperaspis* Dejean,1833**

*Hyperaspis* Redtenbacher, 1843, Tentamen. Dispos. Gen. :8, 12.

**Type species:** *Coccinella reppensis* Herbst, 1783, Arch. Insectengesch  
4:48.subsequent

designation of Crotch (1874, Revis. Coccinellidae 213.

**Diagnostic characters:**

*Hyperaspis* species are tiny, shiny, black lady beetles with several red, orange or yellow spots on the back. Epipleuron excavated for reception of middle and hind femoral apices; mentum with anterior margin emarginate and concave medially; body more oval, lateral margins of elytra more evenly rounded, dorsally more convex; tarsal claws with or without a basal tooth. This genus is represented in Libya by two species

***Hyperaspis marmottani* (Fairmaire 1868)**

**Distribution:** Mauritania, Libya.In Libya, this species was reported from Libya(Barga,and Giarabub) by E.Zavattari.1934 ,and Mader.V.L.1955 but it not represented in the Libyan collection.

***Hyperaspis vinciguerra* (Capra, 1929)**

**Distribution:** Russia,Africa,Pakistan ,North Africa,Egypt,and Libya, this species was reported from Libya (Giarabub) by E.Zavattari.1934, ,and Mader.V.L.1955 but it not represented in the Libyan collection

**Diet:** Feed on *Aphis craccivora*.

**Remarks:** *Hyperaspis* is worldwide in distribution. 294 species were recorded from America, 27 species from Palearctic, 19 from Russia and 3 species from Far East and one species *Hyperaspis leechi* were recorded from Pakistan (Rahatullah and Inayatullah, 2014).

**Subfamily :Sticholotidinae Weise,1901**

**Diagnostic characters:** Minute, L = 1.0 to 1.5 mm; pronotum with anterolateral angle delimited from disc by an oblique line; prosternum anteromedially with a reflexed lobe; maxillary palpus with apical palpomere conical or elongate-oval and pointed apically; postcoxal line short, divided and not forming an arc.

**Tribe Sticholotidini (=Pharini)**

**Genus *Pharoscymnus* Bedel, 1906**

*Pharus* Mulsant, 1850: 942, 948 (preoccupied). Type species: *Coccinella 6-guttata*

Gyllenhal in Schönherr, 1808: 206, by subsequent designation of ?Korschefsky, 1931.

*Pharoscymnus* Bedel, 1906: 93 (replacement name)-Smirnoff, 1956: 1.

*Pharoscymnus (Gymnopharus)* Sicard, 1909: 157.-Korschefsky, 1931: 214.

Type species:

*Pharoscymnus (Gymnopharus) eburifer* Sicard, by original designation.

***Pharoscymnus varius* Kirsch**

**Diagnostic characters:** Form round, strongly convex, dorsal side densely pubescent. Ground colour dark brown, each elytron with a pair of reddish/orange yellow spots, anterior spot subquadrate and larger, posterior spot roundish. Ventral side uniformly dark brown. Head quadrate, clypeal

margin narrowly extending laterally over eyes, eyes not emarginate around antennal insertions. Antennae short, ten-segmented. Last segment of maxillary palpi elongate, subconical. Prosternal intercoxal process quadrate, with a pair of subparallel carinae. Postcoxal line on abdominal ventrite I incomplete, running parallel to posterior margin of ventrite I, but stopping short of lateral margin. Male genitalia as illustrated.

**Diet:** *Latania* scale, *Hemiberlesia latania*, Hemiptera:Diaspididae(Mona and Abd-Rabou.2011)

**Distribution :** Egypt Murtiania, and Libya. In Libya (Barca) ,this species was reported from Libya by E.Zavattari,1934

#### **Subfamily EPILACHNINAE Mulsant 1846**

#### **Tribe Epilachnini(Mulsant 1846)**

#### **Genus *Henosepilachna* Li, 1961**

*Henosepilachna argus* (Geoffroy, 1785): Kuthy (1897) – földitökböde

*Henosepilachna elaterii* (Rossi, 1794): Papp(1938) – magrugóböde

= *chrysomelina* of authors, not Fabricius, 1775

*Epilachna* Chevrolat, 1837. in Dejean Cat. coleopt. P. f. *Epilachna*, Dieke Smithson. 1947. Misc. Coll. 106(15) : 5. Dejean, 1837: 460. Type species: *Coccinella borealis* Fabricius, 1775, by subsequent designation by Hope, 1840. *Epilachna (Cleta)* Mulsant, 1850b: 866.

Type species: *Epilachna eckloni* Mulsant, 1850b, designated by Jadwyszczak & Wegrzynowicz, 2003: 31. *Epilachna (Hypsa)* Mulsant, 1850b: 860. Type species; *Epilachna nigrolimbata* J. Thomson, 1875. Subsequent designation by Korschefsky 1931.40

*Solanophila* Weise, 1898a: 191. Type species: *Epilachna gibbosa* Crotch, 1874,

subsequent designation by Li & Cook, 1961. Synonymised by Korschefsky, 1931.

*Afissa* Dieke, 1947: 113. Type species: *Coccinella flavicollis* Thunberg, 1781, by original designation. Synonymised by Li & Cook, 1961.

*Epilachna (Aparodentata)* Wang & Cao, 1993: 126. Type species: *Epilachna yongshanensis* Cao & Xiao, 1984, by original designation.

*Epilachna (Uniparodentata)* Wang & Cao, 1993: 126. Type species: *Epilachna paramagna* Pang & Mao, 1979, by original designation.

The last visible abdominal sternite in the female divided, or apparently divided, longitudinally in the middle; tarsal claw usually with a basal tooth

***Henosepilachna elaterii* (Rossi, 1794)**

*Epilachna canina* (F.)

[*Epilachna* ' *chrysomelina* ' (F.)]; used variably either for *Henosepilachna argus* (Geoffroy) or *Henosepilachna elaterii* (Rossi) or *Henosepilachna vigintioctopunctata* (F.)

