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STRUCTURE OF *ICHNEUMONIDAE* (*HYMENOPTERA*) COMMUNITIES IN URBAN GREEN AREAS OF WARSAW

ABSTRACT

The structure of *Ichneumonidae* communities associated with linden canopy was examined in different green areas of Warsaw such a suburbs, parks, housing estates, and central parts of the town, and also in a natural habitat (*Tilio-Carpinetum*). A total of 392 species were recorded. Increasing urban pressure (along the transect: natural habitat — suburbs — urban green) and growing habitat pollution (in the transect: park — streetside zone of the park) limit abundance and often species composition of *Ichneumonidae*. The dominance structures of *Ichneumonidae* communities in the green areas of Warsaw were more similar to each other than to the dominance structure of the community occurring in the natural habitat. Different habitats of urban green areas are predominated by the same species. These are *Dichrogaster aestivalis*, *Charitopes chrysopae*, and *Ch. clausus* (parasitoids of *Neuroptera*). Various trophic groups of *Ichneumonidae* differ in their susceptibility to anthropogenic pressure. Parasitoids of biting phytophages are severely limited, while parasitoids of gall-forming, mining, and folding phytophages are less affected. A certain stimulating influence was observed on the parasitoids of aphidophages.

INTRODUCTION

Specific habitat conditions of the town have direct and indirect, host-mediated effects on parasitoids. Urbanization modifies abiotic and biotic environment in the way either positively or negatively influencing species richness, abundance, and dominance structures of parasitoid communities. All these community characteristics are closely related to the number of species and abundance of hosts and they also depend on the adaptation of parasitoids to specific conditions of urban habitats. The intensity of urban pressure depends on the size of green areas, species composition and structure of the vegetation, also on the type of management, structure of surrounding habitats, distance to the streets, etc.

The hosts of parasitoids can be affected in different ways in urban habitats. For example, the number of species can be reduced for *Noctuidae* (Winiarska 1982), aphidophages: *Neuroptera* (Czechowska 1982), *Syrphidae* (Bańkowska 1981), and *Sphecidae* (Skibińska 1982). Instead, the abundance

of aphids increases with habitat pollution, which is correlated with an increase in the abundance of their predators (Czechowska et al. 1979). Generally, also the number of parasitoid species, *Ichneumonidae* (Sawoniewicz 1982) and *Proctotrupoidea* (Garbarczyk 1982), declines with urban pressure, though it is not always the case. For example, the number of species of parasitoids of aphidophages is maintained at an almost stable level.

The objective of this paper is to characterize *Ichneumonidae* communities and trophic guilds occurring in linden canopy of different green habitats of Warsaw, subject to anthropogenic pressure of different kinds and intensity. Particular emphasis is put on the relationship between the structure of the community and the design of urban areas, habitat pollution, management and isolation of green areas.

This paper is restricted to the analysis of *Ichneumonidae* communities occurring in the canopy of lindens (*Tilia cordata* Mill.) as this is the dominant tree in urban habitats, growing in all main green areas of Warsaw.

All study areas were located on the potential linden-oak-hornbeam (*Tilio-Carpinetum*) sites. They are characterized in detail by Kubicka et al. (1986). In the present paper the materials collected from the following sites[1] are used:

A natural habitat (control) — a linden-oak-hornbeam forest (*Tilio-Carpinetum*) located in the Jaktorowska Forest near the village of Hamernia.

A suburban habitat:

Białołęka Dworska — a small linden-oak-hornbeam forest surrounded by crop fields and gardens;

Ursynów — a palace park surrounded by crop fields, orchards, and gardens.

Urban green habitats:

Parks (the name of the street denotes streetside plots; Roman figures denote plots in the parks at increasing distances from the street);

Łazienki Park (Ujazdowskie Avenue + plot II) — an old 86ha park (the streetside plot is on the site of a typical linden-oak-hornbeam forest, the within-park plot on the site of a wet linden-oak-hornbeam forest);

Park at the Cemetery of Soviet Soldiers (Żwirki i Wigury Avenue + plots I and II) — a young 20ha park bordering on vast green areas (allotments, fallows, etc.):

Saxon Garden (Marszałkowska Street[2] + plots II and III) — an old 16ha park surrounded by streets.

[1] The classification of study areas used in this paper is simplified as compared to that in other papers of this series. The main difference is that parks and the adjacent streetside greens are considered here as a single green area. Generally accepted denominations (Kubicka et al. 1986) of the plots taken into consideration are preserved.

[2] Kubicka et al. (1986) consider this site to be a peripheral plot of the park and denote it as Saxon Garden I. It is directly adjacent to a street and separated from the rest of the park by a sidewalk.

Green areas of loosely built-up housing estates:

Wierzbno (plot II) and Muranów (plot II) — vast green habitats in loosely built-up areas.

Green areas of a centre of the town (closely built-up areas):

M.D.M. — a small courtyard in a closely built-up area (M.D.M. II) and lindens along the sidewalk (Konstytucji Square).

On these plots *Ichneumonidae* were captured 569 times (Tab. 1) in

Table 1. The number of *Ichneumonidae* catches in different study areas and years

Study area \ Year	1974	1975	1976	1977	Total
Hamernia			22	14	36
Białołęka Dworska			10	12	22
Ursynów	11	33			44
Łazienki Park [1]	18	60	20		98
Cemetery of Soviet Soldiers [1]	50	83			133
Saxon Garden [1]	36	60			96
Wierzbno			18	11	29
Muranów			19	11	30
M.D.M. II			19	11	30
Konstytucji Square		24	20	7	51
Total	115	260	128	66	569

[1] Including the streetside plot.

1974—1977 by means of Moericke's cups (Czechowski, Mikołajczyk 1981). A total of more than 7900 specimens were captured, representing 392 species. Since the number of traps varied from plot to plot (from 2 to 3) and the number of sampling days also varied (from 5 to 14), an index of abundance was calculated as the mean number of individuals caught per trap per day (Tab. 2).

The *Ichneumonidae* captured were classified into trophic guilds associated with different host groups on the basis of the parasitoid classification proposed by Garbarczyk and Sawoniewicz (1984). Trophic groups occurring in the study areas are described in a paper on the species composition of *Ichneumonidae* of Warsaw (Sawoniewicz 1982).[3]

Species composition and abundance of *Ichneumonidae* communities in particular study areas and plots are given in Tab. 7. Specimens of the subfamilies *Orthocentrinae* and *Oxytorinae* were not identified to species but they are included to respective trophic guilds.

[3] Much information on *Ichneumonidae* hosts can be found in Owen et al. (1981), who classified parasitoids mostly according to the taxonomic position of their hosts. The present paper characterizes only three parasitoid guilds associated with specific hosts.

Table 2. The number of individuals captured (n) and the index of abundance (n) for *Ichneumonidae* communities in different study areas and years

Study area, plot \ Year	1974		1975		1976		1977		Total
	n	n′	n	n′	n	n′	n	n′	n
Hamernia					528	1.35	206	1.37	734
Białołęka Dworska					75	0.75	109	0.84	184
Ursynów	775	1.24	449	0.35					1224
Łazienki Park:									
Ujazdowskie Avenue	283	0.37	298	0.23					581
plot II			496	0.41	242	0.80			738
Cemetery of Soviet Soldiers:									
Żwirki i Wigury Avenue	369	0.49	233	0.25					602
plot I	434	0.54	417	0.36					851
plot II	516	0.70	357	0.34					873
Saxon Garden:									
Marszałkowska Street	356	0.68	298	0.33					654
plot II	97	0.18	190	0.22					287
plot III	79	0.18	224	0.21					303
Wierzbno (plot II)					106	0.34	119	0.31	225
Muranów (plot II)					74	0.21	116	0.32	190
M.D.M:									
plot II					76	0.28	127	0.32	203
Konstytucji Square			149	0.12	77	0.24	45	0.24	271
Total	2909		3111		1178		722		7920

THE EFFECT OF DESIGN OF URBAN AREAS

The effect of habitat urbanization on changes in *Ichneumonidae* communities was determined in a gradient of habitats with decreasing size of green areas and, at the same time, increasing anthropogenic pressure, that is, along the transect: a natural habitat (*Tilio-Carpinetum* forest near Hamernia), suburban green (Białołęka Dworska and Ursynów), urban parks (park at the Cemetery of Soviet Soldiers and Saxon Garden),[4] green of housing estates (Wierzbno and Muranów), green of closely built-up areas (M.D.M.).

In this gradient of increasing anthropogenic pressure, the index of community abundance declined from 1.36 in the natural habitat to 0.24 in the green of the city centre. Changes in the number of species followed a different pattern. More species were found in the suburbs and parks

[4] The Łazienki Park is excluded from this analysis since the within-park plot was on a slightly different site.

(195 and 244, respectively) than in the natural habitat (139 species). Much poorer in species were the communities occurring in green areas of housing estates (82 species) and in the centre of the town (89 species) (Tab. 4).

THE DESCRIPTION COMMUNITIES

In the natural habitat, *Stilbops vetula* was the dominant species, accounting for 22% of the community. The proportion of other relatively numerous species varied from 5 to 1% (Fig. 1 and Tab. 7). The dominant species and *Triclistus podagricus, Gelis albipalpus,* and *Campoplex rothi* are parasites of *Microlepidoptera; Gelis areator* and *Itoplectis alternans* are ecopolyphages; *Acrolyta submarginata, Bathythrix thomsoni* and *B. strigosa* are superparasitoids; *Cratichneumon culex* and *Homotherus varipes* attack biting phytophages; *Nemeritis lativentris* probably infest *Raphidioptera*; *Dichrogaster aestivalis* is a parasite of *Chrysopa* spp. (*Neuroptera*).

Ichneumonidae communities of suburban green areas were dominated by three species accounting for about 6% of the community each. These were *Dichrogaster aestivalis, Charitopes chrysopae* [both parasitoids of aphidophages (*Neuroptera*)] and *Lathrolestes luteolator* [a parasite of *Selandia annulipes* Kl. (*Symphyta*) occurring on linden leaves]. The group of abundant species, accounting for 3 to 1% of the community, consisted of *Charitopes clausus* and *Dichrogaster longicaudatus* (parasitoids of *Neuroptera*), *Homotropus strigator, Promethes sulcator, Sussaba coriacea neopulchella, S. erigator, Diplazon laetatorius, Enizemum ornatum,* and *Ethelurgus sodalis* [parasitoids of aphidophagous *Syrphidae* (*Diptera*)], *Gelis albipalpus, Campoplex restrictor, Coccygomimus turionellae, Eudelus simillimus,* and *Diadegna fenestralis* (parasites of *Microlepidoptera*), *Rhembobius perscrutator* (parasite of coprophagous *Syrphidae*), and *Itoplectis alternans* (ecopolyphage). There were large differences in the dominance structures of ichneumonid communities between the two suburban habitats (Białołęka Dworska and Ursynów). Several species abundant in Ursynów were absent from Białołęka Dworska. These were *Lathrolestes luteolator, Promethes sulcator, Sussaba coriacea neopulchella, S. erigator, Enizemum ornatum, Coccygomimus turionellae, Eudelus simillimus, Campoplex restrictor,* and *Rhembobius perscrutator.* Instead, the proportion of *Gelis albipalpus* in Białołęka Dworska was 12 times as high as in Ursynów (Tab. 7).

Urban parks were largely dominated by *Charitopes chrysopae*, which made up 10% of the total number of individuals in the community. This is a parasitoid of aphidophages (*Neuroptera*). Abundant species (accounting for 5 to 1% of the community) comprised parasitoids of aphidophages such as

Dichrogaster aestivalis and *Charitopes clausus* (parasitoids of *Neuroptera*), *Homotropus strigator, Promethes sulcator, Ethelurgus sodalis, Enizemum ornatum, Diplazon tetragonus,* and *Syrphoctonus flavolineatus* (parasidois of *Syrphidae*); parasitoids of *Microlepidoptera: Gelis albipalpus, Campoplex restrictor, C. rufinator, Coccygomimus turionellae, Glypta nigrina, Diadegma fenestralis, Apophua bipunctoria,* and *Diaglyptidea conformis*; a superparasitoid *Acrolyta submarginata*, and an ecopolyphage *Gelis areator* (Fig. 1 and Tab. 7).

