

The seasonal dynamics of Megachilidae and Anthophoridae species (Hymenoptera: Apoidea) in Romania.

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Abstract

There has been analyzed the dynamics of the Apoidea in Romania according to the seasons starting from the material gathered by the specialists of The National Museum of Natural History “Grigore Antipa” in Bucharest during 2004 – 2008 and also taking into account the already existing material in the collections of the “Antipa” Museum and the Brukenthal National Museum. There were identified 63 species of Megachilidae and 65 species of Anthophoridae that were collected from 176 localities and collecting sites, 100 of these representing new quotations for the presence of the Apoidea.

Till now there hasn't been done a study of comparison between these two apoid families in Romania. In this respect all the data presented in this work bring new information regarding the ecology of the Megachilidae and Anthophoridae.

Key words: Megachilidae, Anthophoridae, dynamics according to the seasons, Romania.

Introduction

The activity during the day of the Megachilidae and Anthophoridae depend on the species, the physiological conditions of the male and female, the weather conditions and the specificity of the development of the plants. The males' activity is usually directed towards searching and attracting the females. In the morning the males show up earlier than the females and watch their nests or control the areas with flowers in bloom. The day activity of the female is closely associated with the behavior regarding mainly the building of the nest (choosing the place for the nests, the preparation of the nest cavity, gathering the supplies) (MICHENER 2000).

In Romania there are few works in the literature of specialty that provides data regarding the phenology and ecology of wild bees. So, IUGA (1958) brought valuable contributions to the knowledge of the apoid ecology, and AFTENE (1995a, b) did studies regarding the influence of the no biotic factors upon the development of the life cycle in the species of Megachilidae; also she emphasized the flying periods and watched the way of nesting of 21 megachilid species belonging to the Romanian fauna.

Materials and methods

The researched material was collected during 2004 – 2008 by the specialists of The National Museum of Natural History “Grigore Antipa” (Bucharest) from different areas in Romania, respectively: Maramureş (2004), Crişana: Bihor County (2008); Oltenia: Gorj County (2004) and Mehedinţi County

(2007), Dobrogea (2005, 2006); Transylvania: Piatra Craiului National Park (2004, 2005) and Făgăraş Mountains Area (2005 - 2008), Muntenia: Bucureşti and its surroundings (2006, 2007, 2008). To these there is also added the material researched that is within the scientific collections belonging to the “Antipa” Museum as well as to the “Brukenthal” Museum (Sibiu).

The species were collected with the help of the entomologic net from the visited plants and nearby the nest; the material comes from 176 localities and collecting places.

The identification of the species was done according to the external morphology, using the works of BANASZAK & PONOMAREVA (1978) for megachilid and the works of IUGA (1958) and OSYCHNYUK, PANFILOV & PONOMAREVA (1978) for anthophorid, and also taking into account the genitals feature using the works of SAUNDERS (1896), IUGA (1958) and HERNÁNDEZ & MORA (1985).

There were taken photos of the habitats where the gatherings were done. We present the collecting sites (Figures 1 – 4), as follows:

Results and Discussion

There were identified 128 species of Apoidea belonging to 29 genera of 2 families: Megachilidae (63 species, 16 genera) and Anthophoridae (65 species, 13 genera).

As a result of the study done regarding the Megachilidae and Anthophoridae there were obtained the results presented synthetically in the tables 1,2 illustrated in the figures 5,6.



Fig. 1. Xero - termophilous vegetation (Dobrogea).



Fig. 2. Alternation of heat loving woods and dryness loving pastures (Dobrogea).



Fig. 3. Birch wood (Maramureş).



Fig. 4. Vegetation along the roads: *Tanacetum - Artemisium vulgare* (Sărata, Transylvania).

Table 1.

The list of the collected megachilidae indicating the collecting period.

