

**THE VARIATION OF DISTRIBUTION OF THE RELATIVE ABUNDANCE
AND DOMINANCE OF THE FAMILIES OF EPIGEIC COLEOPTERA
(ORDER COLEOPTERA) IN WHEAT FIELDS, BRĂILA (BRĂILA COUNTY)
AND MOLDOVA (ROMANIA) 1977-2002**

VARVARA Mircea

Abstract. This ample paper contains the original, synthetic results on numerical and percentage variation of the relative abundance and dominance as well as the structure of classes of dominance in 16 families of epigenous coleopterans in wheat fields, Brăila and Moldova (south, centre, north), 21 localities, 1977-2002. The material was collected by means of Barber pitfalls with preservative liquid, 4% formalin solution, protected from rainfalls. Preponderantly, there were used 12-Barber pitfalls in every crop. The pitfalls functioned in the field between 60 days and 103 days, on average, 81 days, from April 25 to September 3. In all, 26,755 individuals of coleopterans were collected, belonging to 16 families. Concordantly with the total number of individuals collected, the families rank as follows: 1. Carabidae, 13,664 individuals (51.07%), present in all localities (100%); 2. Tenebrionidae, 2591 (9.69%), 13 localities (61.90%); 3. Staphylinidae, 2366 (8.82%), 19 localities (90.48%); 4. Coccinellidae, 2134 (7.99%), 18 localities (85.71%); 5. Dermestidae 1659 (6.20%), 16 localities (76.19%); 6. Anthicidae 1147 (4.29%), 17 localities (80.95%); 7. Scarabaeidae, 672 (2.51%), 19 localities (90.48%); 8. Chrysomelidae, 531 (1.98%), 18 localities (85.71%); 9. Silphidae 527 (1.97%), 11 localities (52.38%), 10. Elateridae, 459 (1.72%), 20 localities (95.24%); 11. Curculionidae, 440 (1.64%), 21 localities (100%); 12. Lathridiidae, 322 (1.20%), nine localities (42.86%); 13. Cantharidae, 130 (0.49%), 16 localities (76.19%); 14. Histeridae, 95 (0.36%) 6 localities (28.57%); 15. Meliridae, 10 (0.04%), 8 localities (38.10%); 16. Byrrhidae 8 (0.03%), 4 localities (19.05%).

Keywords: Moldova, wheat crop, families, epigenous coleopterans, relative abundance, dominance.

Rezumat. Variația distribuției abundenței și dominanței relative a familiilor de coleoptere epigeice (ord. Coleoptera) în culturile de grâu, Brăila (județul Brăila) și Moldova (România), 1977-2002. Lucrarea conține rezultatele sintetice, originale asupra variației numerice și procentuale a abundenței relative și dominanței precum și structura claselor de dominanță la 16 familii de coleoptere epigeice din culturile de grâu, Brăila și Moldova (sud, centru, nord), 21 de localități, 1977-2002. Materialul a fost colectat prin metoda capcanelor Barber, cu lichid conservant, soluție de formol 4 %, protejate împotriva precipitațiilor. Preponderent, s-au folosit câte 12 capcane Barber în fiecare cultură (Tabel 1). Capcanele au funcționat în culturi, între 60 de zile și 103 zile, în medie 81 de zile, de la 25 aprilie - 3 septembrie. În total, au fost colectați 26.755 indivizi de coleoptere, aparținând la 16 familii. Concordant cu numărul total de indivizi colectați, familiile se ierarhizează, astfel: 1. Carabidae, 13,664 indivizi (51,07%), prezente în toate localitățile (100%); 2. Tenebrionidae, 2591 (9,69%), 13 localități (61,90%); 3. Staphylinidae, 2366 (8,82 %), 19 localități (90,48%); 4. Coccinellidae, 2134 (7,99%), 18 localități (85,71%); 5. Dermestidae 1659 (6,20%), 16 localități (76,19%); 6. Anthicidae 1147 (4,29%), 17 localități (80,95%); 7. Scarabaeidae, 672 (2,51%), 19 localități (90,48%); 8. Chrysomelidae, 531 (1,98%), 18 localități (85,71%); 9. Silphidae 527 (1,97%), 11 localități (52,38%); 10. Elateridae, 459 (1,72%), 20 localități (95,24%); 11. Curculionidae, 440 (1,64%), 21 localități (100%); 12. Lathridiidae, 322 (1,20%), 9 localități (42,86%); 13. Cantharidae, 130 (0,49%), 16 localități (76,19%); 14. Histeridae, 95 (0,36%), 6 localități (28,57%); 15. Meliridae, 10 (0,04%), 8 localități (38,10%); 16. Byrrhidae, 8 (0,03 %), 4 localități (19,05%).

Cuvinte cheie: Moldova, cultura de grâu, familii, coleoptere epigeice, abundența relativă, dominanța.

INTRODUCTION

Wheat is the most important cultivated plant for human food because of the chemical composition of wheat kernels. Wheat plants have a high ecological plasticity. In Moldova, there are two areas for the cultivation of wheat, a favourable area (Iași, Vaslui, Galați counties) and a very favourable one (Botoșani County). Agricultural crops (clover, alfalfa, wheat, corn, sunflower, beets, vines, etc.) through their activity during the vegetative activity, density, the degree of shading of the soil surface, etc. influence the humidity at the soil surface and micro-currents, factors that influence the activity of the epigeic arthropods, depending on their valences against moisture.

Papers on carabids in agro-ecosystems of Romania were published by: (ANDRIESCU et al., 1983; CÂRLAN & VARVARA, 1998-1999; POPESCU & ZAMFIRESCU, 2004; TĂLMACIU, 1995; VARVARA et al., 1981, 1985, 1992, 1995; VARVARA & ANDRIESCU, 1986, 2003; VARVARA & BRUDEA, 1999; VARVARA, 2001, 2005, 2005a, 2008; VARVARA & BULIMAR, 2002; VARVARA & ZAMFIRESCU, 2008), VARVARA & et al., 2012.; BANIȚĂ et al. (1994) mention the species of carabids in wheat crops in Oltenia.

BICA (2005) presents the quantitative results on the family of Carabidae in Banat. MALSCHI (2000) mentions the species of Carabidae in the cereal crops in the centre of Transylvania.

NECULISEANU (2003) (Republic of Moldova) published quantitative researches on carabids (1986-1988, 1989, 1992) in the wheat crops (etc.). DĂNILĂ (2005) published his results on the coenoses of carabids in wheat crops, etc. in central and northern part of the Republic of Moldova.

MATERIAL AND METHODS

The material collected is original, actually collected in the favourable season (May, June, July) continuously, on average, 81 days for 11 years, 1977 - 2002. The presentation of the method of collecting answers at three questions: Where, how, when?

The material was collected in Brăila, at points, Terrace, Salt Lake and Moldova, on the whole, 21 localities, belonging to seven counties: Brăila, Galați, Vaslui, Vrancea, Iași, Bacău, Suceava, Botoșani (Moldova) (Table 1).

There was used the classic, standard, ecological method of Barber pitfalls. There were used mainly 12 pitfalls in each locality and crop to collect all classes of dominance structure. There were used tin cans, 800 ml capacity, with a height of 11 cm. and 8 cm. in diameter. Each pitfall was protected against rainfalls. The pitfalls were organized in four rows, each row having three pitfalls. The distance between the lines and pitfalls was 5 m. The surface of capture was 300 square meters. There was used a 4% formalin solution as a preservative liquid.

The pitfalls functioned in crops, between 60 days and 103 days, on average, 81 days, from April 25 to September 3, 1977-2002 (Table 1).

The purpose of this paper is the synthetic presentation of knowledge and distribution of abundance and the hierarchy of the families of Coleoptera in the locality of Brăila (Brăila County) and Moldova in wheat crops, actually 11 seasons, 1977-2002.

Objectives of the paper:

1. Collecting of the material based on an optimum number of Barber pitfalls;
2. Analysis, identification and framing of the individuals of coleopterans in families: For scientific identifications of the families, the taxonomic order of the families there was used the *Oprelitel nasecomah evropeiscai ciasti SSR*, Vol. II, KUHNTPAUL, *Illustrierte Bestimmungs-Tabellen der Kafer Deutschlands*, Stuttgart 1912, Vol. 1, Familien – Tabelle, pg. 7- 25, HARDE K., W, SEVERA, F. *Der Kosmos – Kaferfurer*, Stuttgart, 1984, pg. 1- 321, colour album.
3. The drawing up of tables and graphs;
4. Synthesis of data for the establishment of abundance and the structure of the dominance classes.

