Al-Azhar Bulletin of Science

Volume 17 | Issue 1 Article 6

6-1-2006
Section: Botany, Microbiology and Zoology

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How to Cite This Article

MORSI, G. and EL–GHARBAWY, A. (2006) "SURVEY AND POPULATION STUDIES ON COLEOPTEROUS FAUNA OF NORTHERN SINAI AND BENI–SUIF GOVERNORATES USING LIGHT TRAPS," *Al-Azhar Bulletin of Science*: Vol. 17: Iss. 1, Article 6.
DOI: https://doi.org/10.21608/absb.2006.14720

Al-Azhar Bull. Sci. Vol. 17, No. 1 (June.): pp. 43-56, 2006.

SURVEY AND POPULATION STUDIES ON COLEOPTEROUS FAUNA OF NORTHERN SINAI AND BENI–SUIF GOVERNORATES USING LIGHT TRAPS

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Abstract

A survey together with studies on population densities and relative abundance of coleopterous species were conducted by the use of light traps at Al–Arish city, North Sinai and Sids Agricultural Research Station, Beba City, Beni Suif during 2005. At Beni–Suif the survey revealed the presence of 45 coleopterous species belonging to 31 genera of 9 families: Anobiidae, Bostrychidae, Carabidae, Cicindelidae, Dytiscidae, Elateridae, Hydrophilidae, Scarabaeidae and Staphylinidae.

While surveying Northern–Sinai revealed the presence of 64 coleopterous species belong to 44 genera of 10 families: Anobiidae, Bostrychidae, Carabidae, Cerambycidae, Dytiscidae, Elateridae, Hydrophilidae, Paussidae, Scarabaeidae and Staphylinidae.

The total annual number of beetles was 4140 and 4704 beetles at Sids and Al–Arish, respectively. The highest numbers of coleopterous insects were catched during May to September. The peak was during July for the first region and during August for the second one. The lowest numbers were obtained through January, February, March, November and December.

Introduction

Order Coleoptera is known to include a large number of species, of which several are economic pests on cultivated plants, feed on pollen grains, flowers and fruits of orchards and stored products. Some of which predators. A lot work has been conducted on certain coleopterous insects using a light traps, e.g., Hafez and Bishara (1961); Hanna (1973); Alfieri (1976); Helal (1977); Sharaf El–din (1981); Badr (1985); Salem *et al.* (1985); Sheinishen *et al.* (1985); Amin *et al.* (1985); Salem *et al.* (1986); El–Sayed (1987); Ali and Ibrahim (1988); Shah and Garg (1988); Bebars (2000) and Abdel–Dayem *et al.* (2003).

However, light trap work on beetles as a whole appears to be scanty, especially at North–Sinai and Beni–Suif Governorates. Hence, the present study aims to survey

the coleopterous species and to study their seasonal activity at both Governorates using light traps.

Material and Methods

Two light traps of the Robinson type fitted with 125 watt mercury vapour bulb for each one was operated daily from sunset to sunrise for a year (January to December 2005). The first one was placed above the building of Sids Agric. Res. St. farm at a height of 3 meters. The other was placed in the farm of Al Arish Agric. Res. St. with the same height. A glass jar containing potassium cyanide was placed below the mouth of each trap and every week the coleopterous trapped insects were separated to the different species and counted.

Data of monthly catches for each species and/or family together with their percentage of abundance were tabulated. Families, genera, and species are alphabetically arranged. Species were identified and counted in the insect identification and classification Department, Plant Protection Research Institute, A.R.C., Egypt.

Results and Discussion

Table (1) presents a survey of coleopterous species at Sids, Beni–Suif Governorate. It included 45 species under 31 genera belonging to 9 families. Family Carabidae contained the largest number of species (11), however, family Staphylinidae come after the former and contained the largest number of individuals 1155 representing 27. 9% of the total captured species. The families could be arranged descendingly according to their relative abundance during the whole period of investigation as follows: Staphylinidae, Carabidae, Scarabaeidae, Anobiidae, Elateridae, Dytiscidae, Cicindelidae, Hydrophilidae and Bostrychidae.

