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Flight activity of Czechoslovak Hemerobiidae and Chrysopidae: Investigation by light trap

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Abstract

In the years 1967 to 1971 a light trap fixed on the wall of a park building in Praha – Ruzyně (Central Bohemia) was used for catches which finally included 21 species of the family Hemerobiidae (36 species known from Czechoslovakia) and 13 species of the family Chrysopidae (24 species known from Czechoslovakia). It is assumed that from both aphidophagous families all species to be reckoned with on this locality were present in the catches. With a proportion of 37% of specimens of one family, *Hemerobius lutescens* (F.) represented the most abundantly and most regularly occurring species. Next in order were *H. humulinus* L. (13%), *Wesmaelius subnebulosus* (STEPH.) (11%), *Micromus variegatus* (F.) (10%), and *H. pini* STEPH. (9%). Of the family Chrysopidae the species *Chrysoperla carnea* (STEPH.) prevailed ultimately (ab. 90% specimens of one family). The most intensive fligth activity in both species and specimens was recorded from mid-August to mid-September (2nd generation). The composition of the fauna corresponded to the species representation of trees growing in the surroundings of the trap: *Acer platanoides, Betula* sp., *Quercus* sp., *Fagus silvatica, Pinus silvestris,* and *Picea* sp. Individually caught species included faunistically interesting findings: *Wesmaelius malladai* (NAV.), *W. ravus* (WITH.), *W. mortoni* (McL.), *Drepanepteryx algida* (ERICHS.), *Nineta vittata* (WESM.), *Chrysopa dorsalis* (BURM.), and *Anisochrysa flavifrons* (BRAUER). The foregoing first three species of the genus *Wesmaelius* and *D. algida* were caught into the light trap only.

Up to the present time, 92 species of the order Planipennia including 36 species of the family Hemerobiidae and 24 species of the family Chrysopidae are known from Czechoslovakia. From central Bohemia, the region where light traps were used for catchings, 24 species of Hemerobiidae and 16 species of Chrysopidae were found (ZELENÝ, 1977). As a rule, the material was obtained by sweeping or beating from various plants. In addition, catching into light traps, or on light only, has proved useful for the collection of species of the order Planipennia, although it has been employed less often so far. The material obtained from light traps also has attracted less attention in comprehensive surveys despite the fact that regular collection of samples secured in this way may provide ample information on the composition of populations, the abundancy of species, local flight activity etc. (KILLINGTON, 1936; ANDERSON & GREVE, 1975; NIELSEN, 1977).

Material and Methods

The material compiled from Czechoslovakia from the light trap includes Chrysopidae as part of a study of aphid predators (HONĚK, 1977). The material underlying the present work was obtained from the same type of light trap (NOVÁK, 1970) and from the same locality (Praha-Ruzyně), but from different periods (1967, 1969, 1970, 1971). The light trap was placed at the southern side of a building at 2nd-floor height to automatically catch insects occurring on trees, shrubs and herbs in the adjacent park. The trees and shrubs included the following species: the maple *Acer platanoides,* the birch *Betula* sp., the oak *Quercus* sp., the beech *Fagus silvatica,* the pine *Pinus silvestris,* the spruce *Picea* sp., the lilac *Syringa vulgaris* and other exotic shrubs.

Results

Species of both aphidophagous families were present in the catches in a proportion corresponding to their distribution in central Bohemia or in Czechoslovakia as a whole (Tab. 1). From the survey of species (Tab. 2 and 3, Fig. 1) it is evident that the caught species reflected, essentially, the situation in this locality and its biotype (particularly the spectrum of plant species) in which the trap was placed. Catches of Hemerobiidae in fact included all species that could be expected in this biotope, similarly with the family Chrysopidae. Hence it may be stated that light lures all, or short of all, species of both foregoing families.