Table 1. Localities, years and parameters of collecting of the epigeic Coleoptera in wheat crops, 1977 - 2002.

No.	Crop, locality, county	Year	Exposition of traps	Days	Traps	Coll.	Sam.
	Wheat (sum)			1,703	264	152	1,899
1	Brăila, Terasă (Brăila County)	1981	May 24 - September 3	103	12	6	72
2	Brăila, Terasă (Brăila C.)	1982	May 28 - August 30	95	12	9	108
3	Brăila, Terasă (Brăila C.)	1983	May 10 - July 20	71	12	7	84
4	Brăila, Terasă (Brăila C.)	1984	May 10 - July 11	63	12	6	72
5	Brăila, Lacul Sărat (Brăila C.)	1981	May 25 - July 15	52	12	7	84
6	Brăila, Lacul Sărat (Brăila C.)	1982	May 25 - July 15	52	12	7	84
7	Brăila, Lacul Sărat (Brăila C.)	1983	April 27 - July 12	77	12	7	84
8	Brăila Lacul Sărat (Brăila C.)	1984	May 8 - July 17	70	12	6	72
9	Vaslui (Vaslui C.)	1977	May 1 - July 20	80	12	8	96
10	Pufești (Vrancea C.)	1978	April 1 - July 30	121	12	8	96
11	Miroslava (Iași C.)	1981	May 1 - July 30	91	12	9	108
12	Hemeiuși (Bacău C.)	1981	May 1 - August 29	110	12	12	144
13	Căbești (Bacău C.)	1983	May 1 - June 25	61	12	6	72
14	Corod (Galați C.)	1983	April 25 - July 23	89	12	9	108
15	Pogonești (Vaslui C.)	1983	April 25 - August 20	117	12	12	144
16	Pogana (Vaslui C.)	1989	Aprilie 24 -July 10	97	10	6	60
17	Zvoriștea (Suceava C.)	1993	April 25 - July 25	91	9	9	81
18	Letea (Bacău C.)	1996	May 1 - July 15	75	12	5	60
19	Chirița (Iași C.)	1999	May 1 - July 7	68	35	6	210
20	Sârbi (Botoșani C.)	1999	June 1 - July 30	60	6	4	24
21	Santa Mare (Botosani C.)	2002	May 1 - June 30	60	12	3	36
	Average			81.10	12	7.24	90.43

RESULTS

As a result of the effort of collecting the material of epigeic arthropods, actually 11 seasons (1977 -2002) in wheat crops, 21 localities , 264 Barber pitfalls (on average 12, limits 6-35), that functioned in the field 1.703 days (on average, 81 days limits, 52 - 121 days), 152 collectings (on average 7, limits 3 - 12) and 1,899 analysed samples (on average 90, limits 24 -144), there were collected and analysed 26.755 individuals of epigeic arthropods belonging to 16 families of Coleoptera (Table 2).

The number of individuals belonging to the families, the presence of the families in wheat crops, as well as the structure of dominance within each family is variable in large limits as a result of the pedoclimatic conditions in the respective localities and years (Tables 2, 3).

Table 2. Numerical and percentage variation of the individuals of the coleopteran families and of the collecting localities, from Brăila and Moldova, 1977- 2002.

No.	Families	Individuals	%	Localities	%
1	Carabidae	13,664	51.07	21	100
2	Tenebrionidae	2,591	9.69	13	61.90
3	Staphylinidae	2,366	8.82	19	90.48
4	Coccinellidae	2,134	7.99	18	85.71
5	Dermestidae	1,659	6.20	16	76.19
6	Anthicidae	1,147	4.29	17	80.95
7	Scarabaeidae	672	2.51	19	90.48
8	Chrysomelidae	531	1.98	18	85.71
9	Silphidae	527	1.97	11	52.38
10	Elateridae	459	1.72	20	95.24
11	Curculionidae	440	1.64	21	100
12	Lathridiidae	322	1.20	9	42.86
13	Cantharidae	130	0.49	16	76.19
14	Histeridae	95	0.36	6	28.57
15	Melyridae	10	0.04	8	38.10
16	Byrrhidae	8	0.03	4	19.05
	Total	26,755	100.0		

Table 3. Numerical and percentage variation of dominance structure of Coleoptera families and their presence and absence in wheat crops, Brăila and Moldova, 1977- 2002.

No.	Families	I	II	III	IV	V	Total	%	Abs.	%
1	Carabidae	-	-	-	1	20	21	100	-	-
	%	-	-	-	4.76	95.23			-	-
2	Tenebrionidae	2	3	3	1	4	13	61.90	8	38.10
	%	15.38	23.08	23.08	7.69	30.77				
3	Staphylinidae	3	1	7	2	6	19	90.48	2	9.52
	%	15.79	5.26	36.84	10.53	31.58				
4	Coccinellidae	4	-	6	3	5	18	85.71	3	14.29
	%	22.22	-	33.33	16.67	27.78				
5	Dermestidae	6	1	4	2	3	16	76.19	5	23.81
	%	37.50	6.25	25.00	12.50	18.75				
6	Anthicidae	5	1	6	1	4	17	80.95	4	19.05
	%	29.41	5.88	35.29	5.88	23.53				
7	Scarabaeidae	6	6	4	1	2	19	90.48	2	9.52
	%	31.58	31.58	21.05	5.26	10.53				
8	Chrysomelidae	6	3	5	4	-	18	85.71	3	14.29
	%	33.33	16.67	27.78	22.22	-				
9	Silphidae	8	-	2	-	1	11	52.38	10	47.62
	%	72.73	-	18.18	-	9.09				
10	Elateridae	8	2	7	3	-	20	95.24	1	4.76
	%	40.00	10.00	35.00	15.00	-				
11	Curculionidae	11	7	2	-	1	21	100	-	-
	%	52.38	33.33	9.52	-	4.76				
12	Lathridiidae	4	2	1	1	1	9	42.86	12	57.14
	%	44.44	22.22	11.11	11.11	11.11				
13	Cantharidae	12	-	2	2	-	16	76.19	5	23.81
	%	75.00	-	12.50	12.50	-				
14	Histeridae	4	1	1	-	-	6	28.57	15	71.43
	%	66.67	16.67	16.67	-	-				
15	Melyridae	8	-	-	-	-	8	38.10	13	61.90
	%	100	-	-	-	-				
16	Byrrhidae	4	-	-	-	-	4	19.05	17	80.95
	%	100	-	-	-	-				
	Limits	2-12	1-7	1-7	1-4	1-20	4-21		1-17	4.76-80.95

Legend: **I** = subrecedent (below 1%); **II** = recedent (1.1 – 2%); **III** – subdominant (2.1 – 5%); **IV** = dominant (5.1 - 10%); **V** = eudominant (over 10.1%).

Abundance and dominance of the families showed a large variation from 8 individuals (Byrrhidae family) (present only in four localities (19.05%) to 13,664 individuals (Carabidae family in all localities (100%).

Coleoptera belonging to the family Carabidae were found in all those 21 investigated localities (100%), with an average of 650 individuals, with a variation in very broad limits, between 57 (6.40%) Căbești (1983, Bacău County and 3,587 (96.95%, Salt Lake (1983, Brăila County) (Table 4).

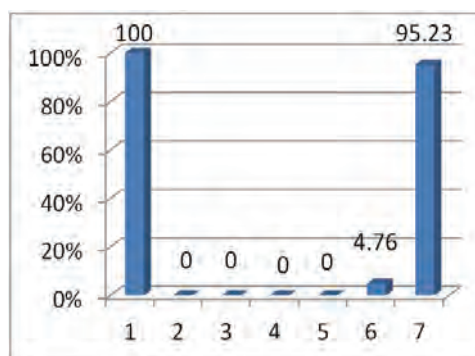
Table 4. Distribution, variation of activity abundance (A) and dominance (D) of Carabidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality and Year	A	D	No.	Locality, Year	A	D (%)
1	Brăila, Terasă (1981)	191	22.47	11	Miroslava (1981)	367	34.92
2	Brăila, Terasă (1982)	254	38.60	12	Hemeiuși (1981)	1,119	55.56
3	Brăila, Terasă (1983)	343	34.37	13	Căbești (1983)	57	6.40
4	Brăila, Terasă (1984)	195	40.46	14	Corod (1983)	326	30.21
5	Brăila, Lacul Sărat (1981)	269	28.99	15	Pogonești (1983)	465	16.72
6	Brăila, Lacul Sărat (1982)	365	44.79	16	Pogana (1989)	247	15.91
7	Brăila, Lacul Sărat(1983)	3587	96.95	17	Zvoriștea (1993)	1,925	87.03
8	Brăila, Lacul Sărat(1984)	324	73.30	18	Letea (1996)	1,760	90.24
9	Vaslui (1977)	292	15.80	19	Chirița (1999)	330	22.62
10	Pufești (1978)	260	88.44	20	Sârbi (1999)	508	94.07
				21	Santa Mare (2002)	480	57.69
					Individuals	13,664	
					Average	650.67	
					Limits	57-3587	

The dominance of the family Carabidae in localities and the respective years varied between 6.40% (dominant, Căbești, 1983 (Bacău County) and 96.95% (eudominant, Salt Lake, Brăila County) (Table 5, Fig. 1).