Dominant species living in green areas of housing estates accounted for about 4% of the community, each. They comprised parasitoids of aphidophages: *Dichrogaster aestivalis* and *Charitopes chrysopae* (parasitoids of *Neuroptera*), and *Diplazon tetragonus* (parasitoid of *Syrphidae*), and a parasitoid of *Microlepidoptera — Diaglyptidea conformis*. Abundant species (comprising from 3.5 to 1% of the community) consisted of parasitoids of aphidophages: *Charitopes clausus* and *Dichrogaster longicaudatus* (parasitoids of *Neuroptera*), also *Homotropus strigator, Ethelurgus sodalis,* and *Bathythrix pellucidator* (parasitoids of *Syrphidae*); parasitoids of *Microlepidoptera*: *Gelis albipalpus* and *Campoplex restrictor*; a parasitoid of *Macrolepidoptera: Itamoplex armator;* a parasitoid of parasitoids: *Acrolyta submarginata*; parasitoids of general predators: *Nemeritis lativentris* (probably a parasitoid of *Raphidioptera*) and *Hemiteles similis* (parasitoid of *Aranei*); and an ecopolyphage *Gelis areator*. The *Ichneumonidae* communities of the Wierzbno and Muranów housing estates were characterized by a similar species composition and similar proportions of abundant species. The only exceptions were *Acrolyta submarginata* and *Hemiteles similis,* occurring only in Wierzbno, and *Diaglyptidea conformis,* reaching a particularly high proportion of 9% in Muranów (Tab. 7).

Urban green habitats of closely built-up areas were dominated by 7 species accounting for 6—3% of the community, each. The highest proportion of about 6% was in the case of *Hypsicera curvator,* a parasitoid of *Microlepidoptera*. Also other dominants such as *Gelis albipalpus* and *Campoplex restrictor* are associated with this group of hosts. Still other dominants, *Charitopes chrysopae, Ch. clausus,* and *Dichrogaster aestivalis* are associated with *Neuroptera*, and *Nemeritis lativentris* probably with *Raphidioptera*. Numerous species (accounting for about 1% of the community) consisted of *Gelis areator, Acrolyta submarginata, Diadegma fenestralis, Leptocampoplex cremastoides*, and *Diplazon tetragonus* (Fig. 1). There were some differences in the species composition of the dominant group between the two plots in closely built-up areas. The community of the courtyard in M.D.M. (plot II) was dominated by *Gelis albipalpus* and *Nemeritis lativentris*. At the Konstytucji Square, in addition to these two species also *Campoplex restrictor* and *Hypsicera curvator* were in the group of dominants (Tab. 7).

These dominance structures of *Ichneumonidae* communities living in suburban

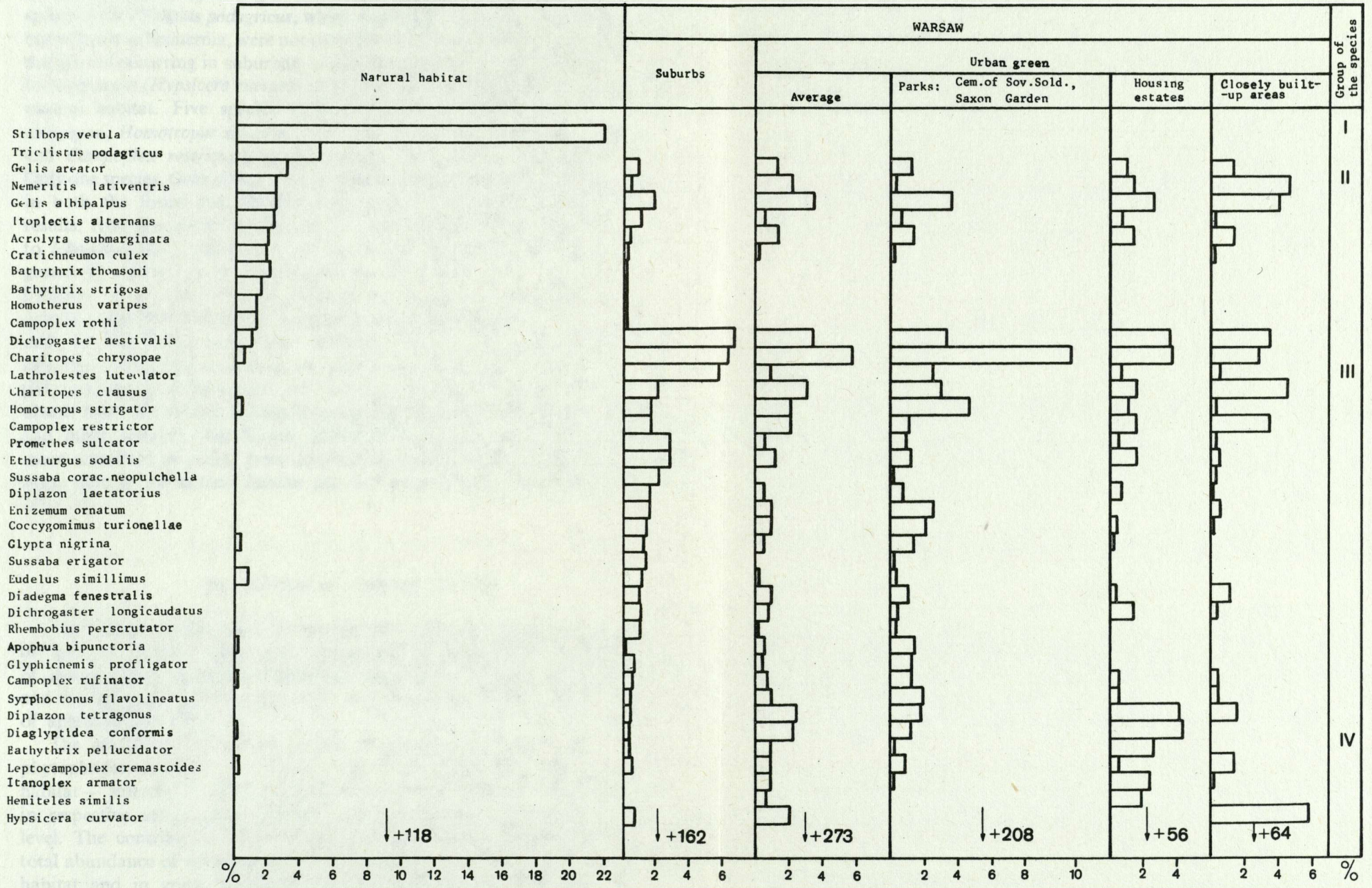

Fig. 1. Changes in the dominance structure of *Ichneumonidae* communities along the transect: natural habitat (Hamernia) — suburbs (Białołęka Dworska and Ursynów, on the average) — urban green areas of Warsaw

and urban green habitats differed markedly from the dominance structure of the community occurring in the natural habitat. *Stilbops vetula* (a spring species) and *Triclistus podagricus*, which were dominant in the linden-oak-hornbeam forest at Hamernia, were not recorded in Warsaw. At the same time, some dominants occurring in suburban areas (*Lathrolestes luteolator*) and in closely built-up areas (*Hypsicera curvator* and *Charitopes clausus*) were absent from the natural habitat. Five species dominant in urban green areas (*Charitopes chrysopae, Homotropus strigator, Diplazon tetragonus, Diaglyptidea conformis*, and *Campoplex restrictor*) were scarce in the linden-oak-hornbeam forest. Only one species, *Gelis albipalpus* (having hosts living on lindens), was abundant in both the forest and all the study plots in Warsaw. Basing on these results, four groups of species can be distinguished among those common to *Ichneumonidae* communities of the natural and urban habitats. The first group (I) consists of the dominants occurring only in the natural habitat (*Stilbops vetula* and *Triclistus podagrinus*). The second group (II) comprises species abundant (sometimes dominant) in the suburban and urban habitats and, at the same time, also abundant in the natural habitat (*Gelis albipalpus, Nemeritis lativentris*, and *Acrolyta submarginata*). The third group (III) is made up of the species dominant in urban green areas but scarce in or absent from the natural habitat (*Dichrogaster aestivalis, Charitopes chrysopae*, and other species). The fourth group (IV) consists of the species much more abundant in parks, green areas of housing estates, or closely built-up areas than in the natural habitat and the suburbs (e.g., *Hypsicera curvator*) (Fig. 1).

DESCRIPTION OF TROPHIC GUILDS

The *Ichneumonidae* guilds associated with different host groups are given in Tab. 3. Three of them are represented by particularly high numbers of species and individuals. These are parasitoids of gall-forming, mining and folding phytophages, parasitoids of biting phytophages, and parasitoids of aphidophages (Tab. 4).

The abundance of the parasitoids of gall-forming, mining and folding phytophages dropped by a factor for 3—9 along the transect natural habitat — suburbs — urban green areas of different kinds. But their abundance in respective urban green habitats was maintained at a relatively similar level. The contribution of the number of individuals of this guild to the total abundance of *Ichneumonidae* communities was the highest in the natural habitat and in green of closely built-up areas, but different species predominated in each of these habitats. It should be noted that a very high abundance and proportion of this guild in the natural habitat was

Table 3. Proportions of species (%N) and individuals (%n) of trophic guilds associated with different host groups in *Ichneumonidae* communities of natural, suburban and urban habitats

Habitat / Parasitoids of:	Natural		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks [1]		Housing estates		Closely built-up areas	
	%N	%n	%N	%n	%N	%n	%N	%n	%N	%n	%N	%n
— xylophages	3.4	0.7	5.1	1.3	4.9	0.5	4.1	0.9	–	–	4.3	0.9
— leaf mining and folding or gall-forming phytophages	32.1	45.2	33.0	23.3	35.4	30.2	32.9	27.0	26.9	22.6	36.2	37.2
— fungiphages	?	6.9	?	9.3	?	8.4	?	8.8	?	11.4	?	2.7
— exophytophages: [2]												
Lepidoptera	20.5	9.2	16.2	3.3	17.0	2.9	19.5	2.6	7.5	3.6	7.4	2.1
Symphyta	11.6	6.9	12.7	9.5	8.3	4.0	8.5	8.1	8.7	3.3	2.1	1.2
Total	32.1	16.1	28.9	12.8	25.3	6.9	28.0	10.7	16.2	6.9	9.5	3.3
— general predators	6.8	5.0	6.1	3.5	7.3	5.6	6.1	3.4	9.9	4.7	7.4	7.8
— aphidophages:												
Neuroptera	2.1	1.8	3.0	16.6	2.4	15.6	2.8	19.8	7.5	12.4	5.3	12.1
Syrphidae	1.4	0.5	11.2	16.7	9.1	13.3	9.4	17.8	16.3	13.8	16.0	6.4
Sphecidae	–	–	–	–	0.3	0.1	0.4	0.1	–	–	1.1	0.2
Total	3.5	2.3	14.2	33.3	12.8	29.0	12.6	37.7	23.8	26.2	22.4	18.7
— parasitoids	11.0	9.6	3.6	2.9	7.3	6.6	7.3	5.1	10.6	9.2	9.6	6.4
— other hosts	8.3	7.9	7.6	11.7	7.0	10.9	7.8	4.4	10.1	17.4	8.5	21.2
Ecooligophages	1.4	1.0	0.5	0.1	0.3	0.1	0.4	0.1	–	–	–	–
Ecopolyphages	1.4	5.3	1.0	1.8	0.7	1.9	0.8	1.9	2.5	1.6	2.1	1.7

[1] Excluding Łazienki Park.

[2] According to the classification used in an earlier paper (Sawoniewicz 1982) these are biting phytophages.

