



## Survey of order Coleoptera attracted to light traps in Alexandria Governorate with two species newly recorded to Egyptian fauna

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### Abstract

A survey of coleopterous insects was conducted at Alexandria Governorate (Burg Al-Arab and Al-Amria districts) during two successive years from April 2018 to March 2020 using Robinson light traps set up at Alexandria in Burg Al-Arab (Burg Al-Arab regions) and Al-Amria (Rahim and Gurisat regions). The collected individuals were separated, listed, and identified under their related families, genera, and species (25 families and 76 species). *Psyllobora renifer* Cas. (Family: Coccinellidae) and *Digonums irroratus* Kiesen (Family: Ptinidae) are newly recorded to the Egyptian fauna and collected for the first time from our fauna.

### Introduction

Order Coleoptera is the largest order in class Insecta. All over the world, only a quarter of a million species have been described (White, 1983). In Egypt, there are about 2974 species belonging to Coleoptera published by Alfieri (1976) in his professional studies on Egyptian fauna. Very little was known about their distribution, abundance, and identification. More attention has been given to the survey of insect species in different areas of Egypt (Salem *et al.*, 1985, 1986 and 2020; El-Moursy *et al.*, 1996, 1998 and 2001; Fadl and Mossaad, 1997; El-Akkad *et al.*, 1997; Emad, 2000; El-Shewy, 2007 and 2013; EL-Metwally, 2002 and 2008; Salah, 2017 and Ismaieel *et al.*, 2021).

In the present work, the coleopterous species were collected from Burg Al-Arab (Burg Al-Arab regions) and in Al-Amria

(Rahim and Gurisat regions) Alexandria Governorate during two successive years (2018-2019 and 2019-2020). The relative abundance of species is mentioned.

### Materials and methods

A light trap of the Robinson type was set up and operated at the Agricultural Research Station and at Al-Amria and Burg Al-Arab districts, Alexandria Governorate from sunset to sunrise for two consecutive years, April 2018 to March 2020.

Sodium cyanide was used as a killing agent within the receptacle of the trap. Catches of coleopterous insects were separated monthly and sorted into families, genera, and species. Classification, counting, and recording were carried out. Records of monthly catches for each species and each family together with their total annual catches and percentage of abundance were

tabulated and alphabetically arranged. All species were identified in the Department of Insect Survey and Taxonomy, Plant Protection Research Institute, Ministry of Agriculture, Dokki, Egypt.

### Results and discussion

The survey of coleopterous insects was carried out at Alexandria Governorate (Burg Al-Arab and Al-Amria districts) during two successive years from April 2018 to March 2020 using Robinson light traps. Data in Table (1 and 2) showed that the activity of insect populations varied from one year to another. The numbers of the whole catches were (10547 and 11024) in Burg Al-Arab (Figure 1), while the numbers of the whole catches in Al-Amria district were (35715 and 37397) in Rahim and Gurisat, respectively during the two years under study (Figure2). In these two years, the coleopterous insects were collected from April to November and completely disappeared from December to March of the

next year. The collected individuals were separated, listed and identified under their related families, genera and species (25 families and 76 species).

Data also showed that the species of the family Staphylinidae dominated the coleopterous catches in all regions of both districts followed by Carabidae, Anthicidae and Tenbrionidae. Other families were less abundant and represented by smaller numbers of individuals. On the other hand, Nitidulidae, Phalacridae, Apionidae, Monotomidae and Mycetophagidae were represented by rare numbers in the regions under study.

In addition, the family Coccinellidae was represented by two species: *Rodalia cardinalis* Muls. and *Psyllobora renifer* Casey which was collected and identified for the first time in the Egyptian fauna (Figure 3). Also, Family Ptinidae, including *Dignomus irroratus* Kieser was collected and identified for the first time in Egyptian fauna (Figure 4).