*Henosepilachna elaterii* (Rossi, 1794): Papp(1938) – magrugóböde

*Epilachna chrysomelina* (Fabricius) 1775

**Diagnostic characters:** Morphology and biology of the Melon Ladybird Beetle, Twelve-spotted. Body length, 7-9 mm. Body widely ovate, mainly red-brownish; metathorax black; dorsum covered with short hairs. Pronotum without spots; each elytra with 6 black points, of which posterior sometimes merged into V-bend. Shoulders widely rounded, tibiae simple. Epipleura is wide and flat. Egg the same as egg of *Coccinella septempunctata*, but not darkening before hatching. Larva in the 1st instar is about 2 mm in length,

yellow; its dorsal surface is covered with 4 longitudinal rows of branched spicules. Mature larva is 9-10.5 mm in length, yellow-greenish, with 6 dorsal rows of spicules.

**Diet:** The pest damages in adult and larval stages during all vegetation of host plants. It damages mainly melons, cucumbers, pumpkins, and vegetable marrows. Watermelon is damaged in a lesser degree( Moulay et al., 2009).

**Distribution:**Southern Europe, Africa, Asia Minor, Middle East, Afghanistan,Azerbaijan,Turkmenistan,Uzbekistan, Tajikistan **and** Russian,

**Remark:** This species was recorded from Libya (Tripoli,Marada- Gialo, Fezzan,Uwenat-Ghat)by E.Zavattari,1934as *Epilachna chrysomelina* (Fabricius**1775**) 1932 as shown in the above synonymy,.But it is not represented in any Libyan collection.

## RESULTS AND DISCUSSION

### 5.1.SURVEY:

The results of this study suggest that the coccinellid community structure in Battah and neighboring Area with different ecosystems and altitudes. The present study was the first attempt to describe the coccinellid fauna of Battah and neighboring Area in North- Eastern Libya .The object of this study was to explore, identify and prepare inventory of predatory coccinellid species in the Battah and neighboring regions, which will be helpful for the future researchers working on predatory coccinellid species of this region.

Further survey is needed of those areas that were not covered in this study to fully explore predatory coccinellids fauna of Battah and neighboring region.

During this Five-year survey, we collected more than 370 ladybird specimens, belonging to 6 species. According to the results 38 different species from 10 tribes, 14 genera, and 7 subfamilies belonging to family Coccinellidae.

The species were: *Chilocorus bipustulatus* (L), *Exochomus nigripennis* Erichson, *Exochomus* (*Parexochomus*), *lugubrivestis* Mls, *Exochomus* (*Parexochomus*) *pubescens gestroi* Fairmair, *Rodolia cardinalis* (Mulsant), *Rodolia rufipennis* Pic, *Rhyzobius litura* (Fabricius) , *Rhyzobius lophanthae* (Blaisdell) , *Rhyzobius rufipennis* Pic, *Rhyzobius chrysoloides* (Herbst), *Tetrabrachys cordicollis* Guer, *Tetrabrachys Festai* Dod, ***Chilomenes cuppiger*** (Crotch), ***Chilomenes isis*** Crotch, *Coccinellia septempunctata* Linnaeus, *Coccinellia undecimpunctata* Linnaeus, *Coccinellia undecimpunctata aegytiaca* Reiche, *Coccinellia novemntata* Herbst, *Hippodamia convergens*

Guerin-Meneville, *Hippodamia* (= *Adonia*) *variegata* (Goeze), *Hippodamia* *quinesignata* (Kirby), ***Hippodamia sinuata crotchi*** Casey, *Hippodamia* *tredecimpunctata* Linnaeus, *Scymnus* (*Pullus*) *subvillosus* Goeze, *Scymnus* (*Pullus*) *syriacus* (Marsuel), *Scymnus* (*Pullus*) *belophallus* Capra, *Scymnus* (*Pullus*) *dorsalis* Fischl, *Scymnus* (*Pullus*) *pallidiventris* Mls, *Scymnus* (*Pullus*) *nanus* Mls, *Scymnus* (*Pullus*) *pubescens* Panz, *Nephus* (*Nephus*) *ludyi* (Weise), *Nephus* (*Nephus*) *tamaricis*. a. *stramineus* Capra, *Nephus* *stramineus* Capra, *Stethorus* *punctillum* Weise, *Hyperaspis* *marmottani* (Fairmaire), *Hyperaspis* *vinciguerra* (Capra), *Pharoscymnus* *various* Kirsch, *Epilachna* *chrysomelina* (Fabricius)

Further survey is needed of those areas that were not covered in this study to fully explore predatory coccinellids fauna of Battah and Neighboring Area For each record we added a label, containing information about the locality, collection date and collector. Only first records per locality were given. Also, remarks about some interesting species in Battah and Neighboring Area in North- Eastern Libya are given.

## **5.2. SEASONAL ABUNDANCE (Tables. 1, 2, 3, 4):**

Only six species belonging to two genera in two families were collected from both areas (A & B). The six species are listed as follows:

### ***Coccinellia septepunctata* Linnaeus:**

#### **In Area-A:**

It was highly abundant during Winter and Autumn representing, (100%) and (92.31%) respectively of the total number of specimens collected during the whole period of investigation, while in summer and spring very low population (28.3%) and (21.5%). Table (8)

In table (4) and figure (3) the highest population during September (23.88%) and April (17.91%), while the lowest numbers collected in

January(2.99%),February and May(5.97%).But it completely disappeared during October,November,and December.

**In Area-B:**

It was highly abundant during Autumn and Summer representing,(100%) (43.75%), spring (39%), while in winter disappeared. Table(10).

In table (6) and figure (9)the highest population during April(46.15%),while the lowest numbers collected in March(17.95%) and June(7.9%),But it completely disappeared during January, February,May, Sepember.October,November,and December.

***Coccinellia undecipunctata* Linnaeus**

**In Area-A:**

It was highly abundant during Spring and Summer representing,(25.6%) and (18.9%) respectively of the total number of specimens collected during the whole period of investigation in area A,while in Winter and Autumn completely disappeared. Table (8).