Table 4. The number of species (N) and the index of abundance (n') of some trophic guilds, and the total number of species and the index of total abundance of *Ichneumonidae* communities in natural, suburban, and urban habitats

Habitat / Parasitoids of:	Natural		Warsaw									
			Suburbs		Urban green areas							
					Total		Parks [1]		Housing estates		Closely built-up areas	
	N	n′	N	n′	N	n′	N	n′	N	n′	N	n′
— leaf mining and folding or gall-forming phytophages	47	0.61	65	0.19	102	0.09	81	0.11	22	0.07	34	0.09
— exophytophages	47	0.21	57	0.10	73	0.02	69	0.04	13	0.02	9	0.01
— aphidophages	5	0.03	28	0.27	34	0.09	31	0.15	19	0.08	21	0.05
Total of *Ichneumonidae*	139	1.36	195	0.80	307	0.31	244	0.40	82	0.30	89	0.24

[1] Excluding Łazienki Park

due to the high number of *Stilbops vetula*. Individuals of this species accounted for about 50% of this guild. This is a parasitoid of *Adela viridella* Scop. (= *A. reamurella* L.) (*Microlepidoptera*) occurring in the herb layer and under leaf litter of trees of the genera *Fagus* L., *Quercus* L., and *Corylus* L. Most probably the elimination of this lepidopteran from urban green areas of Warsaw by removing leaves accounted for the elimination of its parasitoid as well. The highest number of species of this guild was found in parks and suburban areas, but the contribution of these species to the total number of of *Ichneumonidae* species was similar in all the study habitats along the transect.

The abundance of guild of parasitoids of biting phytophages dropped along the transect by a factor of 20, and the proportion of individuals to the total number of individuals in the communities by a factor of 5. This guild, like the preceding one, was represented by the highest number of species in the suburbs and parks, and the proportion of the number of species declined with increassing anthropogenic pressure.

The guild of parasitoids of aphidophages showed an opposite tendency. The proportion of the number of species in this quild to the total number of species increased by a factor of 3.5—6.5 with anthropogenic pressure along the transect. The other three characteristics of this guild (the number of species, their abundance, and proportion of the number of individuals to the total number of individuals in the community) reached the highest values in the suburbs and parks. It should be noted that also in green areas of loosely and closely built-up areas they were clearly higher than in the natural environment.

It follows from this analysis that different trophic guilds of *Ichneumonidae* occurring in linden canopy differ in the intensity of their response to increasing anthropogenic pressure. Urban conditions have a particularly limiting effect on the guild of parasitoids of biting phytophages. The guild of parasitoids of gall-forming, mining, and folding phytophages are less affected, while the guild of parasitoids of aphidophages is enhanced by increasing anthropogenic pressure.

THE EFFECT OF HABITAT POLLUTION

The effect of the degree of habitat pollution on the occurrence of *Ichneumonidae* was mainly analysed in the park at the Cemetery of Soviet Soldiers, considered as a model habitat, and also in the Saxon Garden and the Łazienki Park.

In the park at the Cemetery of Soviet Soldiers, a transect was established from a streetside zone (Żwirki i Wigury Avenue) through the centre of

the park (plot I) to its periphery (plot II) bordering on vast areas of different green habitats (allotments, fallows, etc.). With increasing distance from the street, that is, with declining habitat pollution, the number of species increased by 1/3 and the abundance of ichneumonid communities increased by 1/2 (Tab. 6).

Ichneumonidae communities occurring on respective plots along the transect, differed in their dominance structure but not so much in the species composition (Fig. 2). All of them were dominated by the same species (*Charitopes chrysopae*), while the proportions of other dominant species differed. For example, the proportion of *Enizemum ornatum* was high on the streetside plot but low on plots I and II. *Homotropus haemorrhoidalis* was absent from plot II. The proportion of *Apophua bipunctoria* was relatively high only on plot I and that of *Glyphicnemis profligator* only on plot II.

The values of indices characterizing more important trophic guilds of *Ichneumonidae* occurring on different plots varied with the distance from the street (Fig. 3, Tabs 5 and 6). They increased with this distance for parasitoids of gall-forming, mining, and folding phytophages, and also for parasitoids of biting phytophages. It should be emphasized that a decrease in the habitat pollution had a much more favourable effect on parasitoids of biting phytophages than on other guilds. An opposite tendency was noted for parasitoids of aphidophages. This guild was the richest in species and individuals in the streetside zone. The values of all indices declined with increasing distance from the street. This was particularly the case of the proportion of the number of individuals in the total number of individuals in the community (a decline from 52% on the streetside plot to 22% on the most distant plot).

The *Ichneumonidae* community occurring in the Saxon Garden was largely affected not only by the degree of habitat pollution in the gradient: streetside zone (Marszałkowska Street) — within-park habitat (plots II and III), but also by the species composition and spatial structure of the vegetation. The park was characterized by a dense linden canopy and absence of the herb layer. The total abundance of the *Ichneumonidae* community was reduced there by a factor of 2.5 as compared with the streetside zone (Tab. 5). The dominance structures of the communities on the two within-park plots were much more similar to each other than to that on the streetside plot (Fig. 4). Two species, *Charitopes chrysopae* and *Homotropus strigator*, and also abundantly occurring *Gelis albipalpus* were common to the three communities. *Syrphoctonus flavolineatus* and *Nemeritis lativentris* were absent from plot III, and *Homotropus tarsatorius* did not occur on the within-park plots. *Lathrolestes luteolator*, *Acrolyta submarginata*, and *Diadegma fenestralis* were abundant on the within-park plots but scarce on the streetside plot. The total abundance of all trophic guilds of *Ichneumonidae* was markedly

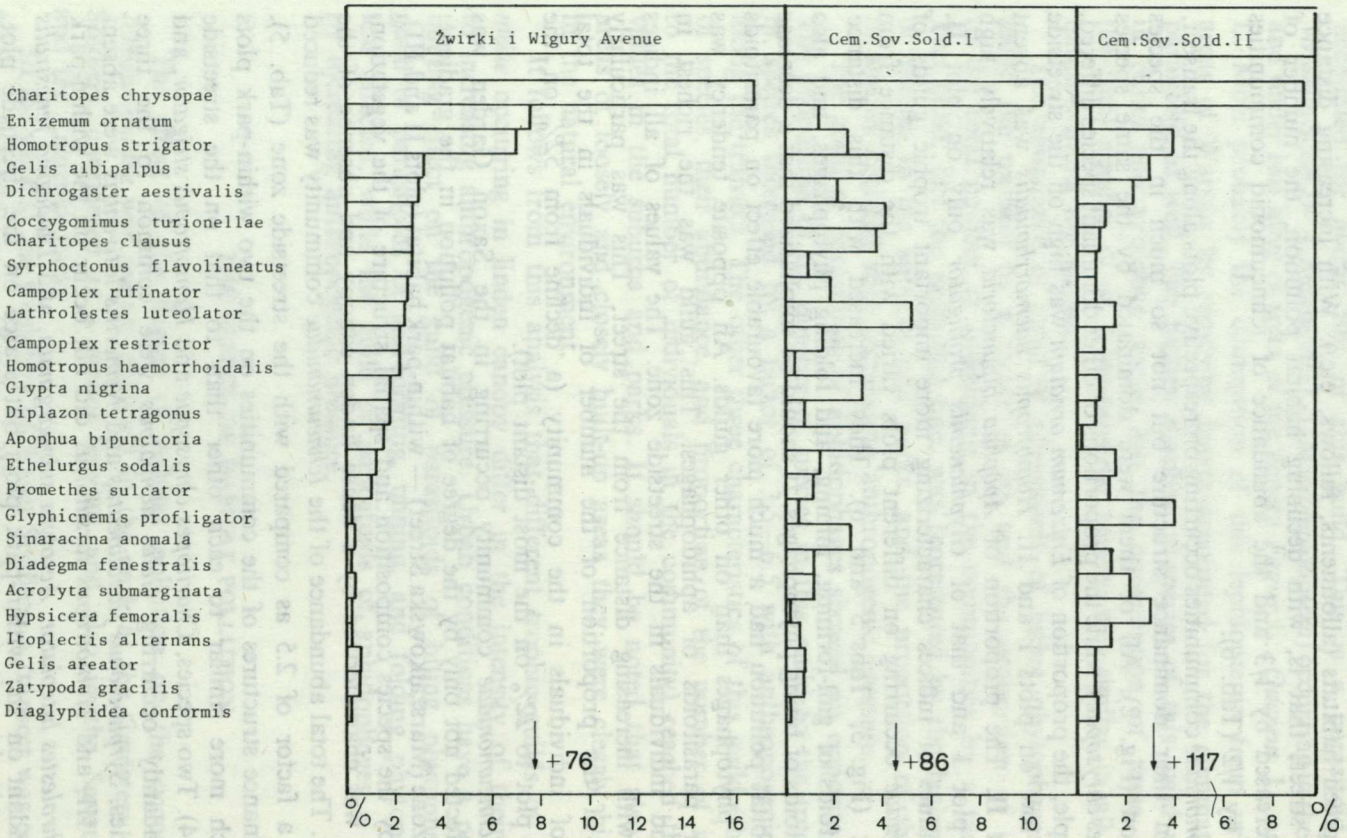

Fig. 2. Changes in the dominance structure of *Ichneumonidae* communities along the transect in the park at the Cemetery of Soviet Soldiers (Żwirki i Wigury Avenue and plots I and II)

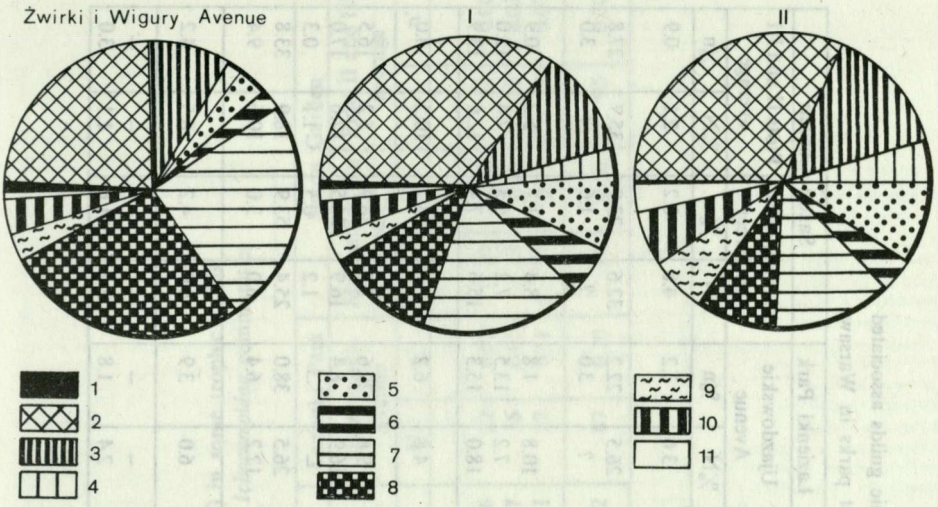

Fig. 3. Proportions of respective trophic guilds (numbers of individuals) in *Ichneumonidae* communities along the transect in the park at the Cemetery of Soviet Soldiers (Żwirki i Wigury Avenue and the plots I and II). Parasitoids of: 1 — xylophages, 2 — leaf mining and folding or gall-forming phytophages, 3 — fungiphages, 4 — 5 — exophytophages: *Lepidoptera* (4) and *Symphyta* (5), 6 — general predators, 7—8 — aphidophages: *Neuroptera* (7) and *Syrphidae* (8), 9 — parasitoids, 10 — other hosts; 11 — ecooligophages and ecopolyphages

reduced on the within-park plots as compared with the streetside plot. But the values of the other indices were higher for the guilds occurring on the within-park plots (II and III) than for those on the streetside plot. Only the parasitoids of aphidophages reached the highest values of all indices on the streetside plot.

The Łazienki Park is established on two sites of potential vegetation: a typical linden-oak-hornbeam forest (streetside zone at Ujazdowski Avenue) and a wet linden-oak-hornbeam forest (within-park plot II). In the centre of the park, where the habitat pollution was lower and the richness of vegetation higher than in the streetside zone, the number of *Ichneumonidae* species was higher (101 and 66, respectively) and the community was more abundant (0.6 and 0.3, respectively). The communities occurring on these two plots had three species in common: *Nemerities lativentris, Glyphicnemis profligator,* and *Charitopes chrysopae.* Only *Acrolyta submarginata,* the dominant species in the centre of the park, was less abundant on the streetside plot, and *Zatypoda gracilis,* which was abundant on the streetside plot, was absent from the centre of the park (Fig. 5 and Tab. 7).