Hemerobius lutescens has been most abundant and invariably prevailed every year in our material accounting for 37% of the total number of species of the family Hemerobiidae from the light trap. The influence exerted on the catches by the site and the biotope is clearly exemplified on this particular species, the most abundant one in the Praha–Ruzyně area. On the other hand, this species has been not found in southern Bohemia, where a different locality (Semice near Písek) and a different biotope were investigated. Besides *H. lutescens* ten other species occurred in our material every year: four in a proportion of 9% to 13%, and six in a proportion of 1% to 5%. All of them were regularly present in the catches every year, however, their proportion varied to a different degree. *H. lutescens* exhibited the smallest variation in quantitiy, its lowest and highest proportions differing by the factor of 1.3. The rest of the species showed more important variations in relative frequency. Thus, for instance, the frequency of *H. humulinus* the second most abundant species in our material, varied by factors up to four in the individual years. This was due to the extremely low catch in 1970. The largest, almost 13fold, difference in frequency over the individual years was exhibited by *H. atrifrons*, a species relying on one single plant species, *Larix decidua,* and for this reason, easily susceptible to being influenced by variations in quantity of its feed, the aphids.

Hemerobius humulinus was the second most abundant species in the trap. Its quantity corresponded to 1/3 of the total catch of *H. lutescens.* Third follows the species *Wesmaelius subnebulosus*, currently present on a variety of trees and shrubs and highly attracted by light. The proportion of the fourth species, *Micromus variegatus,* was surprisingly high. It has not been found in such quantities by sweeping. This species lives mainly on herb growth. Its higher occurrence in our catches was mainly due to its second place in abundance in the material determined in 1971. Only in the fifth place came *Hemerobius pini,* a typical inhabitant of coniferous trees. Other species included in the catches each year (in the sixth to eleventh place) accounted for 1% to 5% of the total catch. Their population density showed higher variations, the highest in monophagous or oligophagous species, such as *Hemerobius atrifrons, H. nitidulus* and *H. micans,* which rely on one single plant species and, hence, on only one or a few species of aphids.

Among the first to appear in the traps in the individual years were *Hemerobius humulinus, H. pini, H. nitidulus, H. micans, Wesmaelius subnebulosus* and *W. betulinus.* Of these

	Czechoslovakia No	Central Bohemia No	Praha-Ruzyně, light-trap		
			No	Relative abundance of species in %	
				From Czechoslovakia	From Central Bohemia
Hemerobiidae	36	24	21	58.3	87.5
Chrysopidae	24	16	13	54.2	81.3

Tab. 1: Number of species of Hemerobiidae and Chrysopidae in Czechoslovakia and captured in the light-trap, Praha-Ruzyně.

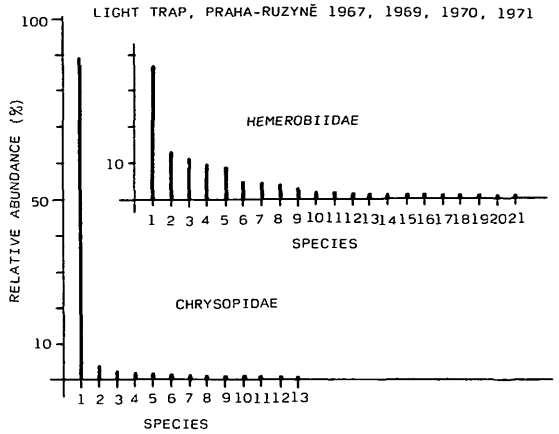

Fig. 1: Relative abundance of species in % of Hemerobiidae and Chrysopidae captured in the light-trap. Praha-Ruzyně, total: 1967, 1969, 1970, 1971.