In table(4) and figure (10)the highest population during April(75.61%),while the lowest numbers collected in June (4.88%), and May(19.51%).

But it completely disappeared

January,February,March,June,July,August,Sepember.October,November & December

**In Area-B:**

It was highly abundant during Summer and Spring representing (18.7%) (6.25%), while in winter disappeared.Table(10).

In table (6) and figure (10) the highest population during April(57.14%),and May(42.6%),but it completely disappeared January, February,March,July,,August,Sepember.October,November,and December.



### ***Hippodamia convergens* Guerin-Meneville**

#### **In Area-A:**

It was highly abundant during Summer and Spring representing,(35.8%) and (29.8%) respectively of the total number of specimens collected during the whole period of investigation,while in Winter and Autumn completely disappeared.Table(8).

The highest population during April(61.82%),while the lowest numbers collected in March (3.64%), and May(34.54%),but it completely disappeared inJanuary,February,June,July,,August,September.October,November,& December.Table(4) and figure (5).

#### **In Area-B:**

It was highly abundant during Spring representing (26.5), while in winter,Summer,and Autumn disappeared.Table (10).

The highest population during April(100%),but it completely disappeared January,February,May,JuneJuly,August,September.October,November, and December.Table(6) and figure(11).

### ***Hippodamia sinuata crotchi* Casey**

#### **In Area-A:**

It was highly abundant during Spring,Summer and Autumn representing,(20.7%) (17%) and(7.69%) respectively of the total number of specimens collected during the whole period of investigation,while in Winter completely disappeared.Table (8).

The highest population during April(69.44%),while the lowest numbers collected in May (16.67%), June(8.33%) and August(5.56),but it completely disappeared inJanuary,February,July,September.October,November,& December.Table(5) and figure(6).

**In Area-B:**

It was highly abundant during Summer, and Spring representing (37.5%), (26.56%), while in winter, and Autumn disappeared. Table(10).

The highest population during April(73.92%), while the lowest numbers collected in May, and June (13.04%), and but it completely disappeared in January, February, March, July, August, September. October, November, and December. Table(7) and figure(12).

***Hippodamia quinquesignata* (Kirby)****In Area-A:**

It was highly abundant during Spring(1.6%) of the total number of specimens collected during the whole period of investigation, while in Winter, Summer and Autumn completely disappeared. Table(8).

The highest population during May (100%), but it completely disappeared in January, February, March, April, July, August, September. October, November, & December. Table (5) and figure(7).

**In Area-B:**

It was highly abundant during Spring representing (1.57%), while in winter, Summer and Autumn disappeared. Table(10). The highest population during May (73.92%), but it completely disappeared in January, February, March, April, June, July, August, September. October, November, and December. Table(7) and figure(13).

***Hippodamia (Adonia) variegata* (Goeze)****In Area-A:**

It was highly abundant during Spring representing, (0.8%) of the total number of specimens collected during the whole period of investigation, while in Winter, summer and Autumn completely disappeared. Table (8).

The highest population during April(100%), but it completely disappeared during January, February, March, May, June, July, August, October, November, and December. Table (5) and figure(8).

**In Area-B:** completely disappeared in Winter, Spring, Summer and Autumn. Table(10)

**In Area-A:**

It was highly abundant of Coccinellid species during Spring(60%), While the lowest number collected in Winter (1%). Figure(14).

**In Area-B:**

It was highly abundant of Coccinellid species during Spring(73.6%), but it completely disappeared during Winter(0%). Figure(16).

Results indicated that Coccinellid species activity started by the March and April to September at two study area , which normally coincide with maturation of the Coccinellid species which depend on weather conditions.

**5.3.MORPHOLOGY:**

External morphological of the adult *Coccinella septempunctata* Linnaeus was chosen as representative of family coccinellidae to study its morphology and compare it with others species of the same family.

Adult *Coccinella septempunctata* Linnaeus can be easily distinguished from them by having elytra yellowish brown with 7 black spots; metacoxal line slightly or deeply curved meeting the posterior margin of 3rd sternite; spermatheca with pointed cornum, Head with a pair of large triangular white spots adjacent to eyes; pronotum with a small quadrate white spot on each anterior angle; prosternal process narrower; 8th sternite in male with four groups of long setae; siphonal capsule with anterior angle; prosternal process; adjacent arm; siphon broader terminally; basal piece with deep emarginations at the anterior margin; basal lobe broadest proximally and tapering distally

#### 5.4.TAXONOMY:

The results of this study suggest that the coccinellid community structure in the six study sites with different ecosystems and altitudes. The present study was the first attempt to describe the coccinellid fauna of the Battah and neighboring Area .The object of this study was to explore,identify and prepare inventory of predatory coccinellid species in the Battah and neighboring Area, which will be helpful for the future researchers working on predatory coccinellid species of this region. In the present work,the author has followed the usual practice of recognizing the family coccinellidae.systematic redescriptions of the coccinellid species based on the external morphological characters of adult were given in detail in the text together with illustrations and synonymy,key for subfamilies,genera and

species were constructed to facilitate their identification. The taxonomy of Battah (Libya) Coccinellidae is well known thanks to the recent monograph of Gordon (1985). Only some of the most recent references on coccinellids have been listed in the Literature cited, good regional works on Coccinellidae include those of Chapin (1974) for Louisiana, Belicek (1976) for western Canada and Alask.

The following species *Chilocorus bipustulatus* (L),*Rodolia cardinalis*(Mulsant), ,*Chilomenes cuppigera* (Crotch),*Chilomenes isis* Crotch,*Coccinellia septepunctata* Linnaeus,*Coccinellia undecipunctata* Linnaeus,*Coccinellia novemntata* Herbst,*Hippodamia convergens* Guerin-Menevile,*Hippodamia* (=Adonia) *variegata*(Goeze),*Hippodamia quinquesignata* (Kirby),*Hippodamia sinuata crotchi* Casey,*Hippodamia tredecimpunctata* Linnaeus,and *Stethorus punctillum* Weise, were newly recorded from Libya for the first time in the presnt study.

