ABUNDANCE AND ACTIVITY OF *COLLETES* BEES ON VISNAGA FLOWERS IN EGYPT.

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Abstract

The abundance and activity of *Colletes* bees were studied in 1989 during the blooming period in Giza and Qalubiya Governorates.

Four species of *Colletes* bees were found visiting and pollinating flowers of visnaga in both localities.

Colletes nanus was the most abundant and active species in the two localities constituting 56.8% and 56.6% of the total catch at Giza and Qalubya, respectively. Three peaks of abundance were observed in Giza locality and two peaks wre found in Qalubiya locality. *Colletes lacunatus* ca. m.e next in abundance, constituting 22.9% of the total catch with two peaks of activity in Giza and 28.8 % with three peaks in Qalubiya. Other species were less abundant and less active.

Individuals of *C. nanus* were found on the flowers from 9 a.m. until 5 p.m in the investigated areas, reaching their maximum activity around 1 p.m. The other species were most active between 11a.m and 1 p.m and their activity ended around 3p. m. in both areas.

INTRODUCTION

Extensive data had been published on the abundance and activity of different genera and species of wild bees pollinating economic plants in different areas in Egypt by Wafa and Ibrahim (1959), Mazzeed (1968), Selim *et al.*, (1970), El Berry *et al,* (1974), Abd El - Sala. m. *et al.*, (1979), El Hefny *et al.*, (1979) and Moustafa *et al.*, (1979).

The genus *Colletes* has an external apparatus for pollen collecting and it use it in pollinating econmic crops.

The present work deals with the population fluctuation, relative abundance and avtivity of *Colletes* bees (Colletidae, Hymenoptera) on visnaga flowers (important medicinal plant) in two localities in Egypt. It is hoped that this work will contribute to the ecological knowledge of this interesting group of wild bees.

MATERIALS AND METHODS

Studies on abundance and avtivity of *Colletes* bees on visnaga flowers were carried out at two localities in Egypt , in the farm of the Faculty of Pharmacology, Cairo University (Giza Province) and in the farm of Medicinal and Orna. m.ental Plants at Kanater, Qalubiya Province.

The flowering period extended from the second week of March until the third week of May in the Year 1989 . The sa. m.pling area in the two localities were one quarter of feddan.

Five sa. m.ple collections per day were taken once every week at two hour - intervals from 9 a. m. till 5 p. m. during the whole blooming period. Each sa. m.ple was presented by 100 rondom strockes by a standard sweeping net throughout the sa. m.pling area . The collected bees were sorted out into species , counted and re-corded together with calculations of the mean temperature and relative humidity.

RESULTS AND DSCUSSION

Data of seasonal abundance and daily activity of *Colletes* bees on Visnaga flowers at Giza and Qalubiya Governorates in 1989 are presented in Tables 1-4.

Giza Locality

The *Colletes* species found visiting visnaga flowers were: *Colletes nanus* Fr., *C. lacunatus* Daurs, *C. cariniger* perez and *C. perezi* Morice. The total number of collected bees during the whole blooming period was 892 bees. The dominant and most abundant species was *C. nanus* (505 bees) , representing 56.8 % of the total catch, followed by *C. laccunatus* (197 bees , 22.9 %), *C. cariniger* ca. m.e third (107 bees, 11.9 %) while *C. perezi* was the least abundant (83 bees, 8.4%) (Table 1).

Individuals of *Colletes nanus* appeared on the flowers with relatively high numbers (63 bees) at the beginning of the blooming period when the mean daily temperature and relative humidity were about 25°C and 38% R.H. The number of visiting bees gradually decreased during the next three weeks , then reincreased reaching a maximum of 91 bees during the fifth week of blooming at 24.5°C and 36% R.H. A slight and gradual decrease occurred onwards till the last week of blooming . It was also noticed that bees of this species were found during the whole period of

Table 1. Seasonal abundance of *Colletes* bees as indicated by weekly catches during the blooming period in Giza Governorate (1989).