Table 5. Proportions of species (%N) and individuals (%n) of trophic guilds associated with various host groups in *Ichneumonidae* communities of different parks in Warsaw

Study area, plot / Parasitoids of:	Cemetery of Soviet Soldiers						Łazienki Park		Saxon Garden			
	Żwirki i Wigury Avenue		Plot I		Plot II		Ujazdowskie Avenue		Marszałkowska Street		Plots II and III average	
	%N	%n	%N	%n	%N	%n	%N	%n	%N	%n	%N	%n
— xylophages	2.8	1.2	2.6	0.7	0.7	0.2	3.6	3.2	4.8	0.2	2.1	0.9
— leaf mining and folding or gall-forming phytophages	35.0	23.5	33.3	33.7	34.8	31.3	26.5	22.2	32.6	23.9	35.7	27.8
— fungiphages	?	9.0	?	11.7	?	14.2	?	3.0	?	1.6	?	3.0
— exophytophages:												
Lepidoptera	8.5	1.5	12.8	3.0	19.2	4.7	10.8	1.8	8.4	1.1	5.2	0.9
Symphyta	5.7	3.2	5.1	8.1	8.9	9.0	7.2	13.5	7.2	6.3	7.4	13.0
Total	14.2	4.7	17.9	11.1	28.1	13.7	18.0	15.3	15.6	7.4	12.6	13.9
— general predators	6.6	2.2	4.3	5.6	4.8	3.7	4.8	6.2	7.2	3.2	10.5	4.0
— aphidophages:												
Neuroptera	5.7	24.5	5.1	17.5	2.8	13.1	9.6	29.6	7.3	26.9	5.2	16.5
Syrphidae	16.1	27.1	13.7	11.6	9.5	8.9	16.9	8.4	16.9	26.5	12.6	17.0
Sphecidae	–	–	–	–	–	–	–	–	1.2	0.5	1.1	0.3
Total	21.8	51.6	18.8	29.1	12.3	22.0	26.5	38.0	25.4	53.9	18.9	33.8
— parasitoids	7.5	2.8	7.6	2.8	8.9	5.8	12.2	6.4	6.0	3.0	10.6	9.4
— other hosts	10.2	4.2	12.9	3.9	8.3	6.1	6.0	3.9	6.0	4.2	8.5	4.2
Ecooligophages	–	–	0.9	0.1	0.7	0.9	–	–	–	–	–	–
Ecopolyphages	1.9	0.8	1.7	1.3	1.4	2.1	2.4	1.8	2.4	1.6	1.1	3.0

Table 6. The number of species (N) and the index of abundance (n′) in some trophic guilds, and the total number of species and the index of total abundance of *Ichneumoidae* communities of different parks in Warsaw

Study area, plot / Parasitoids of:	Cemetery of Soviet Soldiers						Łazienki Park		Saxon Garden			
	Żwirki i Wigury Avenue		Plot I		Plot II		Ujazdowskie Avenue		Marszałkowska Street		Plots II and III average	
	N	n′	N	n′	N	n′	N	n′		n′	N	n′
— leaf mining and folding or gall-forming phytophages	37	0.09	39	0.15	51	0.16	22	0.07	27	0.12	34	0.06
— exophytophages	15	0.02	21	0.05	41	0.07	15	0.05	13	0.04	12	0.03
— aphidophages	23	0.19	22	0.13	18	0.11	22	0.11	21	0.27	18	0.07
Total of *Ichneumonidae*	102	0.37	112	0.45	142	0.52	87	0.30	81	0.50	95	0.20

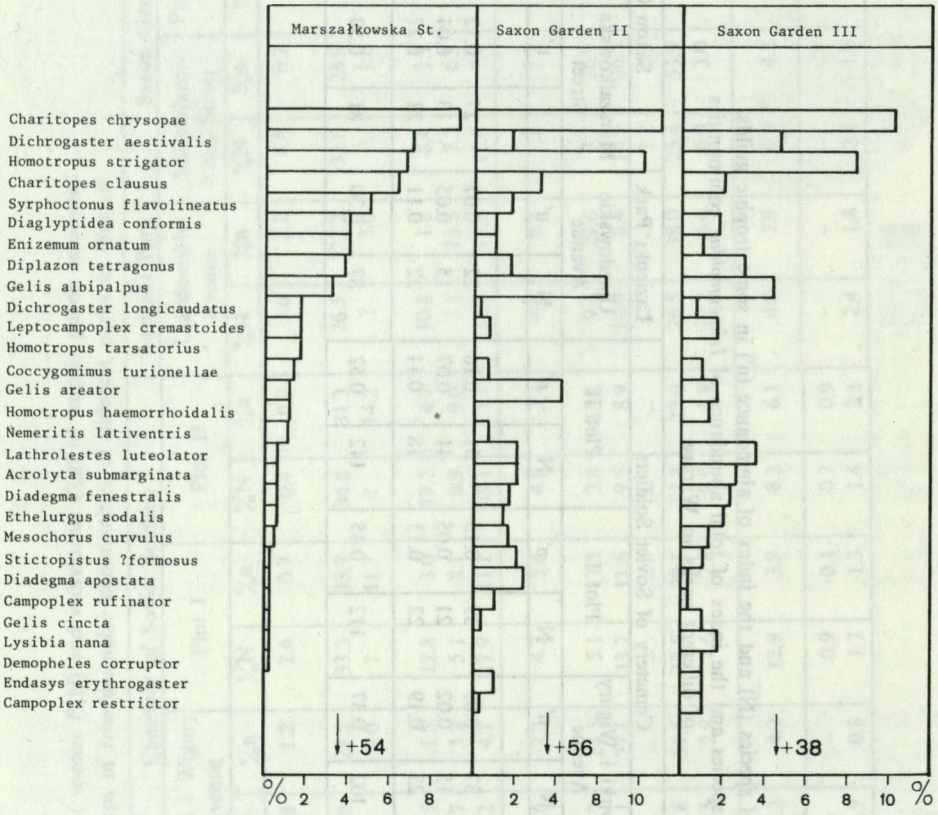

Fig. 4. Changes in the dominance structure of *Ichneumonidae* communities along the transect in the Saxon Garden (Marszałkowska Street and plots II and III)

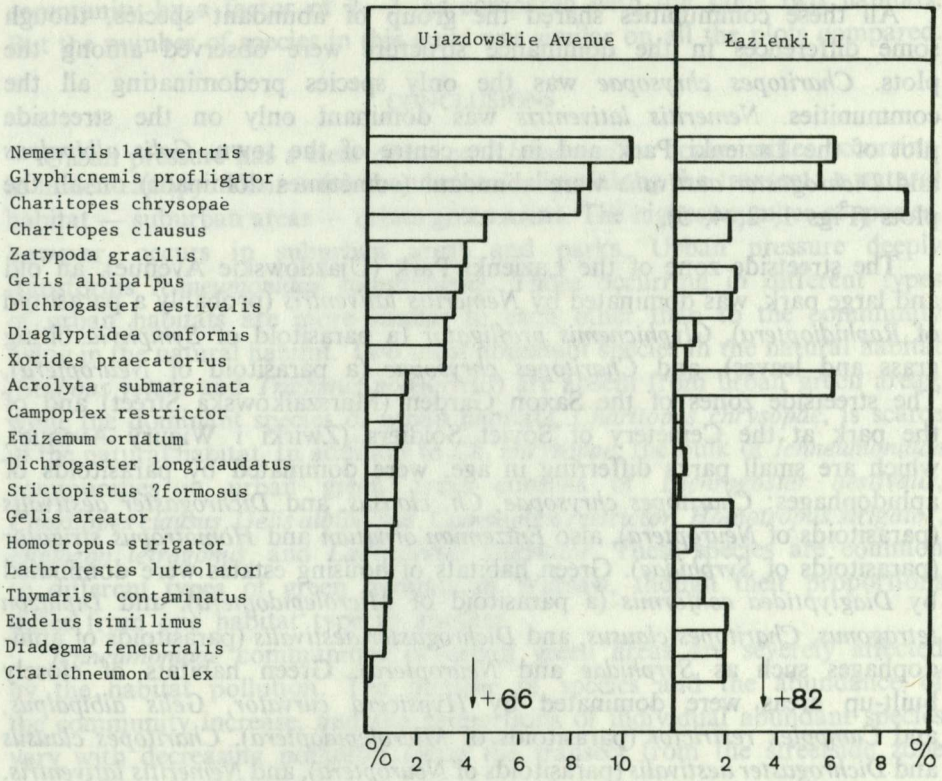

Fig. 5. Changes in the dominance structure of *Ichneumonidae* communities along the transect in the Łazienki Park (Ujazdowskie Avenue and plot II)

THE EFFECT OF MANAGEMENT AND ISOLATION

The assessment of the relationship between *Ichneumonidae* occurrence and the way of management along with the degree of isolation of green areas was based on an analysis of the communities on streetside plots adjacent to large parks (Łazienki Park, Saxon Garden, park at the Cemetery of Soviet Soldiers), and on green areas of losely built-up housing estates (Wierzbno and Muranów) and closely built-up ones (M.D.M.). The number of species in *Ichneumonidae* communities in these three habitat types varied from 81 to 102, thus it was relatively similar. No significant differences were recorded in the abundance of these communities, which varied between 0.24 and 0.37 either. An exceptionally high abundance of 0.5 was noted in the streetside zone of the Saxon Garden (Marszałkowska Street), with a diversified plant cover (Tabs 4 and 6).

All these communities shared the group of abundant species, though some differences in the dominance structure were observed among the plots. *Charitopes chrysopae* was the only species predominating all the communities. *Nemeritis lativentris* was dominant only on the streetside plot of the Łazienki Park and in the centre of the town. *Gelis albipalpus* and *Dichrogaster aestivalis* were abundant (sometimes dominant) on all the plots (Figs 1, 2, 4, 5).

The streetside zone of the Łazienki Park (Ujazdowskie Avenue), an old and large park, was dominated by *Nemeritis lativentris* (probably a parasitoid of *Raphidioptera*), *Glyphicnemis profligator* (a parasitoid of *Symphyta* biting grass and leaves), and *Charitopes chrysopae* (a parasitoid of *Neuroptera*). The streetside zones of the Saxon Garden (Marszałkowska Street) and of the park at the Cemetery of Soviet Soldiers (Żwirki i Wigury Avenue), which are small parks differring in age, were dominated by parasitoids of aphidophages: *Charitopes chrysopae, Ch. clausus,* and *Dichrogaster aestivalis* (parasitoids of *Neuroptera*), also *Enizemum ornatum* and *Homotropus strigator* (parasitoids of *Syrphidae*). Green habitats of housing estates were dominated by *Diaglyptidea conformis* (a parasitoid of *Microlepidoptera*), and *Diplazon tetragonus, Charitopes clausus,* and *Dichrogaster aestivalis* (parasitoids of aphidophages such as *Syrphidae* and *Neuroptera*). Green habitats of closely built-up areas were dominated by *Hypsicera curvator, Gelis albipalpus,* and *Campplex restrictor* (parasitoids of *Microlepidoptera*), *Charitopes clausus* and *Dichrogaster aestivalis* (parasitoids of *Neuroptera*), and *Nemeritis lativentris*, which also predominated the streetside zone of the Łazienki Park (Figs 1, 2, 4, 5, Tab. 7).

The number of species and dominance structure of the trophic *Ichneumonidae* guilds were similar on almost all the plots. Only in green habitats of closely built-up area, these indices were lower for parasitoids of biting phytophages. The abundance and proportions of these guilds followed various patterns. The guild of parasitoids of gall-forming, mining, and folding phytophages was characterized by a similar abundance on all the plots. A peak proportion of 37% of all individuals in the community this guild reached in green habitats of closely built-up areas, on the other plots it was 19—26%. The parasitoids of biting phytophages on streetside plots were enhanced by old parks. The abundance of this guild was higher there by a factor of 4—5 and its proportion by a factor of 2—5, as compared with those in green habitats of closely built-up areas. Also parasitoids of aphidophages were much more abundant in streetside zones of the parks than in green habitats of loosely and closely built-up areas. The abundance of this guild on streetside plots was higher by a factor of 2—5 and the contribution to the total number of individuals in the

community by a factor of 2—3, as compared with the same two habitats. But the number of species in this guild was similar on all the plots compared.