**Table (1): Different families of Coleoptera presented in Burg El-Arab district, Alexandria Governorate along with their species during 2018-2020 seasons.**

Family Species	First year		Second year	
	Annual Total number of individuals	Annual Percentage	Annual Total number of individuals	Annual Percentage
<b>Anobiidae</b>	<b>34</b>	<b>0.3</b>	<b>21</b>	<b>0.2</b>
<i>Lasioderma serricorne</i> F.	34	100	9	42.9
<b>Anthicidae</b>	<b>1086</b>	<b>10.3</b>	<b>1543</b>	<b>16.1</b>
<i>Anthelephila caeruleipennis</i> La-ferte	61	5.6	24	1.6
<i>Anthicus crinitus</i> La-Fert.	652	60	828	53.7
<i>Anthicus vittatus</i> Lucas.			35	2.3
<i>Cyclodinus debilis</i> La-Fert.	160	14.7	236	15.3
<i>Cyclodinus larvipennis</i> (Mars.)	194	17.9	75	4.9
<i>Leptaleus klugi</i> (Laf.)	19	1.7	83	5.4
<b>Apionidae</b>	<b>40</b>	<b>0.4</b>	<b>42</b>	<b>0.4</b>
<i>Malvapion malvae</i> Fab.	40	100	42	100
<b>Bostrychidae</b>	<b>512</b>	<b>4.9</b>	<b>539</b>	<b>4.9</b>
<i>Bostryehopsis reichei</i> Mars.	18	3.5	23	4.3
<i>Phonapate frontalis</i> Fahr.	21	4.1	19	3.5
<i>Rhizopertha dominica</i> (Fab.)	147	28.7	167	31
<i>Scobicia chevieri</i> Villa.	326	63.7	330	61
<b>Carabidae</b>	<b>2094</b>	<b>19.9</b>	<b>2194</b>	<b>19.9</b>
<i>Cicindela lunulata</i> Fabr.	10	2.7	10	0.5
<i>Cicindela melancholica</i> Fabr.	212	6.5	204	9.3
<i>Dyschirius clypeatus</i> Putz.	40	1.9	42	1.9