A total of 4140 individual beetles were trapped during the whole period of study, 0 beetles were captured during January, 10 during February, 103 during March, 268 during April, 444 during May, 927 during June, 1218 during July, 751 during August, 297 during September, 101 during October, 21 during November and 0 during December.

The maximum number were achieved during July, representing 31.04% of the total catch. Relatively, the minimum number were obtained during January and December.

The following is a detailed discussion for the represented families and the most common species of each family at Sids Agr. Res. St.:

Family Staphylinidae: Individuals of this family were the most abundant of all families represented in the study area where 1155 beetles constituting 27.9% of the total catch were obtained during the period of study. Their individuals belonging to 9 species within 6 genera. The number of staphylinid beetles was generally high during June to August and relatively very rare during January and December, reaching their maximum number in July (400 beetles). *Trogophloeus memnonius* Er. was the most abundant species 168 beetles / year were trapped and the least abundant species within the family was *Atheta atramentaria* Gyll. (102 individuals / year).

Family Carabidae: This family is represented by 11 species within 8 genera. The monthly catches of these species were recorded from February up to November and the maximum number was obtained during June (229 individuals). The total annual catch was 725 beetles representing 17.51% of the total coleopterous catches.

Family Scarabaeidae : Six species belonging to two genera were found to represent this family and the total number was 591 individuals representing 14.28%. The maximum number (169 beetles) was in July.

Family Anobiidae: Beetles of family Anobiidae were relatively high abundant (495 beetles / year) and constituting 11.96% of the total catch. This family was represented by 7 species belonging to 7 genera, they were most active from May to August, small numbers were trapped during March to April and September to November, and disappeared during January, February and December. They had one peak during August.

Family Elateridae: Elaterid beetles were found in relatively moderate numbers, 384 beetles representing 9.28% of the coleopterous catch. This family was represented by 6 species of 4 genera. *Agrypnus notodonta* Latr. was the most abundant elatrid species and represented 22.14% of the total catch. No specimens were trapped during January, February and December.

Families Cicindelidae and Hydrophilidae: The two Families were representing by two species for each one. Cicindelid and Hydrophilid constituted 4.2 and 6.6% of the total catch, with a total number of 174 and 273 beetles / year, respectively.

Families Bostrychidae and Dytiscidae: These families were representing by only one species for each bostrychid and hydrophilid represented 2.49 and 5.8% of the total catch, with a total number of 103 and 240 individuals / year, respectively.

Table (2) shows a survey of nocturnal coleopterous insects at Al–Arish, Northern Sinai Governorate together with their total annual and their relative abundance during one year (2005) as indicated by light – trap catches.

The survey revealed the presence of 64 species of 44 genera belonging to 10 families: Anobiidae, Bostrychidae, Carabidae, Cerambycidae, Dytiscidae, Elateridae, Hydrophilidae, Paussidae, Scarabaeidae and Staphylinidae. However, families Cerambycidae and Paussidae was not represented at Sids, Beni–Suif, also, family Cicindelidae was not found at Al–Arish, Sinai during the period of study.

Family Carabidae contained the largest number of species, 22 species and family Staphylinidae ranked the second after the former representing by 11 species, however, family Dytiscidae was represented by 8 species. Families Anobiidae and Scarabaeidae were represented by 5 species for both, however, families Bostrychidae, Cerambycidae and Paussidae contained 2 species for each one. Families Elateridae and Hydrophilidae contained 4 and 3 species, respectively.

The total annual number of coleopterous insects was 4704 insects at Al–Arish region. Coleopterous insects fluctuated throughout the whole year and were found to be most active and were catched in large numbers during the period from April to October with one peak of abundance during August (1137 insects, constituting 24.17% of the total catch). The minimum population occurred during January, February and December.

Individuals of Carabidae and Staphylinidae made the majority of the catch with a total annual number of 1613 and 770 insects forming 34.29% and 16.37% of the total catch, respectively. The peak of carabid insects was observed during September (377 insects), whereas, the peak of staphylinids was during August representing by 208 insects.