Many changes in the names of species were updated according to different works

**1-*Exochomus nigripennis* (Erichson, 1843)**, this species was recorded from Libya (Barga) by Edoardo Zavattari, 1934, as *Exochomus (flavipes) nigripennis* Korschefsky, 1932, which later became synonymy, but it is not in any Libyan collection

**2-*Exochomus (Parexochomus) lugubrivestis* Muls**, this species was recorded from Libya, (Barga) by Zavattari, 1934. But it is not represented in any Libyan collection

**3-*Exochomus (Parexochomus) pubescens gestroi* Fairmair, 1855**, this species was recorded from Libya, (Barga, Gaibub) by Zavattari, 1934. But it is not represented in any Libyan collection

**4-*Rodalia cardinalis* (Mulsant, 1850)**: This species was reported from Libya (Tripoli) by John R. Leeper, 1976 and this species has also been reported in other areas of Libya: in Braga (E. Zavattari, 1934) as *Novius cardinalis* Crotch. Only one specimen represented in Omer AlMaktar collection.

**5-*Rodolia rufipennis* Pic.**, this species was recorded from Libya from Derna by Mader, V.L., 1955. But it is not represented in any Libyan collection.

**6-*Rhyzobius litura* (Fabricius, 1787)**: This species was recorded from Libya (Barga) by Zavattari, 1934.

**7-*Rhyzobius lophanthae* Blaisdell, 1892**, this species was recorded from Libya by Zavattari, 1934, in Barga Area.

**8-*Rhyzobius rufipennis* Pic.** This species was recorded from Libya by Mader, V.L., 1955. But it is not represented in any Libyan collection.

**9-*Rhyzobius chrysomeloides* (Herbst 1792):**This species was recorded from Libya in Braga area by Zavattari,1934,as Synonym *Rhyzobius subdepressus* Seidlitz 1872: 193.But it is not represented in any Libyan collection.

**10-*Tetrabrachys cordicollis* Guer,** this species was recorded from Libya (Tripoli) by Zavattari,1934.and Mader,V.L.1955 under synonom *Litophillus cordicollis*.But it is not in any Libyan collection.

**11-*Tetrabrachys Festai* Dod.,** this species was recorded from Libya (Barga) by Zavattari,1934.as *Litophillus feste* and from Derna byMader.V.L,11955. But it is not represented in any Libyan collection.

**12-*Chilomenes cuppiger* (Crotch,1874).** Only one specimens from Libya in Omer Almoktar collection

**13-*Chilomenes isis* Crotch,1874** Only one specimens from Libya in Omer Almoktar collection .

**14-*Scymnus (Pullus) subvillosus* Goeze, 1777:** Edoardo Zavattari,1934 described *Scymnus (Pullus) subvillosus* Goeze, 1777 from Libya in Barga area as *Pullus subvillosus Juniperi*.But is not in any Libyan collection

**15-*Scymnus (Pullus) syriacus* (Marsuel 1868):**This species was reported from Libya .

**16-*Scymnus (Pullus) belophallus* Capra:** This species was recorded from Libya (Braga) byZavattari,1934. and Mader.V.L.1955,but it not represented in any the Libyan collection

**17-*Scymnus (Pullus) dorsalis* Fisch:** This species was recorded from Libya (Braga) by Zavattari,1934. and Mader.V.L.1955,but it not represented in any the Libyan collection

**18-Scymnus (Pullus) pallidiventris Mls:** This species was recorded from Libya (Braga) by Zavattari,1934. and Mader.V.L.1955,but it not represented in the Libyan collection

**19-Scymnus (Pullus) nanus Mls:** This species was recorded from Libya (Braga) by Zavattari,1934. and Mader.V.L.1955,but it not represented in the Libyan collection

**20-Scymnus (Pullus) pubescens Panz.:** This species was recorded from Libya (Braga) by Zavattari,1934. and Mader.V.L.1955,but it is not represented in the Libyan collection

**21-Nephus (Nephus) ludyi (Weise, 1879),** this species was recorded from Libya ( Braga ) by Zavattari,1934. ,but it is not represented in the Libyan collection.

**22-Nephus (Nephus) tamaricis,** this species was reported from East Libya (Giabub Oasis) by Zavattari.1934,andMader.V.L.1955 but it is not represented in the Libyan collection.

**23-Nephus stramineus,** this species was reported from East Libya (Giabub Oasis) by Zavattari.1934, and Mader.V.L.1955 but it is not represented in the Libyan collection.

**24-Hyperaspis marmottani (Fairmaire 1868),** this species was reported from Libya (Barga,and Giarabub) by E.Zavattari.1934 ,and Mader.V.L.1955 but it not represented in the Libyan collection

**25-Hyperaspis vinciguerra (Capra, 1929),** this species was reported from Libya (Giarabub) by E.Zavattari.1934, ,and Mader.V.L.1955 but it not represented in the Libyan collection

**26-Pharoscygnus various Kirsch,**this species was reported from Libya (Barga) by E.Zavattari,1934

**27-*Henosepilachna elaterii* (Rossi,1794):** This species was recorded from Libya (Tripoli,Marada- Gialo, Fezzan,Uwenat-Ghat)by E.Zavattari,1934as *Epilachna chrysomelina* (Fabricius)**1775**1932as shown in the above synonymy,.But it is not represented in any Libyan collection.



## SUMMARY

Ladybugs beetles of family Coccinellidae are medium sized beetles which are mainly predator on scale insects. In present study, a survey was conducted to explore the Coccinellidae ladybird beetles from 2012-2016.

A total of 38 species in 10 tribes ,14 genera,and 7 subfamilies belonging to family Coccinellidae were recorded from the study area .