Table 5 and Figure 1. Numerical and percentage variation of the presence and absence of Carabidae family and their dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

	Specification	No.	%
1	Presence in localities	21	100
2	Absence	-	-
	Structure of dominance		
3	Subrecedent below 1%	-	-
4	Recedent 1.1 - 2%	-	-
5	Subdominant 2.1 - 5%	-	-
6	Dominant 5.1- 10%	1	4.76
7	Eudominant over 10.1%	20	95.23
	Total	21	99.99



Tenebrionidae family, second in the order of total abundance was found in 13 localities (61.90%), with an average of 199 individuals, numerical and percentage variation ranging between one individual (0.19%, Sârbi 1999, Botoșani County) and 762 individuals (27.40%, Pogonești (1983) Vaslui County) (Table 6).

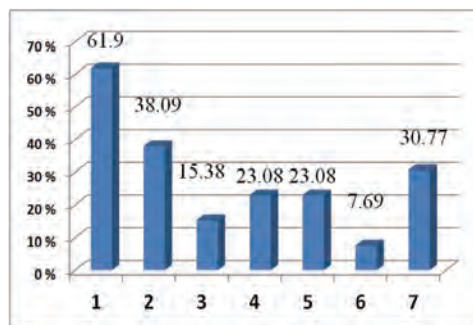
Table 6. Distribution, variation of activity abundance (A) and of dominance (D) of Tenebrionidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality and Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	30	3.53	11	Miroslava (1981)	-	-
2	Brăila, Terasă (1982)	-	-	12	Hemeiuși (1981)	-	-
3	Brăila, Terasă (1983)	10	1.00	13	Căbești (1983)	626	70.34
4	Brăila, Terasă (1984)	6	1.24	14	Corod (1983)	379	35.13
5	Brăila, Lacul Sărat (1981)	30	3.23	15	Pogonești (1983)	762	27.40
6	Brăila, Lacul Sărat (1982)	-	-	16	Pogana (1989)	585	37.69
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	-	-
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	-	-
9	Vaslui (1977)	67	3.63	19	Chirița (1999)	19	1.30
10	Pufești (1978)	4	1.36	20	Sârbi (1999)	1	0.19
				21	Santa Mare (2002)	72	8.65
					Individuals	2,591	
					Average	199.31	
					Limits	1-762	

The dominance of Tenebrionidae family varied between 0.19% (subrecedent, Sârbi 1999, Botoșani County) and 27.40% (eudominant, Pogonești 1983, Vaslui County) (Table 7, Fig. 2).

Table 7 and Figure 2. Numerical and percentage variation of the presence and absence of Tenebrionidae family and their dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

	Specification	No.	%
1	Presence in localities	13	61.90
2	Absence	8	38.09
	Structure of dominance		
3	Subrecedent below 1%	2	15.38
4	Recedent 1.1 - 2%	3	23.08
5	Subdominant 2.1 -5%	3	23.08
6	Dominant 5.1 -10%	1	7.69
7	Eudominant over 10.1%	4	30.77
	Total	13	100.0



Staphylinidae family occupies the 3rd position . It was found in 19 localities (90.48%), with an average of 124 individuals, the numerical variation varying between two individuals (Pufești, 1978, Vrancea County) and 743 individuals (Hemeiuși 1981, Bacău County) (Table 8).

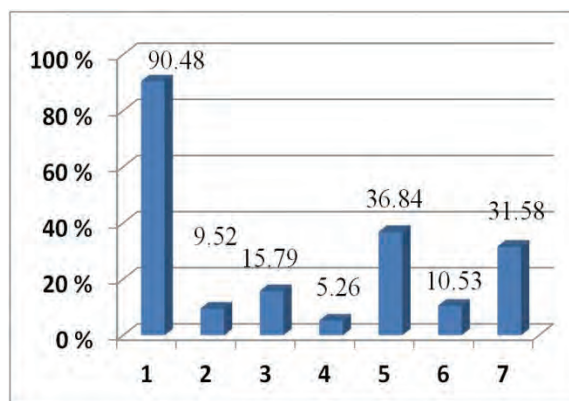
Table 8. Distribution, variation of activity abundance (A) and of dominance (D) of Staphylinidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D (%)	No	Locality, Year	A	D (%)
1	Brăila, Terasă (1981)	307	36.12	11	Miroslava (1981)	66	6.28
2	Brăila, Terasă (1982)	32	4.86	12	Hemeiuși (1981)	743	36.89
3	Brăila, Terasă (1983)	24	2.40	13	Căbești (1983)	15	1.69
4	Brăila, Terasă (1984)	68	14.11	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	307	33.08	15	Pogonești (1983)	14	0.50
6	Brăila, Lacul Sărat (1982)	34	4.17	16	Pogana (1989)	177	11.40
7	Brăila, Lacul Sărat (1983)	15	0.41	17	Zvoriștea (1993)	101	4.57
8	Brăila, Lacul Sărat (1984)	21	4.75	18	Letea (1996)	40	2.06
9	Vaslui (1977)	97	5.25	19	Chirița (1999)	281	19.26
10	Pufești (1978)	2	0.68	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	22	2.64
					Individuals	2,366	
					Average	124.53	
					Limits	2-743	

The dominance of Staphylinidae family had limits of variation between 0.68% (subrecedent, Pufești 1978 (Vrancea County) and 36.89% (eudominant, Hemeiuși, Bacău County) (Table 9, Fig. 3).

Table 9 and Figure 3. Numerical and percentage variation of the presence and absence of Staphylinidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	19	90.48
2	Absence	2	9.52
	Structure of dominance		
3	Subrecedent, below 1 %	3	15.79
4	Recedent 1.1 -2%	1	5.26
5	Subdominant 2.1 - 5%	7	36.84
6	Dominante 5.1 - 10%	2	10.53
7	Eudominant over 10.1%	6	31.58
	Total	19	100.0



Coccinellidae family occupies the 4th position . It was found in 18 localities (85.71%), with an average of 118 individuals; the numerical variation was between 5 individuals (Letea, 1996), Bacău County and 1.072 (1983, Pogonești (Vaslui County) (Table 10).

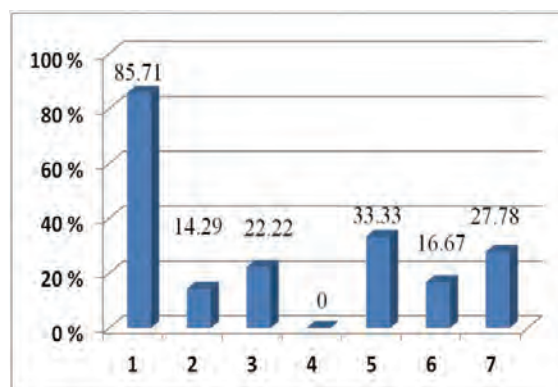
Table 10. Distribution, variation of the activity abundance (A) and of dominance (D) of Coccinellidae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	94	11.06	11	Miroslava (1981)	-	-
2	Brăila, Terasă (1982)	31	4.68	12	Hemeiuși (1981)	17	0.84
3	Brăila, Terasă (1983)	9	0.90	13	Căbești (1983)	23	2.58
4	Brăila, Terasă (1984)	25	5.19	14	Corod (1983)	65	6.02
5	Brăila, Lacul Sărat (1981)	94	10.13	15	Pogonești (1983)	1,072	38.55
6	Brăila, Lacul Sărat (1982)	40	4.91	16	Pogana (1989)	-	-
7	Brăila, Lacul Sărat (1983)	16	0.43	17	Zvoriștea (1993)	66	2.98
8	Brăila, Lacul Sărat (1984)	23	5.20	18	Letea (1996)	5	0.26
9	Vaslui (1977)	367	19.86	19	Chirița (1999)	34	2.33
10	Pufești (1978)	10	3.40	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	143	17.19
					Total individuals	2,134	
					Average	118.56	
					Limits	5-367	

The dominance limits of Coccinellidae family were between 0.26% (subrecedent, Letea 1996, (Bacău County) and 38.55% (eudominant, Pogonești, Vaslui County) (Table 11, Fig. 4).

