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NIGHT DISTRIBUTION OF CERTAIN SPECIES OF COLEOPTERA AS INDICATED BY CAPTURES IN A LIGHT TRAP AT QUENA

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ABSTRACT

The night distribution of nineteen species over a whole trapping period can be considered under the following headings:

a. Early flyers
b. Species with two peaks of activity. The effect of light of low intensity, temperature and humidity on the activity of those species is discussed.
c. Species with three peaks of activity.

The night distribution of above mentioned species has been compared in each group of the nights.

a. Species with one peak in group A and two in group B. This section includes 2 species, while the reverse was found in four species.
b. Species with two maximum flight activity in group A and one in group B. This division includes one species whereas the reverse was found in five species.
c. Species with similar or different night distribution in both the two groups. These two sections include four and two species respectively.

Eighteen species were chosen to study their night distribution on nights with high and low catches. They can be divided into: (a) Species with the same or different night distribution on both nights with high and low catches, (b) Species with the same night distribution on night distribution on night with high catches and different on nights with low catches.

INTRODUCTION

In Egypt, our knowledge on night distribution of Coleoptera is very meagre and fragmentary. No attempt has been made to deal with the order as a whole or even with a single family. Therefore, it was found useful to report the results of night distribution studies obtained from species of Coleoptera which were trapped in sufficient numbers by a light trap.

MATERIALS AND METHODS

A Robinson mercury vapour light trap (Robinson and Robinson 1950) fitted with 125 watt bulb (Philips HPL Type 57236 G/97) was used. The trap was run once every three nights from sunset

to sunrise for a period of one year (October 1977 to September 1978).

In late autumn and winter the catch was very small and, therefore, it was only possible to study the rate of activity for a period of seven months (March-September 1978). The catches were taken once every thirty minutes for the first two hours of the night and they were then taken once every two hours throughout the rest of the night. The night was, therefore, divided into a number of periods, which varied from 5 to 6. Hence the nights, period was divided into two groups to avoid the summation of the last period of group B to period five to group A, and to define the peak of group B at sunrise (Hamad, 1977). Group A contained nights which had six periods and group B five periods.

To compare between nights of high catches and those of low catches, the three nights with the highest catch and the three nights with lowest catch were selected, month by month, and the captures in each thirty minutes and two hours were summed separately.

RESULTS AND DISCUSSION

The night distribution of nineteen species over a period of seven months can be considered under the following headings:

1. **Early flyers:**

Species of this group fly in their largest numbers in subperiod 1a or 1c. The following species fall in this group: *Tachys lucosi* Duv. (fig. 2) and *Paederus alfierii* Koch. (fig. 4 j). Hanna (1963) similarly found that the former species came to light at 1c. The same author (1973) pointed out that the largest number of *Cicindela nilotica* Dej. came to light at dusk after which there was a sharp decline towards sunrise. Hanna and Hamad (1975 d) reported that the *Paederus alfierii* was an early flyer.

2. **Species with two peaks of activity:**

The following species belong to this division: *Chaetocnema tibialis* Ill., *Nephus includens* Kirsch., (fig. 2), *Bidessus confusus* Klug., *Drasterius bimaculatus* Rass., *Migneauxia crassiuscula* Aube., *Aphodius lividus* Oliv. (fig. 3), *Oxytelus nitidulus* Grav. (fig. 4), *Gastrallus striatus* Zouf, and *Anthicus crinitus* LaF. (fig. 1). The peaks were observed in subperiod 1a and period six for *C. tibialis, N. includens, B. confusus, D. bimaculatus, M. crassiuscula, A. lividus* and *O. nitidulus;* in subperiod 1a and period five for *G. striatus* and in subperiod 1b and period six for *A. crinitus*. The first and second peaks, which occurred at dusk and at sunrise, may be attributed to light of low intensity. It is interesting to note that the second peak in case of *G. striatus* occurred before sunrise, this may be due to low temperature and high relative humidity. Hanna (1963) found that *Trogophloeus niloticus* Er., showed a release of activity at dusk, this was followed by a sharp decline of activity during the night activity then rose again just before sunrise. Hanna (1973) pointed out that *Cicindela melancholica* F., has two peaks, the first in period one (at dusk) and the second peak in period five.

3. **Species with three peaks of activity:**

This group includes the following species: *Bembidion niloticum* Dej, *Cicindela melancholica* F. (fig. 1), *Tachys fasciatus* Mats., *T. fumigatus* Sch. (fig. 2), *Laccobius leucaspis* Kier. (fig. 3), *Rhyssemus goudati* Hard, *Atheta gregaria* Erich. and *Philonthus quisquiliarius* GyII. (fig. 4). The largest numbers of *T. fasciatus, L. leucaspis* (fig. 3) and *R. goudati* (fig. 4) were observed in subperiods 1a, 1d and period six. Hanna (1963) reported that *T. fumigatus* (fig. 2) has two peaks

of activity. In the present work *C. melancholica* has three peaks occurred in subperiods 1b, 1d and period five. If the two peaks in subperiods 1b and 1d were considered as one peak, in this case *C. melancholica* has two peaks. This result was also observed by Hanna (1973). In *T. fumigatus, A. gregaria* and *P. quisquiliarius,* (fig. 4) the three peaks were observed in subperiod 1a, period three and six, whereas in *B. niloticum* the peaks occurred in subperiod 1a, period four and six.

