

AN ANALYSIS ON CARABIDAE, TENEBRIONIDAE AND STAPHYLINIDAE (COLEOPTERA) FAUNA IN ASPAT (STROBILOS) ANCIENT CITY AND ITS TERRITORIUM, BODRUM, MUĞLA, TURKEY

Rukiye Tanyeri* , İ. Ethem Çevik and Serdar Tezcan*****

* Department of Biology, Faculty of Science, Sinop University, Sinop, TURKEY. E-mail: rukitanyeri@hotmail.com

** Department of Biology, Faculty of Science, Ege University, 35100 Bornova, Izmir, TURKEY. E-mail: ethem.cevik@ege.edu.tr

*** Department of Plant Protection, Faculty of Agriculture, Ege University, 35100 Bornova, Izmir, TURKEY. E-mail: serdar.tezcan@gmail.com

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ABSTRACT: This study was carried out between 2007–2008 to identify the species belonging to Carabidae, Tenebrionidae and Staphylinidae in Aspat (Strobilos) region (Bodrum, Muğla) of western Turkey. As a result of this study, eight species which belong to Carabidae [*Carabus (Procrustes) coriaceus*, Linnaeus, 1758, *Carabus (Pachystus) graecus* Dejean, 1826, *Calathus (Calathus) fuscipes* (Goeze, 1777), *Calathus (Calathus) longicollis* Motschulsky, 1865, *Calathus erythroderus* Gemminger & Harold, 1868, *Nebria (Nebria) brevicollis* (Fabricius, 1792), *Amara (Amara) aenea* (De Geer, 1774), *Zabrus politus* Gauth, 1869]; 10 species which belong to Tenebrionidae [*Dailognatha quadricollis quadricollis* Solier, 1835, *Probaticus tenebricosus* Brullé, 1832, *Raibosceles coelestinus coelestinus* (Waltl, 1838), *Opatroides punctulatus* Brullé, 1832, *Colpotus sulcatus* Ménétériés, 1832, *Gonocephalum (Gonocephalum) rusticum* Olivier, 1811 *Cephalostenus orbicollis* (Ménétériés, 1836), *Dendarus moesiacus* Mulsant et Rey, 1854, *Phymatitris (Graecopachys) quadricollis quadricollis* Solier, 1835, *Zophosis punctata punctata* Brullé, 1832]; 15 species which belong to Staphylinidae [*Tachyporus nitidulus* (Fabricius, 1781), *Stenus maculiger* Weise, 1875, *Aleochara tristis* Gravenhorst, 1806, *Anotylus inustus* (Gravenhorst, 1806), *Paederus fuscipes* Curtis, 1826, *Philonthus rufimanus* Heer, 1839, *Philonthus concinnus* (Gravenhorst, 1802), *Philonthus intermedius* (Lacordaire, 1835), *Philonthus laminatus* (Creutzer, 1799), *Ocypus curtippennis* Motschulsky, 1849, *Ocypus mus* Brullé, 1832, *Ocypus picipennis picipennis* (Fabricius, 1793), *Xantholinus graecus graecus* Kraatz, 1858, *Xantholinus rufipennis* Erichson, 1839, *Megalinus scutellaris* (Fauvel, 1900)] impending totaly 33 species determined. Among those, 15 species are the first records for local fauna of Muğla.

KEY WORDS: Fauna, Coleoptera, Muğla, Turkey

Anatolia which can be regarded as a mainland for its climate, topography, biodiversity and also comes forward with its cultural values. In recent years, to protect and introduce natural and cultural values have been held together with its maintainability. Agrotourism which has entered the agenda of developed countries many years ago has started to be heard in our country although its used limited.

Aspat (Strobilos) ancient city history dating back to the 7th century, has hosted many civilizations. A project carried out to death with archaeological wealth and biodiversity in the agricultural terraces around this city and aimed planning and management the archaeological park around Aspat (Diler, 2010). Determination of biodiversity in this area is considered to be the first step for a holistic approach to the protection of the natural environment.

