

Insects as Food of *Corvidae* from the Northern Dobrudja

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Introduction

The human presence in the Northern-Dobrudja and in the Danube Delta has had noteworthy effects on the nature. In comparison with the natural ecosystems, the ones influenced by man's activities have a different qualitative and quantitative structure, and another trophic network. Only the species using the new trophic resources (in a man-influenced system) can withstand triumphantly the impact with the human pressure.

Relevant example is that of the family *Corvidae*. Six species - belonging to the mentioned family - live in the research area: *Corvus cornix*, *Corvus frugilegus*, *Corvus monedula*, *Corvus corax*, *Garrulus glandarius* and *Pica pica*.

In the present paper the authors analyse a special component of the food-spectrum of these bird species: the insects. The age of the studied bird-specimens was not taken into account (during the interpretation of the results), because it was proved previously the similarity between the food-spectrum of the juveniles and the adults belonging to the above mentioned bird-species (KISS *et* RÉKÁSI, 1975; 1977; 1980; 1983; 1986; 1991; KISS, STERBETZ *et* RÉKÁSI, 1978, 1980).

Materials and methods

During the 21.10.1971 - 21.06.1990 period 594 stomachs (with bold letters the total number of stomachs/species) were collected in the following sites (in the parentheses the number of stomachs collected in the locality):

Corvus cornix (**408**): Sf. Gheorghe (67), Murighiol (45), Letea (40), C.A.Rosetti (38), Sarinasuf (33), Tulcea (27), Uzlina (23), Can. Lipovenilor (17), Crişan (10), Can. Dunavăţ (8), Ins. Sacalin (7), Mahmudia (6), Gorgova (4), Cardon (3), Calugăra (3), Dunavăţu de Jos (3), Popina II (3), Sălcieni (3), T. Vladimirescu (2), Baia (1), Camena (1), Can. Magearu (1), Caraorman (1), Măcin (1), M. Bravu (1).

Pica pica (**151**): Tulcea (37), Maliuc (35), Crişan (14), Murighiol (10), Sarinasuf (9), C.A. Rosetti (8), Letea (8), Sf. Gheorghe (8), Uzlina (5), Caraorman (3), Sfiştofca (3), Can. Dunavăţ (2), Can. Lipovenilor (2), Sălceni (2), Vulturu (2), Cardon (1), Pătlăgeanca (1), Sulina (1).

Corvus frugilegus (**15**): Tulcea (5), Maliuc (3), Sarinasuf (3), Colina (2), M. Bravu (1), Murighiol (1).

Garrulus glandarius (**14**): Maliuc (3), Somova (3), Rândunica (2), Tulcea (3), Enisala (1), Sălceni (1), T. Vladimirescu (1).

Corvus monedula (**5**): Colina (2), Letea (1), Maliuc (1), Tulcea (1).

Corvus corax (**1**): C. A. Rosetti (1).

The contents of the samples were fixed and sorted and qualitatively and quantitatively analysed, using the method presented in previous papers (KISS *et* RÉKÁSI, 1975; 1977; 1983; 1986; 1991; KISS, STERBETZ *et* RÉKÁSI, 1978, 1990).

Results and discussions

Table no 1 shows the results of the analysis of the stomach-contents:

- the list of the insect species found in the stomachs;
- the frequency - in percentage (number of samples containing the insect species, divided by the total number of samples of the bird species - **F.** from Table 1. means frequency);
- the number of insect specimens found in the stomachs, in the four seasons (symbols in Table no 1 : **W.** - winter; **S.** - spring; **Su.** - summer; **A.** - autumn; in parentheses are the numbers of stomachs containing the respectively insect species).

In some cases, because of the very high degree of digestion, only higher systematic levels (as genus, family or order) were determined. Taking account on this fact, it can be stated that more than 100 insect species were found. The dominant genera are (see **F.** column):

- beetles: *Geotrupes*, *Harpalus*, *Otiorrhynchus*, *Zabrus* and *Carabus*;
- orthopterans: *Calliptamus* and *Gryllotalpa*;
- bugs: *Eurygaster*.