Individuals of families : Scarabaeidae, Anobiidae and Dytiscidae came after in abundance and were trapped in relatively high numbers, constituting 10.93%, 9.8% and 9.72% of the total catch. Also, one peak of population was observed for 3 families at the period of study, during September for the first one and during August for the two later with 165, 120 and 100 insects, respectively. On the other hand, families Hydrophilidae and Elateridae were in moderate numbers among coleopterous catch and were represented by 5.46% and 5.19% of the total trapped insects, respectively.

The percentage in August of families Paussidae and Bostrychidae are 1.06% and 0.89%, with 50 and 42 insects, respectively.

Finally, family Cerambycidae was the least abundant among coleopterous catch and was represented by very few numbers of individuals and / or species.

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حصر ودراسة التعداد الحشرى لرتبة غمدية الأجنحة بإستخدام المصائد الضوئية بمحافظتى بنى سويف وشمال سيناء

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تم حصر ودراسة الكثافة العددية والوفرة النسبية لحشرات غمدية الأجنحة بإستخدام المصيدة الضوئية فى محافظتى بنى سويف وشمال سيناء خلال عام 2005 وقد أسفر الحصر عن وجود 45 نوعاً تحت 31 جنس تنتمى إلى 9 عائلات من رتبة غمدية الأجنحة فى محافظة بنى سويف بينما فى شمال سيناء أسفر الحصر عن وجود 64 نوعاً تحت 45 جنس تنتمى إلى 10 عائلات.

وكان العدد الكلى للخنافس 4150 ، 4724 فرداً فى كل من سدس (بنى سويف) والعريش (شمال سيناء) على التوالى.

وكانت الحشرات أكثر إنجذاباً للمصيدة من مايو إلى سبتمبر ووصلت إلى قمة نشاطها ووفرتها خلال شهر يوليو فى محافظة بنى سويف وخلال أغسطس فى المنطقة الثانية وكانت الحشرات أقل تواجداً خلال يناير ، فبراير ، مارس ، نوفمبر وديسمبر.

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Table (1): Monthly catches of coleopterous insects attracted by light–trap at Sids Beni–Suwef during one year 2005

Family & Species	Jan.	Feb.	Mar.	Apr.	May	Jun	Jul	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
1. Anobiidae														
Anobium punctatum De Geer	–	–	2	6	8	13	23	52	11	7	–	–	122	2.95
Gastrallus laevigatus Ol.	–	–	3	4	10	18	9	2	6	1	–	–	53	1.28
Lurioderma serricorne F.	–	–	1	5	13	21	32	45	2	1	–	–	120	2.9
Metholcus cylindricus Germ.	–	–	2	4	3	14	16	9	1	1	1	–	51	1.23
Nicobium castaneum Ol.	–	–	1	3	2	8	10	14	2	1	–	–	41	0.99
Petalium parmatum Bdi.	–	–	–	5	2	12	17	8	1	–	1	–	46	1.11
Stegobium paniceum L.	–	–	2	4	6	16	22	11	–	1	–	–	62	1.5
	–	–	11	31	44	102	129	141	23	12	2	–	495	11.96
2. Bostrychidae														
Enneadesmus forficula Frm.	–	–	2	5	10	16	26	35	8	1	–	–	103	2.49
3. Carabidae														
Bembidion aegyptiacum Dej.	–	–	4	12	9	21	4	6	12	–	1	–	69	1.67
Bembidion niloticum Schat.	–	–	1	3	7	35	16	3	4	1	1	–	71	1.71
Calosoma chlorostictum Klug	–	–	–	2	3	12	10	9	2	1	–	–	39	0.93
Egadroma marginata Dej.	–	1	1	3	6	14	8	2	1	1	–	–	37	0.94
Pogonus gilvipes Dej.	–	–	4	7	6	21	29	8	2	1	–	–	78	1.88
Pterosticus aegyptius Tsch.	–	–	2	5	4	16	12	2	3	–	1	–	45	1.09
Pterosticus barbarus Dej.	–	–	3	8	12	13	20	4	2	–	–	–	62	1.5
Pterosticus pharao Luts.	–	–	1	4	5	22	42	11	3	1	–	–	89	2.15
Scarites planus Bon.	–	–	1	4	7	15	12	18	8	2	1	–	68	1.64

Table (1): Cont.