Comparison of night distribution in two groups:

The night distribution of nineteen species has been compared in two groups (group A and B). In two species (*Tachys lucosi* and *Paederus alfierii*) one peak occurred in group A and two peaks in group B, whereas the reverse number of peaks were observed in six species *C. tibialis, N. includens* (fig. 2), *D. bimaculatus, M. crassiuscula* and *A. lividus* (fig. 3). A single species (*B. confusus*) (fig. 1) showed two peaks in group A and three in group B, while the reverse number of peaks were observed in five species (*B. niloticum,* (fig. 1), *T. fasciatus* (fig. 2), *L. leucaspis* (fig. 3), *C. melancholica* (fig. 1) and *A. gregaria* (fig. 4). Four species (*T. fumigatus* (fig. 2), *R. goudati* (fig. 4), *O. nitidulus* (fig. 4 hi) and *P. quisquiliarius*) (fig. 4) not showed similar night distribution in the two groups. The first peak was observed in subperiod 1a and the second peak at sunrise in the two groups. On the other hand two species (*G. striatus* & *A. crinitus* (fig. 1 bc & ef) have different maximum night distribution in group A and B.

As a matter of fact, no attempt has been made to divide the nights into two or three groups according to the number of periods. The previous authors divided the nights into equal numbers of periods during the time of collections. Hamad (1977) classified the nights into three groups due to distinctive differences in length of nights throughout the whole year, and also to avoid the summation of the catch at sunrise in set B and set C to the six and five periods in set A. The authors believe that Hamad's (1977) method is better, chiefly for species having either bimodal type of activity or with largest numbers at sunrise. Hamad (1977) found that *Arctocorisa heiroglyphica* Duf., (Corixidae) in three groups of nights has bimodal type of activity.

The night distribution on nights of high catches and on nights of low catches:

Seventeen species were chosen to study their night distribution on nights with high and low catches. These species can be divided into the following main groups and were illustrated in figures 5 and 6.

a) Species with the same night distribution on both nights with high and low catches.

This group includes *Aphodius lividus, Oxytelus nitidulus, Philonthus quisquiliarius, Bidessus confusus, Migneauxia crassiuscula, Bembidion niloticum, Laccobius leucaspis* and *Rhyssemus goudati.* The largest numbers of these species occurred in subperiod 1a, while the second peak was observed in period five for the former species and at dawn for *O. nitidulus* and *P. quisquiliarius* in the two groups of nights and on good nights for *B. confusus* and *M. crassiuscula.* On the other hand, the second peak occurred in subperiod 1d for *L. leucaspis* and *R. goudati* on nights of high and low catches, for *B. confusus* and *M. crassiuscula* on nights of low catches, and for *B. niloticum,* it occurred in period four. The third peak occurred at sunrise for the last three species (in this group), on nights with high and low catches and in nights of low catches for *B. confusus* and *M. crassiuscula.*

b) Species with the same night distribution on nights of high catches and with different distribution on nights of low catches:

This group includes, *Tachys fumigatus, T. lucosi, Anthicus crinitus, Chaetocnema tibialis* and

Drasterius bimaculatus. The largest numbers, for the first and second species, occurred in subperiod 1a, then the numbers declined towards sunrise, while in the rest species two peaks were observed in subperiod 1a and at sunrise on nights of high catches. On nights of low catches two species had two peaks, three species had three peaks and one species had four peaks.

c) Species with different night distribution on both nights of high catches and low catches:

This group includes *Paederus alfierii, Gastrallus striatus, Nephus includens, Atheta gregaria* and *Tachys fasciatus*. In *P. alfierii,* one peak occurred on nights of high catches and two on nights of low catches, in *G. striatus* and *N. includens* two peaks were observed in both nights with high and low catches, in case of *A. gregaria* two peaks occured on nights of high catches and three peaks on nights of low catches and in case of *T. fasciatus* three peaks were observed on nights with high catches and four peaks on nights with low catches. Williams (1935) found that on poor nights the captures of all nocturnal insects fell rapidly from a maximum in the first period towards period seven, then a small rise was observed in the last period, while on good nights the captures keep on at a high level till mid-night. After mid-night there is a more definite fall towards the last period.

