

## SEASONAL FLUCTUATIONS OF CERTAIN SPECIES OF NOCTURNAL COLEOPTERA AS INDICATED BY A LIGHT TRAP AT QUENA

By

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### ABSTRACT

- 1) One light trap of Robinson type fitted with a mercury vapour bulb was operated for two consecutive years. Eighty - three species were identified and counted. The most abundant species was *Tachys fumigatus* of which over 23.000 individuals were collected over the period of trapping. This species formed 31-23% of the total catch of Coleoptera.
- 2) The Seasonal fluctuations of nineteen species studied and grouped into four groups according to the number of generations in each group.

### INTRODUCTION

The seasonal fluctuations of nocturnal Coleoptera has not received much attention in various parts of the world. In Egypt, Hanna (1969) was the first to make the seasonal abundance of the order as a whole at the garden of Assiut University. Therefore, it was found interesting to study the seasonal fluctuation of species of Coleoptera, found in sufficient numbers at Quena.

### MATERIAL AND METHODS

One light trap of the Robinson type fitted with a 125 watt mercury vapour bulb operated from sunset to sunrise, once every three nights, for two years (October 1976 - September 1978). The trap was set up in the fields of Quena Agricultural school with its mouth at a height of one metre and half. The fields were planted with maize, wheat and different vegetables. The beetles of 83 species were identified and the daily count determined. Nineteen species were obtained in considerable numbers and, therefore, it was possible to study their seasonal fluctuations. The daily numbers of each species were expressed as log. (n+1) (Williams 1937) to avoid Zero catches. The five running means were calculated in order to smooth the curve, which was superimposed on the histogram to have an idea about the number of generations.

## RESULTS AND DISCUSSION

### Catches

Eighty-three species belonging to seventy genera were identified. These genera were arranged into twenty-three families. Carabidae and Tenebrionidae each includes 12 species, whereas, Scarabaeidae, Dytiscidae, Staphylinidae and Hydrophilidae include nine, seven, six and five species, respectively. On the other hand, the remaining 17 families each includes between 1 - 3 species.

The total catches were over 76,000 individuals. The most abundant species was *Tachys fumigatus* Sch. of which over 23,000 individuals were captured. This species formed 31.23% of the total catch of Coleoptera. The next commonest species was *Rhyssalus goudati* Hard. of which over 16,000 individuals were attracted to light. The individuals of this species formed 22.04% of the total catch of the order. Twelve species were represented by large counts. These species are: *Tachys lucosi* Duv. (5908), *Atheta gregaria* Erich. (5276), *Bembidion niloticum* Dej. (2818), *Anthicus tristis* Sch. (2607), *Drasterius bimaculatus* Rass. (2329), *Philonthus quisquiliarius* Gyll. (2088), *Oxytelus nitidulus* Grav. (1764), *Gastrallus striatus* Zouf. (1507), *Paederus alfieri* Koch. (1428), *Tachys fasciatus* Mats. (1366), *Bidessus confusus* Klug. (1278) and *Migneauxia crassiuscula* Aube. (890).

Four species each was represented only by one individual, and three species each was represented by two individuals throughout the whole period of trapping. These species were *Pharator variegatus* Race., *Attagenus obtusus* Gyll., *Coelambus confluens* Fab., *Anemia aegyptica* pic. and *Orphinus globulicornis* Rot., *Carpophilus mutilatus* Er., and *Catharsius sesostris* Wat., respectively.

### Seasonal Fluctuations

Figures 1, 2 and 3 show the dates of occurrence of all identified species, the catch of species in certain nights is represented by a short line and, therefore the flight period of each species was determined in each year.

Nineteen abundant species are chosen to study the seasonal fluctuation. The individual numbers of each species in different months in the two trapping years are given in Tables 1 - 3, with these details, the seasonal fluctuations of abundant species can be discussed under the following headings:

1. Species having one generation : This division includes a single species (*Gastrallus striatus*). The beetles of this species were mainly captured in spring and summer. This species has one generation per year. (Fig. 4)

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	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.
<b>ANOBIIDAE</b>									
<i>Gastrallus striatus</i>									
<i>Lasioderma serricorne</i>									
<i>Stagobium panicea</i>									
<b>ANTHICIDAE</b>									
<i>Anthicus crinitus</i>									
<i>A. tristis</i>									
<b>BOSTRYCHIDAE</b>									
<i>Bostrychoplites zikely</i>									
<i>Lyctus brunneus</i>									
<i>Sinoxylon ceratoniae</i>									
<b>BRUCHIDAE</b>									
<i>Bruchidius sahlbergi</i>									
<b>CARABIDAE</b>									
<i>Bembidion niloticum</i>									
<i>Cicindela nitotica</i>									
<i>C. melancholica</i>									
<i>Calosoma chlorostictum</i>									
<i>Dromius vagepictus</i>									
<i>Egadroma marginata</i>									
<i>Phrator variegatus</i>									
<i>Siagona europea</i>									
<i>S. kindermanni</i>									
<i>Tachys fasciatus</i>									
<i>T. fumigatus</i>									
<i>T. lucosi</i>									
<b>CHRYSOMELIDAE</b>									
<i>Chaetocnema tibialis</i>									
<i>Longitarsus albineus</i>									
<i>Phyllotreta cruciferae</i>									
<b>COCCINELLIDAE</b>									
<i>Coccinella undecimpunctata</i>									
<i>Nephus includens</i>									
<i>Scymnus interruptus</i>									
<b>CRYPTOPHAGIDAE</b>									
<i>Cryptophagus affinis</i>									
<b>CUCUJIDAE</b>									
<i>Airaphilus geminus</i>									
<i>Monotoma bicolor</i>									
TRAPPING DATES <sup>76-77</sup> <sub>77-78</sub>									
	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.