Family & Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
Tachys pharao Schat.	–	–	2	6	11	19	12	6	2	1	–	–	59	1.43
Zuphium olens *Rossi*	–	–	2	4	23	41	32	4	2	–	–	–	108	2.61
	–	1	21	58	93	229	197	73	41	8	4	–	725	17.51
4. Cicindelidae														
Cicindela aulica Dej.	–	–	2	3	26	17	14	12	8	2	–	–	84	2.03
Cicindela nilotica Dej.	–	–	1	5	22	40	17	3	1	1	–	–	90	2.17
	–	–	3	8	48	57	31	15	9	3	–	–	174	4.2
5. Dytiscidae														
Hydaticus leander Rossi	–	–	6	12	25	42	56	68	22	8	1	–	240	5.8
6. Elateridae														
Agrypnus notodonta Latr.	–	–	2	4	10	19	22	18	9	1	–	–	85	2.05
Cardiophorus humilis Er.	–	–	1	2	4	13	16	21	4	1	–	–	62	1.5
Cardiophorus pharaonum Bayss.	–	–	1	4	3	9	12	18	2	1	–	–	50	1.21
Drasterius bimaculatus Rossi	–	–	3	8	9	12	18	7	3	–	–	–	60	1.45
Drasterius figuratus Germ.	–	1	2	6	3	18	32	3	2	1	–	–	68	1.64
Heteroderes *crucifer* Rossi	–	–	3	4	12	21	13	2	4	–	–	–	59	1.43
	–	1	12	28	41	92	113	69	24	4	–	–	384	9.28
7. Hydrophilidae														
Hydraena nilotica Rey	–	–	6	10	16	25	32	12	4	1	–	–	106	2.56
Sphaeridium bipustulatum F.	–	1	2	8	32	44	65	13	2	–	–	–	167	4.03
	–	1	8	18	48	69	97	25	6	1	–	–	273	6.6

Table (1): Cont.

Family & Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
8. Scarabaeidae														
Aphodius contractus Klug	–	–	4	6	14	18	21	4	6	2	1	–	76	1.84
Aphodius granarius L.	–	–	2	10	8	26	32	3	2	1	–	–	84	2.03
Aphodius hydrochoeris F.	–	–	1	4	8	17	26	12	3	2	1	–	84	2.03
Aphodius klugi Schm.	–	–	3	2	4	16	12	11	8	1	–	–	57	1.38
Aphodius lividus Ol.	–	2	3	10	18	26	42	54	16	4	1	–	176	4.25
Pentodon bispinosus Kust.	–	1	6	8	12	40	36	10	8	2	1	–	124	3.0
	–	3	19	40	64	143	169	94	43	12	4	–	591	14.28
9. Staphylinidae														
Atheta atramentaria Gyll.	–	–	1	10	6	17	35	14	10	8	1	–	102	2.46
Atheta sordida Marsh.	–	–	3	18	10	22	42	22	12	4	–	–	133	3.21
Bledius angustus Muls.	–	–	2	9	8	18	56	24	11	3	2	–	133	3.21
Medon obsoletus N.	–	1	4	6	11	22	27	15	16	6	–	–	108	2.61
Peaderus alfierii Koch.	–	–	1	4	12	35	38	16	14	7	3	–	130	3.14
Peaderus memnorius Er.	–	1	3	7	9	16	48	28	10	9	2	–	133	3.21
Philonthus turbidus Er.	–	–	1	3	5	20	56	38	12	4	1	–	140	3.38
Trogophloeus memnonius Er.	–	2	2	2	4	18	66	46	23	5	–	–	168	4.06
Trogophloeus niloticum Er.	–	–	4	9	6	9	32	28	13	6	1	–	108	2.61
	–	4	21	68	71	177	400	231	121	52	10	–	1155	27.9
Total		**10**	**103**	**268**	**444**	**927**	**1218**	**751**	**297**	**101**	**21**	**–**	**4140**	

Table (2): Monthly catches of coleopterous insects attracted by light trap at Al–Arish (North Sinai) during one year 2005