The species were, *Chilocorus bipustulatus* (L), *Exochomus nigripennis* Erichson,*Exochomus*(*Parexochomus*),*lugubrivesis*Mls,*Exochomus*(*Parexochomus*) *pubescens gestroi* Fairmair,*Rodolia cardinalis*(Mulsant),*Rodolia rufipennis* Pic, *Rhyzobiuslitura* (Fabricius) , *Rhyzobius lophanthae*(Blaisdell) ,*Rhyzobius rufipennis* Pic,*Rhyzobius chrysoloides* (Herbst),*Tetrabrachys cordicollis*Guer,*Tetrabrachys Festai* Dod,***Chilomenes cuppiger*** (Crotch),***Chilomenes isis*** Crotch,*Coccinellia septepunctata* Linnaeus,*Coccinellia undecipunctata* Linnaeus,*Coccinellia undecimpunctata aegytiaca*Reiche,*Coccinellia novemntata* Herbst,*Hippodamia convergens* Guerin-Menevile,*Hippodamia* (=Adonia) *variegata*(Goeze) ,*Hippodamia quinquesignata* (Kirby),***Hippodamia sinuata crotchi*** Casey,*Hippodamia tredecimpunctata* Linnaeus,*Scymnus* (*Pullus*) *subvillosus* Goeze,*Scymnus* (*Pullus*) *syriacus* (**Marsuel** ),*Scymnus* (*Pullus*) *belophallus* Capra,*Scymnus* (*Pullus*) *dorsalis* Fischl,*Scymnus* (*Pullus*) *pallidiventris* Mls,*Scymnus* (*Pullus*) *nanus* Mls,*Scymnus* (*Pullus*) *pubescens* Panz,*Nephus* (*Nephus*) *ludyi* (Weise),*Nephus* (*Nephus*) *tamaricis*. *a. stramineus* Capra,*Nephus stramineus* Capra,*Stethorus punctillum* Weise,*Hyperaspis marmottani* (Fairmaire ) ,*Hyperaspis vinciguerra* (Capra),*Pharoscymnus various* Kirsch,*Epilachna chrysolina* (Fabricius).

were newly recorded from Libya for the first time in the presnt study.

Members of the some genera were closely resembled to each other. They were separated on the basis of diagnostic characters of adult female and male genitalia.

External morphological of the adult *Coccinella septempunctata* Linnaeus was studied in detail.

Seasonal abundance of Coccinellids bugs was recorded in two different localities(A&B areas) belonging to Battah .Macphail traps,nets,and some bugs were also collected by hand picking were used. collected bugs were killed in ethyl acetate tubes,counted sorted into species and taken to laboratory for identification.

## الملخص العربي

### أ\_ الدراسة البيئية:

أول دراسة تعمل في ليبيا عامة وفي منطقة بطة والمناطق المجاورة لها خاصة ( الواقعة في شمال شرق ليبيا) علي حشرات خنافس أبي العيد ،ولقد بدأت2012-2016- وشملت انواع مختلفة من

البنات في منطقة الدراسة وتم مسح أماكن عديدة، و الانواع التي تم تجميعها خلال الدراسة:

أولاً: الدراسة البيئية في منطقة الشرقية وشملت 13 نوع وهي :

1-كيلوكورس بيبستيلس (*Chilocorus bipustulatus* (L)

2 –رودوليا كاردينالس (*Rodolia cardinalis*(Mulsant)

3- كيلومينس كابيتجي (*Chilomenes cuppiger* (Crotch)ü

4- كيلومينس ايزيز (*Chilomenes isis* Crotch

5-كوكسلينلا سيبتيينكتاتا *Coccinellia septempunctata* Linnaeus

6-كوكسلينلا ينديسبتيينكتاتا *Coccinellia undecimpunctata* Linnaeus

7-كوكسلينلا نوفيمنت (*Coccinellia novemntata* Herbst

8-هيبوداميا كونفيرجينس *Hippodamia convergens* Guerin-Menevile

9- هيبوداميا فارجاتا (*Hippodamia (Adonia) variegata*(Goeze)

10- هيبوداميا كوينقسيناتا (*Hippodamia quinquesignata* (Kirby)

11- هيبوداميا سنيواتا Casey (*Hippodamia sinuata crotchi*

12- هيبوداميا تريسيبيتيينكتات *Hippodamia tredecimpunctata* Linnaeus

13-أستثورس بنكتيتوم *Stethorus punctillum* Weise

ثانيا : الدراسة البيئية في منطقة بطة و ضواحيها و شملت 6 أنواع وهي:

1\_أبي العيد ذات 13 نقطة *Hippodamia convergens* Guerin-Menevile

2\_أبي العيد ذات 9 نقاط *Hippodamia sinuata* Crotchi

3\_أبي العيد ذات اتصال *Hippodamia quinquesignata* (Kirby)

4\_أبي العيد ذات النقاط 13 المتعرجة *Hippodamia variegata*(Goeze)

5\_أبي العيد ذات 7نقاط *Coccinella septempunctata* Linnaeus

6\_أبي العيد ذات 11نقطة *Coccinella undecimpunctata* Linnaeus

ثالثاً: دراسة بحثية أي تم التجميع من الدراسات السابقة للأصناف الموجودة في المنطقة الشرقية (منطقة بركة) وشملت علي 38 نوع.

ب\_الكثافة الموسمية:-

1- أجريت هذه الدراسة في منطقة بطة والمناطق المجاورة لها،ومن ثم تم اختيار موقعين من منطقته بطة للقيام بدراسة الكثافة العددية، الموقع الأول و مساحته 36 هكتار ، والموقع الثاني مساحته 20 هكتار، وتم تجميع العينات من شهر يوليو / 2013 إلي شهر يونيو/ 2014 .

2- تجميع العينات بواسطة اليد و بالشبكة هوائية وأنواع مختلفة من المصائد،وذلك باهتزاز أغصان الأشجار و الشجيرات، نقلت العينات بأنابيب صغيرة محكمة الإغلاق تحتوي علي كحول الأيثانول مخفف 70 % ، وأرقت كل عينة ببطاقة تعريف تحوي مكان الجمع و تاريخه و النبات الذي وجدت عليه.