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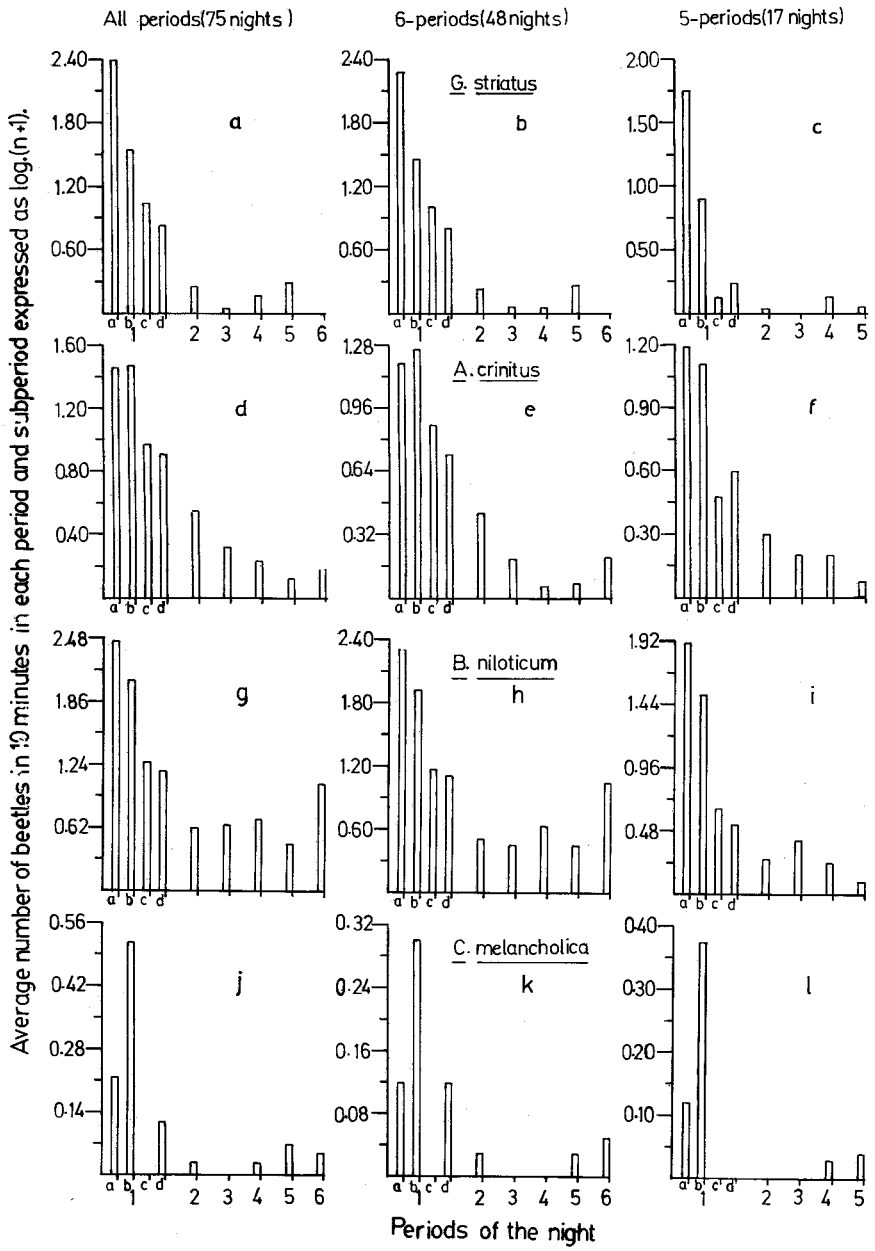

Fig. 1: Night distribution of *Gastrallus striatus, Anthicus crinitus, Bembidion niloticum* and *Cicindela melancholica* over a period of 7 months (March-September 1978).