In this context species belonging to order of Dermaptera; Scutelleridae, Cydnidae and Pentatomidae (Hemiptera); Elateridae (Coleoptera) have been reported by Tezcan et al. (2011, 2013) and Gülperçin & Tezcan (2012). This article aims to display the results of faunistic studies which is the first interdisciplinary research in an ancient city of Turkey. Species belonging to Carabidae, Tenebrionidae and Staphylinidae families which has determined studies of Aspat region discussed faunistically and evaluated by various parameters.

Analyzing studies about the Tenebrionidae species' distribution in Muğla provinces, it's seen that Kaszab (1968) 24 species, Tezcan et al. (2004a, 2004b) nine species, Ferrer & Soldati (1999) four species, Yolcu (2010) two species and Keskin & Nabozhenko (2011) one species have been reported. When the Carabidae fauna of Muğla is examined, it was seen that seven species by Tezcan et al. (2007) and one species by Kesdek (2010) were informed. According to recent contributions, the family Staphylinidae contains more than 150 species in Muğla province, 40 of which occur only in this province (Anlaş, 2009-updated-; Assing, 2011, 2013; Anlaş & Frisch, 2014; Anlaş, 2015, 2016; Schülke & Smetana, 2015).

MATERIAL AND METHODS

The study material consist of 969 samples of the species due to families of Carabidae, Tenebrionidae and Staphylinidae which are collected Aspat (Strobilos) ancient city province of Muğla, Bodrum during the years of 2007-2008.

The study area located in 27°26' east longitude and 37°02' north latitude covers approximately 500 hectares. Aspat hill located east of the study area is conical hill and its peak height is about 400 meter. Field studies carried out using different sampling methods in selected total of nine localites. One of them called Aspataltı which is located north of the Akyarlar-Bitez road and the others located around Aspat hill in equal sizes that shown in Figure 1 and Table 1 (Tezcan et al., 2013).

The region stands out historical riches and also plant diversity. According to floristic study it has 337 plant species belonging to 63 families and 13 of them are endemic for this area (Çınar, 2010). Common plant species and their families (with orders) in the sampling localities and locality numbers are given together: Cupressaceae (Pinales): *Cupressus sempervirens* L. (VIII, IX); Pinaceae (Pinales): *Pinus brutia* L. (VI, VII, VIII); Apiaceae (Apiales): *Daucus carota* L. (II, VI, VIII); Asteraceae (Asterales): *Cirsium vulgare* (Savi) Ten (VIII, IX); Brassicaceae (Brassicales): *Malcolmia flexuosa* (Sibth & Sm) Sibth & Sm (I, II), *Sinapis alba* L. (VI, VIII); Chenopodiaceae (Caryophyllales): *Salsola kali* L. (III, IV, VIII); Polygonaceae (Caryophyllales): *Rumex tuberosus* L. subsp. *creticus* (Boiss) Rech (II, IX); Fabaceae (Fabales): *Acacia cyanophylla* Lindley (VI, VIII), *Ceratonia siliqua* L. (VI), *Lotus peregrinus* L. var. *peregrinus* L. (IV, VI, IX), *Pisum sativum* L. var. *arvense* (L.) Poiret (VIII, IX), *Trifolium clypeatum* L. (VIII, IX); Apocynaceae (Gentianales): *Nerium oleander* L. (VI, VII, VIII); Lamiaceae (Lamiales): *Mentha pulegium* L. (I, VIII), *M.suaveolens* Ehrh. (I, VIII), *Vitex agnus-castus* L. (I, VIII); Liliaceae (Liliales): *Asphodelus aestivus* Brot. (I, VIII, IX); Euphorbiaceae (Malpighiales): *Euphorbia peplus* L. var. *peplus* (V, VI, VIII); Guttiferae (Malpighiales): *Hypericum perforatum* L. (VI, VII, VIII); Myrtaceae (Myrtales): *Eucalyptus camaldulensis* Dehnh. (VII, VIII) and Convolvulaceae (Solanales): *Convolvulus siculus* L. subsp. *siculus* (III, IV).

Sampling was done with the forceps from the surface, under stones which the insects hidden, tree bark cracks and also using sweep net and beating tray and

pitfall and bait trap methods. In addition cow dung were examined (Tezcan et al., 2013).