CONCLUSIONS

Urban pressure has a clear effect on *Ichneumonidae* communities occurring in linden canopy. Their total abundance declines along the transect: a natural habitat — suburban areas — urban green areas. The highest number of species, however, occurs in suburban areas and parks. Urban pressure deeply transforms *Ichneumonidae* communities. Those occurring in different types of urban habitats are more similar to each other than to the community living in the natural habitat. Two most abundant species in the natural habitat (*Stilbops vetula* and *Triclistus podagricus*) are absent from urban green areas, while the dominant species of urban habitats, *Charitopes chrysopae*, is scarce in the natural habitat. In addition to *Ch. chrysopae*, the bulk of *Ichneumonidae* communities in urban green areas consists of *Dichrogoster aestivalis*, *Charitopes clausus*, *Gelis albipalpus*, *Campoplex restrictor*, *Homotropus strigator*, *Diplazon tetragonus*, and *Lathrolestes luteolator*. These species are common to different types of green habitats in Warsaw, though their proportions differ from one habitat type to another.

Ichneumonidae communities of urban green areas are severely affected by the habitat pollution. The number of species and the abundance of the community increase, and the proportions of individual abundant species vary with decreasing pollution along the transect from the streetside zone to within-park plots.

Differences between *Ichneumonidae* communities occurring in the streetside zones of large parks and those occurring in isolated green habitats of closely built-up areas are relatively small. The number of species is similar and the main abundant species are the same, though in different proportions.

There are several trophic guilds of *Ichneumonidae* associated with different host groups, in urban green areas of Warsaw and in the natural habitat. The main guilds, characterized by the highest number of species and individuals, comprise the guild of parasitoids of gall-forming, mining, and folding phytophages, the guild of biting phytophages, and the guild of parasitoids specialized in attacking aphidophages. The effect of urban pressure and habitat pollution is particularly destructive to parasitoids of biting phytophages. Parasitoids of gall-forming, mining, and folding phytophages are less affected, while parasitoids of aphidophages are enhanced to some extent. This last guild is particularly favoured in suburban areas, also in parks and, particularly in their streetside zones.

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STRUKTURA ZGRUPOWAŃ *ICHNEUMONIDAE* (*HYMENOPTERA*) W ZIELENI MIEJSKIEJ WARSZAWY

STRESZCZENIE

Badano strukturę zgrupowań *Ichneumonidae* występujących w różnych środowiskach zieleni miejskiej Warszawy (parkach, zieleni osiedli mieszkaniowych i zieleni centrum miasta) na tle stanu zgrupowań ze środowisk podmiejskich i środowiska naturalnego (lasu *Tilio-Carpinetum*). Odłowy prowadzono w latach 1974—1977 metodą żółtych szalek Moerickego zawieszonych w koronach lip. Uzyskany materiał liczy około 8000 osobników reprezentujących ponad 400 gatunków.

Presja urbanizacyjna wywiera wyraźny wpływ na zgrupowania *Ichneumonidae*. W transekcie środowisko naturalne — suburbia — zieleń miejska spada ogólna liczebność *Ichneumonidae*. Najwyższa liczba gatunków występuje natomiast w suburbiach i parkach. Pod wpływem presji urbanizacyjnej następuje radykalna przebudowa zgrupowań *Ichneumonidae*. Zgrupowania z różnych typów zieleni miasta są bardziej podobne do siebie niż do zgrupowania ze środowiska naturalnego (*Tilio-Carpinetum*). Dwóch najliczniej występujących gatunków w środowisku naturalnym (*Stilbops vetula* i *Triclistus podagricus* brak jest w zieleni miejskiej, natomiast dominant w zieleni Warszawy, *Charitopes chrysopae*, występuje nielicznie w środowisku naturalnym. Oprócz *Ch. chrysopae*, trzon zgrupowań *Ichneumonidae* zieleni Warszawy tworzą *Dichrogaster aestivalis* i *Charitopes clausus* (parazytoidy *Neuroptera*); *Homotropus strigator* i *Diplazon tetragonus* (parazytoidy mszycożernych *Syrphidae*); *Gelis albipalpus* i *Campoplex restrictor* (parazytoidy *Microlepidoptera*); oraz *Lathrolestes luteolator* (parazytoid *Symphyta*). Gatunki te

są wspólne dla różnych typów zieleni Warszawy, choć ich udziały w poszczególnych zgrupowaniach są różne.

Duży wpływ na ukształtowanie zgrupowań *Ichneumonidae* ma również stopień skażenia środowiska. Wraz z jego spadkiem w transekcie od strefy przyjezdniowej ku wnętrzu parku rośnie liczba gatunków i liczebność zgrupowań oraz zmieniają się udziały poszczególnych gatunków licznie występujących.

Różnice między zgrupowaniami występującymi w strefach przyjezdniowych, będących pod wpływem dużego kompleksu zieleni parkowej, a zgrupowaniami izolowanymi w centrum miasta są stosunkowo małe. Liczba gatunków jest zbliżona, występuje też wspólny podstawowy trzon gatunków licznie występujących, choć udziały tych gatunków są różne.

W zieleni Warszawy i w środowisku naturalnym występuje kilka kompleksów troficznych *Ichneumonidae* związanych z określonymi grupami biotycznymi żywicieli. Do głównych kompleksów, wyróżniających się dużą liczbą gatunków i liczebnością, należą: kompleks parazytoidów fitofagów wyroślotwórczych, minujących i zwijających, kompleks parazytoidów fitofagów zgryzających i kompleks parazytoidów drapieżców wyspecjalizowanych — afidofagów. Wzrost stopnia zurbanizowania i nasilenia skażenia środowiska szczególnie negatywnie oddziałuje na parazytoidy fitofagów zgryzających, w mniejszym stopniu na parazytoidy fitofagów wyroślotwórczych, minujących i zwijających, natomiast w pewnym stopniu pozytywnie na parazytoidy afidofagów. Ten ostatni kompleks szczególnie korzystne warunki znajduje w suburbiach, a także w parkach, szczególnie w ich strefach przyjezdniowych.

СТРУКТУРА СООБЩЕСТВ *ICHNEUMONIDAE* (*HYMENOPTERA*) ГОРОДСКИХ ЗЕЛЕНЫХ НАСАЖДЕНИЙ ВАРШАВЫ

РЕЗЮМЕ

Исследовали структуру сообществ *Ichneumonidae* крон лип в разных биотопах городских зеленых насаждений Варшавы: в субурбиях, парках, жичых районах и в центре города, а также в природном биотопе (*Tilio-Carpinetum*). Констатировали в общем свыше 392 видов *Ichneumonidae*. Рост урбанизационного пресса (в трансекте: природный биотоп — субурбий — городская зелень) и рост степени загрязнения среды (в трансекте: внутрения часть парка — наружная часть парка, прилегающая к улице) ограничивают в количественном отношении, а часто также в качественном встречающиеся сообщества *Ichneumonidae*. Структуры доминации сообществ из исследованных типов городской зелены Варшавы в значительно большей степени сходны друг с другом чем структуры доминации в природном биотопе. На территории зеленых насаждений Варшавы встречается одна основная группа видов, встречающихся многочисленно. К ним относятся, например, *Dichrogaster aestivalis*, *Charitopes chrysopae* и *C. clausus* (паразитоиды *Neuroptera*). Антропогенный пресс в различной степени влияет на выделенные трофические сообщества *Ichneumonidae* — четко ограничивает паразитоидов грызущих фитофагов, в меньшей степени паразитоидов орехотворок, минирующих и листоверток. Определенное положительное влияние антропогенного пресса отметили по отношению встречаемости паразитоидов афидофагов.

Table 7. Check-list of *Ichneumonidae* species, the number of individuals captured (n) and proportions (%) of particular species on different study areas in natural, suburban, and urban (Warsaw) habitats (+ — denotes a very low proportion)

No.	Habitat, study area, plot / Species	Natural		Suburban				Urban green areas																					
								Parks																Housing estates				Closely built-up areas			
								Łazienki Park				Cemetery of Soviet Soldiers						Saxon Garden											
		Hamernia		Białołęka Dworska		Ursynów		Ujazdowskie Avenue		Plot II		Żwirki i Wigury Avenue		Plot II		Plot III		Marszałkowska Street		Plot II		Plot III		Wierzbno (II)		Muranów (II)		MDM (II)		Konstytucji Square	
		n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%		%	n	%	n	%	n	%	n	%	n	%	n	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	Ephialtinae																														
1	*Scambus annulatus* Kiss	3	0.4	1	0.5	12	0.9			1	0.1	1	0.2	3	0.4	5	0.6	1	0.2	2	0.7	2	0.7			1	0.5			2	0.8
2	*Scambus calobatus* Grav.	2	0.2	5	2.7							1	0.2																		
3	*Scambus detritus* Holmgr.					1	+									1	0.1														
4	*Scambus sagax* Hartig	1	0.1													1	0.1													1	0.4
5	*Scambus dilutus* Ratz.															1	0.1														
6	*Pimpla manifestator* L.															2	0.2														
7	*Townesia tenuiventris* Holmgr.											1	0.2			1	0.1														
8	*Liotryphon crassisetus* Thoms.													1	0.1	1	0.1														
9	*Liotryphon punctulatus* Ratz.					1	+									1	0.1														
–	*Dolichomitus* spp.			1		1				1		5		3		2		3												1	
10	*Dolichomitus agnoscendus* Roman							1	0.2																						
11	*Acropimpla pictipes* Grav.	4	0.5									1	0.2			1	0.1														
12	*Gregopimpla inquisitor* Scop.	2	0.2					1	0.2							1	0.1													2	0.8
13	*Iseropus stercorator* Fabr.	1	0.1																												

14	*Tromatobia oculatoria* Fabr.													1	0.1																		
15	*Tromatobia ovivora* Bohem.	2	0.2			3	0.2			1	0.1									1	0.3									1	0.4		
16	*Zaglyptus multicolor* Grav.	2	0.2																							2	1.1	1	0.5				
17	*Zaglyptus varipes* Grav.																							1	0.4								
18	*Clistopyga incitator* Fabr.			1	0.5	2	0.1	4	0.7	2	0.2	1	0.2					2	0.3	2	0.7			1	0.4					1	0.4		
19	*Piogaster* sp.							1	0.2																								
20	*Schizopyga flavifrons* Holmgr.							2	0.4													1	0.3										
21	*Oxyrrhexis carbonator* Grav.											1	0.2											1	0.4								
22	*Polysphincta boops* Tschek	1	0.1																	1	0.3												
23	*Sinarachna anomala* Holmgr.	1	0.1			11	0.8					2	0.3	23	2.7	5	0.6	1	0.2			2	0.7										
24	*Zatypoda albicoxa* Walker	2	0.2	1	0.5											1	0.1													1	0.4		
25	*Zatypoda bohemani* Holmgr.															1	0.1							1	0.4								
26	*Zatypoda gracilis* Holmgr.	2	0.2			3	0.2	22	3.8			3	0.5	6	0.7	6	0.7	2	0.3									1	0.5				
27	*Itoplectis alternans* Grav.	16	2.2	6	3.3	8	0.6	3	0.5	6	0.8	1	0.2	5	0.6	12	1.4	2	0.3			2	0.7	1	0.4	2	1.1	1	0.5				
28	*Itoplecti maculator* Fabr.					4	0.3					4	0.7	4	0.5	2	0.2	1	0.2	1	0.3	1	0.3										
29	*Apechtis quadridentata* Thoms.	4	0.5			1	+																										
30	*Apechtis rufata* Gmel.	3	0.4											1	0.1	8	0.9																
31	*Coccygomimus aquilonius* Cress.	6	0.7																			1	0.3										
32	*Coccygomimus conmixta* Kiss	1	0.1			1	+																										
33	*Coccygomimus contemplator* Müll.	5	0.6	2	1.1	1	+	1	0.2	3	0.4	2	0.3	2	0.6	6	0.7																
34	*Coccygomimus instigator* Fabr.					2	0.1	1	0.2					1	0.1	1	0.1							1	0.4								
35	*Coccygomimus spuria* Grav.													1	0.1																		
36	*Coccygomimus turionellae* L.					19	1.6			1	0.1	16	2.7	35	4.1	10	1.1	9	1.4	2	0.7	3	1.0	2	0.9					1	0.4		
37	*Theronia atalantae* Poda															1	0.1																
38	*Perithous divinator* Rossi											1	0.2																				
39	*Poemenia collaris* Haupt			1	0.5																												
40	*Poemenia hectica* Grav.							1	0.2																								
41	*Rhyssella approximator* Fabr.			1	0.5																												
	Tryphoninae																																
42	*Phytodietus femoralis* Holmgr.	2	0.2			1	+															1	0.3										
43	*Phytodietus polyzonias* Forst.	2	0.2													1	0.1							2	0.9								
44	*Phytodietus rufipes* Holmgr.																													1	0.4		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
45	*Netelia tarsata* Brischke	1	0.1							1	0.1					1	0.1														
46	*Netelia testacea* Grav.					3	0.2	1	0.2					1	0.1	2	0.2														
47	*Neliopisthus elegans* Ruthe											1	0.2																		
48	*Thymaris contaminatus* Grav.	2	0.2					5	0.9	8	1.1	1	0.2					3	0.5												
49	*Ctenochira* sp.					2	0.1																								
50	*Ctenochira sanguinatoria* Ratz.							1	0.2																						
51	*Grypocentrus incisulus* Ruthe									3	0.4									2	0.7										
52	*Polyblastus macrocentrus* Thoms.			1	0.5																										
53	*Erromenes bibulus* Kasp.			1	0.5																										
–	*Eridolius* spp.	6				1																									
54	*Tryphon auriculatus* Thoms.					1	+																								
55	*Tryphon bidentatus* Steph.															1	0.1														
56	*Eucerus pruinosus* Grav.	4	0.5													1	0.1														
57	*Brachycyrtus ornatus* Kriechb.					1	+											2	0.3												
	Adelognathinae																														
58	*Adelognathus brevicornis* Holmgr.	4	0.5			1	+																								
59	*Adelognathus facialis* Thoms.			1	0.5							1	0.2																		
60	*Adelognathus granulatus* Perk.	1	0.1																												
61	*Adelognathus laevicollis* Thoms.	2	0.2			1	+											2	0.3												
62	*Adelognathus nigricornis* Thoms.	1	0.1																												
63	*Adelognathus pallipes* Holmgr.	1	0.1													1	0.1														
64	*Adelognathus tetracinctorius* Thunb.									1	0.1					2	0.2					1	0.3			1	0.5				
65	*Adelognathus sp.*	1	0.1	2	1.1			1	0.2																						
	Xoridinae																														
66	*Ischnoceros caligatus* Grav.	1	0.1																												
67	*Ischnoceros rusticus* Geoff.			1	0.5																										
68	*Xorides praecatorius* Fabr.			1	0.5			17	3.0	3	0.4	1	0.2					1	0.2	1	0.3	1	0.3								
69	*Xorides irrigator* Fabr.	1	0.1																												

