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HYMENOPTEROUS AND DIPTEROUS POLLINATORS DIVERSITY ON VARIOUS FLOWERING PLANTS IN RIYADH, SAUDI ARABIA

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Abstract: Hymenopterous and Dipterous pollinators were surveyed at three different locations Al-Diriyah, Al-Uyaynah and Derab during 2001-2 in Riyadh, Saudi Arabia, on Alfalfa (*Medicago sativa* L.), Coriander (*Coriandrum sativum* L.), Mustured (*Brassica napus*), Rocket (*Eruca sativa)*, Radish (*Raphanus sativus*) and Broad beans (*Vicia faba*) flowering plants. On alfafa, 17, 14 and 14-Hymenopterus species were found in AL-Diriyah, AL-Uyaynah and Derab, respectively whereas, six dipterous species were found in each location. On coriander, 23, 20 and 16-Hymenopterus and 10, 6and 7-dipterous species were recorded in AL-Diriyah, AL-Uyaynah and Derab respectively. On mustard 22, 16 hymenopterus, whereas, 7 and 5-dipterous species were found in AL-Diriyah and Derab. On Rocket, 15-hymenopterus and 4-dipterous species in AL-Diriyah, whereas 14-hymenopterus and 7-dipterous species were recorded in AL-Uyaynah. On Radish, 17-hymenopterus and 5-dipterous species in AL-Diriyah, while 18-hymenopterus and 3-dipterous species were found in AL-Uyaynah. On Broad bean, 11-hymenopterus and 7-dipterous species were found Derab. In general, dominant hymenopterus pollinators were honeybees followed by bees genera such as: *Andrena, Hexachysis, Componotus, Halictus, Osmia, Pompilus* and *Dieles* and also wasps. More abundant dipterous genera were Agromyza, *Chrysoma, Drosophila* and *Syrphus* which found in the three locations. The species diversity of Hymenopterus pollinators was more in AL-Diriyah as compared with AL-Uyaynah and Derab, while about equal number of Dipterous species were found in both locations. Also majority of the Hymenopterus pollinators were recorded on Coriander, Mustard and Radish plants respectively whereas, more Dipterous pollinators were found on Coriander, Broad bean, Alfalfa and Mustard plants.

Key words: hymenopterous, dipterous, pollinators, flowering plants, Saudi Arabia.

Introduction

Insect pollinators and flowering plants have a special relationship in which each benefits the other. Insects pollinate many flowering plants enabling them to reproduce; in turn, flowering plants provide them pollen and nectars as source of food for their survival.

Plant pollination by insects is important for better production (Nogueira-Couto and Calmona,

1993). Globally the annual contribution of pollinators to agricultural crops has been estimated at about US$ 54billion (Kenmore and Krell, 1998). Mostly attention is focused on bees and vertebrate pollinators (Torchio, 1990, Osborne *et al.* 1991) whereas, other groups of insect pollinators also play considerable role but their contributions to plant reproductive success is underestimated because of their reputations as ineffective pollinators (Faegri and Vander Pijl, 1979).

In Saudi Arabia (Riyadh area) only alfalfa were studied with respect to their Hymenopterus and Dipterous pollinators(Alsuhaibani, 1996.)

Hymenoptera pollinators which comprises the majority of all insect pollinators, were studid by EL-Bery *et al* 1974; EL-Kifl *et al* 1974;Wafa *et al* 1974; EL-Hefny *et al* 1979a; Mohamed and EL-Hefny 1979; Hussein and AbdEL-Aal 1982; and Hussein *et al* 1991 in Egypt.

Dipterans are common flower visiting insects having about 71-families contain anthophilous species (Larson *et al.* 2001). The important pollinating flies belong to the families Bombyliidae, Syrphidae, Anthomyiidae,Tachinidae, Calliphoridae. Alsuhaibani, 1996 recorded eleven dipterous pollinators species belonging to 4-families on alfalfa.

The aim of the present study is to record the relative abundance of various Hymenopterous and Dipterous pollinators on 6-flowering plants at three different locations in Riyadh, Saudi Arabia.