Table 11 and Figure 4. Numerical and percentage variation of the presence and absence of Coccinellidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

	Specification	No.	%
1	Presence in localities	18	85.71
2	Absence	3	14.29
	Structure of dominance		
3	Subrecedent below 1%	4	22.22
	Recedent 1.12.%	-	-
5	Subdominant 2.1 - 5%	6	33.33
6	Dominant 5.1 - 10%	3	16.67
7	Eudominant over 10.1%	5	27.78
	Total	18	100.0



Dermestidae family occupies the 5th position. It was found in 16 localities (76.19%), with an average of 103 individuals; the numerical and percentage variation was between one individual (0.12%, Brăila, Terrace 1981;) one individual (0.21%, Brăila, Terrace, 1984; one individual (0.11%) Brăila, Salt Lake, 1981) and 694 individuals (37.55%), Vaslui, 1977 (Vaslui County) (Table 12).

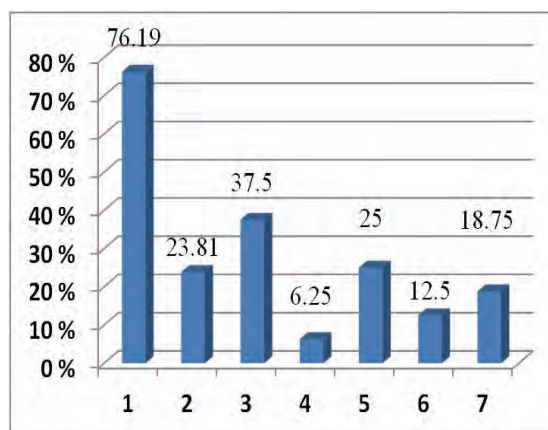
Table 12. Distribution, variation of the activity abundance (A) and of dominance (D) of Dermestidae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

No.	Locality and Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	1	0.12	11	Miroslava (1981)	5	0.48
2	Brăila, Terasă (1982)	55	8.36	12	Hemeiuși (1981)	-	-
3	Brăila, Terasă (1983)	476	47.70	13	Căbești (1983)	58	6.52
4	Brăila, Terasă (1984)	1	0.21	14	Corod (1983)	175	16.22
5	Brăila, Lacul Sărat (1981)	1	0.11	15	Pogonești (1983)	9	0.32
6	Brăila, Lacul Sărat (1982)	-	-	16	Pogana (1989)	64	4.12
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	19	0.86
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	41	2.11
9	Vaslui (1977)	694	37.55	19	Chirița (1999)	33	2.26
10	Pufești (1978)	-	-	20	Sârbi (1999)	7	1.30
				21	Santa Mare (2002)	20	2.40
					Total individuals	1,659	
					Average	103.69	
					Limits	1-694	

The dominance limits of Dermestidae family were comprised between 0.11% (subrecedent, Brăila, Salt Lake, 1981 (Brăila County) and 37.55%, (eudominant, Vaslui 1977, Vaslui County) (Table 13, Fig. 5).

Table 13 and Figure 5. Numerical and percentage variation of the presence and absence of Dermestidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	16	76.19
2	Absence	5	23.81
Structure of dominance			
3	Subrecedent below 1%	6	37.50
4	Recedent 1.1- 2	1	6.25
5	Subdominant 2.1-5	4	25.00
6	Dominant 5.1 - 10	2	12.50
7	Eudominant over 10.1%	3	18.75
Total		16	100.0



Anthicidae family occupies the 6th position. It was found in 17 localities (80.95%), with an average of 67 individuals and limits between one individual (0.23%, subrecedent, Brăila, Salt Lake) and 31 (11.15% eudominant, Pogonești 1983 Vaslui County) (Table 14).

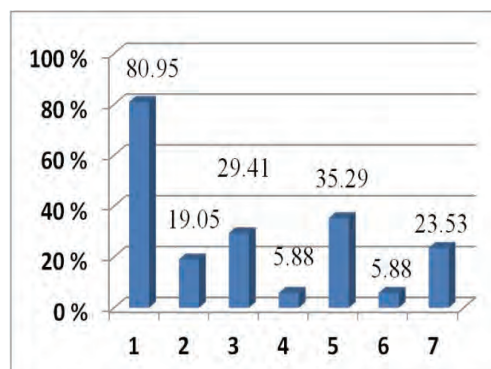
Table 14. Distribution, variation of the activity abundance (A) and of dominance (D) of Anthicidae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	19	2.24	11	Miroslava (1981)	44	4.19
2	Brăila, Terasă (1982)	163	24.77	12	Hemeiuși (1981)	-	-
3	Brăila, Terasă (1983)	100	10.02	13	Căbești (1983)	37	4.16
4	Brăila, Terasă (1984)	17	3.53	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	19	2.05	15	Pogonești (1983)	310	11.15
6	Brăila, Lacul Sărat (1982)	31	3.80	16	Pogana (1989)	253	16.30
7	Brăila, Lacul Sărat (1983)	58	1.57	17	Zvoriștea (1993)	-	-
8	Brăila, Lacul Sărat (1984)	1	0.23	18	Letea (1996)	18	0.92
9	Vaslui (1977)	15	0.81	19	Chirița (1999)	6	0.41
10	Pufești (1978)	-	-	20	Sârbi (1999)	4	0.74
				21	Santa Mare (2002)	52	6.25
Total individuals						1,147	
Average						67	
Limits						1-310	

The dominance limits were between 0.23% (subrecedent, Salt Lake (1984), Brăila County) and 11.15%, eudominant, Pogonești, 1983 (Vaslui County) (Table 15, Fig. 6).

Table 15 and Figure 6. Numerical and percentage variation of the presence and absence of Anthicidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	17	80.95
2	Absence	4	19.05
Structure of dominance			
3	Subrecedent below 1%	5	29.41
4	Recedent 1.1-2%	1	5.88
5	Subdominant 2.1 - 5%	6	35.29
6	Dominant 5.1 - 10%	1	5.88
7	Eudominant over 10.1%	4	23.53
Total		17	



Scarabaeidae family occupies the 7th position. It was found in 19 localities (90.47 %), with an average of 35 individuals and limits between one individual (0.03 %, subrecedent, Brăila, Salt Lake, 1983, Brăila County) and 215 (14.74%, eudominant, Chirița, 1983, Iași County) (Table 16).

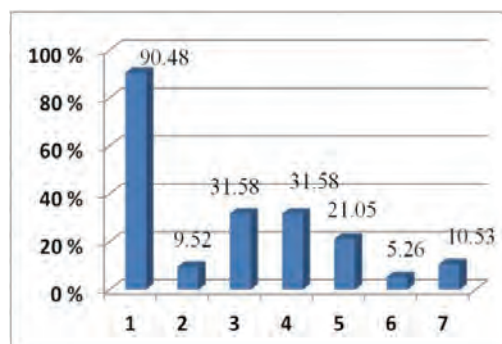
Table 16. Distribution, variation of the activity abundance (A) and of dominance (D) of Scarabaeidae family in the investigated wheat fields , Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	11	1.29	11	Miroslava (1981)	13	1.24
2	Brăila, Terasă (1982)	4	0.61	12	Hemeiuși (1981)	41	2.04
3	Brăila, Terasă (1983)	3	0.30	13	Căbești (1983)	12	1.35
4	Brăila, Terasă (1984)	60	12.45	14	Corod (1983)	13	1.20
5	Brăila, Lacul Sărat (1981)	11	1.19	15	Pogonești (1983)	65	2.34
6	Brăila, Lacul Sărat (1982)	2	0.25	16	Pogana (1989)	154	9.92
7	Brăila, Lacul Sărat (1983)	1	0.03	17	Zvoriștea (1993)	-	-
8	Brăila, Lacul Sărat (1984)	15	3.39	18	Letea (1996)	4	0.21
9	Vaslui (1977)	42	2.27	19	Chirița (1999)	215	14.74
10	Pufești (1978)	4	1.36	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	2	0.24
					Total individuals	672	
					Average	35.37	
					Limits	1-215	

The dominance limits were between 0.03% (subrecedent, Salt Lake, 1983, Brăila County) and 14.74% (eudominant, Chirița 1999, Iași County) (Table 17, Fig. 7).