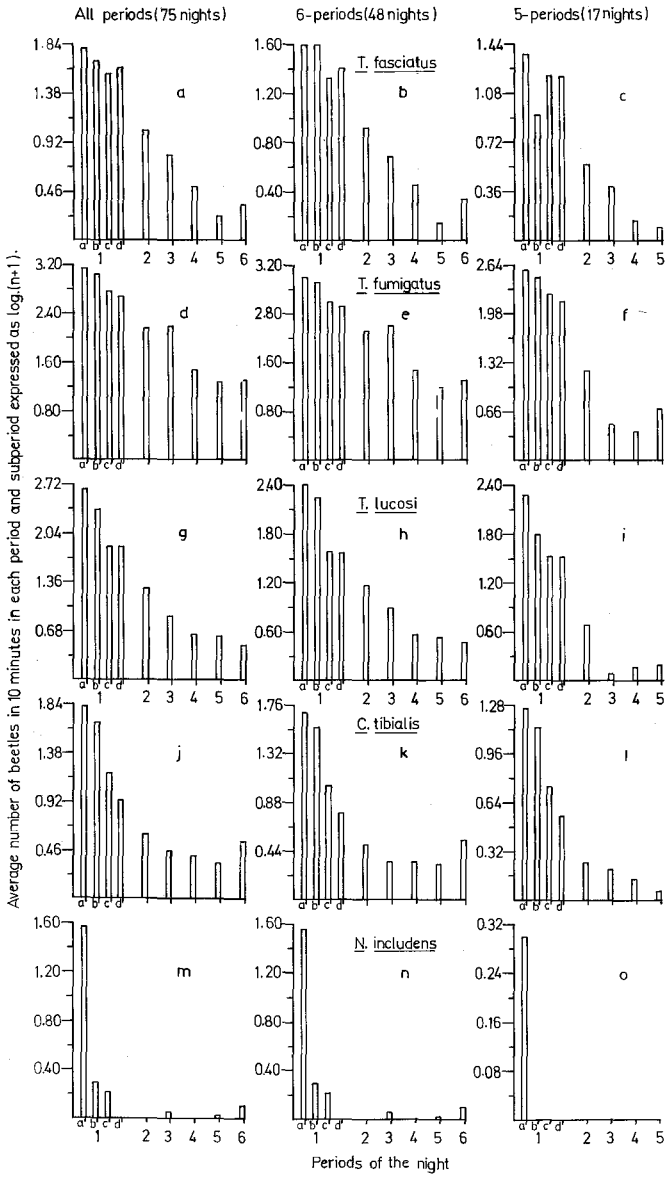

Fig. 2: Night distribution of *Tachys fasciatus, Tachys fumigatus, Tachys lucosi, Chaetocnema tibialis* and *Nephus includens* over a period of 7 months (March-September 1978).

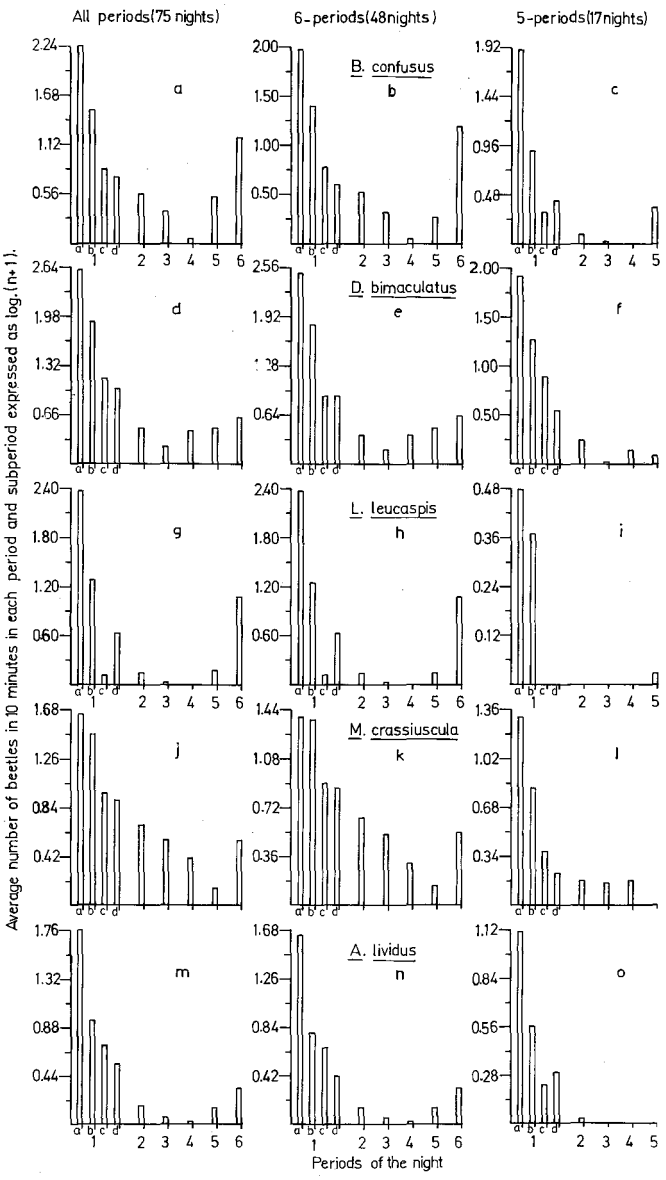

Fig. 3: Night distribution of *Bidessus confusus, Drasterius bimaculatus, Laccobius leucaspis, Migneauxia crassiuscula* and *Aphodius lividus* over a period of 7 months (March-September 1978).