Some of the insect species have different kinds of defensive means (as stinking excreta or stings). In the case of *Corvus cornix* 68.86% of the stomachs contain insects. In the case of *Pica pica* 83.42% of the stomachs contain insects. The great number of insect species and high level of biomass of insects consumed show the important role of the species belonging to the family *Corvidae* in the integrated pest-control.

In the cases of *Corvus frugilegus*, *Garrulus glandarius* and *Corvus monedula* there were not enough samples for statistical analysis. Table 2 shows the number of insect species, number of stomachs where the insect-species were found (columns **St.** in Table no 2) and number of insect specimens found in the samples (columns **Sp.** in Table no 2) of these three bird species.

In the case of the only specimen of *Corvus corax* (accidentally electrocuted) there were no food-components of animal origin.

Conclusions

Considering the results of the stomach-content analyses, the conclusions are:

- the species belonging to the family *Corvidae* consume more than 100 species of insects;
- many of the consumed insect species are pests of the agricultural crops or plants;
- species with defensive means (excreta or stings) are also consumed by these birds;
- *Pica pica* consumes more insects than *Corvus cornix*;
- the stomach-content analysis could be one of the methods for studying the trophic relationships and biodiversity of the ecosystems.

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Insectele – hrană pentru specii de Corvidae din Dobrogea de Nord**Rezumat**

Autorii au cercetat spectrul trofic la 6 specii de păsări aparținând familiei Corvidae. S-au analizat 594 de probe bromatologice recoltate în perioada 21.10.1971- 21.06.1990 din 50 de puncte din Dobrogea de Nord, majoritatea din Delta Dunării. Coșofana (*Pica pica*) și cioara grivă (*Corvus cornix*) au consumat peste 100 specii de insecte, majoritatea fiind gândaci (îndeosebi din genurile *Harpalus*, *Geotrupes* și *Otiorrhynchus*), dar și lăcuste și ploșnițe, dăunătoare agriculturii. Multe dintre acestea posedă excreții rău mirositoare sau urticante. Coșofana consumă proporțional mai multe insecte (83.4% din probe având componenți din aceasta grupă sistematică) decât cioara grivă (cu 68.8% din numărul probelor). În cazul celorlalte specii (*Corvus frugilegus*, *Garrulus glandarius*, *Corvus monedula*, *Corvus corax*) nu s-a colectat suficient material pentru prelucrări statistice. Lucrarea ilustrează biodiversitatea zonei cercetate, prezentând totodată și o serie de inter-relații trofice.

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Table no 1

Insect species found in the stomachs of *Corvus cornix* and *Pica pica*
Specii de insecte găsite în stomacurile Corvus cornix and Pica pica