Figure 1. Dates of trapping of Families : Anobiidae, Anthicidae, Bostrychidae, Bruchidae, Carabidae, Chrysomelidae, Coccinellidae, Cryptophagidae and Cucujidae in 1976 - 77 & 1977 - 78 (Short lines at the foot of the figure show the dates when the trap was working).

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	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.
<b>CURCULIONIDAE</b>									
<i>Shorpia rubida</i>									
<i>Sitona lividipes</i>									
<i>Smicronyx rufipennis</i>									
<b>DERMESTIDAE</b>									
<i>Attagenus obtusus</i>									
<i>Orphinus globulicornis</i>									
<b>DYTISCIDAE</b>									
<i>Bidessus confusus</i>									
<i>B. porcatu</i>									
<i>Coelambus confluens</i>									
<i>Erates sticticus</i>									
<i>Hyphoporus solieri</i>									
<i>Laccophilus umbrinus</i>									
<i>Rhantus pulverosus</i>									
<b>ELATERIDAE</b>									
<i>Heteroderes musculus</i>									
<i>Drasterius bimaculatus</i>									
<b>GEORYSSIDAE</b>									
<i>Georyssus costatus</i>									
<b>HETERO CERIDAE</b>									
<i>Heteroceru nitoticu</i>									
<b>HYDROPHILIDAE</b>									
<i>Cercyon quisquiliu</i>									
<i>Dactylosternum insulare</i>									
<i>Enochru bicolor</i>									
<i>E. parvulu</i>									
<i>Laccobiu leucaspis</i>									
<b>NITIDULIDAE</b>									
<i>Carpophilu hemipteru</i>									
<i>C. mutilatu</i>									
<b>LATHRIDIIDAE</b>									
<i>Migneauxia crassiuscula</i>									
TRAPPING DATES <sup>76-77</sup> / <sub>77-78</sub>									
	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.

Figure 2. Dates of trapping of Curculionidae, Dermestidae, Dytiscidae, Elateridae, Georyssidae, Heteroceridae, Hyderophilidae, Nitidulidae and Lathridiidae in 1976 - 77 & 1977-78. (short lines at the foot of the figure as in Figure 1).

	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.
<b>SCARABAEIDAE</b>									
<i>Adoretus clypeatus</i>									
<i>Aphodius lividus</i>									
<i>Catharsius sesostris</i>									
<i>Onitis alexis</i>									
<i>Onthophagus sellatus</i>									
<i>Pentodon bispinosus</i>									
<i>P. deserti</i>									
<i>Psammobius laevicollis</i>									
<i>Rhysserus goudati</i>									
<b>SCOLYTIDAE</b>									
<i>Coccotrypes dactyliperda</i>									
<b>STAPHYLINIDAE</b>									
<i>Atheta gregaria</i>									
<i>Oxytelus nitidulus</i>									
<i>Paederus affierii</i>									
<i>Philonthus concinnus</i>									
<i>P. quisquiliarius</i>									
<i>P. turbidus</i>									
<b>TENEBRIONIDAE</b>									
<i>Alphitobius laevigatus</i>									
<i>Anemia aegyptiaca</i>									
<i>A. fausti</i>									
<i>A. pilosa</i>									
<i>Cabirus cyrenicus</i>									
<i>Cechnosternum rutulum</i>									
<i>Cnemeplatia atropas</i>									
<i>Gonocephalum setulosum</i>									
<i>Latheticus oryzae</i>									
<i>Mesomorphus setosus</i>									
<i>Trachyscelis aphodioides</i>									
<i>Tribolium confusum</i>									
<b>THROSCIDAE</b>									
<i>Throsacus obtusus</i>									
TRAPPING DATES	76-77								
	77-78								
	Sept.	Oct.	Nov.	March	April	May	June	July	Aug.

Figure 3. Dates of trapping of Scarabaeidae, Scolytidae, Staphylinidae, Tenebrionidae and Throscidae in 1976-77 & 1977-78. (Short lines at the foot of the figure as in Figure 1).

Table 1

Total catch of selected species of Families : *Anobiidae* *Anthicidae* and *Carabidae*  
in each month in the two trapping years (1976 - 77) and (1977 - 78).