Materials and Methods

The experiment was carried out during 2001 –2002 seasons at 3-different locations (Al-iriyah, Al-Uyaynah and Derab) in Riyadh, Saudi Arabia. The followring plant species and their flowering periods were tested for their insect pollinators throughout the course of study.

Types of plants and their flowering periods and locations were discribed in the following table:

Type of plant	Flowering Periods	Location		
		AL-Diriyah	AL-Uyanah	Dearb
Alfalfa (*Medicago sativa* L.)	Apr. - Jun.	+	+	+
Coriander(*Coriandrum sativum* L.)	Feb. - Mar.	+	+	+
Mustard (*Brassica napus*)	Feb. - Apr.	+	-	+
Rocket (*Eruco sativa* miller)	Apr . - May.	+	+	-
Radish (*Raphanus sativus* L.)	Apr . - May.	+	+	-
Broad bean (*Vicia faba*L.)	Jan. - Feb.	-	-	+

The insect pollinators were surveyed using extensive sweep net sampling each represent 100-sweeps at random, once a week from each of the 6-plants species during their respective flowering seasons. Hymenopterous and Dipterous insects specimens were preserved either dry or in 70% alcohol for identification. All specimens were classified to their respective orders and families. The identification upto species level was made in the insect's museum, College of Agriculture, King Saud University, Riyadh. Some of the unknown insect specimens were get identified from "The insect identification and classification research section, plant protection research institute, Agriculture Research Center, Dokki, Egypt". Some Hymenopterous insects were also recorded through visual observation. The above mentioned crops were maintained with normal agricultural practices without using any pesticide. The relative percentage for the species of Hymenoptera and Diptera collected during entire study period was calculated using formula species Facylate, 1971.

$$A = t/T * 100$$

Where t = Total member of each species collected during sampling

T = Total number of all species collected during sampling.

Results and Discussion

Hymenoptrus pollinators recorded during the survey are presented in tables (1,2 and 3) whereas, Dipterous in tables (4,5 and 6). In AL-Diriyah 5-plant species, Alfalfa (*M. sativa* L.), Coriander (*C. sativum* L.), Mustured (*B. napus*), Rocket *(E. sativa*), and Radish (*R. sativus*) were present, in AL-Uyanah 4-plant species Alfalfa, Coriander, Rocket and Radish and in Derab also 4-plant species Alfalfa, Coriander, Mustured and Broad beans were present to record relative abundance of Hymenoptrus and Dipterous pollinators Data presented in table (7) summarized quantitatively families, genera and species . Data in table (8) shows the percentage of species from the total species collected in the 3-locations of study.

1- Alfalfa (*M. sativa* L.)

The number of families and genera of hymenoptera recorded at 3-location (Al-Diriyah, Al-Uyaynah and Derab) were 8, 8 and 9; 17, 14 and 14, respectively (Tab. 7). The most dominant hymenopterus pollinators in three location were *Anderan , Apis , Eumenuis, Halictus, Dieles* and *Scolia.* The results indicated that more genera were recorded from alfalfa in AL-Diriyah. Comparing these results with records of Wafa *et al* . 1974 about the main pollinators from EL-Giza in Egypt region indicates that there is a regional difference

between these two studies. The main pollinatars in their worke were *Apis, Megacbile, Pseudomegacbil, Nomioides, Nomia, Ceratina* and *Andrena*

Alfalfa harbors Dipterous pollinators 6,6 and 6 genera belonging to 6, 6 and 5 families in AL-Diriyah , AL- Uyanah and Derab, respectively . *Agromyza sajae* and *Musca domestica* were the most Dipterous pollinators on alfalfa in different location (Tables 4,5 and 6). Alsuhaibani, 1996 recorded fifteen Hymenopterus pollinators species belonging to 9-families and eleven Dipterous pollinators species belonging to 4-families on alfalfa during two years at Derab - Riyadh.

2- Coriander (*C. sativum* L.)