No. of taxa	Insect species	Stomachs of <i>Corvus cornix</i>					Stomachs of <i>Pica pica</i>				
		F.	W.	S.	Su.	A.	F.	W.	S.	Su.	A.
a	b	c	d	e	f	g	h	i	j	k	l
1	<i>Acrida hungarica</i>	0,74	0	0	15(2)	1(1)	0	0	0	0	0
2	<i>Aelia acuminata</i>	0,74	0	2(1)	3(2)	0	1,98	0	5(2)	3(1)	0
3	<i>Aeschna affinis</i>	0	0	0	0	0	0,66	0	0	2(1)	0
4	<i>Aeschna mixta</i>	0	0	0	0	0	0,66	0	0	0	1(1)
5	<i>Agelena gracilis</i>	0	0	0	0	0	0,66	0	0	2(1)	0
6	<i>Agriotes lineatus</i>	2,71	0	18(7)	11(4)	0	6,62	0	13(6)	5(4)	0
7	<i>Agriotes pilosus</i>	0,24	0	1(1)	0	0	0	0	0	0	0
8	<i>Agriotes sp.</i>	1,23	3(1)	4(2)	0	2(2)	0,66	0	2(1)	0	0
9	<i>Amara aenea</i>	4,44	0	20(4)	23(10)	8(4)	4,63	3(2)	9(2)	8(3)	0
10	<i>Amara familiaris</i>	0,24	0	0	0	2(1)	0	0	0	0	0
11	<i>Amphimallon solstitialis</i>	0	0	0	0	0	0,66	0	0	3(1)	0
12	<i>Anax imperator</i>	0,24	0	0	0	2(1)	0,66	0	0	2(1)	0
13	<i>Anax parthenope</i>	0,24	0	1(1)	0	0	0	0	0	0	0
14	<i>Anax sp.</i>	0,24	0	0	1(1)	0	0	0	0	0	0
15	<i>Anisoplia segetum</i>	2,22	0	2(1)	11(7)	3(1)	0	0	0	0	0
16	<i>Anisoplia sp.</i>	0,74	0	18(1)	2(1)	3(1)	0	0	0	0	0
17	<i>Anisus vortex</i>	0,24	0	0	1(1)	0	0	0	0	0	0
18	<i>Anomala vitis</i>	3,45	0	10(4)	43(10)	0	2,64	0	3(3)	1(1)	0
19	<i>Anoxia pilosa</i>	0,74	0	5(3)	0	0	3,31	0	5(4)	0	1(1)
20	<i>Anoxia sp.</i>	0,24	0	0	1(1)	0	0	0	0	0	0
21	<i>Aphodius erraticus</i>	0,24	0	6(1)	0	0	0	0	0	0	0
22	<i>Aphodius fossor</i>	0,24	0	3(1)	0	0	0	0	0	0	0
23	<i>Apion sp.</i>	1,48	0	11(2)	6(3)	2(1)	2,64	0	10(4)	0	0
24	<i>Apion trifolii</i>	0,49	0	7(2)	0	0	0	0	0	0	0
25	<i>Bembidion laticolle</i>	0,24	0	3(1)	0	0	0	0	0	0	0
26	<i>Bidessus geminus</i>	0,49	0	1(1)	4(1)	0	0,66	0	0	6(1)	0
27	<i>Blaps lethifera</i>	0	0	0	0	0	0,66	0	0	2(1)	0
28	<i>Blaps mortisaga</i>	0,24	0	0	1(1)	0	0	0	0	0	0
29	<i>Bombus sp.</i>	0,24	0	3(1)	0	0	0	0	0	0	0
30	<i>Bombus terrestris</i>	0	0	0	0	0	0,66	0	0	2(1)	0
31	<i>Calcephora sp.</i>	1,23	0	0	12(5)	0	1,98	3(1)	1(1)	2(1)	0
32	<i>Calliptamus barbarus</i>	0,49	0	0	28(1)	6(1)	1,98	0	2(1)	8(2)	0
33	<i>Calliptamus italicus</i>	0,98	0	6(1)	6(3)	0	1,98	0	0	7(3)	7(1)
34	<i>Carabus convexus</i>	0	0	0	0	0	1,98	0	3(1)	3(2)	0
35	<i>Carabus granulatus</i>	0,74	0	6(2)	3(1)	0	0,66	0	3(1)	0	0
36	<i>Carabus scabriusculus</i>	0,24	0	1(1)	0	0	0,66	0	0	4(1)	0