Species	Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
<i>Gastrallus striatus</i>	76-77	---	0.0	0.0	0.0	0.0	5	20	245	201	84	10	4
	77-78	0.0	0.0	0.0	0.0	0.0	0.0	35	570	121	180	27	9
<i>Anthicus crinitus</i>	76-77	---	62	19	0.0	0.0	0.0	0.0	7	82	80	50	65
	77-78	27	9	0.0	0.0	0.0	0.0	0.0	18	38	89	57	19
<i>Bembidion niloticum</i>	76-77	---	79	9	1	1	1	2	11	174	133	297	899
	77-78	270	23	0.0	0.0	0.0	0.0	4	65	99	334	279	137
<i>Tachys fasciatus</i>	76-77	---	0.0	11	0.0	1	0.0	0.0	17	16	89	57	70
	77-78	417	40	0.0	0.0	0.0	1	1	24	206	116	129	26
<i>Tachys fumigatus</i>	76-77	---	1629	240	3	0.0	16	12	132	1363	746	3296	2091
	77-78	3593	145	1	0.0	3	2	22	326	4686	1662	2180	1774
<i>Tachys lucosi</i>	76-77	--	322	58	0.0	0.0	0.0	3	34	708	316	379	522
	77-78	850	86	0.0	0.0	0.0	0.0	1	121	1188	675	527	118

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Table 2

Total catch of selected species of Families: *Chrysomelidae*, *Coccinellidae*, *Dytiscidae*, *Elateridae* and *Heteroceridae* in each month in the two trapping years (1976-77) and (1977-78).

Species	Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
<i>Chaetocnema tibialis</i>	76-77	---	40	10	0.0	0.0	0.0	0.0	15	59	23	51	164
	77-78	37	7	0.0	0.0	0.0	0.0	1	21	87	89	110	48
<i>Nephus include</i>	76-77	---	16	99	77	46	46	8	7	30	6	7	0.0
	77-78	136	1	14	2	19	3	11	78	7	3	0.0	5
<i>Bidessus confusus</i>	76-77	---	95	52	2	1	1	5	23	56	40	106	54
	77-78	194	3	2	0.0	0.0	1	1	47	93	244	130	128
<i>Drasterius bimaculatus</i>	76-77	---	201	58	0.0	0.0	0.0	6	24	94	86	88	411
	77-78	42	27	3	0.0	0.0	0.0	13	36	113	276	501	350
<i>Heterocerus niloticus</i>	76-77	---	68	56	11	2	1	3	2	10	1	0.0	0.0
	77-78	8	5	8	0.0	0.0	1	0.0	0.0	0.0	0.0	0.0	0.0
<i>Migneauxia crassiscula</i>	76-77	---	1	24	0.0	0.0	0.0	1	205	124	73	35	32
	77-78	88	11	1	0.0	0.0	0.0	0.0	40	60	76	101	18

Table 3  
Total catch of selected species of Families : *Scarabaeidae* and *Staphylinidae* in each month in the two trapping years (1976 - 77) and (1977 - 78).

Species	Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
<i>Aphodius lividus</i>	76-77	---	34	31	3	1	1	1	9	51	49	27	52
	77-78	46	21	11	0.0	3	3	11	53	31	32	54	10
<i>Rhyssesus goudati</i>	76-77	---	2009	1760	0.0	6	26	229	644	601	278	131	329
	77-78	2535	682	36	0.0	2	12	2888	1771	761	807	300	1066
<i>Atheta gregaria</i>	76-77	---	140	100	7	5	17	111	366	367	240	584	320
	77-78	833	17	19	5	7	22	153	1118	428	171	164	82
<i>Oxytelus nitidulus</i>	76-77	---	44	16	0.0	0.0	7	12	34	49	42	41	83
	77-78	65	31	0.0	0.0	0.0	3	14	170	380	384	288	101
<i>Paederus alfierii</i>	76-77	---	180	40	0.0	0.0	0.0	1	5	28	23	23	56
	77-78	37	23	76	1	0.0	0.0	0.0	54	121	319	232	19
<i>Philonthus concinnus</i>	76-77	---	19	12	1	0.0	0.0	7	6	20	21	18	12
	77-78	10	12	0.0	0.0	0.0	0.0	4	18	29	37	24	15
<i>Philonthus quisquiliarius</i>	76-77	---	253	73	7	0.0	4	9	16	125	126	86	196
	77-78	225	52	12	0.0	0.0	0.0	15	65	241	215	193	175