<i>Microlestes minutulus</i> Goeze.	150	7.2	151	6.9
<i>Orthomusbar barbarus</i> (Dej.)	34	0.1	26	1.2
<i>Scarites subcylindricus</i> Chau.	13	0.5	13	0.6
<i>Sphaerotachys lucasi</i> (Jacq.)	770	11.9	854	38.9
<i>Stenolophus marginatus</i> Dej.	668	63.2	672	30.6
<i>Tachys aegytiacus</i> Chatz-Koch.	197	5.6	222	10.1
<b>Coccinellidae</b>	<b>9</b>	<b>0.09</b>	<b>14</b>	<b>0.1</b>
<i>Psyllobora renifer</i> Casey	9	100	14	100
<b>Chrysomelidae</b>	<b>150</b>	<b>1.4</b>	<b>148</b>	<b>1.3</b>
<i>Phyllotreta cruciferae</i> G.	150	100	148	100
<b>Cleridae</b>	<b>349</b>	<b>3.3</b>	<b>378</b>	<b>3.4</b>
<i>Necrobia rufipes</i> (Fab.)	349	100	378	100
<b>Curculionidae</b>	<b>80</b>	<b>0.8</b>	<b>87</b>	<b>0.8</b>
<i>Hypolixus nubilosus</i> Boh.	54	67.5	51	58.6
<i>Rhynchophorus ferrugineus</i> Oliv.	26	32.5	36	41.4
<b>Dynastidae</b>	<b>146</b>	<b>1.4</b>	<b>162</b>	<b>1.5</b>
<i>Temnorrhynchus baal</i> Reiche.	146	100	162	100
<b>Dytiscidae</b>	<b>171</b>	<b>1.6</b>	<b>182</b>	<b>1.7</b>
<i>Hydroglyphus confuses</i> (Klug.)	51	29.8	62	34.1
<i>Hydaticus leander</i> Rossi.	120	70.2	120	65.9
<b>Elateridae</b>	<b>415</b>	<b>4</b>	<b>425</b>	<b>3.9</b>
<i>Agrypnus notodonta</i> Germ.	37	8.9	31	7.3
<i>Drasterius figuratus</i> Germ.	378	91.1	394	92.7
<b>Hybosoridae</b>	<b>257</b>	<b>2.4</b>	<b>260</b>	<b>2.4</b>
<i>Hybosorus illigeri</i> Reiche.	257	100	260	100
<b>Hydrophilidae</b>	<b>849</b>	<b>8.1</b>	<b>945</b>	<b>8.6</b>
<i>Cercyon laminatus</i> Sharp.	184	31.7	196	20.7
<i>Cercyon quisquilius</i> L.	476	30	534	56.5
<i>Enochrus Politus</i> (Kust.)	105	20.4	123	13
<i>Holochares melanophthalmus</i> Muls.	70	17.8	74	7.8
<i>Hydrobius fuscipes</i> L.	14		18	1.9
<b>Latridiidae</b>	<b>33</b>	<b>0.3</b>	<b>38</b>	<b>0.4</b>
<i>Corticaria fulv</i> (Com.)	33	100	38	100
<b>Meloidae</b>	<b>10</b>	<b>0.1</b>	<b>14</b>	<b>0.1</b>
<i>Synhoria senegalensis</i> Laf.	5	50	6	42.9
<i>Zonitoschema pallidissima</i> Rtt	5	50	8	57.1
<b>Mycetophagidae</b>	<b>216</b>	<b>2</b>	<b>231</b>	<b>2.1</b>
<i>Typhaea stercorea</i> L.	216	100	231	100
<b>Nitidulidae</b>	<b>5</b>	<b>0.05</b>	<b>7</b>	<b>0.06</b>
<i>Carpophilus mutilats</i> Er.	5	100	7	100
<b>Ptinidae</b>	<b>32</b>	<b>0.2</b>	<b>27</b>	<b>0.2</b>
<i>Dignomus irroratus</i> Kiesen.	8	3.5		
<i>Gastrallus marginipennis</i> Lecont.	17	70.8	19	70.4
<i>Gastrallus striatus</i> Zoufal.	7	29.2	8	29.6
<b>Scarabaeidae</b>	<b>679</b>	<b>6.4</b>	<b>723</b>	<b>6.6</b>
<i>Aphodius lividus</i> Pan.	467	68.8	491	67.9
<i>Onitis alexis</i> Klug.	41	6	44	6.1
<i>Onthophagus sellatus</i> Klug.	55	8.1	65	9
<i>Pentodon algermius</i> (Fuess.)	1	0.1	1	0.1
<i>Pentodon desert ferrantei</i> N.	33	4.9	38	5.3
<i>Phyllognathus excavatus</i> Forster.	1	0.1	2	0.3
<i>Pleurophorus caesus</i> Creutz.	43	6.3	46	6.4
<i>Rhysemodes orientalis</i> (Muls.God.)	38	5.6	63	5