Table 17 and Figure 7. Numerical and percentage variation of the presence and absence of Scarabaeidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
	Presence in localities	19	90.48
	Absence	2	9.52
	Structure of dominance		
1	Subrecedent below 1%	6	31.58
2	Recedent 1.1 - 2%	6	31.58
3	Subdominant 2.1 - 5%	4	21.05
4	Dominant 5.1 - 10%	1	5.26
5	Eudominant over 10.1%	2	10.53
	Total	19	100.0



The next family, Chrysomelidae, totalized 531 individuals (1.98%), present in 18 crops (85.71%), with an average of 29 individuals and limits between 3 individuals (0.68% subrecedent), Brăila, Salt Lake 1984, Brăila County and 77 individuals (7.33%, dominant, Miroslava, 1981, Iași County) (Table 18).

Table 18. Distribution, variation of the activity abundance (A) and of dominance (D) of Chrysomelidae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

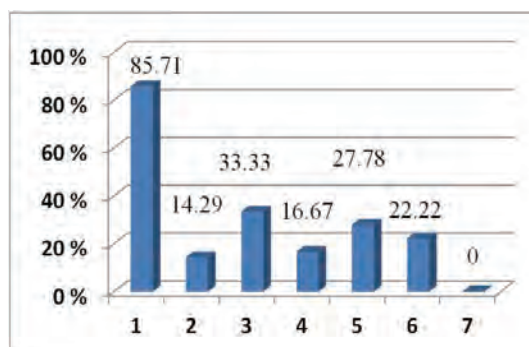
No.	Locality, Year	A	D	No.	Locality and Year	A	D
1	Brăila, Terasă (1981)	62	7.29	11	Miroslava (1981)	77	7.33
2	Brăila, Terasă (1982)	49	7.45	12	Hemeiuși (1981)	23	1.14
3	Brăila, Terasă (1983)	4	0.40	13	Căbești (1983)	37	4.16
4	Brăila, Terasă (1984)	20	4.15	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	62	6.68	15	Pogonești (1983)	39	1.40
6	Brăila, Lacul Sărat (1982)	21	2.58	16	Pogana (1989)	29	1.87
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriște (1993)	12	0.54
8	Brăila, Lacul Sărat (1984)	3	0.68	18	Letea (1996)	47	2.42
9	Vaslui (1977)	18	0.97	19	Chirița (1999)	11	0.75
10	Pufești (1978)	-	-	20	Sârbi (1999)	12	2.22
				21	Santa Mare (2002)	5	0.60
					Total individuals	531	
					Average	29.50	
					Limits	3-77	

Chrysomelidae family had limits of dominance between 0.68% (subrecedent, Salt Lake, 1984, Brăila County) and 7.33% (dominant, Miroslava, 1981, Iași County).

The numerical and percentage variation of classes structure of dominance are rendered in Table 19 and Fig. 8.

Table 19 and Figure 8. Numerical and percentage variation of the presence and absence of Chrysomellidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	18	85.71
2	Absence	3	14.29
3	Structure of dominance		
4	Subrecedent below 1%	6	33.33
5	Recedent 1.1 - 2%	3	16.67
6	Subdominant 2.1 - 5%	5	27.78
7	Dominant 5.1 - 10%	4	22.22
8	Eudominant over 10.1%	-	-
	Total	18	100.



Silphidae family, position 9, totalized 22 individuals (1.97%) with an average of 47 individuals, present only in 11 localities (52.38%) and numerical and percentage limits between one individual (0.15% subrecedent, Brăila, Terrace, (1982), Brăila County and 395 individuals (27.07%, eudominant, Chirița, 1999, Iași County).

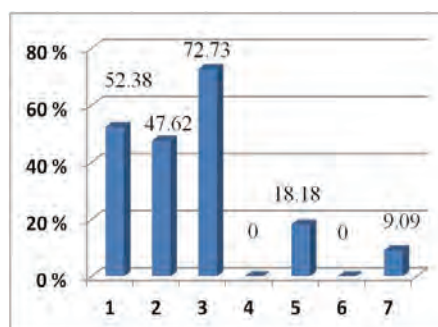
Table 20. Distribution, variation of the activity abundance (A) and of dominance (D) of Silphidae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	2	0.24	11	Miroslava (1981)	4	0.38
2	Brăila, Terasă (1982)	1	0.15	12	Hemeiuși (1981)	8	0.40
3	Brăila, Terasă (1983)	-	-	13	Căbești (1983)	-	-
4	Brăila, Terasă (1984)	-	-	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	2	0.22	15	Pogonești (1983)	-	-
6	Brăila, Lacul Sărat (1982)	2	0.25	16	Pogana (1989)	35	2.26
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	6	0.27
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	-	-
9	Vaslui (1977)	70	3.79	19	Chirița (1999)	395	27.07
10	Pufești (1978)	2	0.68	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	-	-
					Total individuals	527	
					Average	47.91	
					Limits	1-395	

The limits of dominance of Silphidae family varied between 0.15%, (subrecedent, Brăila, Terrace, 1982, Brăila County) and 27.07% (eudominant, 1999, Iași County) (Table 21).

Table 21 and Figure 9. Numerical and percentage variation of the presence and absence of Silphidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	11	52.38
2	Absence	10	47.62
	Structure of dominance		
3	Subrecedent below 1%	8	72.73
4	Recedent 1.1 -2%	-	-
5	Subdominant 2.1 -5%	2	18.18
6	Dominant 5.1 -10%	-	-
7	Eudominant over 10.1%	1	9.09
	Total	11	100.0



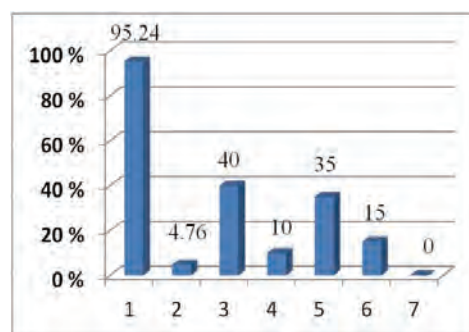
The next family, Elateridae, position 10, totalized 459 individuals, with an average of 22 individuals present in 20 crops (95.23%) and numerical limits ranging between one individual (0.19%), subrecedent, Sârbi, 1999, Botoșani County) and 99 (9.42%, dominant, Miroslava, 1981, Iași County) (Table 22).

Table 22 and Figure 10. Distribution, variation of the activity abundance (A) and of dominance (D) of Elateridae family in the investigated wheat fields, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	3	0.35	11	Miroslava (1981)	99	9.42
2	Brăila, Terasă (1982)	23	3.50	12	Hemeiuși (1981)	36	1.79
3	Brăila, Terasă (1983)	1	0.10	13	Căbești (1983)	13	1.46
4	Brăila, Terasă (1984)	30	6.22	14	Corod (1983)	64	5.93
5	Brăila, Lacul Sărat (1981)	3	0.32	15	Pogonești (1983)	11	0.40
6	Brăila, Lacul Sărat (1982)	17	2.09	16	Pogana (1989)	6	0.39
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	45	2.03
8	Brăila, Lacul Sărat (1984)	11	2.49	18	Letea (1996)	9	0.46
9	Vaslui (1977)	54	2.92	19	Chirița (1999)	5	0.34
10	Pufești (1978)	7	2.38	20	Sârbi (1999)	1	0.19
				21	Santa Mare (2002)	21	2.52
					Total Individuals	459	
					Average	22.95	
					Limits	1-99	

Table 23 and Figure 10. Numerical and percentage variation of the presence and absence of Elateridae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	20	95.24
2	Absence	1	4.76
	Structure of dominance		
3	Subrecedent below 1%	8	40.00
4	Recedent 1.1 - 2%	2	10.00
5	Subdominant 2.1 - 5%	7	35.00
6	Dominant 5.1 - 10%	3	15.00
7	Eudominant over 10%	-	-
	Total	20	100.0



Curculionidae family totalized 440 individuals, with an average of 20, present in all the crops; the numerical variation ranged between one individual (Sârbi, 1999 Botoșani County) and 178 individuals (Miroslava, 1981, Iași County) (Table 24).