This plant species harbored more Hymenopterus and Dipterous pollinators than the other plants. Twenty-three genera of Hymenoptera were recorded in AL-Diriyah belonging to 11 families. In AL- Uyanah twenty genera belonging to 10 families, Derab sixteen genera belonging to 7 families (Tab. 1,2 and 3). The families Andrenidae , Apidae, Halictidae, Scolidae and Vespidae were among the most ubiquitous found on the plant in each location of study. On other hand it is possible to say that most important Hymenopterus pollinators species found in different locations were *Andrena, Apis , Halictus , Diles* and *Polistes*.

Many representatives of dipterous pollinators were also recorded. The plant harbored 10, 6 and 7 genera belong to 7, 5 and 6 families in AL-Diriyah , AL-Uyanah and Derab respectively. The most abundant dipterous pollinators recorded from three locations (Tab. 4, 5 and 6) were *Agromcyza, Chrysoya, Drosophila , Musca* and *Syrphus*. EL-Berry *et al.* 1974 noticed that *Syrphus corollae* was most domonant fly and *Andrena* was most abundant wild bees on umbelliferous flowering plants. Rashad 1976 and 1978 and EL-Hefny *et al.* 1979 reported that *Andrena* is one of the most dominant wild bees on coriander in Egypt. Darwish *et al.* 1991 reported that highly dominant hymenopterus pollinator was honeybee followed by 7 wild bees genera and also wasps. The dipterous genera, *Eristalis, Lucilia* and *Syrphus* were recorded by on coriander by Yousif-Khalil *et al.* (1986).

3- Mustard (*B.napus*)

Mustard is an excellent source of nector and pollen (Mc-Gregor 1976). The plants were cultivated in Al- Diriyah and Derab. It harbored 22 and 16 genera belonging to 12 and 8 families of Hymenopterus pollinators (Tab. 1, 3). The most common Hymenopterus pollinators families were identified as *Anderenidae, Apidae, Formicidae, Halictidae, Scolidae and Vespidae.* Mohamed and El-Hefny 1979

reported that Halictid bees were collected from clover, wild mustard and cabbage. Ali 1988 found that Apidae , Halictidae , Andrenidae and Formicidae collected from mustard in Assiut and New valley. Several Dipterous pollinators genera and families recorded in AL-Diriyah and Derab were 7,5; 5,4 respectively (Tab. 4 ,6). *Chrysoma, Musca, Parasarophga* and *Syrphus* were found most abundant pollinators on mustard .

4-Rocket (*Eruca sativa* Miller)

This plant was presented in AL-Diriyah and AL- Uyanah. The number of recorded genera and families in AL- Diriyah and AL-uyanah were 15, 14 and 10,9 for Hymenopterus pollinators and 4 ,4 and 4 ,7 for Dipterous pollinators respectively. In AL- Diriyah most collected genera and families were same as from AL- Uyanah . It can be concluded that the more dominant Hymenopterus pollinators were honeybees followed by 10-wild bees genera, while *Agromyza sajae* and *Syrphus corolla* were most abundant Dipterous pollinators on Rocket. EL-Berry *et al* 1974 recorded same genera on some vegetable plants in Egypt.

5- Radish (*Raphanus sativus*)

The radish is almost entirely insect – pollinated crop. Eleven families of Hymenoptera were recorded from AL- Diriyah , comprising 17 genera and nine familes from AL- uyanah comprising 18 genera. The most collected genera were *Anderena, Apis, Halictus, Osmia, Pompilus* and *Liris* from AL- Diriyah and AL-uyanah (Tab. 1- 2).In dipterous pollinators five family including 5-genera were recorded from AL-Diriyah whereas, Two families including 2-genera from AL-Uyanah. *Syrphus corolla* and *Musca domestica* were found most abundant Dipterous on radish in both location. Radchenko, 1966 reported that honeybees and wild bees were the main pollinators on radish flowers. Adam, 1980 stated that different insect group collected from radish, honeybee remained 75.45% during spring whereas, flies, wild bees and wasps remained 7.086, 5.07, 1.8, respectively.

6-Broad Beans (*V. faba* L.)