<b>Silvanidae</b>	<b>78</b>	<b>0.7</b>	<b>80</b>	<b>0.7</b>
<i>Ahasverus advena</i> (Walt.)	78	100	80	100
<b>Staphylinidae</b>	<b>2946</b>	<b>28</b>	<b>2918</b>	<b>26.5</b>
<i>Aleochara bipustulata</i> L.	53	1.8	58	2
<i>Aleochara moesta</i> Grav.	53	1.8	61	2.1
<i>Bledius unicornis</i> Germ.	160	5.4	174	6
<i>Gabronthus maritimus</i> Motsch.	73	2.5	87	3
<i>Paederus alfieri</i> Koch.	328	11.1	344	11.8
<i>Philonthus agilis</i> Grave.	33	1.1	30	1
<i>Philonthus concinnus</i> Grav.	27	0.9	29	1
<i>Philonthus longicornis</i> Steph.	139	4.7	152	5.2
<i>Philonthus quisquiliarius</i> Gylle.	119	4	118	4
<i>Philonthus</i> Sp.	6	0.2	3	0.1
<i>Scopae debilis</i> Hoch.	1955	66.4	1862	63.8
<b>Tenebrionidae</b>	<b>356</b>	<b>3.4</b>	<b>402</b>	<b>3.6</b>
<i>Alphitobius diaperinus</i> Panz.	10	2.8	16	4
<i>Alphitobius laevigatus</i> Fabr.	102	28.7	109	27.1
<i>Cheirodes sardoa</i> Gene.	3	0.8	5	1.2
<i>Gonocephalum rusticum</i> Oli.	51	14.3	54	13.4
<i>Gonocephalum setulosum</i> Fald.	29	8.1	35	8.7
<i>Imatismus villosus</i> Haag.Rutenberg.	12	3.4	14	3.5
<i>Myrmexchixenus picinus</i> (Aube.)	44	12.4	46	11.4
<i>Opatropis hispida</i> Brull.	27	7.6	29	7.2
<i>Opatroides punctulatus</i> Brull.	34	9.6	42	10.4
<i>Palorus subdepressus</i> Wall.	1	0.3	4	1
<i>Scleron orientalis</i> F.	43	12.1	48	11.9
<b>Grand total</b>	<b>10547</b>		<b>11024</b>	

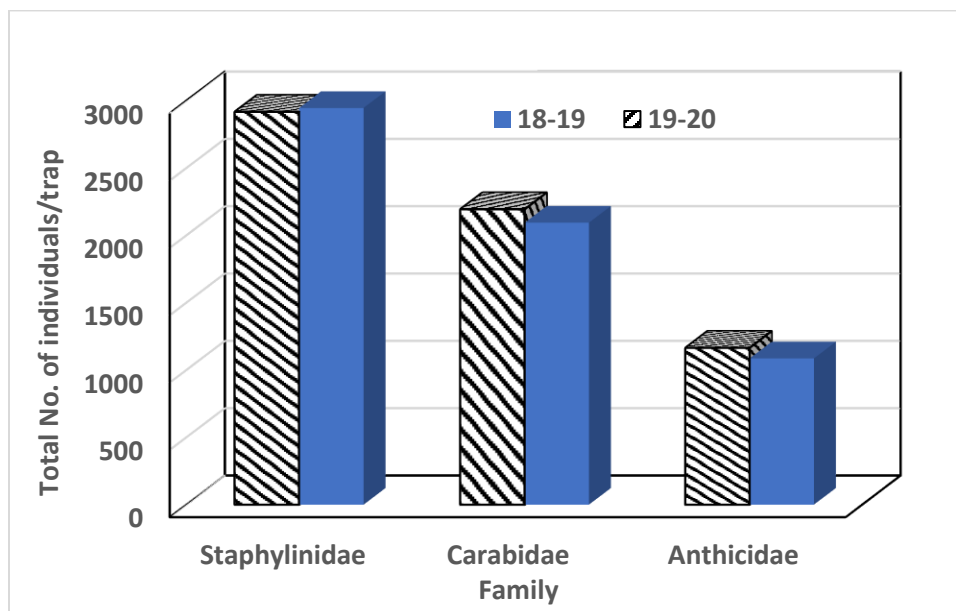


Figure (1): The total numbers of the most abundant coleopterous families at Burg El-Arab district, Alexandria Governorate caught using light trap during 2018-2019 and 2019-2020.