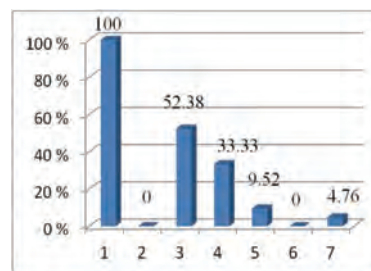
Table 24. Distribution, variation of the activity abundance (A) and of dominance (D) of Curculionidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	11	1.29	11	Miroslava (1981)	178	16.94
2	Brăila, Terasă (1982)	11	1.67	12	Hemeiuși (1981)	3	0.15
3	Brăila, Terasă (1983)	3	0.30	13	Căbești (1983)	5	0.56
4	Brăila, Terasă (1984)	4	0.83	14	Corod (1983)	28	2.59
5	Brăila, Lacul Sărat (1981)	11	1.19	15	Pogonești (1983)	33	1.19
6	Brăila, Lacul Sărat (1982)	10	1.23	16	Pogana (1989)	1	0.06
7	Brăila, Lacul Sărat (1983)	3	0.08	17	Zvoriștea (1993)	20	0.90
8	Brăila, Lacul Sărat (1984)	8	1.81	18	Letea (1996)	16	0.82
9	Vaslui (1977)	17	0.92	19	Chirița (1999)	67	4.59
10	Pufești (1978)	3	1.02	20	Sârbi (1999)	1	0.19
				21	Santa Mare (2002)	7	0.84
					Total individuals	440	
					Average	20.95	
					Limits	1-178	

The dominance limits varied between 0.19 % (subrecedent, Sârbi, 1999, Botoșani County) and 16.94 % (eudominant, Miroslava, 1981, Iași County) (Table 25, Fig. 11).

Table 25 and Figure 11. Numerical and percentage variation of the presence and absence of Curculionidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	21	100
2	Absence	-	-
Structure of dominance			
3	Subrecedent, below 1%	11	52.38
4	Recedent 1.1 - 2%	7	33.33
5	Subdominant 2.1- 5%	2	9.52
6	Dominant 5.1- 10%	-	-
7	Eudominant over 10.1%	1	4.76
	Total	21	99.99



Lathridiidae family occupies the 12th position, totalising 322 individuals, being present in 9 localities (42.85%); it was registered an average of 35 individuals, with limits of the numerical variation between two individuals (Letea, 1996, Bacău County and Chirița, 1999, Iași County) and 147 (Brăila, Salt Lake, 1982, Braila county) (Table 26).

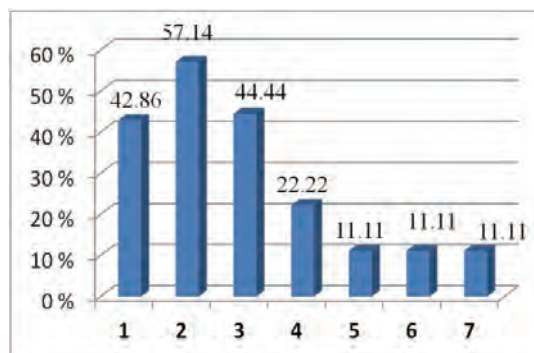
Table 26. Distribution, variation of the activity abundance (A) and of dominance (D) of Lathridiidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	-	-	11	Miroslava (1981)	84	7.99
2	Brăila, Terasă (1982)	30	4.71	12	Hemeiuși (1981)	-	-
3	Brăila, Terasă (1983)	16	1.60	13	Căbești (1983)	-	-
4	Brăila, Terasă (1984)	-	-	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	-	-	15	Pogonești (1983)	-	-
6	Brăila, Lacul Sărat (1982)	147	18.04	16	Pogana (1989)	-	-
7	Brăila, Lacul Sărat (1983)	5	0.14	17	Zvoriștea (1993)	8	0.36
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	2	0.10
9	Vaslui (1977)	28	1.52	19	Chirița (1999)	2	0.14
10	Pufești (1978)	-	-	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	-	-
					Total individuals	322	
					Average	35.78	
					Limits	2-147	

The variation of dominance was between the limits of 0.10% subrecedent, Letea, 1996, Bacău County) and 18.04% (eudominant, Brăila, Salt Lake, 1982, Brăila County) (Table 27, Fig. 12).

Table 27 and Figure 12. Numerical and percentage variation of the presence and absence of Lathridiidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	9	42.86
2	Absence	12	57.14
Structure of dominance			
3	Subrecedent below 1%	4	44.44
4	Recedent 1.1 - 2%	2	22.22
5	Subdominant 2.1 - 5%	1	11.11
6	Dominant 5.1 - 10%	1	11.11
7	Eudominant over 10.1%	1	11.11
	Total	9	99.99



Cantharidae family, position 13, totalized 130 individuals, with an average of 8, and the numerical limits between one individual (Brăila, Terrace, 1982, Braila, Terrace 1983) and 44 (Vaslui, 1977, Vaslui) (Table 28).

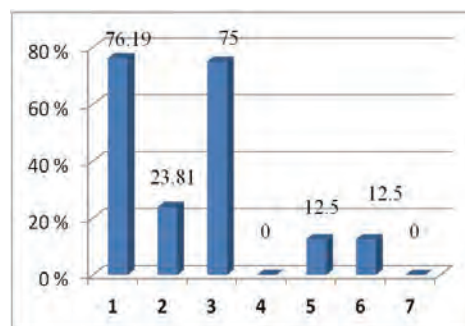
Table 28. Distribution, variation of the activity abundance (A) and of dominance (D) of Cantharidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality, Year	A	D	No.	Locality, Year	A	D
1	Brăila, Terasă (1981)	11	1.29	11	Miroslava (1981)	7	0.67
2	Brăila, Terasă (1982)	1	0.15	12	Hemeiuși (1981)	3	0.15
3	Brăila, Terasă (1983)	1	0.10	13	Căbești (1983)	2	0.22
4	Brăila, Terasă (1984)	13	2.70	14	Corod (1983)	9	0.83
5	Brăila, Lacul Sărat (1981)	11	1.19	15	Pogonești (1983)	1	0.04
6	Brăila, Lacul Sărat (1982)	6	0.74	16	Pogana (1989)	-	-
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	6	0.27
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	-	-
9	Vaslui (1977)	44	2.38	19	Chirița (1999)	6	0.41
10	Pufești (1978)	2	0.68	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	7	0.84
					Total individuals	130	
					Average	8.13	
					Limits	1-44	

The numerical and percentage structure of variation of the dominance classes are rendered in table 29.

Table 29 and Figure 13. Numerical and percentage variation of the presence and absence of Cantharidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	16	76.19
2	Absence	5	23.81
	Structure of dominance		
3	Subrecedent below 1 %	12	75.00
4	Recedent 1.1 - 2 %	-	-
5	Subdominant 2.1 - 5 %	2	12.50
6	Dominant 5.1 - 10 %	2	12.50
7	Eudominant over 10.1 %	-	-
	Total	16	



Histeridae family, position 14, was collected only in six wheat crops (28.57%), Moldova, 95 individuals (0.36%) with an average of 15 and numerical limits between one individual (Pogana, 1989, Vaslui county; 1 individual (Santa Mare, Botoșani County) and 53 (Chirița 1999, Iași) (Table 30).

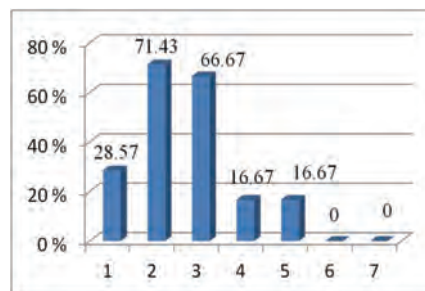
Table 30. Distribution, variation of the activity abundance (A) and of dominance (D) of Histeridae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality and Year	A	D (%)	No.	Locality and Year	A	D (%)
1	Brăila, Terasă (1981)	-	-	11	Miroslava (1981)	-	-
2	Brăila, Terasă (1982)	-	-	12	Hemeiuși (1981)	19	0.92
3	Brăila, Terasă (1983)	-	-	13	Căbești (1983)	-	-
4	Brăila, Terasă (1984)	-	-	14	Corod (1983)	18	1.67
5	Brăila, Lacul Sărat (1981)	-	-	15	Pogonești (1983)	-	-
6	Brăila, Lacul Sărat (1982)	-	-	16	Pogana (1989)	1	0.06
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	-	-
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	3	0.15
9	Vaslui (1977)	--	-	19	Chirița (1999)	53	3.63
10	Pufești (1978)	-	-	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	1	0.12
					Total individuals	95	
					Average	15.83	
					Limits	1-53	

The numerical structure of the dominant classes is rendered in Table 31 and Fig. 14.