Collected specimens were transferred to jars filled with 70% alcohol and taken to the laboratory and prepared for identification.

RESULTS AND DISCUSSION

As a result of this study 969 specimens belong to 33 species determined. Eight species belonging to Carabidae, 10 species of Tenebrionidae and 15 species of Staphylinidae were reported from the region (Table 2). Distribution of the species according to the localities were given in Table 3.

All specimens are regarded according to families, the specimens of Tenebrionidae family composed of 92% of all specimens. Among those *Dailognatha quadricollis* is common. Regarding the numbers of the species, Staphylinidae family comes forward with its 15 species. Tenebrionidae family with 10 species and Carabidae family with 8 species follows it.

When the density of the samples are observed according to localities, it has been that 65,04% of the material have been collected from the south of Aspat hill (VI). With 9% the southwest of Aspat hill (VII), locality IV and Aspataltı (I) with 8.5% follows the south of Aspat hill. 17% of the material obtained from the localities of II, III, IV, VIII and IX.

In order to collect the material, seven different methods were used and the specimens which were collected by these methods are shown in Table 4. Most of the collected specimens (81,6%) were obtained by pitfall traps. This method is followed by collecting under stones and animal dung method, respectively. Seasonal differences were observed according to the sampled specimens. 37 species in spring, 20 species in the summer, 16 species in autumn and 18 species in winter were collected. Sampling status of the specimens according to seasons listed in Table 5.

Amongst the above mentioned species, *A.aenea*, *C. (P.) graecus*, *C. (P.) coriaceus*, *N. brevicollis*, *C. erythroderus*, *C. fuscipes* from Carabidae, *D. moesiacus*, *C. sulcatus* and *P. quadricollis quadricollis* from Tenebrionidae and *P. concinnus*, *P. intermedius*, *P. rufimanus*, *M. scutellaris*, *O. curtippennis* and *O. picipennis picipennis* from Staphylinidae are the first records for local fauna of Muğla.

With this study, it is thought that Aspat ancient city which faces to lose its natural elements by antropogenic effects contributes to own country' biodiversity with its three families fauna. Besides the richness of three families is remarkable when the biological values of the area are considered.