**Table (2): Different families of Coleoptera presented in Al-Amria district, Alexandria Governorate along with their species during 2018-2020 seasons.**

Family Species	First year		Second year	
	Annual Total number of individuals	annual Percentage	Annual Total number of individuals	Annual Percentage
<b>Anobiidae</b>	<b>41</b>	<b>0.1</b>	<b>50</b>	<b>0.1</b>
<i>Lasioderma serricorne</i> F.	41	100	50	100
<b>Anthicidae</b>	<b>2335</b>	<b>6.5</b>	<b>2428</b>	<b>6.5</b>
<i>Anthicus crinitus</i> La-Fert.	1222	52.3	1212	49.9
<i>Cyclodinus bremeri</i> Laf.	393	16.8	397	16.4
<i>Cyclodinus debilis</i> La-Fert.	160	6.9	205	8.4
<i>Hirticollis hispidus</i> Rossi.	290	12.4	321	13.2
<i>Omonadus floralis</i> L.	270	11.6	293	12.1
<b>Bostrychidae</b>	<b>311</b>	<b>0.9</b>	<b>349</b>	<b>0.9</b>
<i>Bostryehopsis reichei</i> Mars.	35	11.3	49	14
<i>Lyctus brunneus</i> Steph.	16	5.1		
<i>Rhizopertha dominica</i> (Fab.)	59	18.8	72	20.6
<i>Scobicia chevieri</i> Villa.	201	64.6	228	65.3
<b>Carabidae</b>	<b>4378</b>	<b>12.3</b>	<b>4510</b>	<b>12.1</b>
<i>Amblystomus metallescens</i> (Dej.)	501	11.4	528	11.7
<i>Cicindela lunulata</i> Fabr.	75	1.7	84	1.9
<i>Cicindela melancholica</i> Fab.	51	1.2	62	1.4
<i>Microlestes minutulus</i> Goeze.	481	11	487	10.8
<i>Pterostichus pharao</i> Luts.	455	10.4	485	10.8
<i>Scarites subcylindricus</i> Chau.	26	0.6	27	0.6
<i>Sphaerotachys lucasi</i> (Jacq.)	1164	26.6	1184	26.3
<i>Stenolophus marginatus</i> Dej.	1430	32.7	1441	32
<i>Tachys gilvus</i> Shaum.	9	0.2	11	0.2
<i>Tachys torretassoi</i> Schatz&Koch.	1186	4.2	201	4.5
<b>Coccinellidae</b>	<b>89</b>	<b>0.2</b>	<b>119</b>	<b>0.3</b>
<i>Psyllobora renifer</i> Casey	89	100	119	100
<b>Chrysomelidae</b>	<b>932</b>	<b>2.6</b>	<b>937</b>	<b>2.5</b>
<i>Chloropterus stigmaticollis</i> Fair.	2	0.2	6	0.6
<i>Phyllotreta cruciferae</i> G.	930	99.8	931	99.4
<b>Cleridae</b>	<b>320</b>	<b>0.9</b>	<b>332</b>	<b>0.9</b>
<i>Necrobia rufipes</i> (Fab.)	320	100	332	100
<b>Cryptophgidae</b>	<b>36</b>	<b>0.1</b>	<b>39</b>	<b>0.1</b>
<i>Cryptophgus affinis</i> Stem.	36	100	39	100
<b>Curculionidae</b>	<b>83</b>	<b>0.2</b>	<b>90</b>	<b>0.2</b>
<i>Lixus ornatus v.nubilosus</i> Boh.	39	47	44	48.9
<i>Temnorhinus brevirostris</i> Gyll.	44	53	46	51.1
<b>Dytiscidae</b>	<b>771</b>	<b>2.2</b>	<b>807</b>	<b>2.2</b>
<i>Copelatus Ibrahimi</i> Angus. & Kaschef.	229	29.7	240	29.7
<i>Hydroglyphus confuses</i> (Klug.)	9	1.2	12	1.5
<i>Hydaticus leander</i> Rossi.	533	69.1	555	68.8
<b>Elateridae</b>	<b>735</b>	<b>2.1</b>	<b>764</b>	<b>2</b>
<i>Agrypnus notodonta</i> Germ.	12	1.6	18	2.4
<i>Cardiophorus pharaonum</i> Buyss.	22	3	27	3.5
<i>Drasterius figuratus</i> Germ.	701	95.4	719	94.1