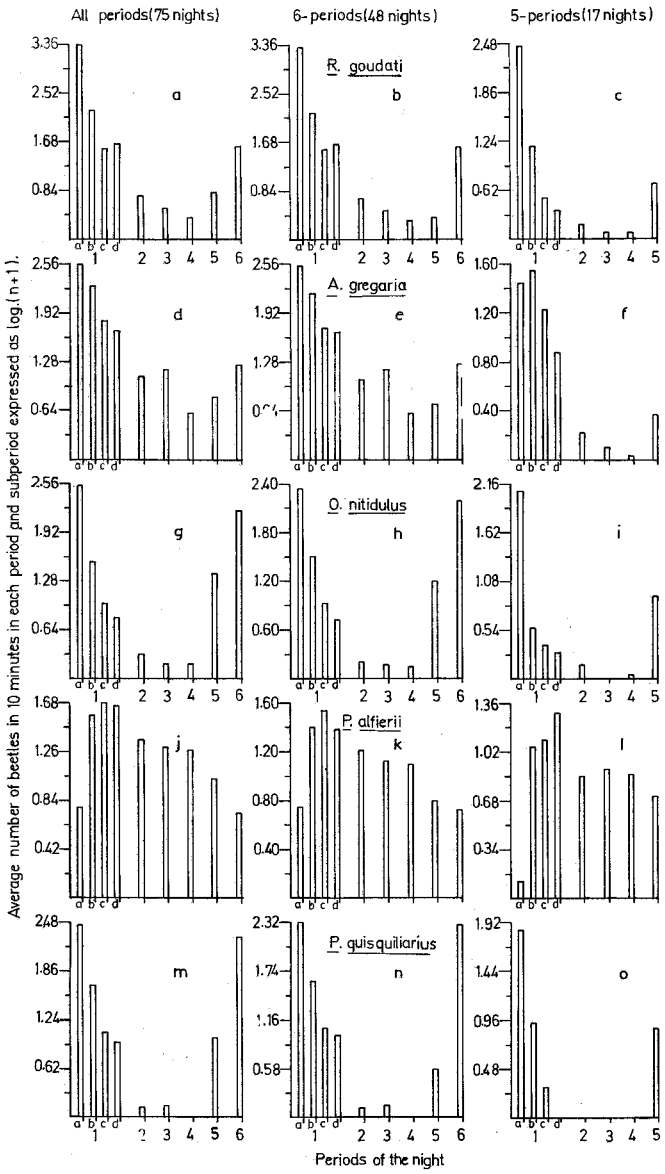

Fig. 4: Night distribution of *Rhyssemus goudati, Atheta gregaria, Oxytelus nitidulus, Paederus alfierii* and *Philonthus quisquiliarius* over a period of 7 months (March-September 1978).

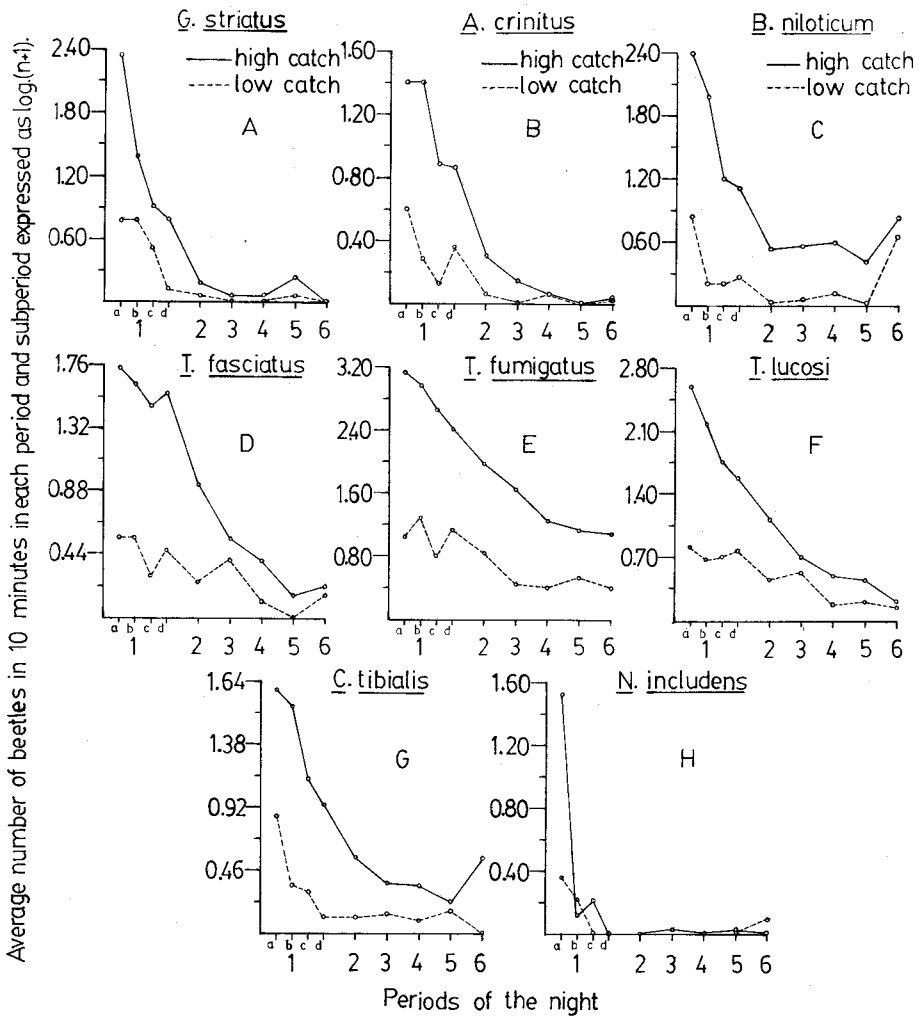

Fig. 5: Average number of *Gastrallus striatus, Anthicus crinitus, Bembidion niloticum, Tachys fasciatus, Tachys lucosi, Chaetocnema tibialis* and *Nephus includens* on nights of high and low catches.