This crop was only cultivated in Derab . It harbored 11-genera belonging to 8-families of Hymenopterus pollinators. Also seven genera of dipterous pollinators belonging to 5-families. The more abundant hymenopterus was honeybees followed by *Anderena, Halictus, Emicosbius* and *Liris* (Tab. 3 - 6). Palmer, 1967 indicated that bees are beneficial to beans, the bumblebee is the best pollinator. Willam 2004 stated that the flowers of faba bean produce copious pollen and nectar. They are particularly visited by both long and short–tongued bumblebees, honeybees and solitary bees.

Table (1): Survey of Hymenopterous pollinators collected from flowering clover, coriander, mustard, rocket and radish in AL-Diriyah during 2001 and 2002.

Location			AL- Diriyah				
Crops			Alfalfa	Coriander	Mustard	Rocket	Radish
No.	Family	Genus					
1	Andrenidae	*Andrena aegypticola*	—	*	—	—	*
2		*Andrena arsione*	—	**	*	*	*
3		*Andrena flavipes*	*	*	—	—	—
4		*Andrena fuscosa*	—	*	—	*	*
5		*Andrena longibarbis*	*	—	*	—	*
6		*Andrena mariana*	—	**	—	*	—
7		*Andrena savigngii*	*	—	*	—	—
8		*Andrena sp.*	**	**	**	*	—
9	Anthophoridae	*Ceratina tarsata*	*	*	—	*	—
10	Apidae	*Apis mellifra*	**	***	**	**	*
11		*Apis florae*	*	**	**	—	*
12	Chysididae	*Hexachysis luncea*	—	**	—	—	—
13		*Stilbum splemdidum*	—	—	—	—	*
14	Euminidae	*Eumenuis maxylosa*	*	**	*	*	—
15		*Odynerus niloticus*	—	—	—	*	—
16	Formicidae	*Componotus maculatus*	—	*	**	—	*
17		*Componotus sericeus*	—	*	**	*	—
18		*Cataglyphis biocolor*	—	**	*	—	—
19	Halictidae	*Halictus senilis*	**	*	*	*	*
20		*Lasioglossum gibber* vech	*	*	*	—	—
21	Ichneumonidae	*Emicosbilus berlatus*	—	—	*	—	—
22	Megacliidae	*Osmia submacida*	*	—	**	**	*
23	Pompalidae	*Pompilus melao*	—	—	—	—	*
24		*Syphonoxyx flavicoinis*	—	—	*	—	—
25	Scolidae	*Dieles collaris fab*	*	*	—	—	—
26		*Dieles hyalina Klug*	*	**	*	*	—
27		*Dieles sp.*	*	*	*	*	*
28		*Scolia mauca F.*	*	**	**	—	—
29	Sphecidae	*Liris haemorrhoydalis*	—	—	*	*	*
30		*Philansus abdelkader*	—	*	*	*	—
31		*Stizus biznatus Spig*	—	*	—	—	—
32	Vespidae	*Polistes wattir comeron*	*	*	*	*	*
33	Xylocepidae	*Xylocopa aestuanus*	—	*	*	—	*

*** =highly abundant ** =moderately abundant * = abundant and — = absent

Table (2): Survey of Hymenopterous pollinators collected from flowering clover, coriander, rocket and radish in AL-Uyaynah during 2001 and 2002.

NO.	Location	AL-Uyaynah				
	Crops		Alfalfa	Coriander	Rocket	Radish
	Family	Genus				
1	Andrenidae	*Andrena aegypticola*	*	**	—	*
2		*Andrena arsione*	—	*	*	**
3		*Andrena flavipes*	**	*	*	*
4		*Andrena longibarbis*	*	*	—	*
5		*Andrena mariana*	—	**	—	*
6		*Andrena sp.*	*	**	**	*
7	Apidae	*Apis mellifra*	**	***	*	*
8		*Apis florae*	—	**	**	*
9	Chysididae	*Hexachysis luncea*	—	—	—	*
10		*Stilbum splemdidum*	—	*	*	*
11	Euminidae	*Eumenuis maxylosa*	*	*	*	—
12	Formicidae	*Componotus maculatus*	—	**	*	*
13		*Componotus sericeus*	—	—	*	—
14		*Cataglyphis biocolor*	—	*	—	—
15	Halictidae	*Halictus senilis*	**	*	*	*
16		*Lasioglossum gibber* vech	*	—	*	—
17	Ichneumonidae	*Emicosbilus berlatus*	—	*	—	—
18	Megacliidae	*Osmia submacida*	*	*	*	—
19	Pompalidae	*Syphonoxyx flavicoinis*	*	—	—	*
20	Scolidae	*Dieles collaris fab*	**	*	—	*
21		*Dieles hyalina Klug*	—	*	—	*
22		*Dieles sp.*	*	**	—	*
23		*Scolia mauca F.*	*	—	—	*
24	Sphecidae	*Liris haemorrhoydalis*	—	*	—	*
25		*Philansus abdelkader*	*	—	*	—
	Vespidae	*Polistes wattir comeron*	—	*	*	—