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LITERATURE CITED

- Anlaş, S.** 2009. Distributional checklist of the Staphylinidae (Coleoptera) of Turkey, with new and additional records. *Linzer Biologische Beiträge*, 41 (1): 215-342.
- Anlaş, S.** 2015. On the genus *Sunius* Curtis, 1829 of Turkey II. Two new micropterous species and additional records from Western Anatolia in Turkey (Coleoptera: Staphylinidae: Paederinae). *Zootaxa*, 3986 (4): 493-498.
- Anlaş, S.** 2016. On the subgenus *EurySunius* Reitter in Turkey III. A new species from western Anatolia and additional records (Coleoptera: Staphylinidae: Paederinae: *Astenus*). *Turkish Journal of Entomology*, 40 (1): 15-21.
- Anlaş, S. & Frisch, J.** 2014. On the Scopaeina Mulsant & Rey of the Middle East: A new species from Turkey and new biogeographic data (Coleoptera: Staphylinidae: Paederinae). *Soil Organisms*, 86 (3): 86 (3): 153-167.
- Assing, V.** 2011. On the Staphylinidae of Turkey VIII. Eleven new species, two new synonymies, a new combination, and additional records (Coleoptera: Staphylinidae). *Koleopterologische Rundschau*, 81: 179-227.
- Assing, V.** 2013. On the Staphylinidae (Coleoptera) of Turkey IX. Five new species, a new synonymy, and additional records. *Stuttgarter Beiträge zur Naturkunde A, Neue Serie* 6: 103-125.
- Çınar, H.** 2010. Aspat (Strobilos) Kalesi, Muğla, Bodrum (Turgutreis) ve çevresinin floristik özellikleri. Muğla Üniversitesi, Fen Bilimleri Enstitüsü, Biyoloji Anabilim Dalı, Yüksek Lisans Tezi, (113 s.).
- Diler, A.** 2010. Aspat (Strobilos) ve territoriumunda arkeolojik park yönetimi ve antik tarım alanlarına agro-turizm planlaması. 107K234 No'lu Tübitak Projesi Sonuç Raporu.
- Ferrer, J. & Soldati, L.** 1999. Contribution a l'étude des Tenebrionidae de Turquie (Insecta, Coleoptera). *Entomofauna Zeitschrift für Entomologie*, 20 (4): 53-92.
- Gülperçin, N. & Tezcan, S.** 2012. Aspat (Strobilos) antik kenti ve çevresindeki (Bodrum, Muğla) tarım teraslarının Elateridae (Insecta: Coleoptera) faunası. *Selçuk Tarım Bilimleri Dergisi*, 26 (3): 14-19.
- Kaszab, Z.** 1968. Ergebnisse zoologischer Sammelreisen in die Türkei. *Annalen des Naturhistorischen Museums Wien*, 72: 451-463.
- Keskin, B. & Nabozhenko, M. V.** 2011. Review of the genus *Odoenemis* Allard, 1876: *O. korbi* species-group (Coleoptera: Tenebrionidae: Helopini). *Annales Zoologici*, 61 (2): 339-354.
- Kesdek, M.** 2010. Contribution to the knowledge of Carabidae fauna of Turkey. Part 10: Apotomini, Broscini (Broscinae), Tachyini and Trechini (Trechinae) (Coleoptera, Carabidae). *Linzer Biologische Beiträge*, 42 (1): 743-748.
- Schülke, M. & Smetana, A.** 2015. Staphylinidae, pp. 304-1134. In: Löbl I. & Löbl D. (eds), *Catalogue of Palaearctic Coleoptera*. Volume 2. Hydrophiloidea - Staphyloinoidea. Revised and updated edition. *Leiden: Brill*: xxvi + 1702 pp.
- Tezcan, S., Karsavuran, Y., Pehlivan, E., Keskin, B. & Ferrer, J.** 2004a. Contributions to the knowledge of the Tenebrionidae (Coleoptera) from Turkey. Part I. Lagriinae, Pimeliinae, Bolitophaginae, Diaperinae. *Türkiye Entomoloji Dergisi*, 28 (2): 99-114.
- Tezcan, S., Karsavuran, Y., Pehlivan, E., Keskin, B. & Ferrer, J.**, 2004b. Contributions to the knowledge of the Tenebrionidae (Coleoptera) from Turkey. Part II. Opatrinae, Tenebrioninae, Adeliinae. *Türkiye Entomoloji Dergisi*, 28 (3): 163-180.
- Tezcan, S., Jeannel, C. & Keskin, B.**, 2007. Ground beetles (Coleoptera: Caraboidea) of the ecologically managed cherry orchards of Western Anatolia (Turkey) along with some new additional data. *Anadolu Üniversitesi Bilim ve Teknoloji Dergisi*, 8 (1): 53-63.
- Tezcan, S., Gülperçin, N. & Anlaş, S.** 2011. Aspat (Strobilos) antik kenti ve çevresi (Bodrum, Muğla)'nin Dermaptera (Insecta) faunası. *Anadolu Doğa Bilimleri Dergisi*, 2 (2): 7-15.
- Tezcan, S., Gülperçin, N. & Fent, M.** 2013. Aspat (Strobilos) antik kenti ve çevresindeki (Bodrum, Muğla) tarım teraslarının Scutelleridae, Cydnidae ve Pentatomidae (Hemiptera: Pentatomoidea) faunası üzerinde bir analiz. *Türkiye Entomoloji Dergisi*, 37 (2): 249-259.
- Yolcu, F.** 2010. Ege ve Marmara Bölgeleri Helopini Latreille, 1802 (Coleoptera: Tenebrionidae: Tenebrioninae) faunası. Ege Üniversitesi Fen Bilimleri Enstitüsü, Yüksek Lisans Tezi, 62 s.