a	b	c	d	e	f	g	h	i	j	k	l
37	<i>Carabus sp</i>	9,13	4(2)	74(11)	61(18)	12(4)	6,62	2(1)	22(6)	3(1)	4(2)
38	<i>Carabus ulrichii</i>	0,24	0	1(1)	0	0	0	0	0	0	0
39	<i>Carabus violaceus</i>	0	0	0	0	0	1,32	0	2(1)	2(1)	0
40	<i>Cassida viridis</i>	0,24	0	0	1(1)	0	0,66	0	5(1)	0	0
41	<i>Cetonia aurata</i>	0	0	0	0	0	0,66	0	1(1)	0	0
42	<i>Chlorophorus varius</i>	0	0	0	0	0	1,32	0	2(1)	2(1)	0
43	<i>Chrysomelidae (sp.)</i>	0,74	0	0	3(2)	1(1)	1,32	2(1)	0	2(1)	0
44	<i>Cicada sp.</i>	0	0	0	0	0	1,32	0	1(1)	0	2(1)
45	<i>Cicindella campestris</i>	0,24	0	14(1)	0	0	0,66	0	0	3(1)	0
46	<i>Cleonus punctiventris</i>	2,96	0	44(9)	5(2)	2(1)	2,64	13(1)	10(3)	0	0
47	<i>Cleonus sp.</i>	0,24	0	5(1)	0	0	0	0	0	0	0
48	<i>Clivina fossor</i>	0	0	0	0	0	1,98	0	6(3)	0	0
49	<i>Coccinella septempunctata</i>	0	0	0	0	0	1,32	0	3(2)	0	0
50	<i>Coccinella sp.</i>	0	0	0	0	0	1,98	0	3(1)	2(1)	1(1)
51	<i>Coleoptera (sp., larvae)</i>	1,23	0	3(2)	2(1)	3(2)	0,66	1(1)	0	0	0
52	<i>Copris lunaris</i>	0,98	0	5(3)	3(1)	0	1,98	0	5(3)	0	0
53	<i>Curculio glandium</i>	0,24	0	0	14(1)	0	0	0	0	0	0
54	<i>Curculionidae (sp.)</i>	0,74	0	0	6(2)	2(1)	0,66	0	0	0	2(1)
55	<i>Cybister lateralimarginalis</i>	0,49	0	7(2)	0	0	0	0	0	0	0
56	<i>Decticus verrucivorus</i>	0,24	0	0	2(1)	0	0	0	0	0	0
57	<i>Dermacenter marginatus</i>	0,24	0	1(1)	0	0	0	0	0	0	0
58	<i>Diptera (sp.)</i>	0,24	0	0	2(1)	0	0	0	0	0	0
59	<i>Doclostaurus maroccanus</i>	0,24	0	0	2(1)	0	0,66	0	0	4(1)	0
60	<i>Dorcus paralellipedus</i>	0	0	0	0	0	0,66	0	1(1)	0	0
61	<i>Dorcadion sp.</i>	0,49	0	30(2)	0	0	0	0	0	0	0
62	<i>Dytiscus marginalis</i>	1,48	0	4(3)	3(3)	0	1,32	0	3(2)	0	0
63	<i>Dytiscus sp.</i>	0,98	0	7(2)	1(1)	1(1)	0,66	1(1)	0	0	0
64	<i>Elaphrius riparius</i>	0,24	0	0	2(1)	0	2,64	0	6(2)	20(2)	0
65	<i>Elaphrius sp.</i>	0	0	0	0	0	0,66	0	2(1)	0	0
66	<i>Epicometis hirta</i>	0,24	0	0	2(1)	0	0	0	0	0	0
67	<i>Eurygaster integriceps</i>	0,24	0	0	2(1)	0	0	0	0	0	0
68	<i>Eurygaster maura</i>	1,48	0	5(2)	9(4)	0	5,96	3(2)	14(5)	6(2)	0
69	<i>Eurygaster sp.</i>	0,24	0	0	0	1(1)	0	0	0	0	0
70	<i>Eusomus ovulum</i>	0,24	0	1(1)	0	0	0	0	0	0	0
71	<i>Eysarcoris punctatus</i>	0,24	0	0	1(1)	0	0	0	0	0	0
72	<i>Forficula auricularia</i>	0	0	0	0	0	0,66	0	0	1(1)	0
73	<i>Formica rufa</i>	0,49	0	4(2)	6(2)	0	0	0	0	0	0