Table (3): Survey of hymenopterous pollinators collected from flowering clover, coriander, mustard and broad bean in Dierab during 2001 and 2002.

NO	Location	Derab				
	Crops		Alfalfa	Coriander	Mustard	Broad bean
	Family	Genus				
1	Andrenidae	*Andrena aegypticola*	—	—	—	*
2		*Andrena arsione*	*	**	*	—
3		*Andrena flavipes*	*	*	*	—
4		*Andrena fuscosa*	*	**	—	—
5		*Andrena mariana*	*	—	—	*
6		*Andrena savigngii*	—	*	*	—
7		*Andrena sp.*	*	**	***	—
8	Apidae	*Apis mellifra*	**	***	***	**
9		*Apis florae*	—	**	**	*
10	Chysididae	*Hexachysis luncea*	—	—	—	*
11		*Stilbum splemdidum*	—	—	*	*
12	Euminidae	*Eumenuis maxylosa*	*	—	—	*
13	Formicidae	*Componotus maculates*	—	**	*	—
14		*Componotus sericeus*	—	*	*	—
15		*Cataglyphis biocolor*	*	*	*	—
16	Halictidae	*Halictus senilis*	**	**	**	*
17		*Lasioglossum gibber* vech	—	—	—	—
18	Ichneumonidae	*Emicosbilus berlatus*	*	—	—	*
19	Pompalidae	*Pompilus melao*	*	—	—	*
20	Scolidae	*Dieles hyalina Klug*	—	**	—	—
21		*Dieles sp.*	*	*	*	—
22		*Scolia mauca F.*	*	***	*	—
23	Sphecidae	*Liris haemorrhoydalis*	—	—	—	*
24		*Philansus abdelkader*	—	—	*	—
25		*Stizus biznatus Spig*	*	**	*	—
26	Vespidae	*Polistes wattir comeron*	—	*	*	—

Table (4): Survey of dipterous pollinators collected from flowering clover, coriander, mustard, rocket and radish in AL-Diriyah during 2001 and 2002.

Location			AL- Diriyah				
Crops			Alfalfa	Coriander	Mustard	Rocket	Radish
NO	Family	Genus					
1	Agromyzidae	*Agromyza sajae* Zehnt	***	*	——	*	——
2	Asilidae	*Amphispeletus sp.*	*	——	——	——	*
3	Anthomyiidae	*Atherigina sp.*	——	*	*	*	——
4	Calliphoridae	*Chrysomya albiceps* wied	*	*	*	——	*
5		*Chrysomya regalis* f.	——	*	*	——	——
6	Drosophilidae	*Drosophila melanogater*	**	*	——	——	——
7	Muscidae	*Musca domestica* L.	*	**	**	*	*
8		*Gymnodia tonitruui* wied	——	*	——	——	——
9	Otiidae	*Physiphora alceae* preyler	——	——	——	——	*
10	Sarcophagidae	*Parasarophaga sp.*	——	*	*	——	——
12	Syrphidae	*Syrphus corolla* f.	*	**	*	*	*
13		*Sphaerophoria sp.*	——	*	*	——	——

*** =highly abundant ** =moderately abundant

* = abundant and —— = absent

Table (5): Survey of dipterous pollinators collected from flowering clover, coriander, rocket and radish in AL-Uyaynah during 2001 and 2002.