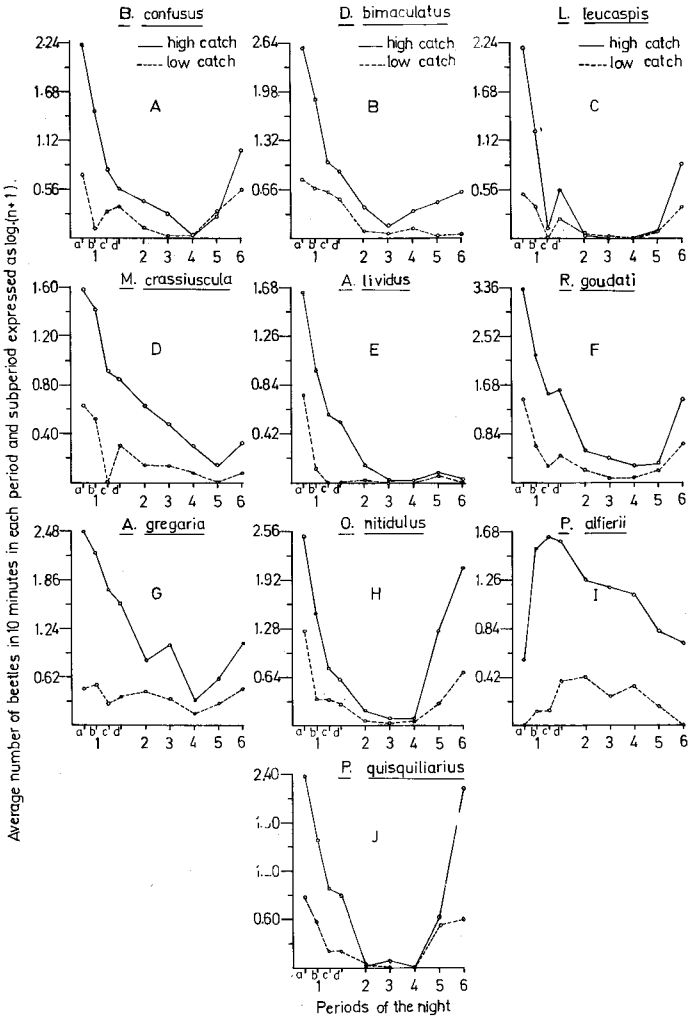

Fig. 6: Average number of *Bidessus confusus, Drasterius bimaculatus, Laccobius leucaspis, Migneauxia crassiuscula, Aphodius lividus, Rhyssemus goudati, Atheta gregaria, Oxytelus nitidulus, Paederus alfierii* and *Philonthus quisquiliarius* on nights of high and low catches.

Table 1

The night distribution of certain species of Coleoptera over a period of 7 months (In 10 minutes in each period and subperiod).

Species	Periods of the night								
	1				2	3	4	5	6
	1a	1b	1c	1d					
G. striatus	241.66	34.68	9.98	5.99	0.82	0.16	0.50	0.93	0.0
A. crinitus	28.65	28.99	8.65	7.32	2.67	1.15	0.73	0.35	0.63
B. niloticum	288.67	113.65	17.64	14.33	3.09	3.41	3.99	2.01	10.52
C. melancholica	0.66	2.32	0.0	0.33	0.08	0.0	0.08	0.17	0.11
T. fasciatus	60.65	45.65	35.33	40.34	10.07	5.31	2.24	0.66	1.17
T. fumigatus	1385.99	1097.99	565.99	467.30	141.25	152.98	30.01	18.68	20.13
T. lucosi	451.64	241.33	71.65	70.33	18.07	6.99	3.32	3.10	2.10
C. tibialis	66.33	47.66	14.33	8.00	3.08	1.83	1.63	1.26	2.67
N. includens	36.33	1.00	0.67	0.0	0.0	0.16	0.0	0.08	0.28
B. confusus	174.31	30.99	5.99	4.72	2.57	1.24	0.16	2.28	14.92
D. bimaculatus	409.52	81.97	13.66	9.32	2.24	0.66	1.91	2.25	3.30
L. leucaspis	240.33	17.99	0.33	3.34	0.42	0.08	0.00	0.49	10.69
M. crassiuscula	42.66	28.02	8.34	7.0	3.99	2.73	1.48	0.41	2.66
A. lividus	54.64	7.64	4.33	2.65	0.48	0.16	0.08	0.41	1.11
R. goudati	2315.30	161.30	35.98	43.65	4.66	2.21	1.40	5.44	37.46
A. gregaria	356.55	184.65	67.40	50.29	11.39	13.98	3.16	5.59	17.15
O. nitidulus	332.0	33.31	8.66	5.32	1.06	0.58	0.57	22.52	158.20
P. alfierii	4.98	35.98	46.48	43.40	21.79	19.58	17.89	9.49	4.40
P. quisquiliarius	279.37	46.98	11.65	8.31	0.32	0.42	0.0	9.48	195.56

Table 2

The night distribution of certain species of Coleoptera in the two groups of the nights (in 10 minutes in each period and subperiod).