TAXON	THE COLLECTING PERIOD OF THE SPECIES													
	III		IV		V		VI		VII		VIII		IX	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
<i>Lithurgus chrysurus</i>														
<i>Lithurgus cornutus</i>														
<i>Trachusa byssina</i>														
<i>Rhodanthidium septemdentatum</i>														
<i>Paraanthidiellum lituratum</i>														
<i>Anthidium florentinum</i>														
<i>Anthidium manicatum</i>														
<i>Anthidium punctatum</i>														
<i>Proanthidium oblongatum</i>														
<i>Anthidiellum strigatum</i>														
<i>Stelis minuta</i>														
<i>Stelis ornatula</i>														
<i>Stelis phaeoptera</i>														
<i>Chelostoma campanularum</i>														
<i>Chelostoma distinctum</i>														
<i>Chelostoma florissomne</i>														
<i>Chelostoma rapunculi</i>														
<i>Heriades crenulatus</i>														
<i>Heriades truncorum</i>														

TAXON	THE COLLECTING PERIOD OF THE SPECIES													
	III		IV		V		VI		VII		VIII		IX	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
<i>Hoplitis anthocopoides</i>									■					
<i>Hoplitis claviventris</i>							■		■		■			
<i>Hoplitis leucomelana</i>									■					
<i>Hoplitis manicata</i>							■		■					
<i>Hoplitis praestans</i>					■									
<i>Hoplitis ravouxi</i>								■		■				
<i>Anthocopa papaveris</i>							■							
<i>Osmia aurulenta</i>				■						■				
<i>Osmia bicolor</i>			■			■				■				
<i>Osmia brevicornis</i>					■									
<i>Osmia caeruleascens</i>				■		■		■		■				
<i>Osmia cerinthidis</i>			■				■							
<i>Osmia cornuta</i>	■		■			■								
<i>Osmia emarginata</i>											■			
<i>Osmia fulviventris</i>							■		■	■				
<i>Osmia leaiana</i>								■				■		
<i>Osmia rufa</i>	■		■		■	■	■	■						
<i>Chalicodoma ericetorum</i>							■							
<i>Chalicodoma parietina</i>				■										
<i>Megachile alpicola</i>								■	■	■		■		
<i>Megachile centuncularis</i>									■	■				■
<i>Megachile lagopoda</i>									■			■		
<i>Megachile lapponica</i>									■	■				
<i>Megachile leucomalla</i>								■				■		
<i>Megachile ligniseca</i>			■		■		■		■					■
<i>Megachile melanopyga</i>									■					
<i>Megachile nigriventris</i>			■				■							
<i>Megachile octosignata</i>								■						■
<i>Megachile pilicrus</i>								■		■	■			
<i>Megachile pilidens</i>								■		■				
<i>Megachile rotundata</i>									■	■	■			
<i>Megachile versicolor</i>												■	■	■
<i>Megachile willughbiella</i>								■	■	■				
<i>Coelioxys afra</i>									■	■	■			
<i>Coelioxys aurolimbata</i>						■	■		■					
<i>Coelioxys caudata</i>									■					
<i>Coelioxys elongata</i>								■						■
<i>Coelioxys haemorrhoea</i>									■					
<i>Coelioxys inermis</i>										■				
<i>Coelioxys mandibularis</i>								■						
<i>Coelioxys polycentris</i>											■			■
<i>Coelioxys quadridentata</i>										■				
<i>Coelioxys rufescens</i>									■		■			
<i>Coelioxys rufocaudata</i>								■		■				

Table 2.

The list of the collected anthophoride indicating the collecting period.

TAXON	THE COLLECTING PERIOD OF THE SPECIES													
	III		IV		V		VI		VII		VIII		IX	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
<i>Habropoda zonatula</i>							■	■						
<i>Anthophora aestivalis</i>					■									
<i>Anthophora bimaculata</i>					■				■		■			
<i>Anthophora crassipes</i>						■			■					
<i>Anthophora crinipes</i>			■		■									
<i>Anthophora furcata</i>							■	■			■			
<i>Anthophora plagiata</i>						■	■							
<i>Anthophora plumipes</i>	■		■	■	■									
<i>Anthophora quadrimaculata</i>					■	■								
<i>Anthophora retusa</i>			■			■			■					
<i>Anthophora robusta</i>						■							■	
<i>Amegilla magnilabris</i>								■	■					
<i>Amegilla quadrifasciata</i>									■	■				■
<i>Amegilla salviae</i>										■				
<i>Eucera cinerea</i>					■	■		■						
<i>Eucera clypeata</i>									■	■				
<i>Eucera dalmatica</i>					■			■		■				
<i>Eucera helvola</i>												■		
<i>Eucera interrupta</i>					■			■		■				
<i>Eucera longicornis</i>			■	■	■			■	■	■				
<i>Eucera nigrescens</i>					■	■		■		■				
<i>Eucera nigrilabris</i>			■					■				■		
<i>Eucera nitidiventris</i>					■	■		■						
<i>Eucera parvicornis</i>					■				■					
<i>Eucera pollinosa</i>					■				■					
<i>Eucera taurica</i>									■					
<i>Tetralonia armeniaca</i>								■	■	■			■	
<i>Tetralonia dentata</i>									■	■				
<i>Tetralonia hungarica</i>								■				■		
<i>Tetralonia lyncea</i>									■	■			■	
<i>Tetralonia salicariae</i>									■			■		
<i>Tetralonia scabiosae</i>									■			■		
<i>Tetralonia tricincta</i>									■		■			
<i>Melecta albifrons</i>			■											
<i>Melecta luctuosa</i>				■	■	■		■						
<i>Thyreus ramosus</i>									■	■				■
<i>Thyreus scutellaris</i>								■		■				■
<i>Pasites maculatus</i>									■	■				
<i>Biastes brevicornis</i>									■			■		
<i>Biastes emarginatus</i>									■		■			
<i>Epeolus variegatus</i>										■	■	■		
<i>Nomada armata</i>								■	■	■				
<i>Nomada cruenta</i>									■					
<i>Nomada fabriciana</i>					■									
<i>Nomada ferruginata</i>		■							■					
<i>Nomada fucata</i>			■	■	■			■						
<i>Nomada fulvicornis</i>					■			■						
<i>Nomada goodeniana</i>					■	■								
<i>Nomada mutica</i>														
<i>Nomada nobilis</i>									■					