Location			AL-Uyaynah			
Crops			Alfalfa	Coriander	Rocket	Radish
NO	Family	*Genus*				
1	Agromyzidae	*Agromyza sajae* Zehnt	***	*	*	—
2	Asilidae	*Amphispeletus sp.*	*	—	—	—
3	Calliphoridae	*Chrysomya albiceps* wied	*	*	—	—
4	Drosophilidae	*Drosophila melanogater*	—	*	*	*
5	Muscidae	*Musca domestica* L.	**	*	*	*
6		*Gymnodia tonitruui* wied	—	—	—	—
7	Sarcophagidae	*Parasarophaga sp.*	*	—	—	—
8	Syrphidae	*Syrphus corolla* f.	**	*	**	*
9		*Sphaerophoria sp.*	—	*	*	—

Table (6): Survey of dipterous pollinators collected from flowering clover, coriander, mustard and broad bean in Dierab during 2001 and 2002.

Location			Derab			
Crops			Alfalfa	Coriander	Mustard	Broad bean
NO	Family	Genus				
1	Agromyzidae	*Agromyza sajae* Zehnt	**	*	——	*
2	Calliphoridae	*Chrysomya albiceps* wied	—	*	——	*
3		*Chrysomya regalis* f.	——	——	*	*
4	Drosophilidae	*Drosophila melanogater*Mg	*	*	——	**
5	Muscidae	*Musca domestica* L.	*	*	*	*
6	Sarcophagidae	*Parasarophaga sp.*	*	*	*	——
7	Syrphidae	*Syrphus corolla* f.	*	*	*	*
8		*Sphaerophoria sp.*	*	*	*	*

Table (7): Number of families and genera of Hymenopterous pollinators recovered from several flowering plants in 3 location in Riaydh area 2001 and 2002

Hymenoptera		CROP					
NO.	Location	Alfalfa	Coriander	Mustard	Rocket	Radish	Broad bean
Family	AL-Diriyah	8	11	12	10	11	—
	AL-Uyanah	8	10	—	9	9	—
	Derab	9	7	8	—	—	8
Genus	AL-Diriyah	17	23	22	15	17	—
	AL-Uyanah	14	20	—	14	18	—
	Derab	14	16	16	—	—	11

Table (7): Number of families and genera of dipterous pollinators recovered from several flowering plants in 3 location in Riaydh area 2001 and 2002

Dipterae		CROP					
NO.	Location	Alfalfa	Coriander	Mustard	Rockt	Radish	Broad bean
Family	AL-Diriyah	6	7	5	4	5	—
	AL-Uyanah	6	5	—	4	3	—
	Derab	5	6	4	—	—	5
Genus	AL-Diriyah	6	10	7	4	5	—
	AL-Uyanah	6	6	—	7	3	—
	Derab	6	7	5	—	—	7

Table (8) : Percentage of certain species of Hymenopterous and Dipterous pollinatorsCollected from different flowering plants of the total species and differents location during 2001 and 2002 seasons.

Location	% Hymenoptera						Total species
	Alfalfa	Coriander	Mustard	Rocket	Radish	Broad bean	
AL-Diriyah	51.5	69.7	66.7	45.5	51.5	–	33.00
AL- Uyanah	42.4	60.6	–	42.4	54.5	–	
Dearb	42.4	48.5	48.5	–	–	33.3	
Mean	45.4	59.6	57.6	43.9	53.02	33.3	

Location	% Diptera						Total species
	Alfalfa	Coriander	Mustard	Rocket	Radish	Broad bean	
AL-Diriyah	46.2	67.9	53.8	30.8	38.5	–	13.00
AL- Uyanah	46.2	46.2	–	53.8	23.07	–	
Dearb	46.2	53. 8	38.5	–	–	53.8	
Mean	46.2	55.9	46.2	42.3	30.8	53.8	

Finally, it can be concluded from this work in AL-diriyah ,AL-Uyanah and Derab that 6 plant species. The highly dominant Hymenopterus pollinators was honeybee followed by 10 wild bees genera . The species diversity of Hymenoptera was more in AL-Diriyah as compared with AL-Uyanah and Derab, while about equal number of Hymenopterus species were found in AL- Uyanah and Derab. The results indicated that the pollinator fauna of the same plants was proportionally much higher in AL-Diriyah due to ecosystem diversity of the three locations. The pollinator fauna in the AL- Uyanah and Derab was found less established than that of AL-Diriyah due to cultivation of the land in the later area for a long time.