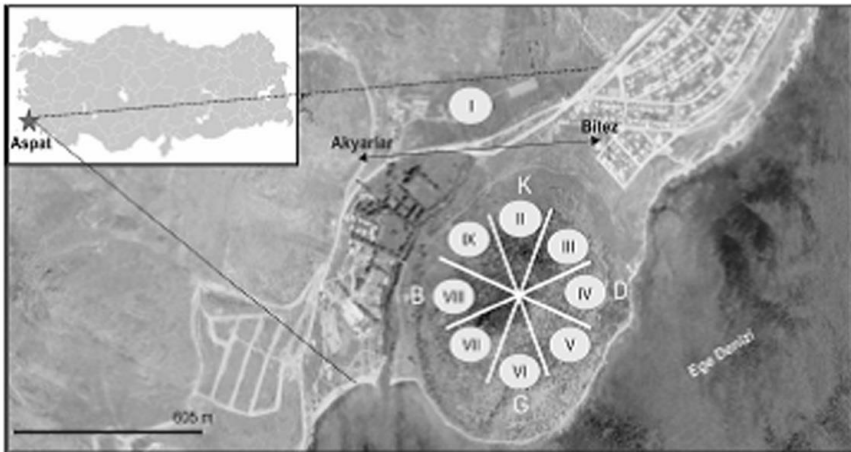


Figure 1. The geographical location of study area.

Table 1. Sampling localities.

Locality number	Locality area
I	Aspataltı (the North of Akyarlar-Bitez road)
II	The north of Aspat hill
III	The northeast of Aspat hill
IV	The east of Aspat hill
V	The southeast of Aspat hill
VI	The south of Aspat hill
VII	The southwest Aspat hill
VIII	The west of Aspat hill
IX	The northwest of Aspat hill

Table 2. Species and families determined in the study.

Family	Species
Carabidae	<i>Carabus (Procrustes) coriaceus</i> Linnaeus, 1758
	<i>Carabus (Pachystus) graecus</i> Dejean, 1826
	<i>Calathus (Calathus) fuscipes</i> (Goeze, 1777)
	<i>Calathus (Calathus) longicollis</i> Motschulsky, 1865
	<i>Calathus erythroderus</i> Gemminger & Harold, 1868
	<i>Nebria (Nebria) brevicollis</i> (Fabricius, 1792)
	<i>Amara (Amara) aenea</i> (De Geer, 1774)
	<i>Zabrus politus</i> Gauth, 1869
	Tenebrionidae
<i>Probaticus tenebricosus</i> Brullé, 1832	
<i>Raibosceles coelestinus coelestinus</i> (Waltl, 1838)	
<i>Opatroides punctulatus</i> Brullé, 1832	
<i>Colpotus sulcatus</i> Ménériés, 1832	
<i>Gonocephalum rusticum</i> Olivier, 1811	
<i>Cephalostenus orbicollis</i> (Ménériés, 1836)	
<i>Dendarus moesiacus</i> Mulsant et Rey, 1854	
<i>Phymatotris (Graecopachys) quadricollis quadricollis</i> Solier, 1835	
Staphylinidae	<i>Zophosis punctata</i> Brullé, 1832
	<i>Tachyporus nitidulus</i> (Fabricius, 1781)
	<i>Stenus maculiger</i> Weise, 1875
	<i>Aleochara tristis</i> Gravenhorst, 1806
	<i>Anotylus inustus</i> (Gravenhorst, 1806)
	<i>Paederus fuscipes</i> Curtis, 1826
	<i>Philonthus rufimanus</i> Heer, 1839
	<i>Philonthus concinnus</i> (Gravenhorst, 1802)
	<i>Philonthus intermedius</i> (Lacordaire, 1835)
	<i>Philonthus laminatus</i> (Creutzer, 1799)
	<i>Ocyopus curtispennis</i> Motscholsky, 1849
	<i>Ocyopus mus</i> Brullé, 1832
	<i>Ocyopus picipennis picipennis</i> (Fabricius, 1793)
	<i>Xantholinus graecus graecus</i> Kraatz, 1858
	<i>Xantholinus rufipennis</i> Erichson, 1839
<i>Megalinius scutellaris</i> (Fauvel, 1900)	

Table 3. Distribution of the species according to the localities.