3-تم فحص 374 عينة باستخدام مكبرة ثنائية العين وتم التعرف علي العينات .

التقسيم العملي :

شعبة مفصليات الأرجل Phylum arthropoda

تحت شعبة سداسية الأرجل Subphylum Hexapoda

طائفة الحشرات Class Insect

رتبة غمدية الأجنحة Order Coleoptera

فوق فصيلة كيسيزويدي Superfamily Cucujoidea

فصيلة كوسوليندي Family Coccinellidae

تحت فصيلة كوسنيليني Subfamily Coccinellinae

جنس هيبوديميا Genus Hippodamia

أبي العيد ذات 13 نقطة *Hippodamia convergens* Guerin-Meneville

أبي العيد ذات 9 نقاط *Hippodamia sinuata* Crotch

أبي العيد ذات اتصال *Hippodamia quinquesignata* (Kirby)

أبي العيد ذات النقاط 13 المتعرجة *Hippodamia variegata*(Goeze)

جنس كوسينلا Genus *Coccinella*

أبي العيد ذات 7 نقاط *Coccinella septempunctata* Linnaeus

أبي العيد ذات 11 نقطة *Coccinella undecimpunctata* Linnaeus

حيث كان عدد العينات التي جمعت من الموقع الأول 202 عينة تنتمي إلى 6 أنواع مختلفة تم تصنيفها على النحو التالي:

أسم العينة	عددها	نسبتها
<i>Coccinella septempunctata</i> Linnaeus	67	33.2 %
<i>Coccinella undecimpunctata</i> Linnaeus	41	20.3 %
<i>Hippodamia convergens</i> Guerin-Menevile	55	27.2 %
<i>Hippodamia sinuata</i> Crotchi	36	17.2 %
<i>Hippodamia quinquesignata</i> (Kirby)	2	1 %
<i>Hippodamia variegata</i> (Goeze)	1	0.5 %

و كان عدد العينات التي جمعت من الموقع الثاني 87 عينة تنتمي إلى 5 أنواع مختلفة تم تصنيفها على النحو التالي:

أسم العينة	عددها	نسبتها
<i>Coccinella septempunctata</i> Linnaeus	39	44.83 %
<i>Coccinella undecimpunctata</i> Linnaeus	7	8.05 %
<i>Hippodamia convergens</i> Guerin-Menevile	17	19.54 %
<i>Hippodamia sinuata</i> Crotchi	23	26.44 %
<i>Hippodamia quinquesignata</i> (Goeze)	1	1.14%

أما في المناطق المجاورة فكان عدد العينات 82 عينة, 81 عينة من أبي العيد 7 نقاط و واحدة من أبي العيد 13 نقطة.

أما من ناحية الجنس تم تصنيف العينات علي حسب الصفات الخارجية إلي 6 الأنواع من خنافس أبي العيد تنتمي إلي جنسين مختلفين:-

الجنس Genus	النوع Species
Genus Hippodamia	<i>Hippodamia convergens</i> Guerin-Menevile
	<i>Hippodamia sinuata</i> Crotch
	<i>Hippodamia quinquesignata</i> (Goeze)
	<i>Hippodamia variegata</i> (Goeze)
Genus Coccinella	<i>Coccinella septempunctata</i> Linnaeus
	<i>Coccinella undecimpunctata</i> Linnaeus

#### ت\_ الشكل الخارجي:

تم دراسة الشكل الخارجي للطور البالغ لحشرة أبي العيد ذات 7 نقاط تحت فصيلة كوسنيليني  $\gamma\alpha$  كوسنيلينا بالتفصيل لمعظم الخواص الأساسية الهامة لفصيلة كوسنيليني. هذه الدراسة تبين منها ايضاحات كثيرة ساهمت في تسهيل وتميز أنواع الحشرة البالغة.

ث-التصنيف:في هذه الدراسة تم وضع مفاتيح للفصائل وتحت الفصائل والقبائل والاجناس، وتحت أجناس، والأنواع لفصيلة كوسنيليني وإعادة الوصف والمرادفات والتوزيع الجغرافي والعوائل النباتية.

## LITERATURE CITED

- Abdallah, L. A. (1988):** Studies on predator and parasite insects attacking scale insects and mealybugs in Dakahlia Governorate. Ph. D. Thesis, Fac. Agric., Mansoura Univ.
- Abd-Rabou, S.; Ahmed, N. and Moustafa, M.( 2012):** Predators of scale insects (Hemiptera: Coccoidea) and their role in control in Egypt. Egypt. Acad. J. Biolog. Sci., 5(3): 203 -209 .
- Abdel Salam.A,H. and N,F. AbdelBaky. (2000):** Possible storage of *Coccinella undecimpunctata* (Col.,Coccinellidae) under low temperature and its effect on somebiological characteristics. J. Appl.Ent.124,169-176pp. Blackwell Wissenschafts-Verlag\ Berlin.
- Arshad Ali, Rizvi P.Q.( 2007):** Development and predatory performance of *Coccinella septempunctata* L. (Coleoptera: Coccinellidae) on different aphid species. Journal of Biological Sciences, 7(8):1478-1483.
- Ashfaque, Muhammad .(2012):**Taxonomic studies of family coccinellidae (coleoptera) of gilgit-baltistan, Pakistan. A dissertation submitted to the University of Agriculture, Pakistan.
- Belicek, J. (1976):** Coccinellidae of western Canada and Alaska with analysis of the transmontane zoogeographic relationships between the fauna of British Columbia and Alberta (Insecta:Coleoptera: Coccinellidae). Quaestiones Entomologicae 12: 283 – 409.
- Berthiaume, R. Hébert, C.and Cloutier, C. (2007):** Comparative use of *Mindarus abietinus* (Homoptera:Aphididae) by two coccinellids (Coleoptera: Coccinellidae), the native *Anatis mali* and the exotic *Harmonia axyridis*, in a Christmas tree plantation. *Environmental Entomology* 36: 319–328.