<b>Hybosoridae</b>	<b>248</b>	<b>0.7</b>	<b>262</b>	<b>0.7</b>
<i>Hybosorus illigeri</i> Reiche.	248	100	262	100
<b>Hydrophilidae</b>	<b>999</b>	<b>2.8</b>	<b>1035</b>	<b>2.8</b>
<i>Cercyon laminatus</i> Sharp.	112	11.2	118	11.4
<i>Cercyon quisquilius</i> L.	799	80	824	79.6
<i>Holochares melanophthalmus</i> Muls.	88	8.8	93	9
<b>Monotomidae</b>	<b>87</b>	<b>0.2</b>	<b>95</b>	<b>0.3</b>
<i>Monotoma picipes</i> Her.	87	100	95	100
<b>Mycetophagidae</b>	<b>142</b>	<b>0.4</b>	<b>160</b>	<b>0.4</b>
<i>Typhaea stercorea</i> L.	142	100	160	100
<b>Nitidulidae</b>	<b>498</b>	<b>1.4</b>	<b>513</b>	<b>1.4</b>
<i>Carpophilus immaculatus</i> Luc.	498	100	513	100
<b>Phalacridae</b>	<b>3</b>	<b>0.008</b>	<b>4</b>	<b>0.01</b>
<i>Stilbus nitidus</i> (Mel.)	3	100	4	100
<b>Ptinidae</b>	<b>544</b>	<b>1.5</b>	<b>576</b>	<b>1.5</b>
<i>Gastrallus marginipennis</i> Lecont.	314	57.7	327	56.8
<i>Gastrallus striatus</i> Zoufal.	230	42.3	249	43.2
<b>Scarabaeidae</b>	<b>573</b>	<b>1.6</b>	<b>610</b>	<b>1.6</b>
<i>Aphodius lividus</i> Pan.	452	78.9	468	76.7
<i>Onitis alexis</i> Klug.	3	0.5	5	0.8
<i>Pentodon desert ferrantei</i> N.	10	1.7	14	2.3
<i>Phyllognathus excavatus</i> Forster.	51	8.9	63	10.3
<i>Pleurophorus caesus</i> Creutz.	57	9.9	60	9.8
<b>Scolytidae</b>	<b>60</b>	<b>0.2</b>	<b>68</b>	<b>0.2</b>
<i>Coccotypes dactyliperda</i> F.	60	100	68	100
<b>Silvanidae</b>	<b>167</b>	<b>0.5</b>	<b>180</b>	<b>0.5</b>
<i>Ahasverus advena</i> (Walt.)	90	53.9	99	55
<i>Oryzophilus surinamensis</i> L.	77	46.1	81	45
<b>Staphylinidae</b>	<b>19213</b>	<b>53.8</b>	<b>20003</b>	<b>53.5</b>
<i>Aleochara bipustulata</i> L.	508	2.6	536	2.7
<i>Aleochara moesta</i> Grav.	15	0.08	17	0.08
<i>Bledius unicornis</i> Germ.	219	1.1	217	1.08
<i>Paederus alfieri</i> Koch.	13973	72.7	14536	72.7
<i>Philonthus longicornis</i> Steph	84	0.4	89	0.4
<i>Philonthus maritimus</i> Motsch.	62	0.3	69	0.3
<i>Philonthus quisquiliarius</i> Gylle.	35	0.2	41	0.2
<i>Philonthus</i> Sp.	5	0.02	6	0.02
<i>Philonthus sordidus</i> Grav.	120	0.6	124	0.6
<i>Scopaes debilis</i> Hoch.	4092	21.3	4260	21.3
<i>Trogophloeus niloricus</i> Er.	100	0.5	108	0.5
<b>Tenebrionidae</b>	<b>3108</b>	<b>8.7</b>	<b>3339</b>	<b>9</b>
<i>Alphitophagus bifasciatus</i> Mostly.	445	14.3	480	14.4
<i>Alphitobius diaperinus</i> Panz.	14	0.5	9	0.3
<i>Cheirodes sardoa</i> Gene.	768	24.7	879	26.3
<i>Gonocephalum rusticum</i> Oli.	438	14.1	453	13.6
<i>Gonocephalum setulosum</i> Fald.	566	18.2	607	18.2
<i>Mesomorphus setosus</i> Muls	124	4	151	4.5
<i>Myrmechixenus picinus</i> (Aube.)	379	12.2	352	10.5
<i>Opatropis hispida</i> Brull.	4	0.1	10	0.3
<i>Opatroides punctulatus</i> Brull.	111	3.6	139	4.2

