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THE FLOWER-VISITING ACTIVITY OF APOIDEA ON LUCERNE (HYMENOPTERA: APOIDAE)

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Abstract

The flower visiting of *Bombus agrorum* F., *Megachile argentata* F. and *Melitturga clavicornis* LATR. per minute was more frequent than of other species, but *Megachile argentata* F., *Megachile centuncularis* L. and *Eucera pollinosa* SMITH. opened up the highest number of flower heads. On the basis of abundancy (TANÁCS, 1974) and activity of the observed species *Andrena ovulata* K. *Melitta leporina* PZ. and *Melitturga clavicornis* LATR. proved to be the most useful species on the lucerne fields in the environs of Szeged. Although the flower visiting of honey-bee is significant, its flower opening is almost neglectable, which can be explained by its nectar collecting activity.

Introduction

It is common knowledge that the flowers of lucerne may open up automatically (LESINS, 1950), but these produce seeds in smaller number further hampered by a decrease in viability than those pollinated by alien means (BŐJTŐS, 1951). Apoidea as a feeding-biological life-form represent the sustinent elements of the biocenose (SZELÉNYI, 1960). With my observation I aimed at an assessment of the activity of this group of insects. Locality of experiments were the lucerne fields in the environs of Szeged, in southern Hungary.

Methods

My flower visiting observations were carried out during the swarming maximum (at about 13 h) of Apoidea with a view to MÓCZÁR's (1959b) method. The most frequently occurring 10—12 species of wild bee were observed for a period of one minute each. I noted down the number of the visited flowers and how many of these were opened. These observations have been extended to the activity of honey-bees, too.

My observations were carried out on the lucerne fields in the vicinity of the airport (Szeged) on the following days: 23rd—27th July (every day), 2nd and 5th August in 1971, 22nd—23rd, 25th 27th, 30th July, 1st—2nd, 11th August in 1972.

The lucerne fields of Újszentiván is situated some 18 km SE of Szeged not far from the Hungarian—Yugoslavian—Roumanian border, the dates are as follows: 21st—22nd, 28th—31st July, 3rd—4th August in 1971; 22nd—23rd, 25th, 27th—30th June, 1st—2nd, 4th July in 1972.

I have also noted down the weather conditions of days on which observations were made.

Results

Upon the following factors I have evaluated the flower-visiting activity of 33 wild bee species in the years of 1971 and 1972: number of flowers visited per minute, percentage of opened flowers, and the number of actually opened flowers per one minute (Table 1).

Table 1. The flower-visiting activity of wild bees on the lucerne fields in the environs of Szeged in 1971—72

Species	I	II	III	I	II	III	I	II	III
	1971			1972			average		
Bombus agrorum F.	20	55,55	11,00	17	57,63	9,71	18	57,01	10,05
Megachile argentata F.	—	—	—	17	91,66	15,13	17	91,66	15,13
Melitturga clavicornis LATR.	18	63,98	11,25	15	75,81	11,06	16	70,38	11,16
Bombus lapidarius L.	18	61,42	10,75	14	73,24	10,45	16	67,68	10,58
Eucera clypeata ER.	18	50,94	9,00	15	82,69	12,28	16	71,97	11,30
Megachile centuncularis L.	—	—	—	16	85,48	13,25	16	85,48	13,25
Andrena variabilis SM.	16	48,93	7,66	—	—	—	16	48,93	7,66
Bombus terrestris L.	15	70,00	10,50	15	69,85	10,55	15	69,98	10,53
Bombus silvarum distinctus VOGT.	14	63,64	8,75	15	59,21	9,00	15	61,06	8,88
Bombus hortorum L.	—	—	—	15	44,44	6,66	15	44,44	6,66
Melitta leporina PZ.	15	77,11	11,53	13	79,34	10,57	14	78,44	11,00
Halictus calceatus SCOP.	—	—	—	14	48,15	6,50	14	48,15	6,50
Eucera pollinosa SMITH	—	—	—	13	80,38	10,50	13	80,38	10,50
Andrena labialis K.	15	64,65	9,38	8	75,28	6,09	11	69,27	7,47
Halictus malachurus K.	9	57,14	4,00	10	55,74	5,67	10	56,54	5,40
Halictus leucosonius SCHCK.	10	57,14	5,33	—	—	—	10	57,14	5,33
Andrena flavipes PZ.	12	66,00	7,61	7	85,06	6,17	9	72,99	6,92
Halictus eurygnathus BLÜTHG.	8	85,71	7,20	7	75,00	5,57	8	79,79	6,25
Andrena ovatula K.	8	81,81	6,75	7	73,03	5,33	8	76,14	5,80
Halictus patellatus MOR.	—	—	—	6	70,83	4,25	6	70,83	4,25

I = number of flowers visited per minute
II = percentage value of flower opening
III = value of actual flower opening per minute

It may be established that the flower visiting of *Bombus* species per minute is very high, but *Megachile argentata* F., *Megachile centucularis* L. and *Eucera pollinosa* SMITH. appear to be the most useful species because they open up the highest number of flowers per minute. It is explained by the fact that the high number of visited flowers shew a greater percentage of opened flower heads. A comparison of these results with the country-wide values (MÓCZÁR, 1959b) is shown in Tabl 2.

The flower-visiting values per minute in the case of the same species are very close to each other. Difference of some significance is only observed in *Megachile argentata* F. The actual flower-opening values vary more or less in several species. It was found that the values of both flower-visiting and opening with identical species in the environs of Szeged were generally higher than those in 1954—55—56. It may well be explained by the obvious reason that Szeged and its environs are the sunniest regions of Hungary, consequently, they are warmer in climate, these make it possible for Apoidea to increase their activity.

Table 2. The comparison of flower-visiting and actual flower-opening values per minute of 1954—56 and 1971—72

Species	flower visiting per min		actual flower opening per min	
	I	II	I	II
Melitturga clavicornis LATR.	17	16	15,4	11,2
Megachile centuncularis L.	15	16	14,6	13,3
Eucera clypeata ER.	14	16	11,1	11,3
Eucera pollinosa SMITH	11	13	9,4	11,5
Megachile argentata F.	11	17	10,8	15,1
Andrena ovatula K.	6	8	4,9	5,8
Andrena flavipes PZ.	7	9	4,3	6,9
Melitta leporina PZ.	11	14	9,4	11,0
Bombus lapidarius L.	12	16	10,8	10,6
Halictus eurygnathus BLÜTHG.	7	8	5,2	6,3
Bombus terrestris L.	13	15	7,2	10,5
Bombus agrorum F.	—	18	—	10,1

I = MÓCZÁR (1959b) Country-wide data for 1954—55—56 (excluding those of country Csongrad)

II = own data for the environs of Szeged for 1971—72.

The flower opening of lucerne by *Apis mellifera* L. is successful only when the bees collect pollen, for during the time of nectar collecting they hardly ever open the flower heads (MÓCZÁR 1961a). According to BENEDEK, MANNINGER and DÉVAI (1971) bees visit lucerne flowers for the sheer purpose of nectar inbibition. The younger bees in their early days open the flowers up to 75—100 per cent (BÖJTÖS, 1962). In some special areas poor in flora, or in semi-arid spots the honey-bees appear to be the main pollinators among Apoidea (BOHART, 1957; PETKOV, 1967; VANSELL and TODD, 1946). I observed for a period of 50 minutes the activity of honey-bees during which I recorded 895 flower visitings, which means 17.9 visits per minute. The number of actual flower opening per minute is 0.5. During my observations the honey-bees collected almost exclusively nectar, and not pollen, thus, these records substantially support the observations mentioned by MÓCZÁR.

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