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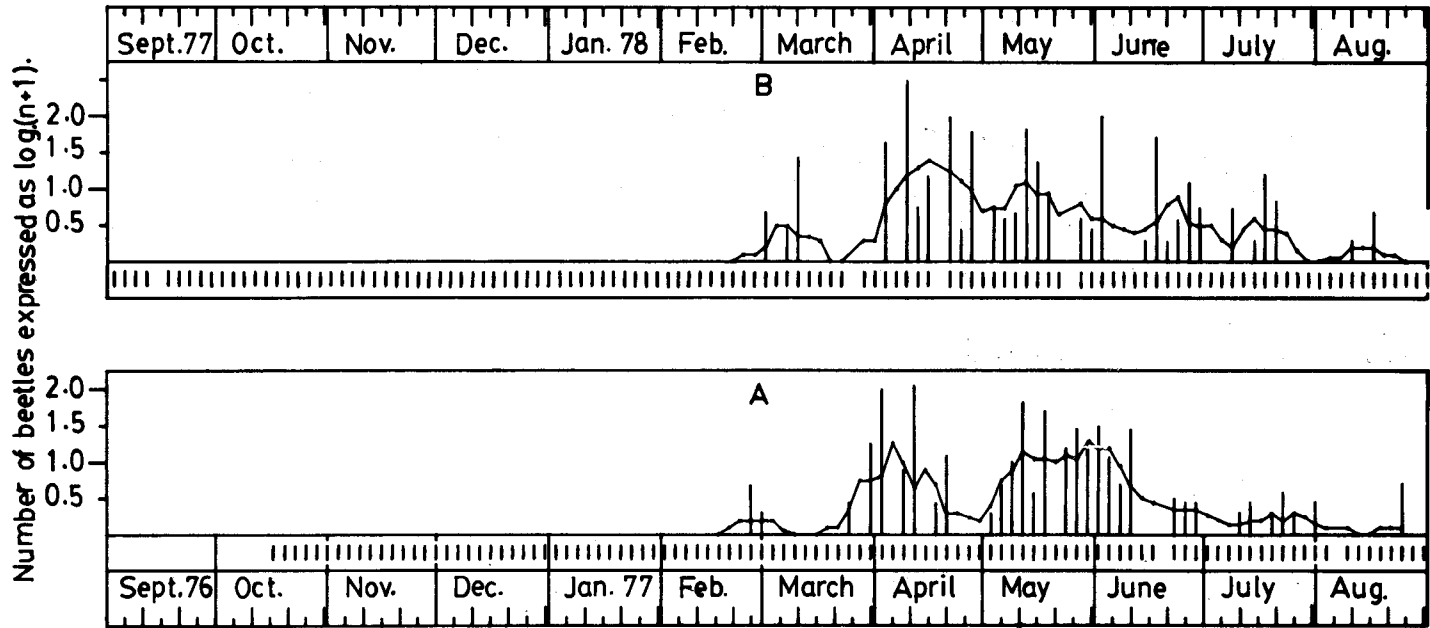


Figure 4. Seasonal fluctuations of *Gastrallus striatus* Zouf. Over a period of two trapping years (A. 1976 - 77 & B 1977-78). (Superimposed curve on histogram represented the Smoothed 5-day running mean). (Autumn 1976 represented by October & November).

2. Species having two generations: This division includes five species namely : *Bidessus confusus* (late March - late June; early July - late November), *Heterocerus niloticus* Grav. (late February - early June; October - January), (*Oxytelus nitidulus* Grav. (late March - late June; early July-mid November) (Fig. 5), *Paederus alfieri* (early May - early August; early August - Early December) and *Philonthus concinnus* Grav. (late March - mid-June; late July - late November). Kamal (1951) and Ahmed (1957) found that *Paederus alfieri* had two generations under laboratory conditions. (Fig. 6)

On the other hand, Ismail (1974) and Hanna and Hamad (1975) similarly found that this species had two generations per year. Their collections were made near ground level. However, *P. alfieri* and *O. nitidulus* were pointed out by Hanna (1969) to be of one generation. On the other hand, the same author reported that *B. confusus* and *H. niloticus* of double brooded species.

3. Species having three generations : This division includes ten species, which are: *Anthicus crinitus* Laf. (late April - late June; early July - mid-August; late August-late November), *Bembidion niloticum* (late March - late June; early July - early August; late August - mid November), *Tachys fasciatus* (early April-late June; early July-mid-August; late August - mid-November), *Tachys lucosi* (early April-early July; early July-mid-August; mid-August-late November), *Chaetocnema tibialis* III. (mid-April-early June; late June-early August; late August-early November), *Nephus includes* kirsch., (late March-early June; late August-late September) between November and February), *Drasterius bimaculatus* (late March-early June; late June-mid-August; mid-August,late November), *Migneauxia crassiuscula* (late March-late June; early July-mid-August; late August-mid November), *Atheta gregaria* (late March-late June; early July-late November *Atheta gregaria* (late November-February) (Fig. 7) and *Philonthus quisquiliarius* (late April - early-July; early-July late November; third in winter months, March and in the first half of April) (Fig. 8). Hanna (1969) found that *A. crinitus*, *T. lucosi*, *D. bimaculatus* and *M. crassiuscula*, each had two generations per year at Assiut. On the other hand, Hafez (1939b) pointed that *P. quisquiliarius* had two generations from the dung collections. The same author (1939 b) found that the same species had two generations in laboratory at 23 - 26C°.

4. Species having four generations: This division includes the following three species: *Tachys fumigatus* (early May-early July; early July-late August; late August - late November; early December-late April) (Fig. 9), *Aphodius lividus* Oliv. (early April-early June; mid-June-mid-August; mid-August-late October; early December-February) and *Rhyssalus goudati* (late March-early June; early June-late July; late