**Booth, R and Pope, R. D.(1989):** A review of the type material of Coccinellidae (Coleoptera) described by F.W. *Pope and by E. Mulsant in the Hope Entomological Collections, Oxford. Entomologica Scandinavica* 20: 343–370

**Brown, W. J. and R. de Ruelle.( 1962):** An annotated list of the Hippodamiini of Northern America with a key to the genera(Coleoptera: Coccinellidae). *Can. Entomol.* 94:643-652.

**Brown, M.W and Miller, S.S. (1998):** Coccinellidae (Coleoptera) in apple orchards of eastern West Virginia and the impact of invasion by *Harmonia axyridis*. *Entomological News* 109: 143–151

**Casey, T. L. (1899):** A revision of the American Coccinellidae. J.N.Y. *Entomol. Soc.* 7:71-169.

**Chapin, E. A. (1946):** Review of the New World species of *Hippodamia* Dejean (Coleoptera: Coccinellidae). *Smithson. Misc. Collect.*106: 1-39.

**Chapin, E. A.( 1965a):** The genera of the Chilacorini (Coleoptera, Coccinellidae). *Bull. Mus. Comp. Zool.* 133:227-271.

**Chapin, J. B. (1974):**The Coccinellidae of Louisiana(Coleoptera: Coccinellidae). Louisiana State University and Agricultural & Mechanical College,pp:88

**Dobzhansky, T.( 1931):** The North American beetles of the genus *Coccinella*. *Proc. U.S. Nat. Mus.* 80:1-32.

**Dobzhansky, T.( 1941):** Beetles of the genus *Hyperaspis* inhabiting the United States. *Smithson. Misc. Collect.* 101:1-94.

**Fleming ,R.C.(2000):**Lady beetles. *Entomological Notes* No.6. Published as a service of Michigan Entomological Society. 2000.



bioindication and economic importance. *Agriculture Ecosystems and Environment* 74: 323-342.

**Galecka, B. (1991):** Distribution and role of coccinellids in an agricultural landscape. In: Polgar L, Chambers RJ, Dixon AFG, Hodek I (Eds) *Behaviour and Impact of Aphidophaga*. The Hague : SPB Academic Publishing, 137–141.

**Gordon, R. D. (1970a):** A review of the genus *Microweisea* Cockerell with a description of a new genus and species of Coccinellidae from North America. *Proc. Entomol. Soc. Washington* 72:207-217.

**Gordon, R. D. (1970b):** A review of the genus *Delphastus* Casey (Coleoptera: Coccinellidae) . *Proc. Entomol. Soc. Washington* 72:356-369.

**Gorden, R.D. (1985 ):** The Coccinellidae (Coleoptera) of America north of Mexico. New York Entomological Society, 93:1-912 .

**Gurney, B and Hussey, N.W .(1970):** Evaluation of some coccinellid species for biological control of aphids in protected cropping. *Annals of Applied Biology* 65: 451–458.

**Hodek, I. (1973):** *Biology of Coccinellidae*. W. Junk, The Hague. 260 pp.

**Horn, G. H. (1895) :** Studies in Coccinellidae. *Trans. Amer. Entomol. Soc.* 22:81-114.

**Inayatullah, C. and E. M. Siddiqui. (1978):** Comparative studies on the anatomy of the abdomen of *Coccinella septumpunctata* and *Coccinella undecimpunctata* (Coleoptera: Coccinellidae). *Pak. J. Zool.*, 10: 261-271.

**Iperti, G. (1999):** Biodiversity of predaceous coccinellids in relation to bioindication and economic importance. *Agriculture, Ecosystem and Enviornment* 74: 323-342.

**Irshad, M. (2001):** Distribution, host, ecology and biotic potential of Coccinellids of Pakistan. *Pakistan Journal of Biological Sciences.*;4:1259–1263.

**IT IS. (2009) :**Integrated Taxonomic Information System. IT IS, USA

**Katakura, H. S., Nakano, S., Kahono, I. Abbas and K. Nakamura.( 2001):** Epilachnine ladybird beetles (Coleoptera: Coccinellidae) of Sumatra and Java. *Tropics*, 10 (3): 325-352.

**Khan, I. (2001):** Aspects of the biology of the ladybird beetle *Stethorus vagans* (Blackburn) (Coleoptera: Coccinellidae). Ph.D Thesis. University of Western Sydney; New South Wales, Australia.: p. 183.

**Kindlmann,P. (2012):** Differences in the predatory behavior of male and female ladybird beetles (Coccinellidae).*European Journal of Environmental Sciences*, Vol. 2, No. 1, pp. 51–55

**Kontodimas, D.C., Milonas, P.G., Stathas, G.J., Papanikolaou, N.E., Skourti, A and Matsinos, Y.G, (2007):** Life table parameters of the aphid predators Kontodimas, D.C., P.G. Milonas, G.J.Stathas, L.P. Economou and N.G.

**Korschevsky, R. (1931):** Pars. 120: Coccinellidae. II. In: Junk, W., Schenkling, S. (Eds.),*Coleopterorum Catalogus*. W. Junk, Berlin, pp. 225–659

**Kumar, V.( 2006):** Taxonomy and zoogeography of Indian Coccinellidae (Coleoptera) Sans Coccinellinae. Ph.D. Thesis, Punjabi University, Patiala, India.