a	b	c	d	e	f	g	h	i	j	k	l
74	<i>Formica</i> sp.	1,23	0	0	8(2)	6(3)	2,64	1(1)	5(1)	127(1)	2(1)
75	<i>Formicoidea</i> (sp.)	0,24	0	0	43(1)	0	0	0	0	0	0
76	<i>Geotrupes mutator</i>	10,86	0	50(22)	44(19)	3(3)	13,24	0	12(7)	23(8)	15(5)
77	<i>Geotrupes</i> sp.	12,34	4(2)	106/25	40(15)	14(8)	4,63	0	11(5)	3(2)	0
78	<i>Geotrupes vernalis</i>	0	0	0	0	0	1,98	0	2(1)	4(2)	0
79	<i>Glomeris hexasticha</i>	0,49	0	3(1)	17(1)	0	0,66	0	1(1)	0	0
80	<i>Gnapter spinimanus</i>	0,49	0	2(2)	0	0	1,32	0	24(1)	2(1)	0
81	<i>Gryllotalpa gryllotalpa</i>	4,93	1(1)	11(6)	16(13)	0	2,64	0	5(4)	0	0
82	<i>Gryllus campestris</i>	0	0	0	0	0	1,32	0	2(2)	0	0
83	<i>Gyrohypnus punctatus</i>	0,24	0	0	1(1)	0	0	0	0	0	0
84	<i>Haltica quercetum</i>	0,49	0	3(1)	7(1)	0	0	0	0	0	0
85	<i>Harpalus aeneus</i>	0,98	0	3(2)	3(2)	0	0,66	0	3(1)	0	0
86	<i>Harpalus affinis</i>	3,95	0	31(8)	17(7)	3(1)	7,94	0	29(9)	7(2)	1(1)
87	<i>Harpalus griseus</i>	0,49	0	3(1)	3(1)	0	0	0	0	0	0
88	<i>Harpalus smaragdinus</i>	0	0	0	0	0	0,66	0	0	3(1)	0
89	<i>Harpalus</i> sp.	12,09	1(1)	113/19	82(26)	9(3)	8,6	2(1)	56(7)	15(4)	6(1)
90	<i>Heteroptera</i> (sp.)	0,24	0	0	1(1)	0	0,66	0	0	1(1)	0
91	<i>Hister</i> sp.	0,49	0	0	3(2)	0	0	0	0	0	0
92	<i>Hister quadrimaculatus</i>	0	0	0	0	0	1,32	0	2(1)	0	3(1)
93	<i>Hister unicolor</i>	0,24	0	0	1(1)	0	1,98	0	8(3)	0	0
94	<i>Homopetra</i> (sp.)	0,49	0	0	2(2)	0	0	0	0	0	0
95	<i>Hydrous piceus</i>	6,66	0	36(23)	6(4)	0	1,98	0	2(1)	3(2)	0
96	<i>Hydrous</i> sp.	2,46	0	20(6)	3(2)	2(2)	0	0	0	0	0
97	<i>Hymenoptera</i> (sp.)	1,23	0	3(2)	14(3)	0	1,98	0	1(1)	5(2)	0
98	<i>Ischnura elegans</i>	0	0	0	0	0	0,66	0	0	2(1)	0
99	<i>Lema melanopus</i>	0	0	0	0	0	0,66	0	0	0	1(1)
100	<i>Lepidoptera</i> (sp., larvae)	2,22	0	4(2)	7(6)	1(1)	5,96	1(1)	5(5)	25(3)	0
101	<i>Leptinotarsa decemlineata</i>	0,24	0	0	0	1(1)	3,31	0	25(5)	0	0
102	<i>Lethrus apterus</i>	0	0	0	0	0	1,32	0	6(2)	0	0
103	<i>Libellula depressa</i>	0,98	0	3(1)	6(3)	0	0	0	0	0	0
104	<i>Libellula</i> sp.	0,24	0	0	2(1)	0	1,32	0	0	9(1)	2(1)
105	<i>Lixus viridis</i>	0	0	0	0	0	0,66	3(1)	0	0	0
106	<i>Lixus</i> sp.	0,24	0	0	3(1)	0	0	0	0	0	0
107	<i>Lytta vesicatoria</i>	0,24	0	6(1)	0	0	0	0	0	0	0
108	<i>Montana montana</i>	0,24	0	0	1(1)	0	0	0	0	0	0
109	<i>Microlepidoptera</i> (sp.)	0	0	0	0	0	0,66	1(1)	0	0	0
110	<i>Myrmidea laevonoidis</i>	0,24	0	0	26(1)	0	0	0	0	0	0
111	<i>Naucoris cimicoides</i>	1,48	0	11(4)	4(2)	0	4,63	9(3)	4(1)	18(1)	14(2)
112	<i>Necrophorus vespillo</i>	0	0	0	0	0	0,66	0	1(1)	0	0
113	<i>Nepa rubra</i>	0,49	0	2(2)	0	0	0	0	0	0	0