TAXON	THE COLLECTING PERIOD OF THE SPECIES													
	III		IV		V		VI		VII		VIII		IX	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
<i>Nomada obtusifrons</i>					■	■								
<i>Nomada ruficornis</i>		■	■		■	■								
<i>Nomada sexfasciata</i>			■		■			■	■					
<i>Nomada stigma</i>						■		■				■		
<i>Nomada zonata</i>							■							
<i>Ceratina acuta</i>										■				
<i>Ceratina callosa</i>								■	■	■	■	■	■	■
<i>Ceratina chrysomalla</i>										■				
<i>Ceratina cucurbitina</i>													■	
<i>Ceratina cyanea</i>					■		■						■	■
<i>Ceratina gravidula</i>									■					
<i>Ceratina nigroaenea</i>					■	■				■				
<i>Ceratina nigrolabiata</i>														
<i>Xylocopa valga</i>			■	■	■	■	■	■	■			■	■	■
<i>Xylocopa violacea</i>			■		■		■						■	

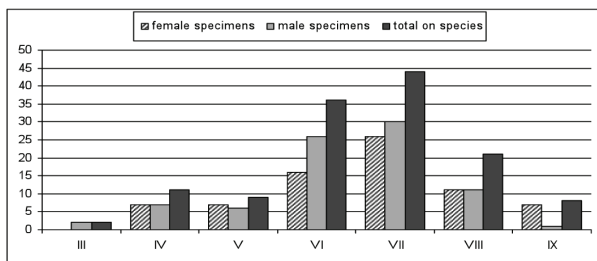


Fig. 5. The dynamics according to the seasons of the Megachilidae.

The Megachilidae were collected starting from March till September. The maximum number of the megachilid species of was collected in July (44 species), followed by June (36 species). The males were also collected during March till September, the maximum being recorded in June and July (26 species, respectively 30 species). There were collected females belonging to the megachilid species during April till September, especially in July (26 species).

The number of the collected Anthophoridae registered an increase from March till September, a slow decrease in July and the number of species suddenly decreases in August and September. From the anthophorid family we collected both male and female specimens during March – September. During the spring months the number of males of all species is bigger than the number of females.

From the comparative study of the dynamics according to the seasons of these two families of Apoidea there was established that the species belonging to the Anthophoridae family are earlier recording the maximum of the flying period earlier with a month than the species of the Megachilidae (June, respectively July). There was also noticed



Fig. 6. The dynamics according to the seasons of the Anthophoridae.

that in both families the males are fewer in number than the females in September due to the fact that they disappear first (most of the species get through the winter as larva).

Conclusions

The megachilid and anthophorid species can fall into three groups of phenology taking into account the flying season: spring species, spring – summer and summer species. The spring species usually flies from March till the end of May; those from spring – summer species from the second half of May till the end of June. The summer species flies from June till the end of August but often they fly till the end of September in the South. The oligolectic species, which are closely associated with some plants, have a shortflight period which lasts 20-30 days.

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