Taxa	Localities									Total number of individuals	Rate (%)	
	I	II	III	IV	V	VI	VII	VIII	IX			
CARABIDAE												
<i>Carabus coriaceus</i>	1			16					1	18	47,36	
<i>Carabus graecus</i>				7		1				8	21,06	
<i>Calathus fuscipes</i>	4									4	10,53	
<i>Calathus longicollis</i>	3						1			4	10,53	
<i>Calathus erythroderus</i>							1			1	2,63	
<i>Nebria brevicollis</i>							1			1	2,63	
<i>Amara aenea</i>	1									1	2,63	
<i>Zabrus politus</i>				1						1	2,63	
Total number in the family	9	0	0	24	0	1	3	0	1	38		
Rate(%)	23,69	0	0	63,16	0	2,63	7,89	0	2,63			
TENEBRIONIDAE												
<i>Dailognatha quadricollis</i>	18		2	11		312	27		13	383	43,08	
<i>Zophosis punctata</i>		1		3	1	262	16	2		285	32,06	
<i>Phymatopteris quadricollis quadricollis</i>	20	2	1	20		29	11	2	13	87	9,79	
<i>Raibosceles coelestinus</i>						20	11	1	16	48	5,5	
<i>Gonocephalum rusticum</i>						3	5			8	0,9	
<i>Cephalostenus orbicollis</i>				1		3	4		4	13	1,46	
<i>Probaticus tenebricosus</i>								1		1	0,11	
<i>Opatroides punctulatus</i>	1			3		17	5			26	2,92	
<i>Colpotus sulcatus</i>							3			3	0,34	
<i>Dendarus moesiacus</i>	2	6	1	1	2	2	4		17	35	3,93	
Total number in the family	41	9	4	39	3	639	86	6	63	889		
Rate(%)	4,61	1,01	0,45	4,26	0,34	72,78	9,67	0,67	7,08			
STAPHYLINIDAE												
<i>Aleochara tristis</i>	6									6	14,28	
<i>Anotylus inustus</i>	12									12	28,57	
<i>Megalinus scutellaris</i>								1		1	2,38	
<i>Ocypus curtipennis</i>				2						2	4,76	
<i>Ocypus mus</i>		1								1	2,38	
<i>Ocypus picipennis picipennis</i>			1						1	2	4,76	
<i>Paederus fuscipes</i>							1			1	2,38	
<i>Philonthus intermedius</i>	1									1	2,38	
<i>Philonthus laminatus</i>	1									1	2,38	
<i>Philonthus rufimanus</i>	1									1	2,38	
<i>Philonthus concinnus</i>	8									8	19,04	
<i>Stenus maculiger</i>									1	1	2,38	
<i>Tachyporus nitidulus</i>	1							1		2	4,76	
<i>Xantholinus graecus graecus</i>	1									1	2,38	
<i>Xantholinus rufipennis</i>	1			1						2	4,76	
Total number in the family	32	1	1	3	0	0	2	1	2	42		
Rate(%)	76,19	2,38	2,38	7,14	0	0	4,76	2,38	4,76			
Total number of individuals	82	10	5	65	3	640	91	7	66	969		
Rate(%)	8,47	1,04	0,51	6,71	0,31	66,04	9,39	0,72	6,81			
Total species number	17	4	4	11	2	9	14	5	8			

Table 4. Comparison of the collection methods.