	Phygadeuontinae																																				
70	*Encrateola laevigata* Ratz.	1	0.1																					1	0.4										
71	*Encrateola mediovittata* Schmiedekn.	5	0.6													1	0.1																		
72	*Eudelus simillimus* Taschenb.	6	0.8			16	1.3	4	0.7	15	2.0	2	0.3					4	0.6	2	0.7	5	1.7												
73	*Acrolyta marginata* Bridgm.	1	0.1			1	+	1	0.2					4	0.5	1	0.1							1	0.4	1	0.5	1	0.5	2	0.8				
74	*Acrolyta submarginata* Bridgm.	14	1.9	2	1.1	2	0.1	9	1.5	45	6.1	2	0.3	9	1.1	18	2.1	4	0.6	6	2.1	8	2.6	6	2.7			3	1.5	3	1.1				
75	*Diaglyptidea* sp.	1	0.1																																
76	*Diaglyptidea conformis* Gmel.	1	0.1			4	0.3	17	3.0	5	0.7	1	0.2	1	0.1	7	0.8	26	4.0	3	1.0	5	1.7	1	0.4	17	8.9								
77	*Lysibia nana* Grav.			2	1.1	11	0.8	1	0.2	1	0.1	4	0.7	6	0.7	7	0.8	2	0.3			5	1.7	1	0.4	1	0.5	2	1.0	7	2.6				
78	*Xiphulcus floricolator* Grav.					12	0.9			1	0.1	3	0.5	2	0.2	1	0.1							1	0.4										
79	*Hemiteles similis* Gmel.																							8	3.6			1	0.5						
–	*Aclastus spp.*	1		1		14		2		7		4		7		6		6		1		1		3		3		3							
80	*Xenolytus bitinctus* Gmel.																							1	0.4			1	0.5						
81	*Dichrogaster aestivalis* Grav.	7	0.9	4	2.2	89	7.3	19	3.3	16	2.1	18	3.0	18	2.1	20	2.3	46	7.0	5	1.7	14	4.7	6	2.7	9	4.7	3	1.5	14	5.1				
82	*Dichrogaster longicaudatus* Thoms.	2	0.2	1	0.5	16	1.3	7	1.1	3	0.4	3	0.5	2	0.2			11	1.7	1	0.3	2	0.7			6	3.1			2	0.8				
83	*Dichrogaster nigrithorax* Horstm.							1	0.2			1	0.2	1	0.1									1	0.4	2	1.1								
84	*Dichrogaster genalis* Haberm.													1	0.1					1	0.3														
85	*Gelis albipalpus* Thoms.	17	2.3	16	8.7	10	0.7	21	3.6	17	2.3	19	3.2	33	3.9	25	2.9	21	3.2	18	6.3	13	4.4	2	0.9	9	4.7	15	7.4	4	1.5				
86	*Gelis areator* Panz.	23	3.1	1	0.5	9	0.7	7	1.1	16	2.2	4	0.7	6	0.7	6	0.7	8	1.2	12	4.2	5	1.7	2	0.9	2	1.1	1	0.5	6	2.2				
87	*Gelis cinctus* L.	8	1.0	1	0.5					3	0.4	1	0.2	4	0.5	1	0.1	2	0.3	1	0.3	3	1.0			1	0.5								
88	*Gelis longicaudatus* Thoms.					1	+																												
89	*Gelis sulcator* Blunck					4	0.3							1	0.1	1	0.1							1	0.4	3	1.6			2	0.8				
–	*Gelis spp.*	1				2				1				1				1		1				2						1					
90	*Odontoneura annulicornis* Thoms.					1	+																								0.4				
91	*Zoophthoorus cynipinus* Thoms.	1	0.1																											1					
92	*Zoophthorus graculus* Grav.															1	0.1																		
93	*Mastrus castaneus* Taschenb.	6	0.7									1	0.2	1	0.1	1	0.1																		
94	*Mastrus pictipes* Grav.	1	0.1																																
95	*Mastrus sordipes* Grav.	1	0.1	1	0.5	5	0.4	3	0.5	2	0.2			1	0.1	1	0.1	2	0.3	1	0.3														
96	*Mastrus tenuicostus* Thoms.	2	0.2																																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
97	*Mastrus varicoxis* Taschenb.	8	1.0																												
–	*Mastrus spp.*	17		14		6		5		4		1		5		8		5		2		4				2		2			
98	*Isadelphus inimicus* Grav.													1	0.1	1	0.1														
99	*Micromonodon tener* Kriechb.	3	0.4					2	0.4					1	0.1			1	0.2	1	0.3										
100	*Lochetica westoni* Bridgm.																	3	0.5	1	0.3	1	0.3					1	0.5		
101	*Ethelurgus sodalis* Taschenb.			2	1.1	36	2.9	5	0.9	3	0.4	7	1.2	12	1.4	14	1.6	4	0.6	4	1.4	6	2.0	3	1.3	4	2.1	1	0.5	2	0.8
102	*Rhembobius perscrutator* Thunb.					17	1.3	1	0.2	1	0.1			2	0.2	4	0.5														
103	*Rhembobius quadrispinus* Grav.					4	0.3					2	0.3	2	0.2	2	0.2														
104	*Glyphicnemis profligator* Fabr.					7	0.6	50	8.6	41	5.6	1	0.2	4	0.5	35	4.0	5	0.8	1	0.3										
105	*Glyphicnemis clypealis* Thoms.									1	0.1																				
–	*Endasys spp.*			1		2		1		1				1		2		3								1					
106	*Endasys erythrogaster* Grav.	2	0.2			1	+	2	0.4							1	0.1			3	1.0	3	1.0			1	0.5				
107	*Charitopes brunneus* Morley					1	+	2	0.4			7	1.2	5	0.6	2	0.2	5	0.8			1	0.3	2	0.9	2	1.1			2	0.8
108	*Charitopes chrysopae* Brischke	4	0.5	8	4.3	80	6.5	48	8.2	66	9.0	101	16.8	89	10.5	81	9.3	60	9.2	25	8.7	31	10.2	13	5.8	3	1.6	4	2.0	10	3.7
109	*Charitopes clausus* Thoms.			3	1.6	24	1.9	26	4.5	8	1.1	16	2.7	32	3.8	8	0.9	41	6.3	9	3.1	6	2.0	3	1.3	4	2.1	10	5.0	12	4.4
110	*? Charitopes* sp.					1	+			1	0.1	1	0.2	1	0.1																
111	*Bathythrix argentata* Grav.							1	0.2																						
112	*Bathythrix pellucidator* Grav.			3	1.6	1	+	1	0.2	1	0.1	1	0.2	1	0.1	3	0.4	1	0.2			1	0.3	9	4.0	2	1.1				
113	*Bathythrix strigosa* Thoms.	11	1.5																			1	0.3								
114	*Bathythrix thomsoni* Kerrich	15	2.0									2	0.3											1	0.4			1	0.5		
115	*Uchidella* sp.	1	0.1							1	0.1	1	0.2																		
116	*Orthizema ?flavicornis* Schmiedekn.							1	0.2																						
117	*Orthizema subannulatum* Bridgm.	7	0.9																												
118	*Gnotus chionops* Grav.																													1	
119	*Gnotus tenuipes* Grav.					1	+																	5	2.2	3	1.6				0.4
120	*Theroscopus rufulus* Gmel.													1	0.1	1	0.1							1	0.4						
121	*Theroscopus semicroceus* Schmiedekn.					6	0.5			2	0.2					1	0.1					2	0.7							1	0.4
122	*Phygadeuon ovatus* Grav.					2	0.1									2	0.2														