Coriander, Mustard and Radish plants were found more attracted to Hymenopterus species. Their mean percentages were 59.6, 57.6 and 53.2%, respectively from the total pollinators at three locations (Tab. 8). This is considerable most likely because the insect visits the flowers on the plants to collected nectar and pollen. On other hand Coriander, Broad bean, Alfalfa, Mustard Rocket and Radish, the mean percentage of the total Dipterous pollinators collected from different locations remained 55.9, 53.8, 46.2, 42.3 and 30.8%, respectively (Tab. 8).

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تنـــوع الملقـحات الحشرية من رتبتى غشائية الأجنحة وذات الجناحين على بعض النباتات المزهـــــرة في الرياض ــ المملكة العربية السعودية

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أجـرى هـذا البحـث فـي مدينة الرياض في ثلاث مناطق مختلفه (الدرعية ، العيينه و د يـــــراب) خـلال موسمى ٢٠٠١ و٢٠٠٢ بهدف حصر أنواع ألملقحات الحشرية من رتبتى غشـائية الأجنحة وذات الجناحين ووقت الإزهار على ستة أنواع نباتية هى :البرسيم ، الكزبرة ، الخردل ، الجرجير ، الفجل و الفول.

وتلخصت النتائج في الآتي :--

علـى نـبات البرسيم في الدرعيية ،العيينه وديراب تم حصر ١٧، ١٤، ١٤نوعاً من حشرات غشـائية الأجنحة و ٦أنواع من الذباب فى كل منطقة من مناطق الدراسه الثلاث على التوالي . على نبات الكزبرة المزهره تم حصر ٢٣، ٢٠و١٦نوع من غشائية الأجنحة و١٠،٦ و٧ أنواع من رتبة ذات الجناحين . على نبات الخردل في منطقتى الدرعية وديراب تم حصر ٢٢ و ١٦ نوع من ملقحات غشائية الأجنحة ، ٧ و ٥ أنواع من ملقحات ذات الجناحين .

علـى نباتات الجرجير و الفجل المزهره بمنطقتى الدرعية والعيينة بلغت الأنواع المتحصل علـيها من غشائية الجناح ١٥، ١٧ و١٤،١٨ بينما بلغت أعداد الأنواع المتحصل عليها من رتبة ذات الجناحين ٤، ٥ و٧، ٣ نوعاً وعلى نباتات الفول في منطقة ديراب وجد ١١نوع من ملقحات غشائية الجناح و٧ أنواع من الذباب .

يمكن القول بصفه عامة أن نحل العسل يعتبر من أكثر أنواع الملقحات الحشرية التابعة لرتبة غشـائية الأجنحة تواجداً على النباتات موضع الدراسة متبوعاً بـ ١٠ أنواع من النحل البري ثم الزنابـير . كذلـك كانت أنواع *Agromyza,Chrysoma, Drosophila, Syrphis* من أكثر أنواع الملقحات الحشرية التابعة لرتبة ذات الجناحين تواجداً على النباتات موضع الدراسة .

ويسـتخلص مـن الدراسة أن منطقة الدرعية كانت أكثر المناطق تنوعاً في حشرات غشائية الأجنحة وتتساوى كل من ديراب والعيينة في أعدادها من الأنواع الحشرية .

وعلى الجانب الآخر فإن الكزبرة والخردل والفجل كانت من أكثر النباتات تنويعاً في الملقحات الـتابعة لرتبة غشائية الأجنحة بينما كانت نباتات الكزبرة والفول من أكثر النباتات تجميعاً لأنواع رتبة ذات الجناحين.