Table 31 and Figure 14. Numerical and percentage variation of the presence and absence of Histeridae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	6	28.57
2	Absence	15	71.43
	Structure of dominance		
3	Subrecedent below 1%	4	66.67
4	Recedent 1.1 - 2%	1	16.67
5	Subdominant 2.1 - 5%	1	16.67
6	Dominant 5.1 - 10%	-	-
7	Eudominant over 10.1%	-	-
	Total	6	100.0



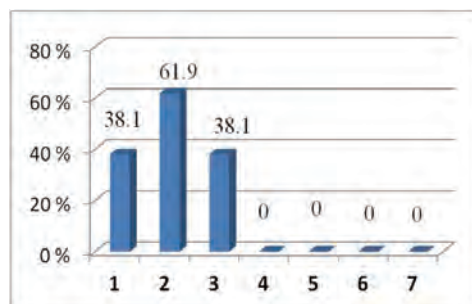
The penultimate of the 16 analysed families, rendered Table 32, is the Meliridae family, position 15, which totaled 10 individuals (0.04%) (Table 32).

Table 32. Distribution, variation of the activity abundance (A) and of dominance (D) of Meliridae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No.	Locality and Year	A	D (%)	No.	Locality and Year	A	D (%)
1	Brăila, Terasă (1981)	1	0.12	11	Miroslava (1981)	-	-
2	Brăila, Terasă (1982)	-	-	12	Hemeiuși (1981)	-	-
3	Brăila, Terasă (1983)	-	-	13	Căbești (1983)	3	0.34
4	Brăila, Terasă (1984)	1	0.21	14	Corod (1983)	1	0.09
5	Brăila, Lacul Sărat (1981)	1	0.11	15	Pogonești (1983)	-	-
6	Brăila, Lacul Sărat (1982)	-	-	16	Pogana (1989)	-	-
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	1	0.05
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	1	0.05
9	Vaslui (1977)	1	0.05	19	Chirița (1999)	-	-
10	Pufești (1978)	-	-	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	-	-
					Total individuals	10	
					Average	1.25	
					Limits	1-3	

Table 33 and Figure 15. Numerical and percentage variation of the presence and absence of Meliridae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	8	38.10
2	Absence	13	61.90
	Structure of dominance		
3	Subrecedent below 1%	8	38.10
4	Recedent 1.1 - 2%	-	-
5	Subdominant 2.1 - 5%	-	-
6	Dominant 5.1 - 10%	-	-
7	Eudominant over 0.1%	-	-
	Total	8	38.10



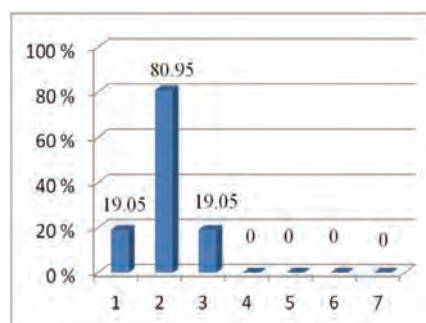
The last family, position 16, is the Byrrhidae family, which totaled only 8 individuals (0.03%) present in only four localities (19.05 %) (Table 34, 35, Fig. 16)).

Table 34. Distribution, variation of the activity abundance (A) and of dominance (D) of Byrrhidae family in the investigated wheat crops, Brăila and Moldova, 1977-2002.

No	Locality, Year	A	D	No	Locality, Year	A	D
1	Brăila, Terasă (1981)	-	-	11	Miroslava (1981)	3	0.29
2	Brăila, Terasă (1982)	-	-	12	Hemeiuși (1981)	2	0.10
3	Brăila, Terasă (1983)	-	-	13	Căbești (1983)	2	0.22
4	Brăila, Terasă (1984)	-	-	14	Corod (1983)	-	-
5	Brăila, Lacul Sărat (1981)	-	-	15	Pogonești (1983)	-	-
6	Brăila, Lacul Sărat (1982)	-	-	16	Pogana (1989)	-	-
7	Brăila, Lacul Sărat (1983)	-	-	17	Zvoriștea (1993)	1	0.05
8	Brăila, Lacul Sărat (1984)	-	-	18	Letea (1996)	-	-
9	Vaslui (1977)	-	-	19	Chirița (1999)	-	-
10	Pufești (1978)	-	-	20	Sârbi (1999)	-	-
				21	Santa Mare (2002)	-	-
					Total individuals	8	
					Average	2	
					Limits	1-3	

Table 35 and Figure 16. Numerical and percentage variation of presence and absence of Byrrhidae family and the structure of dominance classes in wheat fields, Brăila and Moldova, 1977-2002.

No.	Specification	No.	%
1	Presence in localities	4	19.05
2	Absence	17	80.95
	Structure of dominance		
3	Subrecedent below %	4	19.05
4	Recedent 1.1 - 2%	-	-
5	Subdominant 2.1 - 5%	-	-
6	Dominant 5.1 - 10%	-	-
7	Eudominant over 10.1%	-	-
	Total		



DISCUSSIONS

Discussions make evident the generalizations and some interpretations of the results. The fundamental and unique form of existence of life is the individual that carries all the general and particular characters, specific, from kingdom to species (kingdom, class, order, family, genus, species). In the collected material, the order Coleoptera is represented by 16 families (Table 2) in those 21 wheat crops, 1977-2002, Brăila County and seven counties in Moldova (Galați, Vaslui, Vrancea, Iași, Bacău, Suceava, Botoșani). The presence of the families in wheat fields is variable. Only two families (9.52%) are present in all those 21 investigated wheat crops: Carabidae family and Curculionidae family. These families have different trophic characters: the epigeic carabids are the most zoophagous and Curculionidae family is a phytophagous family. The other families were present between minimum four wheat crops, the Byrrhidae family (19.05%) and maximum 20 wheat crops (the Elateridae family, 90.48%).

The relative abundance within the families is highly variable as a result of the variation of ecological factors: food, soil moisture, temperature. The total number of individuals of Carabidae family, in the collected material, represented 51%. Carabidae family is very well adapted to epigeic conditions in agricultural crops; other 8 families totalize 46.81% (Tenebrionidae, 9.69%); Staphylinidae (8.82%); Coccinellidae (7.99%); Dermestidae (6.20%); Anthicidae (4.29%); Scarabaeidae (2.51%); Chrysomelidae (1.98%); Silphidae (1.97%); Elateridae (1.72%) and Curculionidae (1.64%).

Tenebrionidae and Dermestidae families were not collected three years running (1982-1984) in the Salt Lake stationary, Brăila, owing to weak salinated soil.

The variations of local conditions in the localities of wheat crops, Brăila and Moldova, (South, Central, North) influenced the total number of individuals in the families of Coleoptera, causing that the same family to have subrecedent dominance in a locality and dominant or eudominant in other localities. The numerical limits of the families of subrecedent Coleoptera were between two localities (9.52%) (Tenebrionidae, Terrace, 1983, (Brăila County) and Sârbi, 1999, (Botoșani County) and 12 localities (75%). Cantharidae family was not collected in four localities (19.04%).

The limits of the recedent families were between one locality (4.76%) (Staphylinidae, (Căbești, 1983, Bacău County); Dermestidae, (Sârbi, 1999, Botosani County); Anthicidae, (Brăila, Salt Lake, 1983); Histeridae, (Corod, 1983, Galați County) and seven localities: Scarabaeidae, Brăila, Terrace, 1981; Brăila, Salt Lake, 1981; Pufești, 1978, Vrancea County; Miroslova, 1981, Iași County; Hemeiuși, 1981, Bacău County; Căbești, 1983, Bacău County; Corod 1983, Galați County).

The limits of the subdominant families were between one locality (4.76%), Lathridiidae family (Brăila, Terrace, 1982), Histeridae (Chirița, 1999, Iași County) and seven localities (33.33%), the families Staphylinidae, Elateridae (Brăila, Terrace, 1982, 1983; Salt Lake, 1982, 1984; Letea, 1996; Bacău, Zvoriștea 1993; Suceava County, Santa Mare, 2002, (Botoșani). The factor that favoured Staphylinidae family to be subdominant in seven localities, dominant in two localities and eudominant in six localities was the humidity of the soil.

Five families (31.25%) were dominant in each locality (Carabidae, Tenebrionidae, Anthicidae, Scarabaeidae, Lathridiidae). Chrysomelidae family was dominant in four localities. Wheat crops with eudominant families were between one locality (4.76%) and 20 localities (95.23%).

CONCLUSIONS

The analysis of those 26,755 individuals from 1,899 samples collected in 21 wheat crops, over a period of 11 seasons, 1977 - 2002, in Brăila and Moldova give us the opportunity to mention that the epigeic Coleoptera belongs to 16 families. The numerical and percentage presence of the families of Coleoptera in wheat crops varied among 4 localities (19.05%, (Byrrhidae family) and 21 localities (100%), (Carabidae and Elateridae families).