Family & Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
1. Anobiidae														
Lurioderma redtenbacheri Bach.	–	–	8	10	12	16	22	35	9	12	2	–	126	2.68
Lurioderma serricorne F.	–	3	4	20	24	36	42	65	8	20	3	–	225	4.78
Oligomerus ptilineides Woll.	–	–	–	4	2	7	10	12	14	–	–	–	49	1.04
Petalium parmatum Bdi	–	–	–	1	3	8	6	2	3	–	1	–	24	0.51
Stegobium paniceum L.	–	–	3	2	1	9	3	6	10	2	1	–	37	0.79
	–	3	15	37	42	76	83	120	44	34	7	–	461	9.8
2. Bostrychidae														
Dinoderus minutus F.	–	–	1	2	7	6	12	10	6	3	1	–	48	1.02
Enneadesmus trispinosus Ol.	–	–	–	7	9	20	15	32	8	16	10	–	117	2.48
	–	–	1	9	16	26	27	42	14	19	11	–	165	3.51
3. Carabidae														
Abacetus aeneus Dej.	–	–	–	–	6	12	22	13	17	8	2	–	80	1.7
Amara rufescens Dej.	–	1	–	2	3	4	11	21	32	16	–	–	90	1.91
Bembidion niloticum Dej.	–	–	–	9	8	15	33	45	56	62	20	–	248	5.27
Bembidion mixtum sch.	–	–	2	3	4	10	16	22	13	35	9	–	114	2.42
Calosoma chlorostictum Dej.	–	–	1	2	4	2	8	6	9	7	–	–	39	0.83
Calosoma olivieri Dej.	–	–	–	–	2	–	3	4	6	2	1	–	18	0.38
Egadroma marginata Dej.	–	–	–	2	10	6	12	19	8	1	–	–	58	1.23
Glycia castanea Klug	–	–	–	3	–	2	8	16	2	7	1	–	39	0.83
Glycia ornata Klug	–	–	–	1	–	4	6	3	10	2	–	–	26	0.55

Table (2): Cont.

Family & Species	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
Harpalus tenebrosus Dej.	–	–	2	6	2	4	12	16	22	3	1	–	68	1.45
Microlestes flavipes Mots.	–	1	–	4	3	1	8	20	12	1	–	–	50	1.06
Pogonus gilvipes Dej.	–	–	1	3	12	9	22	46	53	36	2	1	185	3.93
Pterostichus barbarus Dej.	–	–	–	8	3	32	36	18	22	16	–	–	135	2.87
Pterostichus crenatus Dej..	–	–	–	1	2	4	12	11	18	9	1	–	58	1.23
Pterostichus pharao Luts.	–	–	1	3	1	6	9	7	12	20	–	–	59	1.25
Scarites laevigatus F.	–	–	2	2	9	4	7	16	18	13	–	–	71	1.51
Scarites planus Bon.	–	–	1	3	2	8	20	12	16	3	–	–	65	1.38
Scarites striatus Dej.	–	–	–	2	1	4	9	6	4	2	1	–	29	0.62
Siagona kindermanni Chd.	–	–	1	1	3	2	4	10	12	1	–	–	34	0.72
Tachys dimidiatus Sch.–Koch	–	–	2	3	4	6	9	11	8	2	–	–	45	0.96
Tachys lucasi Duv.	–	1	–	1	3	3	4	19	16	3	–	–	50	1.06
Tachys priesner Sch.–Koch	–	–	–	3	6	7	12	10	11	2	1	–	52	1.11
	–	3	13	62	88	145	283	351	377	251	39	1	1613	34.29
4. Cerambycidae														
Phoracantha semipunctata F.	–	–	–	1	2	3	6	8	2	1	–	–	23	0.49
Xystrocera globosa Ol.	–	–	1	–	3	4	9	12	8	–	1	–	38	0.81
			1	1	5	7	15	20	10	1	1	–	61	1.3
5. Dytiscidae														
Agabus biguttatus Ol.	–	–	–	3	4	12	4	6	8	9	–	–	46	0.98
Agabus nitidus F.	–	–	2	4	6	9	12	14	15	2	–	–	64	1.36

Table (2): Cont.