**Leng, C. W. (1903a):** Notes on Coccinellidae. *J.N.Y. Entomol. Soc.* 11:35-45.

- Leng, C. W. (1903b):** Notes on Coccinellidae.--II. J.N.Y. Entomol. Soc. 11 :193-213.
- Leng, C. W.( 1908):** Notes on Coccinellidae.--III. J.N.Y. Entomol. Soc. 16:33-44.
- Leng, C. W.(1911):** The species of Brachyacantha of North and South America. Bull. Amer. Mus. Natur. Hist. 30:279-333.
- Mader,V.L.(1955):** Evidenz der palaearktischen Coccinelliden und ihrer Aberrationen in Wort und Bild. Entom. Arbeiten aus dem Museum Gg. Frey, Bd. Wien 6,1955.764- 1035,Plats XXVIII,, XXVIII
- McKenzie, H. L.( 1936) :**An anatomical and systematic study of the genus Anatis of America (Coleoptera--Coccinellidae). Univ. Calif. Publ. Entomol. 6:263-272.
- Mona.M, and S. Abd-Rabou .(2011):** Natural enemies of the latania scale, *Hemiberlesia lataniae* (Hemiptera:Diaspididae) in Egypt. Egypt. Acad. J. biolog. Sci., 4 (1):75 – 90. Egypt.
- Moreton, B.D.(1969):** Beneficial Insects and Mites. Vol. 20. Her Majesty, Stationary Office London. Ministry of Agriculture, Fisheries and Food. *Bulletin;. Ladybirds and spider mites.* pp. 15–20
- Moulay. C.S, A. Blenzar & H.Fursch.(2009):** First record of new species and phenotypes of ladybird (Coleoptera: Coccinellidae) in citrus orchards in Morocco. *Entomologie faunistique – Faunistic Entomology* 2010 (2009) 62 (3),103-107
- Muhammed.A,Farmanullah and Muhammad.A.(2013):** Genus Coccinella (Coccinellidae: COleoptera) from Gilgit-BaltistanFROM with two new recods from Pakistan. Sarhad J. Agric. Vol.29, No.2, 2013
- Mulsant, M.E. (1846):** Histoire Naturelle des Coleopteres de France. Sulcicolles-Securipalpes. Maison, Paris.

**Mulsant, M.E . (1850):** Species des Coleopteres Trimcres Securipalpes. Annales des Sciences Physiques et Naturelles, d'Agriculture et d'Industrie, publiees par la Societe nationale d'Agriculture, etc., de Lyon, Deuxieme Serie, 2.

**Mulsant, E.( 1866):** Monographie des Coccinellides. Ire partie Coccinelliens. Paris, France. 294pp.

**Obrycki, J.J and Kring, T.J. (1998):** Predaceous Coccinellidae in biological control. *Annual Review of Entomology* 43: 295–321.

Özden Ö, Uygun N, Kersting U, 2006. Ladybird beetles (Coleoptera: Coccinellidae) from northern Cyprus, including six new records. *Zoology in the middle east*,39:97-100.

**Poorani, J. ( 2005):** An annotated checklist of the Coccinellidae (Coleoptera) of the Indian Subregion.

**Rafi, A. M., M. Irshad and M. Inayatullah .(2005):**Predatory Lady bird beetles of Pakistan. Rohani Art Press, Blue Area, Islamabad, Pakistan. 105pp.

**Rahatullah, Main Sayed Khan and Mian Inayatullah.( 2014):** *Hyperaspis leechi* a new contribution to the coccinellid fauna of Pakistan. *Journal of Entomology and Zoology Studies* 2014; 2 (6): 333-335.Rahat Ullah<sup>1</sup>, Faizul Haq<sup>2\*</sup>, Habib Ahmad<sup>3</sup>, Mian Inayatullah<sup>4</sup>,

**Redtenbacher, L.( 1844):** Tetamen dispositionis generum et specierum Coleopterorum Pseudotrimeorum. Archiducatus Austriae, Vienna.

**Sasaji, H.( 1968):** Phylogeny of the family Coccinellidae (Coleoptera). *Etizenia*, 35: 1-37.

**Sasaji, H. (1968a):** Phylogeny of the family Coccinellidae (Coleoptera). *Etizenia* 35, 1–3

**Sasaji ,H. (1968b):** Descriptions of the Coccinellid larvae of Japan and

Ryukyus (Coleoptera). The Memoirs of the Faculty of Education, Fukui University, Series II. *Natural Science* 18, 93–136.

**Sasaji, H. (1971):** *Fauna Japonica Coccinellidae (Insecta: Coleoptera)*. Academic Press Japan, Tokyo, Japan.

**Šipoš, J . Kvastegård, E . Baffoe, K.W. Sharmin, K. Glinwood, R and**

**Sweetman, H.L. (1958):** The principles of biological control, Interrelations of populations. hosts and pests and utilization in regulation of animal and plant W. M. C. Brown Co. publishers, 246-251.

**Timberlake, P. H. (1943):** The Coccinellidae or ladybeetles of the Koebele collection--Part I. The Hawaiian Plant. Record 47:1-67.

**Vandenberg, N.J. (2002):** Family 93. Coccinellidae Latreille 1807, pp. 371-389. In: American Beetles, Volume 2. Polyphaga: Scarabaeoidea through Curculionoidea. (Eds. R.H. Arnett, Jr., M.C. Thomas, P.E. Skelley and J.H. Frank). CRC Press LLC, Boca Raton, FL. xiv + 861p

**Vandenberg, N.J. (2002):** Coccinellidae Latreille 1807. In: Arnett, R.H., Jr., Thomas, M.C., Skelley, P.E., Frank, J.H. (Eds.), American Beetles. CRC Press, Boca Raton, pp. 371-389.

**Wingo, C. W. (1952):** The Coccinellidae (Coleoptera) of the upper Mississippi basin. Iowa State Coll. J. Sci. 27:15-53

**Yinon, U. (1969):** Food consumption of the armored scale lady beetle, *Chilocorus bipustulatus* [ *Col. Coccinellidae* ]. - *Entomophaga*, 14, 321-328.

**Zavatari, E. (1934):** Prodrómo della fauna dell Libia Pavia. *Co\_operative*, VII, 123 P.

## Arabic Literature Cited

- 1- خريطة ليبيا الجيولوجية . (1974). لوحة البيضاء . مركز البحوث الصناعية . النسخة الأولى.
- 2- الزوام, سالم محمد.(1984). كتاب الجبل الأخ . دراسة فى الجغرافيا الطبيعية . المنشأة العامة للنشر و التوزيع و الاعلان . الطبعة الأولى .
- 3- النتائج النهائية للتعداد العام للسكان .(2006).