The abundance and dominance of the families of Coleoptera within each wheat crop is highly variable depending on the ecological characteristics determined by the geographical positions of wheat crops within the counties of Moldova.

The number of individuals within the collected families varies greatly from one individual (Tenebrionidae, Dermestidae, Anthicidae, Scarabaeidae, Elateridae, Curculionidae, Cantharidae, Histeridae, Melyridae and Byrrhidae) to 3.587 individuals (Carabidae). Carabidae family manifested itself as dominant in one locality and as eudominant in 20 localities. As a result of the variations in the number of individuals in localities, six families had all the classes of dominance (Tenebrionidae, Staphylinidae, Dermestidae, Anthicidae, Scarabaeidae, Lathridiidae). The families that do not occur as recedent are: Coccinellidae, Silphidae, Cantharidae, Melyridae, Byrrhidae). Cantharidae, Histeridae did not occur as eudominant.

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REFERENCES

- ANDRIESCU I., VARVARA M., MOGLAN I. 1983. The dynamics of carabids (Coleoptera, Carabidae) in the maize experimental crops (*Zea mais* L.) treated with insecticides. *Verhandlungen SIEEC X*. Budapest: 143-145.
- BANIȚĂ EMILIA, COJOCARU DOINA, VOICU M., KISS B., CANTOREANU MARGARETA, LUCA EMILIA, PAULIAN MIHAELA, AFTENE MARIANA. 1994. Cercetări privind structura faunei dăunătoare și utile în culturile de grâu din Oltenia. *Analele Institutului de Cercetări pentru Cereale și Plante Tehnice Fundulea*. București: 169-182.
- BICĂ VALERICA. 2005. Cercetări asupra carabidelor din culturile de cereale cultivate în Câmpia de Vest. *Teză de doctorat*. Universitatea de Științe Agricole și Medicină Veterinară a Banatului. Timișoara (Forma electronică). 274 pp.
- CÂRLAN V. & VARVARA M. 1998-1999. The fauna of Carabidae from two agricultural crops of Moldova (Romania). *Analele Științifice ale Universității "Al. I. Cuza"*. Biologie animală. Iași. **44-45**: 83-92.
- DĂNILĂ A. 2005. Structura cenzelor de Carabidae (Coleoptera, Carabidae) în culturile de grâu, lucernă și viță de vie din Republica Moldova. *Oltenia. Studii și comunicări. Științele Naturii*. Muzeul Olteniei Craiova. **21**: 103-106.
- HARDE K. W. & SEVERA F. 1984. Der Kosmos-Kaferfurer. Stuttgart. (*color album*): 1-321.
- KUNHT PAUL. 1912. Illustrierte Bestimmungstabellen der Kafer Deutschlands. Stuttgart Familien-Tabelle. **1**: 7- 25.
- NECULISEANU Z. 2003. Carabidele (Coleoptera, Carabidae) din zona de interferență biogeografică (Taxonomie, Diversitate, Zoogeografie, Biologie) și importanța lor practică. *Teza de doctor habilitat în științe biologice*. Institutul de Zoologie al Academiei de Științe a Moldovei. Chișinău. (manuscris). 260 pp.
- MALSCHI DANA. 2000. Investigații asupra importanței entomofagilor prădători în agroecosistemele cerealiere din Transilvania. Simpozionul Internațional: Dezvoltare rurală și agricultură ecologică, Iulie 2000, Cluj-Napoca. *Revista BIO TERRA a Societății Bioagricultorilor din România*: 11-14. in June 2012. *Coleoptera) communities in summer barley agrocoenoses*. *Baltic Journal of Coleopterology*. **7**: 123-145.
- VARVARA M., ANDRIESCU I., PETCU I. 1981. Aspects of the fauna of Carabidae in sugar beet crop Dobridor, Dolj County. *Analele Științifice ale Universității "Al. I. Cuza"*. Biologie. Iași. **27**: 75-80.
- VARVARA M., ANDRIESCU I., MOGLAN. 1985. Structura cenozei de Caraboidea (Coleoptera) din culturile experimentale de porumb, tratate cu insecticide pe sol cernoziom de la Brăila. *Analele Științifice ale Universității "Al. I. Cuza"*. Biologie animală. Iași. **31**: 31-32.
- VARVARA M. & ANDRIESCU I. 1986. Die Konstanz und Abundanz der Carabidae in der Zückerrübenkultur der Moldau (Osten Rumaniens). *Analele Științifice ale Universității "Al. I. Cuza"*. Biologie. Supliment. Iași. **32**: 109-113.
- VARVARA M., PISICĂ C., CÂRLAN V. 1992. Contributions to the Knowledge of Carabid Communities in Wheat Crops of Moldavia. *Proceedings of the fourth European Congress of Entomology, 1-6 September, 1991, Gödöllő, Hungary*: 818-823.
- VARVARA M., TĂLMACIU M., GEORGESCU TH. 1995. Structura speciilor de carabidae (Ord. Coleoptera, Carabidae) în câteva culturi viticole din Moldova. *Cercetări Agronomice în Moldova*. Universitatea de Științe Agricole și Medicină Veterinară „Ion Ionescu de la Brad.” Iași, An XXVIII. **3-4**(104): 159-165.
- VARVARA M. & BRUDEA V. 1999. The Structure and Distribution of the Carabid Communities in the Maize Crops from Moldavia. *Studii și Comunicări Științifice*. Universitatea Bacău: 79-84.
- VARVARA M. 2001. Observations on the Carabid Coenosis (Coleoptera, Carabidae) in the Potato Crops from Suceava District. *Simpozionul Jubiliar Consacrat Aniversării a 30 de ani de la Formarea Rezervației „Codrii”, 27-28. September*. Chișinău. **2**: 78-79.
- VARVARA M. & BULIMAR FELICIA. 2002. Long – Term Faunistic and Ecological Research of Carabid Communities in the Winter Wheat Crops from Eastern Romania. *Studii și Comunicări*. Edit. “Ion Borcea”, Bacău. **18**: 143-150.

- VARVARA M. & ANDRIESCU I. 2003. The Coenosis of Carabidae (Coleoptera, Carabidae) in the Apple Trees Orchard Ecosystem from the Iasi County. *Analele Stiintifice ale Universității "Al. I. Cuza", Iași. Biologie animală.* **49**: 31-39.
- VARVARA M. 2005. The Taxonomic and Ecological Spectra of Carabids (Coleoptera: Carabidae) in three Agroecosystems from Moldavia. *Lucrările Simpozionului „Entomofagii și rolul lor în păstrarea echilibrului natural”* Universitatea.”Al. I. Cuza”. Iași: 117-129.
- VARVARA M. 2005a. Diversity and the Main Ecological Requirements of the Epigeic Species of Carabidae (Coleoptera, Carabidae) in three types of Agricultural Ecosystems from Suceava County (Moldavia). *Studii și Cercetări, Biologie.* Universitatea Bacău. **10**: 53-61.
- VARVARA M. 2008. Diversity and Main Ecological Requirements of the Epigeic species of Carabidae (Coleoptera, Carabidae) in the Ecosystem crop of sugar beet from Moldavia, 1981-2001. *Lucrările Simpozionului “Entomofagii și rolul lor în păstrarea echilibrului natural”*. Universitatea “Al. I. Cuza “. Iași: 175-192.
- VARVARA M. & ZAMFIRESCU ȘT. 2008. Composition and the structure of Ecological Requirements of the Species of Carabidae (Coleoptera, Carabidae) in the Maize Crop from Moldavia, 1984-2000. *Oltenia. Studii și comunicări. Științele Naturii.* Muzeul Olteniei Craiova. **24**: 97-108.
- VARVARA M., CHIMISLIU CORNELIA, ȘUSTEK Z. 2012. Distribution and abundance of *Calosoma auropunctatum* HERBST 1784 (Coleoptera, Carabidae) in some agricultural crops in Romania 1977-2010. *Oltenia. Studii și comunicări. Științele Naturii.* Muzeul Olteniei Craiova. **28**(1): 79-90
- *** AKADEMIA NAUK SSSR. 1965. Opredelitel nasecomah evropeiscoi ciasti SSR. *Izdatelstvo Nauka.* **2**: 1-666.

Varvara Mircea

University „Alexandru Ioan Cuza” Iași,
Str. Bulevardul Carol I, No 11, Iași, Romania.
E-mail: mvarvara@uaic.ro

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