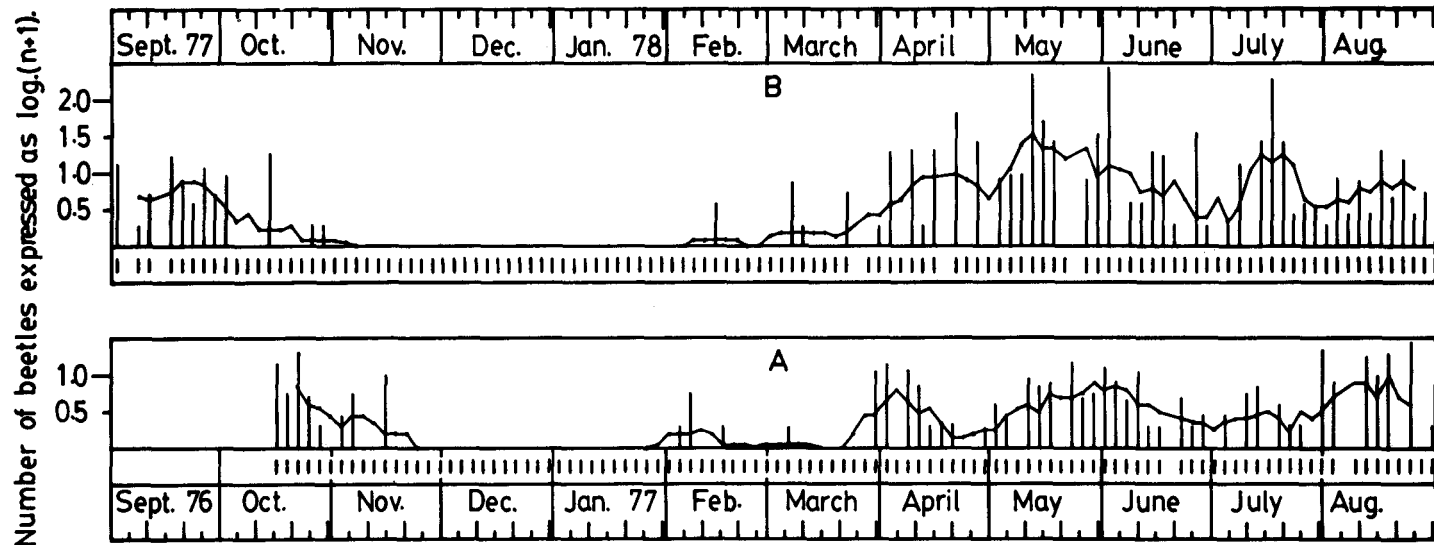


Figure 5. Seasonal fluctuations of *Oxytelus nitidulus* Grav. Over a period of two trapping years (A 1976-77 & B 1977-78). (Superimposed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).

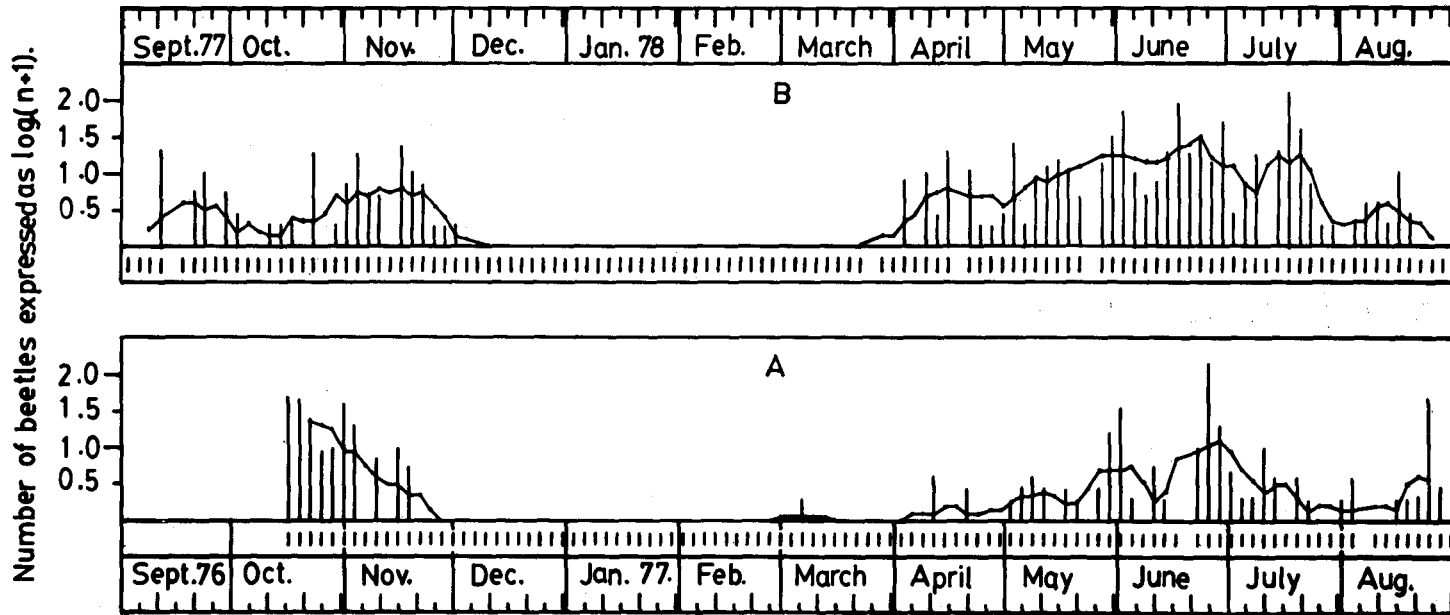


Figure 6. Seasonal fluctuations of *Paederus alfieri* Koch. Over a period of two trapping years (A 1976 - 77 & B 1977-78). (Superimposed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).