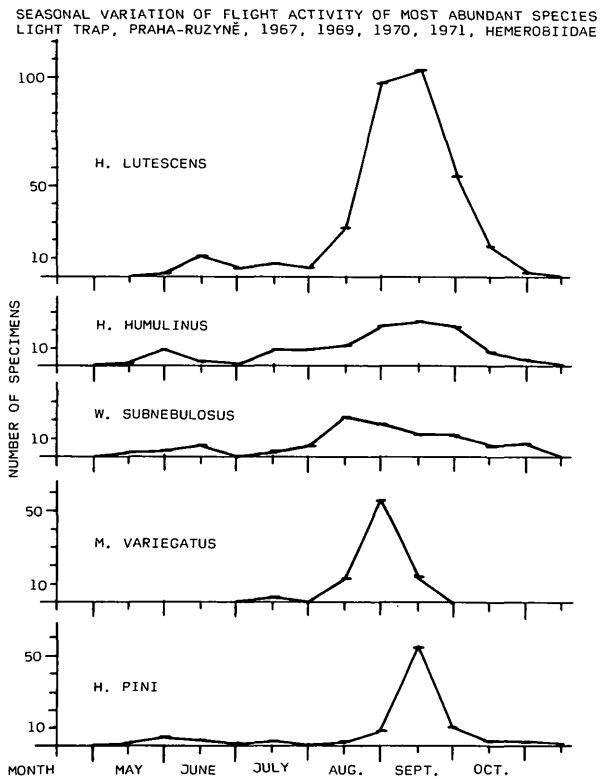

Fig. 2: Seasonal activity of 5 most abundant species of Hemerobiidae from light-trap. Praha-Ruzyně, total: 1967, 1969, 1970, 1971.

	No	%
1. *Hemerobius lutescens* FABR.	343	37.04
2. *Hemerobius humulinus* L.	120	12.96
3. *Wesmaelius subnebulosus* (STEPH.)	101	10.91
4. *Micromus variegatus* (FABR.)	88	9.50
5. *Hemerobius pini* STEPH.	84	9.07
6. *Wesmaelius betulinus* (STROM)	46	4.97
7. *Hemerobius stigma* STEPH.	38	4.10
8. *Hemerobius nitidulus* FABR.	28	3.02
9. *Hemerobius micans* OLIV.	22	2.38
10. *Hemerobius atrifrons* MCLACH.	14	1.51
11. *Micromus angulatus* (STEPH.)	13	1.40
12. *Drepanepteryx phalaenoides* (L.)	8	0.86
13. *Sympherobius elegans* (STEPH.)	4	0.43
14. *Sympherobius pygmaeus* (RAMBUR)	4	0.43
15. *Wesmaelius malladai* (NAVAS)	3	0.32
16. *Wesmaelius ravus* (WITH.)	3	0.32
17. *Wesmaelius mortoni* (MCLACH.)	2	0.22
18. *Wesmaelius quadrifasciatus* (REUTER)	2	0.22
19. *Micromus paganus* (L.)	1	0.11
20. *Wesmaelius concinnus* (STEPH.)	1	0.11
21. *Drepanepteryx algida* (ERICHS.)	1	0.11
Total	926	

Tab. 2: Species, number of specimens and relative abundance in % of Hemerobiidae captured in the light-trap, Praha-Ruzyně.

	No	%
1. *Chrysoperla carnea* (STEPH.)	508	89.28
2. *Chrysopa septempunctata* WESM.	20	3.51
3. *Chrysopa perla* (L.)	12	2.11
4. *Cunctochrysa albolineata* (KILL.)	11	1.93
5. *Nineta flava* (SCOP.)	7	1.23
6. *Chrysopa formosa* (BRAUER)	2	0.35
7. *Anisochrysa prasina* (BRAUER)	2	0.35
8. *Chrysopa dorsalis* BURM.	2	0.35
9. *Nineta vittata* (WESM.)	1	0.18
10. *Nineta pallida* (SCHNEID.)	1	0.18
11. *Tjederina gracilis* (SCHNEID.)	1	0.18
12. *Anisochrysa ventralis* (CURT.)	1	0.18
13. *Anisochrysa flavifrons* (BRAUER)	1	0.18
Total	569	

Tab. 3: Species, number of specimens and relative abundance in % of Chrysopidae captured in the light-trap, Praha-Ruzyně.

only *H. nitidulus* appeared first in two different years while each of the other species came first only in one year. Invariably, *H. lutescens* approached the traps as late as the second half of May. By sweeping, on the other hand, all the foregoing species were obtained as early as the second half of April, the period in which their flight activity is still very low, presumably because of the low temperature of the air.