Family & Species	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
Cybister binotatus Klug	–	1	2	10	7	16	12	8	9	2	1	–	68	1.45
Cybister lateralimarginalis Dej.	–	–	–	1	2	8	16	15	11	10	–	–	63	1.34
Eretes sticticus L.	–	–	1	2	10	12	18	22	9	6	2	–	82	1.74
Hydaticus decorus Klug	–	–	–	2	8	6	12	14	9	7	1	–	59	1.25
Hyphoporus solieri Aube	–	–	2	3	7	5	11	12	3	2	–	–	45	0.96
Rhantus elevatus Shp.	–	1	–	1	2	4	8	9	3	1	1	–	30	0.64
	–	2	7	26	46	72	93	100	67	39	5	–	457	9.72
6. Elateridae														
Agrypnus notodonta Lab.	–	–	2	7	9	18	16	22	14	8	–	–	96	2.04
Cardiophorus pharaonum Buv.	–	–	1	1	3	6	7	4	2	3	–	–	27	0.57
Drasterius figuratus Germ.	–	–	3	2	4	8	10	12	16	3	–	–	58	1.23
Heteroderes musculus Germ.	–	1	–	1	3	6	18	20	12	2	–	–	63	1.34
	-	1	6	11	19	38	51	58	44	16	-	-	244	5.19
7. Hydrophilidae														
Hydrous piceus L.	–	–	1	3	4	8	5	10	7	3	1	–	42	0.89
Sphaeridium bipustulatum F.	–	–	2	7	9	32	54	46	16	8	–	–	174	3.7
Sternolophus solieri Cast.	–	–	1	2	6	4	10	12	3	2	1	–	41	0.87
	–	–	4	12	19	44	69	68	26	13	2	–	257	5.46
8. Paussidae														
Paussus piochardi Say.	–	–	1	2	12	16	25	32	10	9	–	–	107	2.27
Paussus saharae Bed.	–	–	2	1	3	11	10	18	8	2	–	–	55	1.17
	–	–	3	3	15	27	35	50	18	11	–	–	162	3.44

Table (2): Cont.

Family & Species	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	%
9. Scarabaeidae														
Aphodius arabicus Hav.	–	–	2	3	4	8	16	22	28	8	–	–	91	1.93
Aphodius granarius L.	–	–	–	1	2	7	18	12	13	9	–	–	62	1.32
Aphodius lividus Ol.	–	–	1	7	8	10	32	46	62	9	–	–	175	3.72
Aphodius hydrochoeris F.	–	–	–	2	3	4	8	14	19	4	1	–	55	1.17
Pentodon bispinosns Kust.	–	–	–	1	2	15	18	26	43	26	–	–	131	2.78
	–	–	3	14	19	44	92	120	165	56	1	–	514	10.93
10. Staphylinidae														
Aleochara moesta Grav.	–	–	2	–	3	7	8	22	10	3	2	–	57	1.21
Astenus melanurus Kust.	–	–	–	3	2	10	9	12	24	2	1	–	63	1.34
Atheta sordida Marsh.	–	–	1	2	1	25	16	32	18	–	1	–	96	2.04
Bledius furcatus Ol.	–	–	–	–	2	4	10	8	12	2	–	–	38	0.81
Paederus alfierii Koch.	–	–	2	8	18	14	25	32	26	16	–	–	141	3.0
Paederus memnonius Er.	–	–	1	3	9	7	8	9	11	2	–	–	50	1.06
Philonthus longicornis Steph.	–	–	1	2	16	20	22	14	10	8	–	–	93	1.98
Philonthus maritimus Mots.	–	1	2	2	4	6	9	10	2	3	–	–	39	0.83
Philonthus sordidus Grav.	–	–	3	2	5	9	11	16	18	2	1	–	67	1.42
Philonthus turbidus Er.	–	–	1	2	6	4	22	46	12	3	–	–	96	2.04
Stenus cameratus Benick	–	–	–	1	4	6	9	7	2	1	–	–	30	0.64
	–	1	13	25	70	112	149	208	145	42	5	–	770	16.37
Total	**–**	**10**	**66**	**200**	**339**	**591**	**897**	**1137**	**910**	**483**	**71**	**1**	**4704**	