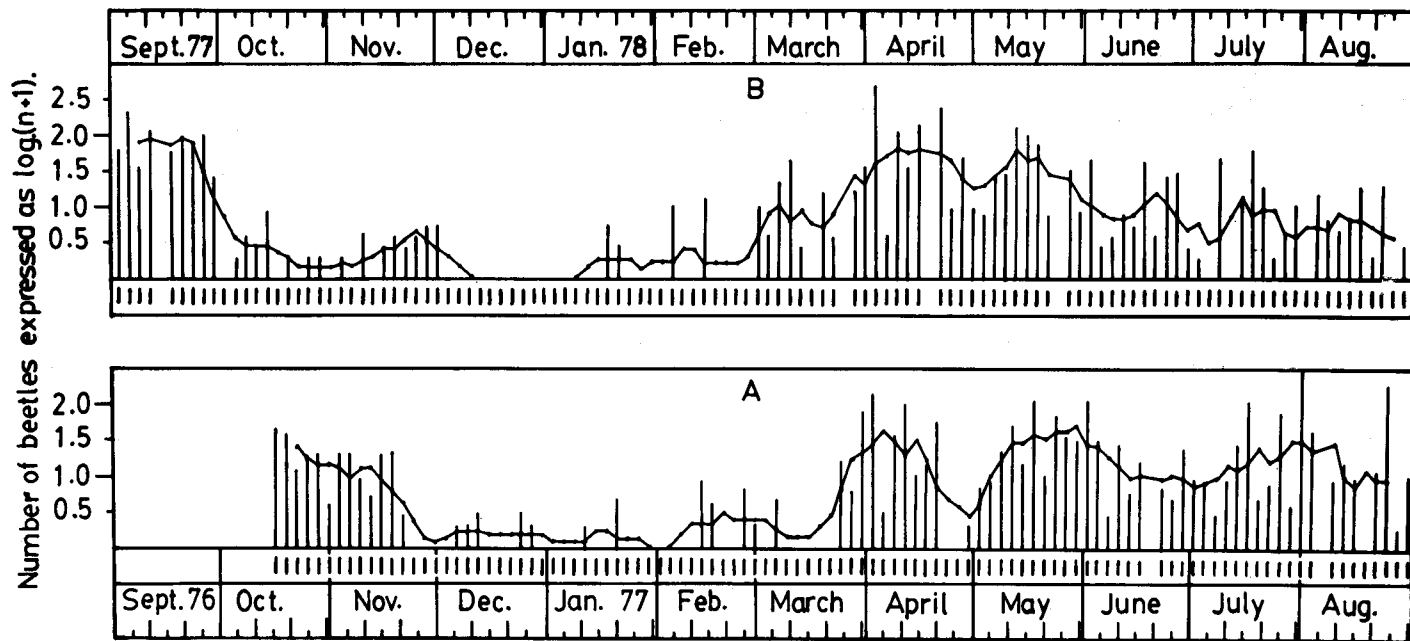


Figure 7. Seasonal fluctuations of *Atheta gregaria* Erich. Over a period of two trapping years (A 1976-77 & B 1977-78). (Superimposed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).