Month		May		June		July		Aug.		Sept.		Oct.	
Date		15	31	15	30	15	31	15	31	15	30	15	31
		Number of specimens											
H. lutescens	1967			2	2				27	31	24	8	1
	1969				1	7	5	11	9	38	7	4	
	1970			2				5	12	17	9		
	1971		1	7	1			11	59	28	15	5	1
Total male/female			1/0	8/3	2/2	5/2	3/2	12/15	53/54	47/67	25/30	6/11	0/12
Total			1	11	4	7	5	27	107	114	55	17	2
H. humulinus	1967	1	3	1			2	1	5	5	7	3	1
	1969		6			4	6	9	3	9	3	3	
	1970			1		2	1		2		1		
	1971					3		1	12	11	11	2	2
Total male/female		1/0	5/4	1/1		8/1	6/3	7/4	7/15	6/19	10/12	2/6	1/2
Total		1	9	2		9	9	11	22	25	22	8	3
W. subnebulosus	1967	2	3	3		1	1	3			5	1	2
	1969					1	1	2	1	5	2	4	
	1970			2			1	9	6	3	1		
	1971			1		1	2	8	11	4	5	1	5
Total male/female		1/1	0/3	3/3		2/1	5/0	7/15	3/15	3/9	3/10	0/6	0/7
Total		2	3	6		3	5	22	18	12	13	6	7
M. variegatus	1967					1		1	7	3			
	1969							7	1				
	1970							2	2				
	1971					1		3	46	11			
Total male/female						1/1		4/9	24/32	11/3			
Total						2		13	56	14			
H. pini	1967	2	3	1	1	1			2	21	6	1	1
	1969		2			1				2	1		
	1970			1				1	3	10	1		
	1971			1					3	21	2	1	
Total male/female		2/0	1/4	2/1	1/0	1/1		1/0	2/6	11/43	0/10	0/2	0/1
Total		2	5	3	1	2		1	8	54	10	2	1

Tab. 4: Seasonal activity and sex ratio of 5 most abundant species from the light-trap, Praha-Ruzyně.

The greatest number of both species and specimens approached the traps from August to the first half of September (2nd generation), but flight activity lasted until late October when the air temperature already started to play an important role. Invariably, every year the smallest number both of species and specimens approached the traps during the second half of June, the period in which most species proceed to developing larvae (Tab. 4, Fig. 2).

Among the species occurring only sporadically at the site under study, as they do in Czechoslovakia as a whole, the following have been of interest: *Micromus paganus,* currently found in headland areas, but rare in central Bohemia; three species belonging to the genus *Wesmaelius, W. malladai, W. ravus* and *W. mortoni; Drepanepteryx algida,* a species represented in our material by one specimen only (the second from Czechoslovakia by the time of catching). Catching by light trap, as luring on light in general, seems to be very appropriate for species of the genus *Wesmaelius* as may be inferred from the fact that *W. ravus, W. mortoni*

and *W. malladai* have been mostly absent in sweepings so far. It is highly probable that this might be related either to their night-bound flight activity, or to their preference of higher parts of trees.

Chrysoperla carnea was the most frequent representative of the family Chrysopidae accounting for 90% of all specimens trapped (Tab. 3, Fig. 1). Next followed the species *Chrysopa septempunctata, Ch. perla, Cunctochrysa albolineata,* and very often also *Nineta flava.* All other species were represented by much lesser numbers of specimens. The majority of *Chrysoperla carnea* were specimens preparing themselves for overwintering. Their occurence and flight activity last from end of July to end of September, a period no other species can match in length. This is one of the reasons underlying the overwhelming dominance of this species in our light-trap catches. The above data on the family Chrysopidae correspond to those reported by HONĚK (1977). Finds of more interest within the family Chrysopidae also included the species *Chrysopa dorsalis, Anisochrysa flavifrons,* and especially *Nineta vittata,* a species more frequently found in headland regions (similar to *Micromus paganus*) rather than in central Bohemia.

All species of both families, Hemerobiidae and Chrysopidae, if caught in greater numbers, included members of both sexes (Tab. 4). Females prevailed on the whole in the material obtained from traps. This might be due to their longer lifetime. This is seen in Tab. 4 showing the males (which hatch first) to be caught in spring, while females prevail in autumn, at the end of their flight activity.

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