Species	Group	Periods of the night								
		1				2	3	4	5	6
		1a	1b	1c	1d					
G. striatus	A	187.10	27.67	9.65	5.33	0.74	0.16	0.17	0.84	0.0
	B	54.65	7.01	0.33	0.66	0.08	0.0	0.33	0.09	—
A. crinitus	A	14.32	16.99	6.66	4.33	1.67	0.57	0.16	0.17	0.63
	B	14.33	12.0	1.99	2.99	1.0	0.58	0.57	0.18	—
B. niloticum	A	209.0	81.99	14.31	12.0	2.25	1.91	3.24	1.74	10.52
	B	79.67	31.66	3.33	2.33	0.84	1.50	0.75	0.27	—
C. melancholica	A	0.33	1.00	0.0	0.33	0.08	0.0	0.0	0.08	0.11
	B	0.33	1.32	0.0	0.0	0.0	0.0	0.08	0.09	—
T. fasciatus	A	37.77	37.77	20.33	24.99	7.41	3.81	1.82	0.41	1.71
	B	22.66	7.34	15.00	15.35	2.66	1.50	0.42	0.25	—
T. fumigatus	A	1005.65	809.00	397.64	333.67	126.17	150.82	28.59	14.74	20.13
	B	380.34	288.99	168.35	133.63	15.08	2.16	1.42	3.94	—
T. lucosi	A	259.64	179.66	37.66	36.66	14.07	6.74	2.83	2.53	2.10
	B	192.00	61.67	33.99	33.67	4.00	0.25	0.49	0.57	—
C. tibialis	A	49.00	34.99	9.67	5.33	2.25	1.25	1.22	1.09	2.67
	B	17.33	12.67	4.66	2.67	0.83	0.58	0.41	0.17	—
N. includens	A	35.33	1.00	0.67	0.0	0.0	0.16	0.0	0.08	0.28
	B	1.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	—
B. confusus	A	95.32	23.99	4.99	3.06	2.33	1.16	0.16	1.92	14.92
	B	78.99	7.00	1.00	1.66	0.24	0.08	0.00	1.36	—
D. bimaculatus	A	325.8	63.98	6.66	6.66	1.41	0.58	1.50	2.00	3.30
	B	83.67	17.99	7.00	2.66	0.83	0.08	0.41	0.25	—
L. leucaspis	A	238.3	16.66	0.33	3.34	0.42	0.08	0.00	0.41	10.69
	B	2.00	1.33	0.00	0.00	0.00	0.00	0.00	0.08	—
M. crassiuscula	A	23.33	22.34	7.00	6.33	3.50	2.31	0.99	0.41	2.66
	B	19.33	5.68	1.34	0.67	0.49	0.42	0.49	0.00	—
A. lividus	A	42.98	4.98	3.66	1.66	0.40	0.16	0.08	0.41	1.11
	B	11.66	2.66	0.67	0.94	0.08	0.00	0.00	0.00	—
R. goudati	A	2032.31	147.65	33.64	42.32	4.08	2.16	1.15	1.32	37.46
	B	282.99	13.65	2.34	1.33	0.58	0.25	0.25	4.12	—
A. gregaria	A	329.32	150.32	51.41	43.65	10.72	13.73	3.08	4.24	17.15
	B	27.33	34.33	15.99	6.64	0.66	0.25	0.08	1.35	—
O. nitidulus	A	210.68	30.65	7.33	4.32	0.65	0.58	0.41	15.25	158.20
	B	122.32	2.66	1.33	1.00	0.41	0.00	0.16	7.16	—
P. alfierii	A	4.65	25.66	33.82	22.65	15.78	12.58	11.48	5.32	4.40
	B	0.33	10.32	11.66	18.75	6.01	7.00	6.41	4.17	—
P. quisquiliarius	A	209.03	39.32	10.66	8.31	0.32	0.42	0.00	2.90	195.56
	B	70.34	7.66	1.00	0.00	0.00	0.00	0.00	6.58	—

Table 3
The night distribution of certain species of Coleoptera on nights with high and low catches over a period of 7 months (in 10 minutes in each period and subperiod)