Date of collection	No. of bees / Species				Total	Mean temp °C	Mean R.H. %
	C.nanus	*C.lacunatus*	*C. cariniger*	*C. perezi*			
10.3.89	63	16	0	0	79	25	38
17.3	64	18	0	0	64	25.5	36
24.3	39	25	10	0	74	24	38
31.3	34	18	16	0	68	25	36
7.4	91	13	17	16	137	24.5	36
14.4	69	20	27	9	125	26	49
21.4	43	26	10	13	92	23	60
28.4	28	30	18	22	98	25	50
5.5	33	18	9	15	75	27	48
12.5	37	13	0	8	58	30	40
19.5	22	0	0	0	22	29	45
Total	505	197	107	83	892		
Percentage	65.8	22.9	11.	8.4			

blooming with three peaks of abundance (Table 1) .

Individuals of *Colletes lacunatus* also appeared at the first week of blooming but in small numbers and continued until the tenth week . The maximum number was collected during the eighth week (30 bees) when the temperature was 25^{o}C and relative humidity 50%. Two peaks of abundance were noticed during the third and eighth weeks (25 and 30 bees , respectively) .

Colletes cariniger bees appeared on the flowers during the third week and disappeared during the last two weeks . They were found in Small numbers with two peaks of abundance during the sixth and eigth weeks of blooming (27 and 18 bees , respectively).

C. perezi was the least abundant species and appeared during the fifth week with small numbers. The highest numbers were obtained during the fifth and eight weeks of blooming (16 and 22 bees, respectively) . Bees of this species disappeared near the end of blooming (Table 1).

As Shown in Table 2 the activity of all *Colletes* species started at 9 a.m when temperature and relative humidity were 22 ^{o}C and 55% except for *C . perezi* which started its activity around 11a. m. Bees of *Colletes nanus* were found active from 9 a.m. until 5 p.m., whereas *C. lacunatus* bees were active till around 3 p. m.. Both *C. cariniger* and *C . perezi* beca. m.e inactive after 1 p.m. Most species attained their maximum daily activity around 1 p.m. when temperature and relative humidity were 29 ^{o}C and 40%. *C. caringiger* attained its maximum activity around 11 a.m. at 24^{o}C and 39 % R.H. The frequencey percent of bees was high around 1 p.m. (44%) and 11 a.m. (31.7) % , and the minimum frequency percent (2.4 %) was around 5 p.m. (Table 2).

Table 2. Daily activity and relative abundance of *colletes* bees on flowers during blooming at Giza Gocernorate (1989).

Collection Period	Mean No. of bees / species / day				Total	frequency %	Mean temp. C	Mean R.H. %
	C.nanus	*C.lacunatus*	*C.cariniger*	*C.perezi*				
9 a. m.	7	2	2	0	11	13.4	22	55
11 a. m.	13	5	5	3	26	31.7	24	39
1 p. m.	20	8	3	5	36	44.0	29	40
3 p. m.	4	3	0	0	7	8.5	28	45
5 p. m.	2	0	0	0	2	2.4	26	50
Total	46	18	10	8	82			

II - Qalubiya locality

Four species that belong to genus *Colletes* were found visiting visnaga plants during its blooming period . These were : *Colletes nanus* Fr., *C. lacunatus* Daurs , *C. cariniger* perez and *C. pumilus* Morice. The total number of bees reached 10001 (Table 3) and *Colletes nanus* appeared to be the most abundant (567 bees constituting 56.6 % of the total catch). This species was followed by *C. lacunatus* (289 bees representing 28.8 %). *C. cariniger* and *C. pumilus* were less abundant representing 9.2% and 5.4 % of the total catch , respectively (Table 3).

C. nanus and *C. lacunatus* started their avtivity with the beginning of blooming and *remained* active *until* the end of the flowering period. *C. pumilus* appeared early in low numbers on the flowers and the period of its avtivity lasted only five weeks showing a peak of 16 individuals during the third week of bloomimng . *C. carininger* was found in relatively small numbers during its avtivity period that started on the fourth week , showing a peak of 27 individuals a week later . It disappeared during the eigth week and the last week of blooming last week (Table 3).

Two peaks of abundance were reported for *C. nanus* on the third and seventh weeks of blooming as represented by 86 and 80 bees , respectively . The temperature ranged getween 20-25 ^{o}C and relative humidity ranged between 36 - 55%. *C. Lacunatus* showed three peaks of abundance throughout the fourth , sixth and nineth weeks of blooming as represented by 28, 45 and 38 indivduals , respectively at 26 - 26. 5 ^{o}C and 35 -50 % R.H. The last two species were found in relatively high numbers all over the blooming period (Table 3).