–	*Phygadeuon* spp. +																														
	+ *Theroscopus* spp.	8		6		40		16		56		6		14		21		29		6		9		36		20		65		8	
123	*Stilpnus blandus* Grav.											1	0.2													3	1.6				
124	*Stilpnus gagates* Grav.			1	0.5	1	+					1	0.2	1	0.1	1	0.1									1	0.5				
125	*Stilpnus pavoniae* Scop.					2	0.1					1	0.2			1	0.1			1	0.3										
126	*Stilpnus ?retritus* Först.	1	0.1																							1	0.5				
–	*Stilpnini* spp.			4		27		8		20		2		5		12		12		3		5		10		5		15		6	
127	*Cremnodes* sp.									1	0.1	1	0.1	1	0.1	3	0.4													1	0.4
128	*Gnypetomorpha* sp.	1	0.1			5	0.4	3	0.5	3	0.4	5	0.8	2	0.2	2	0.2	1	0.2	1	0.3	1	0.3							1	0.4
129	*Demopheles corruptor* Taschenb.	1	0.1			2	0.1			1	0.1							1	0.2			3	1.0					1	0.5		
130	*Javra tricincta* Grav.	1	0.1																												
131	*Cubocephalus anatorius* Grav.					1	+																								
132	*Cubocephalus nigriventris* Thoms.	1	0.1																												
133	*Cubocephalus sperator* Müll.					3	0.2							2	0.2									1							
134	*Oresbius arridens* Grav.	1	0.1			1	+									1	0.1							1	0.4						
135	*Polytribax arrogans* Grav.	1	0.1			1	+									1	0.1														
136	*Pleolophus brachypterus* Grav.									1	0.1			3	0.4	4	0.5														
136	*Pleolophus isomorphus* Schmiedekn.	1	0.1																												
137	*Pleolophus unifasciatus* Schmiedekn.			1	0.5	3	0.2			3	0.4																				
138	*Pleolophus* sp.	1	0.1			1	+																								
139	*Aptesis abdominator* Grav.					4	0.3			2	0.2							1	0.2			1	0.3								
140	*Aptesis gravipes* Grav.					1	+													2	0.7										
141	*Aptesis femoralis* Thoms.															1	0.1														
142	*Aptesis nigrocincta* Grav.			1	0.5	2	0.1			3	0.4			7	0.8	3	0.4	1	0.2					3	1.3						
–	*Hemigasterini* spp.	11												2		4															
143	*Gambrus incubitor* L.																	1	0.2												
144	*Gambrus tricolor* Grav.									1	0.1																				
145	*Aritranis fugitiva* Grav.																							1	0.4						
146	*Aritranis confector* Grav.									1	0.1																				
147	*Pycnocryptus director* Thunb.			1	0.5	1	+															1	0.3	1	0.4						
148	*Ischnus alternator* Grav.											1	0.2																		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
149	*Ischnus inquisitorius* Müll.	1	0.1																												
150	*Trychosis legator* Thunb.					1	+																								
151	*Stenarella gladiator* Scop.					3	0.2																								
152	*Buathra laborator* Thunb.			1	0.5																										
153	*Caenocryptus rufiventris* Grav.													1	0.1																
154	*Itamoplex armator* Fabr.															1	0.1							4	1.8	6	3.1				
155	*Itamoplex spiralis* Geoff.					1	+																								
156	*Itamoplex titubator* Thunb.															1	0.1														
157	*Itamoplex viduatorius* Fabr.																	1	0.2	1	0.3										
158	*Apsilops cintorius* Fabr.							1	0.2																						
	Neorhacodinae																														
159	*Neorhacodes enslini* Ruschka																	1	0.2	1	0.3										
	Stilbopinae																														
160	*Stilbops vetula* Grav.	160	21.8																												
	Banchinae																														
161	*Apophua bipunctoria* Thunb.	1	0.1									10	1.7	40	4.7	2	0.2														
162	*Glypta nigrina* Desv.	2	0.2	1	0.5					2	0.2	11	1.8	26	3.1	8	0.9	1	0.2			1	0.3	1	0.4						
163	*Glypta* sp. 1											3	0.5	4	0.5	2	0.2														
164	*Glypta* sp. 2					2	0.1							5	0.6																
165	*Lissonota antennalis* Thoms.	1	0.1																												
166	*Lissonota coracina* Gmel.					3	0.2			3	0.4	2	0.3	3	0.4	10	1.1	1	0.2					1	0.4	1	0.5	1	0.5		
167	*Lissonota biguttata* Holmgr.																													1	0.4
168	*Lissonota deversa* Grav.					1	+			1	0.1									1	0.3									1	0.4
169	*Lissonota dubia* Holmgr.													4	0.5					1	0.3			1	0.4					1	0.4
170	*Lissonota extrema* Hedw.					1	+					3	0.5	4	0.5																
171	*Lissonota folli* Thoms.							1	0.2									1	0.2												
172	*Lissonota fundator* Thunb.					3	0.2			1	0.1			1	0.1			1	0.2												
173	*Lissonota ?impressor* Grav.					6	0.5																								
174	*Lissonota nigridens* Thoms.									3	0.4																				
175	*Lissonota picticoxis*																														
	Schmiedekn.	2	0.2			2	0.1																								

176	*Lissonota proxima* Fonsc.					1	+									1	0.1	1	0.2																
177	*Meniscus catenator* Panz.					2	0.1			1	0.1					1	0.1							1	0.4										
178	*Exetastes atrator* Forst.					1	+																	1	0.4							1	0.4		
179	*Exetastes adpressorius* Thunb.															1	0.1																		
–	*Lissonota* spp. + *Glypta* spp.			2		3		1		1				1								1		2								1			
	Ctenopelmatinae																																		
180	*Phaestus anomalus* Brischke					1	+	1	0.2																	2									
181	*Xenoschesis fulvipes* Grav.											1	0.2			1	0.1																		
182	*Perilissus lucidulus* Holmgr.					1	+																												
183	*Lathrolestes clypeatus* Zett.	8	1.0	2	1.1																														
184	*Lathrolestes bipunctatus* Bridgm.									1	0.1																								
185	*Lathrolestes luteolator* Grav.					78	6.4	6	1.0			14	2.3	44	5.2	14	1.6	4	0.6	6	2.1	11	3.6	2	0.9							2	0.8		
186	*Lathrolestes* sp.			2	1.1																														
187	*Phobetes atomator* Müll.									1	0.1																								
188	*Euryproctus sinister* Brischke					1	+									1	0.1																		
–	*Ctenopelmatinae* spp.	9		1		8		2		5		1		4		3		2		2		3		2				3							
	Campopleginae																																		
189	*Campoplex borealis* Zett.	2	0.2					1	0.2																										
190	*Campoplex investigator* Haberm.	1	0.1					2	0.4																										
191	*Campoplex lyratus* Thoms.	1	0.1			1	+							1	0.1																				
192	*Campoplex restrictor* Aubert					21	1.7	8	1.3	2	0.2	13	2.2	13	1.5	10	1.1			1	0.3	3	1.0	2	0.9	5	2.6					17	6.3		
193	*Campoplex rufinator* Aubert	1	0.1			9	0.7	5	0.9	3	0.4	15	2.5	16	1.9	7	0.8	2	0.3	3	1.0	1	0.3			2	1.1					2	0.8		
194	*Campoplex rothi* Holmgr.	9	1.2																																
195	*Venturia transfuga* Grav.					3	0.2					1	0.2	1	0.1	1	0.1							1	0.4										
196	*Charops cantator* Degeer									1	0.1																								
197	*Sesioplex cerophagus* Grav.					1	+			1	0.1					3	0.4																		
198	*Nemeritis brevicauda* Horstm.							3	0.5																										
199	*Nemeritis caudatula* Thoms.	1	0.1																																
200	*Nemeritis fallax* Grav.					1	+	3	0.5	6	0.8									2	0.7														
201	*Nemeritis lativentris* Thoms.	17	2.3	2	1.1	3	0.2	60	10.3	45	6.1			2	0.2	1	0.1	7	1.1	2	0.7			3	1.3	3	1.6	16	7.9	6	2.2				
202	*Nemeritis obscuripes* Horstm.									2	0.2																								
203	*Nemeritis silvicola* Horstm.									1	0.1																					2	0.8		

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
204	*Sinophorus teratis* Weet																			1	0.3										
205	*Casinaria* sp.	1	0.1					1	0.2											1	0.3										
206	*Leptocampoplex cremastoides* Holmgr.	2	0.2	1	0.5	8	0.6	4	0.7	6	0.8			3	0.4	7	0.8	10	1.5	2	0.7	5	1.7	1	0.4	1	0.5	6	3.0		
207	*Campoletis latrator* Schrank			1	0.5																										
208	*Campoletis maculipes* Tschek					1	+																								
209	*Bathyplectes* sp.									1	0.1																				
210	*Dusona americana* Ashm.									1	0.1																				
211	*Dusona falcator* Thunb.													1	0.1	1	0.1														
212	*Dusona subimpressa* Först.	3	0.4									1	0.2			1	0.1														
213	*Nepiera collector* Thunb.	1	0.1	1	0.5	2	0.1			3	0.4	1	0.2			1	0.1	1	0.2									1	0.5	1	0.4
214	*Dolophron pedellum* Holmgr.																													1	0.4
215	*Cymodusa leucocera* Holmgr.					4	0.3					1	0.2																		
216	*Phobocampe cingulata* Grav.			2	1.1																										
217	*Phobocampe confusa* Thoms.			1	0.5																										
218	*Phobocampe crassiuscula* Grav.	2	0.2					2	0.4																						
219	*Phobocampe* sp.	2	0.2													1	0.1														
220	*Tranosema nigridens* Thoms.	2	0.2																											1	0.4
221	*Tranosema rostralis* Brischke	2	0.2	1	0.5	9	0.7	3	0.5	1	0.1	5	0.8	7	0.8	8	0.9			3	1.0										
222	*Diadegma anura* Thunb.	1	0.1									1	0.2																		
223	*Diadegma annulicrus* Thoms.																													1	0.4
224	*Diadegma apostata* Grav.							2	0.4							1	0.1	1	0.2	7	2.4	1	0.3								
225	*Diadegma appositor* Aubert																													1	0.4
226	*Diadegma armillata* Grav.					4	0.3	1	0.2	3	0.4	2	0.3	7	0.8	7	0.8					1	0.3					1	0.5		
227	*Diadegma chrysosticta* Gmel.											1	0.2			1	0.1													1	0.4
228	*Diadegnia ? dinianator* Aubert			1	0.5																										
229	*Diadegma neomajalis* Horstm.							1	0.2							1	0.1	1	0.2												

230	*Diadegma meliloti* Horstm.					12	0.9													3	0.5			2	0.7								
231	*Diadegma fenestralis* Holmgr.					14	1.0	4	0.7	14	1.9	1	0.2	9	1.1	12	1.4	4	0.6	5	1.7	7	2.3							8	3.0
232	*Diadegma pusio* Holmgr.					1	+											1	0.2	1	0.3												
233	*Diadegma incompleta* Horstm.	1	0.1	1	0.5							1	0.2																				
234	*Diadegma holopyga* Thunb.					1	+					1	0.2																				
235	*Diadegma eucerophaga* Horstm.					3	0.2	1	0.2	1	0.1	1	0.2																	1	0.4		
236	*Diadegma truncata* Thoms.					1	+																										
–	*Diadegnia* spp.	2		3		9		12		12		3		3		8		29		23		14					1		3				
237	*Macrus parvulus* Grav.					1	+							1	0.1																		
–	*Hyposoter* spp.	5				1																1							2				
–	*Olesicampe* spp.	1		1		7		14		41		1		7		7		19		24		8											
238	*Lathrostizus lugens* Grav.																												1	0.4			
–	*Campopleginae* spp.	11		9		16		6		10		4		14		21		8		3		3		15		10		10		6			
	Cremastinae																																
239	*Pristomerus vulnerator* Panz.	2	0.2			1	+																	6	2.7	1	0.5						
240	*Temelucha interruptor* Grav.					1	+			1	0.1							1	0.2														
241	*Temelucha* sp.													1	0.1																		
242	*Cremastus infirmus* Grav.													1	0.1			1	0.2			1	0.3										
	Phrudinae																																
243	*Pygmaelus nitidus* Bridgm.											2	0.3																				
	Tersilochinae																																
244	*Probles neoversutus* Horstm.									1	0.1			1	0.1	2	0.2																
245	*Barycnemis gracillimus* Thoms.																							1	0.4								
246	*Barycnemis* sp.	1	0.1																											1	0.4		
247	*Aneuclis melanarius* Holmgr.					3	0.2					1	0.2					1	0.2														
248	*Nonodiaparsis frontellus*																																
	Holmgr.	3	0.4			1	+	1	0.2	5	0.7			3	0.4	4	0.5					1	0.3										
249	*Phradis interstitialis* Thoms.					2	0.1											1	0.2														
250	*Tersilochus obscurator* Aubert							1	0.2																								
–	*Tersilochinae* spp.	11		2		10		8		8		5		10		15		8		3		4		4		1				43			
	Ophioninae																																
251	*Ophion brevicornis* Morley	1	0.1																														
252	*Ophion costatus* Ratz.									3	0.4					1	0.1																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
253	*Ophion luteus* L.					2	0.1	1	0.2					7	0.8	2	0.2														
254	*Ophion minutus* Kriechb.	1	0.1																												
	Mesochorinae																														
255	*Astiphromma graniger* Thoms.	1	0.1															1	0.2												
256	*Astiphromma marginellum* Holmgr.	1	0.1																												
257	*Astiphromma strenuum* Holmgr.	2	0.2													1	0.1														
258	*Mosochorus anomalus* Holmgr.	4	0.5					1	0.2	5	0.7			3	0.4	3	0.4					1	0.3								
259	*Mesochorus confusus* Holmgr.	1	0.1																			1	0.3								
260	*Mesochorus curvulus* Thoms.					7	0.6	5	0.9			2	0.3	1	0.1	3	0.4	3	0.5	5	1.7	4	1.3	1	0.4					4	1.5
261	*Mesochorus longicauda* Thoms.					1	+			1	0.1			2	0.2																
262	*Mesochorus nigripes* Thoms.									1	0.1																				
263	*Mesochorus orbitalis* Holmgr.	1	0.1					1	0.2																						
264	*Mesochorus sylvarum* Curtis	2	0.2	1	0.5			2	0.4							3	0.4					2	0.7								
265	*Mesochorus tetricus* Holmgr.	2	0.2									1	0.2																		
266	*Mesochorus vitticollis* Holmgr.									1	0.1																				
267	*Mesochorus vittator* Zett.															2	0.2														
268	*Stictopisthus complanathus* Hal.							3	0.5			1	0.2	1	0.1	1	0.1			1	0.3							1	0.5	1	0.4
269	*Stictopisthus formosus* Bridgm.							7	1.1	1	0.1	2	0.3	1	0.1	1	0.1	1	0.2	6	2.1	3	1.0							1	0.4
–	*Mesochorinae* spp.	4		1		12		6		19		1		3		12		6		2		7		3		2		3		3	
	Metopiinae																														
270	*Trieces rufimitranae* Aeschl.	1	0.1			1	+			1	0.1																				
271	*Triclistus* sp.					3	0.2																								
272	*Triclistus podagricus* Grav.	36	4.9																												
273	*Colpotrochia cincta* Scop.															1	0.1														
274	*Hypsicera curvator* Fabr.					10	0.8																					1	0.5	26	9.6
275	*Hypsicera femoralis* Geoff.			1	0.5	5	0.4					1	0.2	2	0.2	26	3.0	1	0.2	1	0.3										
276	*Exochus decoratus* Holmgr.	1	0.1																												
277	*Exochus flavomarginatus* Holmgr.															1	0.1														
278	*Exochus longicornis* Thoms.			1	0.5																										