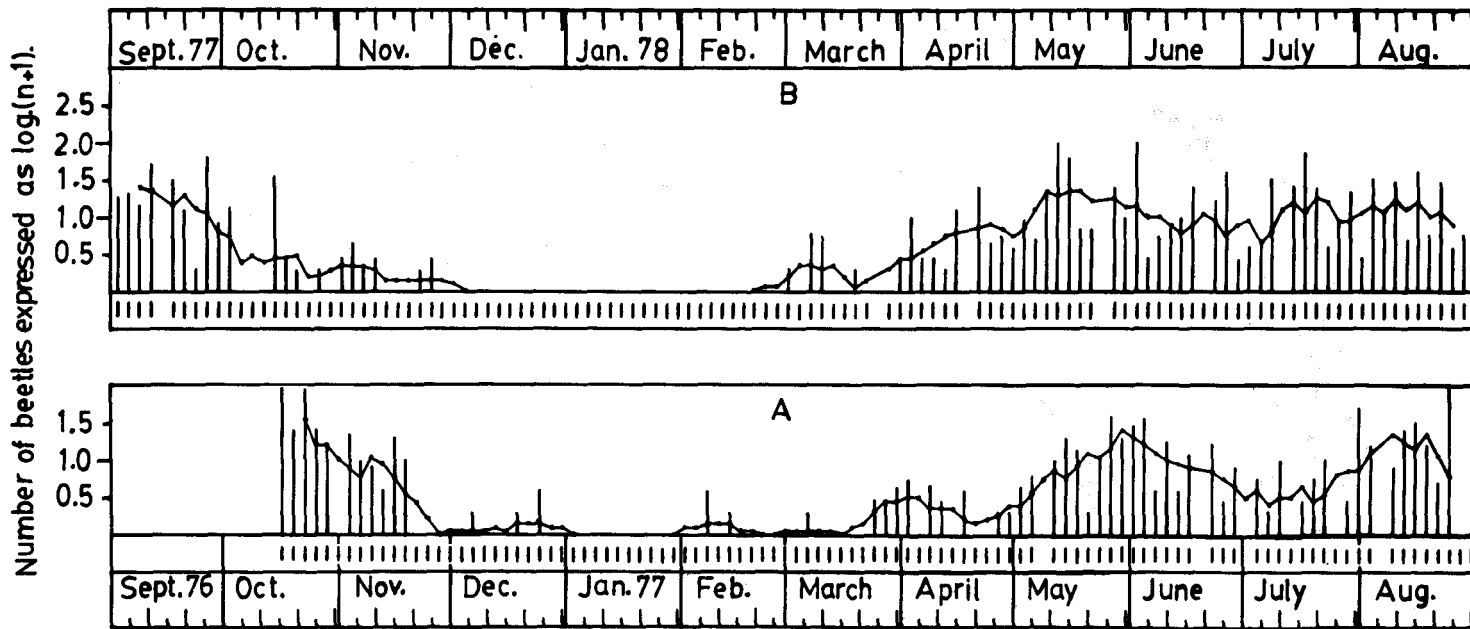


Figure 8. Seasonal fluctuations of *Philonthus quisquiliarius* Gyll. Over a period of two trapping years (A 1976-77 & B 1977-78). (Superimposed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).

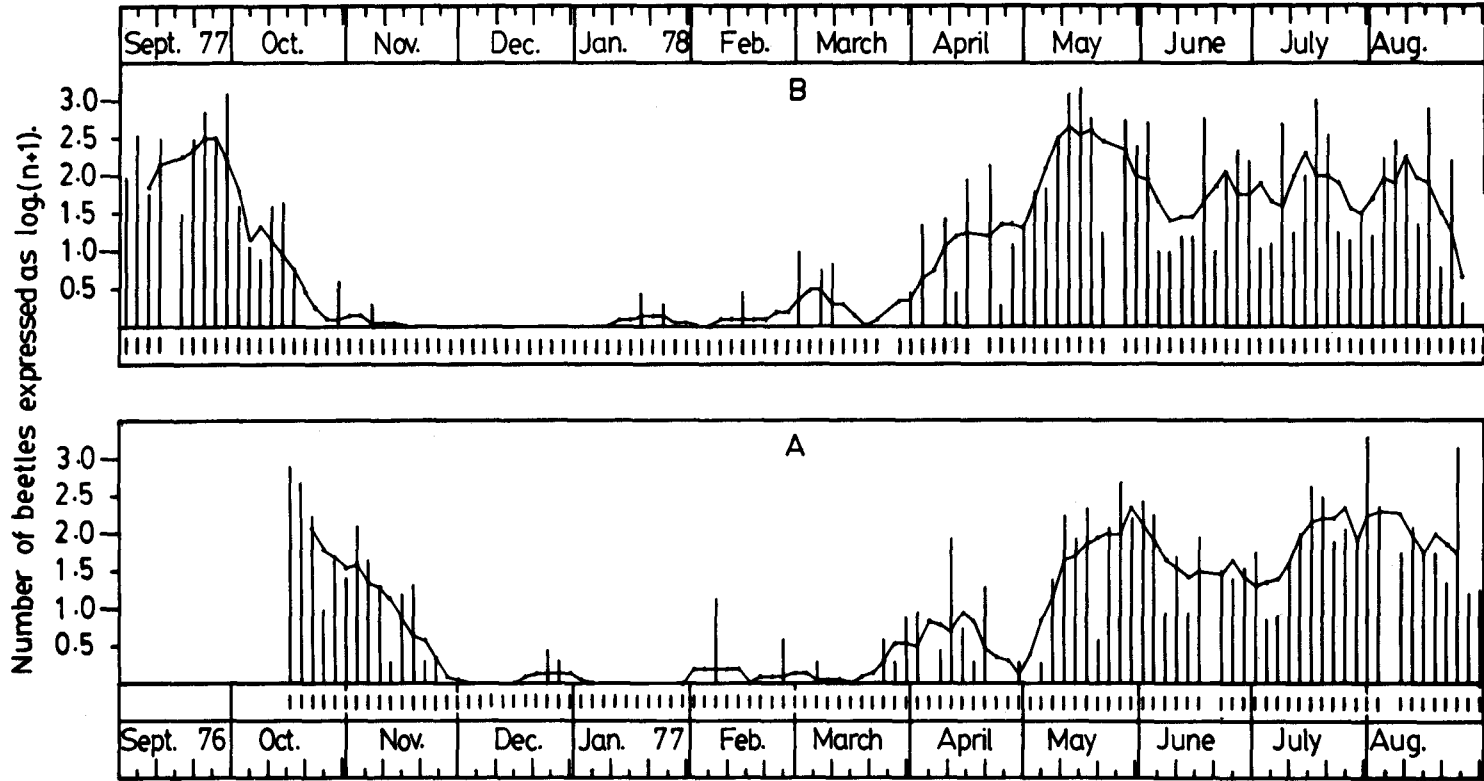


Figure 9. Seasonal fluctuations of *Tachys fumigatus* Sch. over a period of two trapping years (A 1976-77 & B 1977-78). (Superimosed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).