It is cleat in Table 4 that all species started their daily activity around 9a.m. at 20 ^{o}C and 55% R. H. *C. pumilus* however, started its activity around 11 a. m. at 23^{o}C and 36% R.H. Also all species attained their maximum daily activity around 1 p. m. when the temperature reached 27^{o}C and relative humidity 35% *C. pumilus* was most active around 11 p.m., *C . nanus* from about 9 a.m. until 5 p.m. while, *C. lacunatus* and C. *cariniger* from the morning till around 3 p.m. *C. pumilus* individuals ended their activity after 1 p.m.

The percent frequency of *Colletes* bees could be arranged descendigly as follows : 42.8 , 30.8, 11.0 , 13.1 and 2.3 % at 1 p.m. , 11 a.m., 9 a.m. , 3 p.m. and 5 p.m. , respectively.

Table 3. Seasonal abundance of *Colletes* bees as indicated by weekly catches during the blooming period at Qalubiya Governorate (1989).

Date of collection	No. of bees / Species				Total	Mean temp. °C	Mean R.H. %
	C.nanus	*C.lacunatus*	*C. cariniger*	*C. pumilus*			
12.3.89	47	19	0	8	74	23	36
19.3	54	22	0	14	90	25	35
26.3	86	26	0	16	128	25	36
2.4	74	28	14	8	124	26	37
9.4	38	21	27	7	93	24	49
16.4	32	45	22	0	99	26	55
23.4	80	33	9	0	122	20	50
30.4	53	24	0	0	77	26	50
7.5	44	38	11	0	93	26.5	50
14.5	32	20	9	0	61	29	40
21.5	27	31	0	0	40	28	45
Total	567	289	92	53	1001		
Percentage	65.6	28.8	9.2	5.4			

Table 4. Daily activity and relative abundance of *colletes* bees on flowers during blooming at Qalubiya province.

Collection Period	Mean No. of bees / species / day				Total	frequency %	Mean temp °C	Mean R.H. %
	C.nanus	*C.lacunatus*	*C.cariniger*	*C.perezi*				
9 a. m.	6	3	1	0	10	11.0	20	55
11 a. m.	15	8	2	3	28	30.8	23	36
1 p. m.	24	10	3	2	39	42.8	27	35
3 p. m.	5	5	2	0	12	13.1	26	48
5 p. m.	2	0	0	0	2	2.3	22	50
Total	52	26	8	5	91			

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الوفرة العددية والنشاط لنحل *Colletes* علي أزهار نباتات الخلة البلدى فى مصر

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معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقي

تم دراسة النشاط اليومي والموسمي لنحل الـ *Colletes* خلال فترة ازهار نباتات الخلة في عام ١٩٨٩ بمنطقتي الجيزة والقليوبية نظرا لقيامه بدور كبير في التلقيح.

وقد وجدت اربعة أنواع من هذا النحل البري في المنطقتين اكثرها نشاطا النوع المسمي *Colletes nanus* بنسبه ٥٦,٨ ، ٥٦,٦ ٪ من التعداد الكلي في الجيزه والقليوبية علي الترتيب . وقد لوحظت ثلاثه قمم من النشاط في الجيزة وقمتين فقط في القليوبية ويأتي النوع *Colletes nanus* في المرتبه الثانيه مكونا ٢٢,٩ ٪ من التعداد الكلي مع وجود قمتين للنشاط في الجيزة وفي القليوبية، يمثل هذا النوع ٢٨,٨ ٪ من المجموع الكلي وثلاثة قمم من النشاط . أما بقية الانواع فهي أقل نشاطا وأقل تواجداً.

تبدأ افراد النوع *C. nanus* في الظهور علي ازهار نباتات الخله من الساعه التاسعة صباحا وحتي الساعةالخامسه مساء وتصل الي اقصي نشاط لها حوالي الساعة الواحدة ظهراً وبقية الأنواع تكون أكثر نشاطاً بين الساعة الحادية عشرة قبل الظهر والساعة الواحدة بعد الظهر .