a	b	c	d	e	f	g	h	i	j	k	l
114	<i>Nister cadavericus</i>	0,24	0	3(1)	0	0	0	0	0	0	0
115	Noctuidae (sp., larvae)	0,49	0	0	2(2)	0	0,66	0	1(1)	0	0
116	<i>Notonecta glauca</i>	1,48	0	10(5)	2(1)	0	0	0	0	0	0
117	<i>Ochoadeus ferrugineus</i>	0,24	0	0	2(1)	0	0	0	0	0	0
118	<i>Odonata (sp.)</i>	3,95	0	12(2)	32(11)	6(3)	3,97	0	4(1)	9(3)	5(2)
119	<i>Oliaris cuspidatus</i>	0	0	0	0	0	0,66	0	0	2(1)	0
120	<i>Opatrum sabulosum</i>	1,23	0	4(2)	3(2)	2(1)	1,32	0	4(2)	0	0
121	<i>Orthoptera (sp.)</i>	0,74	2(1)	2(1)	0	11(1)	0	0	0	0	0
122	<i>Otiorrhynchus ligustici</i>	6,66	2(1)	64(16)	29(8)	10(2)	8,6	0	39(11)	11(2)	0
123	<i>Otiorrhynchus ovatus</i>	0,98	0	6(2)	18(2)	0	1,32	0	4(1)	1(1)	0
124	<i>Otiorrhynchus sp.</i>	9,13	0	110/20	104/11	12(6)	7,28	4(2)	39(6)	3(1)	6(2)
125	<i>Oxypoda lividipennis</i>	0	0	0	0	0	0,66	0	0	1(1)	0
126	<i>Oxythyrea funesta</i>	0	0	0	0	0	0,66	0	3(1)	0	0
127	<i>Palomena prasina</i>	0	0	0	0	0	0,66	1(1)	0	0	0
128	<i>Phytobius sp.</i>	0,24	0	2(1)	0	0	0	0	0	0	0
129	<i>Platisoma oblongum</i>	0,24	0	0	2(1)	0	0	0	0	0	0
130	<i>Poliphylla fullo</i>	0,49	0	0	14(2)	0	0	0	0	0	0
131	<i>Potosia aeruginosa</i>	0	0	0	0	0	0,66	0	3(1)	0	0
132	<i>Pristicephalus oblongum</i>	0,24	0	0	1(1)	0	0	0	0	0	0
133	<i>Pryaxis sanguinea</i>	0	0	0	0	0	0,66	0	0	2(1)	0
134	<i>Psallidium maxilosum</i>	0,24	0	0	3(1)	0	1,98	0	18(3)	0	0
135	<i>Pyrrhosoma nymphula</i>	0,24	0	1(1)	0	0	0	0	0	0	0
136	<i>Rhizotrogus aequinoctialis</i>	0,24	0	2(1)	0	0	0	0	0	0	0
137	<i>Scotia segetum</i>	0,24	0	83(1)	0	0	0,66	0	0	1(1)	0
138	<i>Sigara lateralis</i>	0,24	0	3(1)	0	0	0,66	0	0	3(1)	0
139	<i>Sitonia sp.</i>	0,98	0	5(2)	7(2)	0	0,66	0	2(1)	0	0
140	<i>Sitonia sulcifrons</i>	0,24	0	3(1)	0	0	0,66	0	2(1)	0	0
141	<i>Staphylinidae (sp.)</i>	0,24	0	0	0	1(1)	0,66	0	1(1)	0	0
142	<i>Stenobothrus crassipes</i>	0	0	0	0	0	0,66	0	0	8(1)	0
143	<i>Stratiomys sp.</i>	0,49	0	1(1)	0	3(1)	0	0	0	0	0
144	<i>Sympetrum sanguineum</i>	0	0	0	0	0	1,98	0	0	8(3)	0
145	<i>Tanymechus dilaticollis</i>	0,49	0	1(1)	2(1)	0	1,98	0	3(1)	5(2)	0
146	<i>Tetramorium caespitum</i>	0,74	0	0	43(3)	0	3,31	0	6(3)	3(2)	0
147	<i>Tichius flavius</i>	0,24	0	0	1(1)	0	0	0	0	0	0
148	<i>Vespa sp.</i>	0	0	0	0	0	1,32	1(1)	0	1(1)	0
149	<i>Zabrus tenebrioides</i>	3,7	0	18(5)	19(8)	4(2)	9,27	1(1)	22(7)	14(6)	0