<i>Palorus subdepressus</i> Wall.	259	8.3	259	7.8
<b>Zopheridae</b>	<b>42</b>	<b>0.1</b>	<b>127</b>	<b>0.3</b>
<i>Bitoma siccana</i> pas.	42	100	127	100
<b>Grand total</b>	<b>35715</b>		<b>37397</b>	

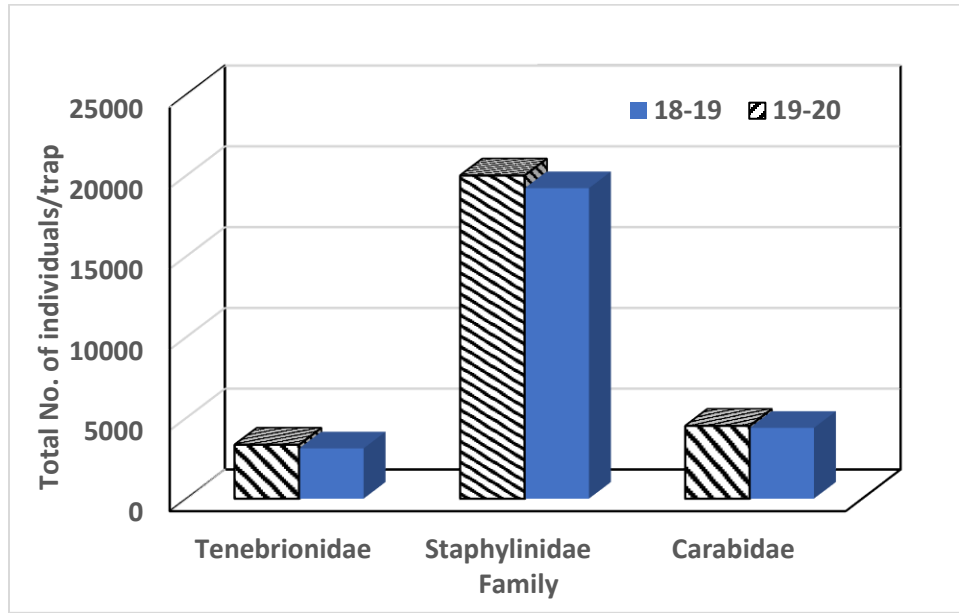


Figure (2): The total numbers of the most abundant coleopterous families at Al-Amria district, Alexandria Governorate caught using light trap during 2018-2019 and 2019-2020.