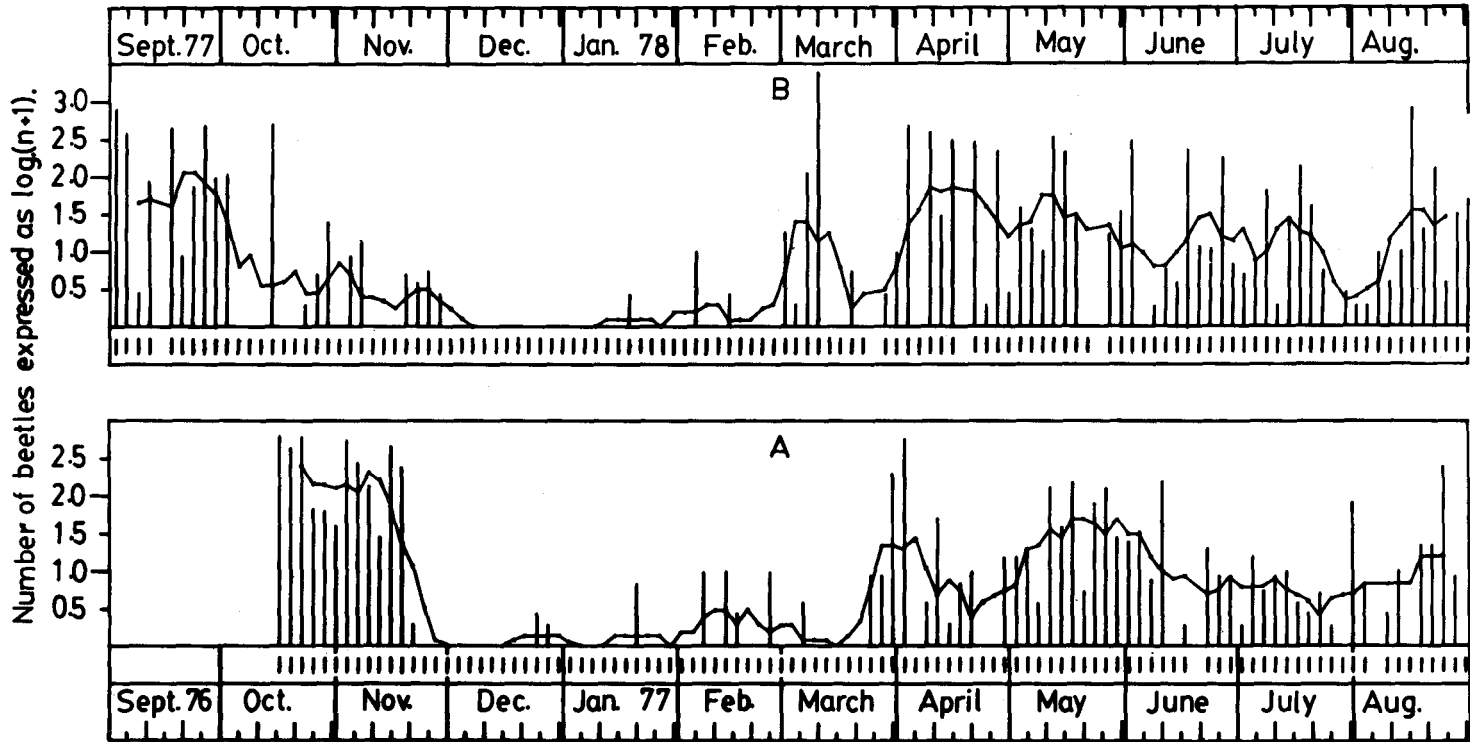


Figure 10. Seasonal fluctuations of *Rhyssmus goudati* Hard. over a period of two trapping years (A 1976-77 & B 1977-78). (Superimposed curve on histogram represented the smoothed 5-day running mean). (Autumn 1976 represented by October & November).



July-late November; late November-early March) (Fig. 10). Hanna (1969) demonstrated that the three species of this division each had two generations at Assiut. On the other hand, Hafez (1939) found from dung collections at Giza that *A. lividus* had two generations per year, whereas the same author (1939 a) pointed that the same species had two generations per year in laboratory at 23-26°C. These variations in the number of generations in different regions may be attributed to different environmental factors.

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## التغير الموسمي لأنواع غمدية الأجنحة الليلية بأستعمال مصيدة ضوئية في قنا

نور الدين فرغلي حمد و محمد زكي يوسف علي

استخدمت مصيدة ضوئية من نوع روبنسون ذات لمبة من بخار الزئبق لمدة عامين متتابعين  
أمكن التعرف على ثلاث وثمانين نوعاً من الحشرات ، كان أكثرها شيوعاً تاكيس فيميجاتيس ،  
حيث جمع منه أكثر من ثلاث وعشرين ألفاً خلال فترة الجمع . كون هذا النوع ٢٣ر٣١٪ من  
مجموعة الرتبة ككل .

درس التغير لتسعة عشر نوعاً ، نظمت بأربع مجموعات حسب عدد الأجيال في كل مجموعة .