279	*Exochus parvispina* Thoms.											1	0.2																				
280	*Exochus tardigrandus* Grav.	2	0.2																														
281	*Exochus tibialis* Holmgr.	1	0.1			1	+					1	0.2	2	0.2	2	0.2																
–	*Exochus* spp.			3		1		2		3				1		4		1				2								1			
	Anomaloninae																																
282	*Aphanistes bellicosus* Wesm.	1	0.1																											1	0.4		
283	*Agrypon anxium* Wesm.	2	0.2																														
284	*Agrypon flaveolatum* Grav.	2	0.2																														
285	*Parania geniculata* Holmgr.					1	+																										
286	*Therion circumflexum* L.					1	+																										
	Oxytorinae																																
–	*Oxytorinae* spp.	10		9		23		2		5		4		15		25		4		5		3		1		2		2		1			
	Orthocentrinae																																
–	*Orthocentrinae* spp.	41		23		82		15		46		48		83		101		11		6		6		11		24		8		2			
	Collyriinae																																
287	*Collyria coxator* Vill.			1	0.5															1	0.3												
	Diplazontinae																																
288	*Diplazon laetatorius* Fabr.			1	0.5	22	1.8			2	0.2	4	0.7	10	1.2	4	0.5	4	0.5	1	0.3	5	1.7	2	0.9	1	0.5			2	0.8		
289	*Diplazon pectoratorius* Thunb.			1	0.5					1	0.1	2	0.3																	1	0.4		
290	*Diplazon tibiatorius* Thunb.																	1	0.2														
291	*Diplazon tetragonus* Thunb.			1	0.5	6	0.5	4	0.7	6	0.8	11	1.8	7	0.8	6	0.7	25	3.8	5	1.7	9	3.0	9	4.0	8	4.2	5	2.5	2	0.8		
292	*Promethes sulcator* Grav.					39	3.2	2	0.4	5	0.7	6	1.0	9	1.1	11	1.3	3	0.5	2	0.7	1	0.3	1	0.4	1	0.5			2	0.8		
293	*Sussaba cognata* Holmgr.					2	0.1									2	0.2																
294	*Sussaba coriacea neopulchella* Diller					29	2.4	1	0.2	1	0.1			1	0.1	1	0.1													2	0.8		
295	*Sussaba dorsalis* Holmgr.					1	+																										
296	*Sussaba erigator* Fabr.					19	1.6			1	0.1			2	0.2	1	0.1																
297	*Sussaba pulchella pulchella* Holmgr.					2	0.1	1	0.2	1	0.1	1	0.2	1	0.1											1	0.5						
298	*Homotropus dimidiatus* Schrank					6	0.5	5	0.9	1	0.1	3	0.5	3	0.4	2	0.2	3	0.5			1	0.3										
299	*Homotropus elegans* Grav.					1	+	1	0.2																								
300	*Homotropus haemorrhoidalis* Szépl.					5	0.4	5	0.9			13	2.2	3	0.4			8	1.2			1	0.3			2	1.1						

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
301	*Homotropus nigritarsus* Grav.																													1	0.4
302	*Homotropus pictus* Grav.					1	+	2	0.4			1	0.2	1	0.1			1	0.2												
303	*Homotropus pulcher* Holmgr.																							1	0.4						
304	*Homotropus signatus* Holmgr.					4	0.3					1	0.2					1	0.2			1	0.3							1	0.4
305	*Homotropus strigator* Fabr.	3	0.4	1	0.5	23	1.9	6	1.0	44	6.0	42	7.0	21	2.5	17	1.9	44	6.7	23	8.1	25	8.3	4	1.8	1	0.5			2	0.8
306	*Homotropus tarsatorius* Panz.	1	0.1			3	0.2	2	0.4			6	1.0	4	0.5	2	0.2	10	1.5					2	0.9	2	1.1			2	0.8
307	*Enizemum ornatum* Grav.					22	1.8	8	1.3	2	0.2	45	7.5	11	1.3	4	0.5	26	4.0	3	1.0	3	1.0					3	1.5		
308	*Syrphoctonus abdominator* Bridgm.																													1	0.4
309	*Syrphoctonus biguttatus* Grav.					2	0.1			1	0.1			2	0.2					1	0.3	1	0.3								
310	*Syrphoctonus flavolineatus* Grav.					7	0.6	4	0.7			16	2.7	8	0.9	6	0.7	33	5.0	5	1.7			1	0.4	1	0.5			2	0.8
311	*Phthorima xanthaspis* Thoms.									1	0.1			1	0.1															1	0.4
312	*Syrphophilus bizonarius* Grav.											2	0.3											1	0.4						
	Ichneumoninae																														
313	*Heresiarches eudoxius* Wesm.	1	0.1																												
314	*Coelichneumon comitator* L.																	1	0.2												
315	*Coelichneumon sugillatorius* L.					3	0.2																								
316	*Hoplismenus bidentatus* Gmel.					2	0.1							1	0.1	2	0.2														
317	*Stenichneumon culpator* Schrank					1	+																								
318	*Syspasis rimulosus* Thoms.											1	0.2																		
319	*Syspasis scutellator* Grav.											1	0.2	1	0.1																
320	*Aoplus castaneus* Grav.															1	0.1														
321	*Aoplus ochropis* Gmel.													1	0.1																
322	*Cratichneumon corruscator* L.	1	0.1																												
323	*Cratichneumon culex* Müll.	13	1.8	1	0.5	1	+	1	0.2	14	1.9			1	0.1	4	0.5	1	0.2									1	0.5		
324	*Cratichneumon fabricator* Fabr.	6	0.8	2	1.1											3	0.4														
325	*Cratichneumon dissimilis* Grav.	1	0.1																												
326	*Cratichneumon luteiventris* Grav.					2	0.1									4	0.5													1	0.4
327	*Cratichneumon rufifrons* Grav.	1	0.1																											1	0.4

328	*Cratichneumon versator* Thunb.					1	+																										
329	*Cratichneumon viator* Scop.																					1	0.3										
330	*Crypteffigies lanius* Grav.					1	+			1	0.1					1	0.1																
331	*Eupalamus oscillator* Wesm.			1	0.5																												
332	*Vulgichneumon suavis* Grav.					1	+																										
333	*Virgichneumon albilineatus* Grav.			1	0.5	1	+							1	0.1	1	0.1	1	0.2									1	0.5	1	0.5	2	0.8
334	*Virgichneumon dumeticola* Grav.					1	+													1	0.3												
335	*Stenobarichneumon basiglyptus* Kriechb.																							1	0.4								
336	*Barichneumon anator* Fabr.													1	0.1			1	0.2					1	0.4								
337	*Barichneumon peregrinator* L.					2	0.1																										
338	*Barichneumon praeceptor* Thunb.					1	+	1	0.2																								
339	*Homotherus locutor* Thunb.	1	0.1	1	0.5	1	+			1	0.1	1	0.2	4	0.5	2	0.2																
340	*Homotherus varipes* Grav.	9	1.2									1	0.2																				
341	*Homotherus* sp.	1	0.1																														
342	*Chasmias motatorius* Fabr.	1	0.1									1	0.2																				
343	*Ichneumon albicollis* Wesm.															1	0.1																
344	*Ichneumon albiger* Wesm.					1	+							1	0.1																		
345	*Ichneumon confusor* Grav.													2	0.2	1	0.1																
346	*Ichneumon ? latrator* Fabr.									1	0.1					1	0.1																
347	*Ichneumon nereni* Thoms.											1	0.2																				
348	*Ichneumon sarcitorius* L.					1	+																										
349	*Ichneumon spurius* Wesm.									1	0.1																						
350	*Probles culpatorius* L.															1	0.1																
351	*Probles* sp.					1	+																										
352	*Ctenichneumon castigator* Fabr.					1	+			1	0.1					1	0.1																
353	*Ctenichneumon funereus* Geoff.					3	0.3																										
354	*Diphyus raptorius* L.											1	0.2	1	0.1			1	0.2														
355	*Triptognathus pulchellus* Christ.											1	0.2																				
356	*Achaius oratorius* Fabr.					4	0.3																										
357	*Limerodes arctiventris* Boie			1	0.5																												
358	*Acolobus albimanus* Grav.	2	0.2													1	0.1																

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
359	*Hepiopelmus melanogaster* Gmel.															1	0.1														
360	*Pristicerops laetepictus* Costa	4	0.5																												
361	*Stenolabus* sp.	2	0.2																												
362	*Platylabus concinnus* Thoms.	4	0.5																												
363	*Platylabus pedatorius* Fabr.					1	+																								
364	*Platylabus iridipennis* Grav.													1	0.1																
365	*Heterischnus truncator* Fabr.					3	0.2																								
366	*Heterischnus thoracicus* Grav.					1	+																								
367	*Heterischnus nigricollis* Wesm.															1	0.1														
368	*Nematomicrus tenellus* Wesm.																							1	0.4						
369	*Herpestomus arridens* Grav.	7	0.9	1	0.5			1	0.2							6	0.7	1	0.2												
370	*Herpestomus brunnicornis* Grav.					1	+									1	0.1														
371	*Dicaelotus* sp.																							2	0.9						
372	*Dicaelotus cameroni* Bridgm.	1	0.1			1	+	3	0.5			2	0.3							2	0.7	1	0.3							2	0.8
373	*Dicaelotus punctiventris* Thoms.	2	0.2	1	0.5																					1	0.5	3	1.5		
374	*Dicaelotus pumilus* Grav.	1	0.1							2	0.2			4	0.5	6	0.7											1	0.5		
375	*Dicaelotus pictus* Schmiedekn.	2	0.2											1	0.1	5	0.6	2	0.3					1	0.4						
376	*Colpognathus divisus* Thoms.					1	+																								
377	*Oiorhinus pallipalpis* Wesm.									1	0.1																				
378	*Diadromus subtilicornis* Grav.					1	+																								
379	*Diadromus collaris* Grav.	1	0.1																											1	0.4
380	*Epitomus infuscatus* Grav.									1	0.1																				
381	*Phaeogenes callopus* Wesm.																			1	0.3										
382	*Phaeogenes ? elongatus* Thoms.															1	0.1														
383	*Phaeogenes flavidens* Wesm.	3	0.4																												
384	*Phaeogenes ? infimus* Wesm.	1	0.1																												
385	*Phaeogenes invisor* Thunb.							1	0.2																						
386	*Phaeogenes ischiomelinus* Wesm.													1	0.1																
387	*Phaeogenes modestus* Wesm.					1	+									1	0.1														

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
388	*Phaeogenes ophthalmicus* Wesm.	1	0.1																												
389	*Phaeogenes spiniger* Grav.	4	0.5																												
390	*Phaeogenes suspicax* Wesm.	2	0.2							2	0.2					1	0.1													1	0.4
391	*Aethecerus discolor* Wesm.															5	0.6							1	0.4			2	1.0		
392	*Centeterus opprimator* Grav.																					1	0.3								