Figure (3): *Psyllobora renifer* Casey



Figure (4): *Dignomus irroratus* Kieser

**References**

- Alfieri, A. (1976):** The Coleoptera of Egypt (Monograph). Mem. Soc. Ent. Egypt, 5; Tenebrionidae: 166 - 202.
- El-Akkad, M.K.; Salem, M.M. and Al-Gamal, M.M. (1997):** Relative abundance of some coleopterous species attracted to a light-trap at Al-Arish city, North Sinai during two successive years. Ann. Agric. Sci., Ain Shams Univ. Cairo, 42(2): 655-664.
- El-Moursy, A.A.; Fadl, H.H. and El-Akkad, M.K. (1996):** Biological diversity of Egypt (Col.). United Nat. Env. Prog. Nat. Nial. Unit, 4: 1-341 and 5: 1-708.
- El-Moursy, A.A.; Fadl, H. H.; Ali, M.S. and Abdel- Dayem, M.S. (1998):** A preliminary account on the insect fauna of Wadi Aliaqi, South-Eastern Desert (Egypt). Bull. Entomol. Soc. Egypt, 76: 149-156.
- El-Moursy, A. A.; El-Hawagry, M.S.; Abdel-Dayem M. S. and Fadl H. H. (2001):** Insect Diversity in Zaranik Protectorate, Northern Sinai, Egypt. Egypt. J. Natural Hist., 3: 62-80.
- El-Shewy, D.A.L. (2007):** Taxonomic studies on Subfamilies Opatrinae and Pedininae (Family Tenebrionidae - Coleoptera) in Egypt, M.Sc. Thesis, Fac. Sci., Al-Azhar University.
- El-Shewy, D.A.L. (2013):** Survey and classification of some species of Family Tenebrionidae (Order Coleoptera) from Egypt. Ph.D. Thesis, Fac. Sci., Al-Azhar University.
- Emad, A.B. (2000):** Comparative study of the insects diversity and the seasonal abundance of some species in two different regions in Egypt. M.Sc. Thesis, Fac. Agric., Al-Azhar University.
- EL-Metwally, N. E. (2002):** Taxonomic study of subfamily Tentyrinae (Family Tenebrionidae – Order Coleoptera) in Egypt, M.Sc. Thesis Fac. Sci. Ain Shams University
- EL-Metwally, N. E. (2008):** Faunistic and taxonomic studies on the Subfamilies Akidinae, Pimeliinae and Blaptinae [Family: Tenebrionidae, Order: Coleoptera] in Egypt. Ph.D. Thesis Fac. Sci. Ain Shams University.
- Fadl, H.H. and Mossaad, M.H. (1997):** The Coleopterous insect fauna of Gabal Elba and the Red Sea Coast. Bull. Ent. Soc. Egypt., 75: 82-93.
- Ismaieel, R.A.; Fadl, H.H. and Abu El-Hassan, G. M. (2021):** A taxonomic review of the aquatic beetles (Hydraenidae: coleoptera) from 25 Egypt, with two new records. Egyptian Journal of Aquatic Biology and Fisheries, 25(5): 479-497. DOI:10.21608/EJABF.2021.202298.
- Salah, M. (2017):** An annotated checklist of the Aquatic polyphaga (Coleoptera) of Egypt II. Family Hydrophilidae. The coleopterists Bulletin. DOI: 1649/0010-71.2.259.
- Salem, M.M.; Badr, M.A.; El-Said, L.M. and Abdel-Azim, A. (1985):** Survey and population density of coleopterous insects at Sids area (Beni-Suef) as indicated by a light trap. Proc. 6<sup>th</sup> Arab Pest. Conf. Tanta Univ., II: 27-37.
- Salem, M.M.; Al-Gamal, M.M.; Hussein, H.R.; Soliman, M.A. and Oshaibah, A. A. (1986):** Survey, abundance, and fluctuation of coleopterous insects at Noubariah region as indicated by a light-trap. Minia J. Agric. Res. & Dev., 8(1): 143-162.
- Salem, M, M.; El-Shewy, D.; El-Metwally, N. E. and Al-Azab, S. A. (2020):** Survey and taxonomic notes on the coleopterous (Coleoptera) insect fauna of the New Valley, Egypt. Egypt. J., 3(4): 1111-1120.
- White, R.E. (1983):** A field guide to the beetles of North America. Houghton Mifflin Company Boston., pp. 368.