Table no 2

Insect species found in stomachs
of *Corvus frugilegus*, *C. monedula* and *G. glandarius*
Specii de insecte găsite în stomacurile
de la *Corvus frugilegus*, *C. monedula* și *G. glandarius*

No. of taxa	Insect species	<i>C. frugilegus</i>		<i>C. monedula</i>		<i>G. glandarius</i>	
		St.	Sp.	St.	Sp.	St.	Sp.
1	<i>Agriotes sp. (larvae)</i>	2	5	0	0	0	0
2	<i>Anisoplia segetum</i>	0	0	1	3	0	0
3	<i>Anomala vitis</i>	0	0	1	3	0	0
4	<i>Carabus sp.</i>	2	4	0	0	2	4
5	<i>Cetonia aurata</i>	0	0	0	0	1	2
6	<i>Cleonus punctiventris</i>	0	0	0	0	1	2
7	<i>Formica sp.</i>	0	0	0	0	1	8
8	<i>Geotrupes mutator</i>	3	4	2	4	0	0
9	<i>Geotrupes sp.</i>	1	1	0	0	1	1
10	<i>Harpalus sp.</i>	2	9	0	0	0	0
11	<i>Hister sp.</i>	0	0	1	2	0	0
12	<i>Hymenoptera sp.</i>	0	0	0	0	1	2
13	<i>Malacosoma neustria (egg)</i>	0	0	0	0	1	x
14	<i>Melolontha sp.</i>	0	0	1	1	0	0
15	<i>Odonata (sp.; larvae)</i>	0	0	0	0	1	2
16	<i>Ontophagus taurica</i>	0	0	1	4	0	0
17	<i>Opatrum sabulosum</i>	1	2	0	0	0	0
18	<i>Otiorrhynchus ligustici</i>	1	4	0	0	1	8
19	<i>Phytobius quadrinodosus</i>	0	0	0	0	1	3
20	<i>Sitonia sp.</i>	0	0	0	0	2	4
21	<i>Tetramorium caespitum</i>	1	2	0	0	0	0



Libellula depressa



Dytiscus marginalis



Bombus terrestris



Carabus scabriusculus

Insects as food of Corvidae
Insecte consumate de corvidelor