Collecting methods	Sweep net	Japanese umbrella	Under stone	Pitfall trap	Bait trap	Animal feces	Under bark	Total number of specimens
CARABIDAE								
<i>Carabus coriaceus</i>				18				18
<i>Carabus graecus</i>			1	7				8
<i>Calathus fuscipes</i>				4				4
<i>Calathus longicollis</i>			1	3				4
<i>Calathus erythroderus</i>				1				1
<i>Nebria brevicollis</i>			1					1
<i>Amara aenea</i>				1				1
<i>Zabrus politus</i>			1					1
Total number in the family	0	0	4	34	0	0	0	38
Rate(%)	0	0	10,6	89,4	0	0	0	
TENEBRIONIDAE								
<i>Dailognatha quadricollis</i>			3	372			1	376
<i>Zophosis punctata</i>	3		4	277				284
<i>Phymatitris quadricollis quadricollis</i>			25	72				97
<i>Raibosceles coelestinus</i>			21	1			23	47
<i>Gonocephalum rusticum</i>			3	5				8
<i>Cephalostenus orbicollis</i>	1		10	2				13
<i>Probatiscus tenebricosus</i>					1			1
<i>Opatroides punctulatus</i>	2		15	3			5	25
<i>Colpotus sulcatus</i>	2		1					3
<i>Dendarus moestacus</i>			13	22				35
Total number in the family	8	0	95	754	3	0	29	889
Rate(%)	0,9	0	10,8	84,9	0,4	0	3,3	
STAPHYLINIDAE								
<i>Aleochara tristis</i>						6		6
<i>Anotylus inustus</i>						11		11
<i>Megalinus scutellaris</i>		4						4
<i>Ocypus curtipennis</i>				2				2
<i>Ocypus mus</i>			1					1
<i>Ocypus picipennis picipennis</i>			2					2
<i>Paederus fuscipes</i>	1							1
<i>Philonthus intermedius</i>						1		1
<i>Philonthus laminatus</i>						1		1
<i>Philonthus rufimanus</i>						1		1
<i>Philonthus concinnus</i>						7		7
<i>Stenus maculiger</i>			1					1
<i>Tachyporus nitidulus</i>				1		1		2
<i>Xantholinus graecus graecus</i>						1		1
<i>Xantholinus rufipennis</i>						1		1
Total number in the family	1	4	4	3	0	30	0	42
Rate(%)	2,2	9,1	9,1	6,8	0	72,8	0	
Total number of individuals	9	4	103	791	3	32	29	969
Rate(%)	0,9	0,4	10,6	81,6	0,3	3,2	3	
Total species number	5	1	16	16	2	9	3	

Table 5. Sampling status of the species according to the seasons.

Season	Winter		Spring			Summer			Autumn			Winter
	1	2	3	4	5	6	7	8	9	10	11	12
CARABIDAE												
<i>Carabus coriaceus</i>				+	+	+			+			
<i>Carabus graecus</i>				+	+	+			+			
<i>Calathus fuscipes</i>								+				
<i>Calathus longicollis</i>	+							+				
<i>Calathus erythroderus</i>		+										
<i>Nebria brevicollis</i>		+										
<i>Amara aenea</i>									+			
<i>Zabrus politus</i>			+									
Total species number in the family	1	2	1	2	2	2	0	2	3	0	0	0
TENEBRIONIDAE												
<i>Dailognatha quadricollis</i>							+	+	+	+		+
<i>Zophosis punctata</i>				+	+	+	+	+	+	+		
<i>Phymatotriss quadricollis quadricollis</i>	+	+	+	+	+	+	+	+	+	+	+	
<i>Ratiboseles coelestinus</i>	+	+			+		+				+	+
<i>Gonocephalum rusticum</i>				+	+			+				
<i>Cephalostenus orbicollis</i>	+		+	+	+	+						
<i>Probatiscus tenebricosus</i>						+						
<i>Opatroides punctulatus</i>	+	+	+	+	+	+			+		+	+
<i>Colpotus sulcatus</i>			+								+	
<i>Dendarus moesiacus</i>	+		+			+	+	+	+		+	
Total species number in the family	5	3	5	5	6	6	5	5	5	5	5	3
STAPHYLINIDAE												
<i>Aleochara tristis</i>				+								
<i>Anorylus inustus</i>		+	+	+	+							
<i>Megalimus scutellaris</i>			+		+							
<i>Ocypus curtipennis</i>					+							
<i>Ocypus mus</i>												+
<i>Ocypus picipennis picipennis</i>	+											
<i>Paederus fuscipes</i>			+									
<i>Philonthus intermedius</i>					+							
<i>Philonthus laminatus</i>					+							
<i>Philonthus rufimanus</i>					+							
<i>Philonthus concinnus</i>					+							
<i>Stenus maculiger</i>	+											
<i>Tachyporus nitidulus</i>				+	+							
<i>Xantholinus graecus graecus</i>		+										
<i>Xantholinus rufipennis</i>			+		+							
Total species number in the family	2	2	4	3	9	0	0	0	0	0	0	1
Total species number	8	7	10	10	17	8	5	7	8	3	5	4