	Number of nights	Catch	Periods of the night								
			1				2	3	4	5	6
			1a	1b	1c	1d					
G. striatus	13	high	224.33	24.34	7.31	5.33	0.58	0.16	0.17	0.76	0.0
	11	low	4.99	5.34	2.34	0.33	0.16	0.0	0.0	0.17	0.0
A. crinitus	14	high	24.33	24.33	6.66	6.33	1.00	0.41	0.16	0.0	0.13
	11	low	2.99	0.99	0.33	1.33	0.17	0.0	0.17	0.0	0.08
B. niloticum	18	high	257.35	100.0	14.99	12.01	2.59	2.75	2.99	1.67	7.16
	17	low	6.00	0.66	0.66	0.99	0.08	0.16	0.41	0.08	3.66
T. fasciatus	17	high	54.99	42.22	30.33	35.34	7.82	2.66	1.58	0.49	0.67
	16	low	2.66	2.67	1.00	2.00	0.83	1.57	0.33	0.0	0.50
T. fumigatus	18	high	1312.98	967.67	451.99	260.66	95.17	45.58	17.74	12.51	11.65
	18	low	10.34	19.66	5.67	12.97	6.49	1.91	1.59	2.50	1.70
T. lucosi	18	high	412.99	146.62	54.33	36.68	12.65	4.16	2.16	1.92	0.67
	18	low	5.33	3.66	4.33	5.00	1.84	2.08	0.50	0.68	0.43
C. tibialis	17	high	58.34	46.34	13.00	7.67	2.59	1.34	1.23	0.76	2.67
	15	low	6.32	1.32	1.00	0.33	0.33	0.41	0.24	0.50	0.0
N. includens	9	high	33.34	0.33	0.67	0.0	0.0	0.08	0.0	0.08	0.0
	5	low	1.33	0.67	0.0	0.0	0.0	0.0	0.0	0.0	0.28
B. confusus	18	high	163.66	27.66	4.99	2.64	1.66	0.91	0.08	0.84	9.00
	18	low	4.32	0.33	1.00	1.41	0.32	0.08	0.08	1.09	2.69
D. bimaculatus	18	high	392.35	77.31	9.32	7.00	1.67	0.50	1.33	2.17	3.20
	14	low	5.17	3.66	3.34	2.32	0.24	0.16	0.41	0.08	0.10
L. leucaspis	13	high	156.67	16.66	0.33	2.67	0.08	0.00	0.00	0.25	6.35
	8	low	2.33	1.33	0.00	0.67	0.17	0.08	0.00	0.24	1.38
M. crassiuscula	15	high	37.66	25.69	7.00	6.00	3.33	2.07	1.08	0.41	1.13
	15	low	3.33	2.33	0.00	1.00	0.41	0.41	0.24	0.00	0.20
H. lividus	17	high	44.29	8.31	3.00	2.32	0.40	0.08	0.08	0.25	0.11
	9	low	4.65	0.33	0.00	0.00	0.08	0.00	0.00	0.16	0.00
R. goudati	20	high	2067.34	148.32	30.66	37.99	2.41	1.67	0.96	1.17	26.6
	19	low	25.32	3.33	0.99	2.00	0.67	0.25	0.25	0.59	3.71
A. gregaria	21	high	300.31	162.32	54.00	35.98	5.83	9.90	1.08	2.83	10.83
	19	low	2.00	2.33	0.99	1.32	1.73	1.24	0.49	0.92	2.00
O. nitidulus	20	high	307.34	28.99	5.00	2.99	0.57	0.25	0.24	16.84	126.74
	18	low	16.66	1.33	1.33	1.00	0.16	0.08	0.16	1.01	4.17
P. alfierii	18	high	2.66	34.00	41.83	39.50	17.50	14.59	12.50	5.66	4.31
	17	low	0.00	0.33	0.33	1.41	1.75	0.83	1.23	0.50	0.00
P. quisquilarius	20	high	232.34	38.33	8.66	6.99	0.08	0.25	0.00	3.25	169.34
	18	low	6.67	2.66	0.66	0.66	0.16	0.00	0.00	2.47	3.07

التوزيع الليلي لأنواع غمدية الأجنحة الليلية بأستخدام حصيلة بمصيدة ضوئية في قنا

نور الدين فرغلى حمد ومحمد زكى يوسف على

التوزيع الليلي لتسعة عشر نوعا درس أولا خلال مدة الدراسة فوجد الآتى :

- أنواع ذات موجة نشاط مبكرة إشتملت هذه المجموعة على نوعين فقط .
- أنواع لها موجتان من النشاط وقد نوقش أثر شدة الضوء الخافت والحرارة والرطوبة على نشاط طيران هذه المجموعة إشتملت هذه المجموعة على تسع أنواع .
- أنواع لها ثلاث موجات نشاط خلال فترات الليل المختلفة .إشتملت هذه الحالة على ثمان أنواع

قسم الليل على أساس عدد الفترات الى المجموعتين وذلك لتفادي تداخل الفترة الأخيرة في المجموعة الثانية مع قبل الأخيرة في الأولى واتضح الآتى من هذه الدراسة :

- أنواع لها موجة نشاط في المجموعة (أ) وموجتان في المجموعة (ب) وهذا القسم شمل نوعان بينما حدث عكس ذلك في أربع أنواع .
- أنواع لها موجتا نشاط في المجموعة أو موجة واحدة في المجموعة ب وهذه المجموعة شملت نوع واحد بينما حدث العكس في خمس أنواع .
- أنواع لها نفس عدد موجات النشاط في المجموعتين وهذه المجموعة إشتملت على أربع أنواع
- أنواع لها نشاط مختلف في كلا المجموعتين وهذا القسم إشتمل على نوعان فقط

ثمانية عشر نوعا اختيرت لدراسة الحصيلة في الليالى الكثيرة العدد والليالي القليلة العدد وهذه الأنواع قسمت في ثلاث مجموعات :

- أنواع لها نفس التوزيع الليلي في الليالي الكثيرة العدد وكذلك القليلة العدد . وهذه المجموعة مثلت بثمان أنواع .
- أنواع لها نفس التوزيع الليلي في الليالي الكثيرة العدد واختلاف في الليالي القليلة