

FIELD STUDIES ON THE FORAGING POPULATIONS AND CASTE COMPOSITION OF SAND SUBTERRANEAN TERMITE *Psammotermes hybostoma* (DESNEUX) IN EL-KONOOZ REGION, QENA GOVERNORATE

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ABSTRACT

The obtained data from the used Poly Vinyl Chloride is a sermo plastic polymer (P.V.C.) traps which contained the corrugated card board represented the food source of subterranean termite, revealed that, the foraging population mostly differs according to season of year. Where, the minimum number of foraging population occurred in January.(1676) individuals. While, the maximum one were represented two peaks (9644 and 12357) individuals during April and August. The foraging population was decreased thought out May and June then decline in July then decreased gradually started from September to reach December. In general, 70913 individuals were collected from 280 m² all over the year with an average of 21.1 individuals/m² or 88641.24 individuals as estimated number / feddan. The general average of caste composition were 77.62, 13.96, 4.50 and 3.91% for workers, nymphs, Soldiers and winged adults, respectively. The total number of workers and soldiers were 58238 individuals. The total number of soldiers were 3193 represented 57.82% of all individuals. These numbers were collected from 235 P.V.C. traps represented 247.82 individuals per trap.

Keywords: Caste composition, population, foraging, Subterranean termites , traps.

INTRODUCTION

Ecological studies on the subterranean termites in arid regions are scares. The absolute density of subterranean termite populations in any particular habitat had not been reliably. Relative density, caste composition and foraging activity of subterranean termites have been studied by different methods, wooden stakes and wood blocks (Jones *et al.*, 1990), toilet paper rolls (Lafage *et al.*, 1973 and Said 1979) corrugated card board rolls (Lafage *et al.*, 1983; El-Sebay, 1991; Ahmed, 2003 and El-Bassyouni,2001). Sand subterranean termite, *Psammotermes hybostoma* (Desneux) (Fam. Rhinotermitidae) is considered as a great economic importance in Egypt. It is cause a great damage to the rural buildings constricted with mud bricks as well as furniture and farmed wood within new buildings (Ahmed, 2008). This species is a widely dispersed all over the two sides of the River Nile and all Oases in both Eastern and Western deserts (Rizk *et al.*, 1985). Such methods which carried out in the same arid grass land have given a good results such as Saudi Arabi (Badawi *et al.*, 1985) and in Egypt (Hosny and Said, 1980). Qena Governorate is one of the most infested localities with subterranean termites. The present investigation is an attempt to study the foraging populations and caste composition for this species under Qena conditions.

MATERIALS AND METHODS

Experiments were carried out in El-Konooz region, Qena Governorate from January 2009 to December 2009. The method devised to observe foraging population involved declining the dead wood from ground, where, all superficial and partially buried dead debris were removed from chosen area (280 m²) to prevent any nutrient interferences with the applied traps. Forty rolls of corrugated card board were prepared in the laboratory of Termite research in Plant Protection Research Institute where wrapped in roll shape (10 cm high and 5-7 cm in diameter). Each roll of corrugated card board was placed inside perforated Poly Vinyl Chloride P.V.C. can (12 cm high and 5-7 cm in diameter) and sent to the experimental area. Tarps were distributed all over the area and arranged as 4 columns and 10 rows with 2 m intervals between each ones. Traps were wetted with water and closed with plastic cover before buried in holes (12 cm depth in soil, the plastic cover of traps was appeared at the same level of soil surface and numbered for a marking sign of traps. Rolls of corrugated card board were served as food source of cellulose material and humidity which attracted the subterranean termite to the soil surface. To check for subterranean termite foraging population, each trap was removed from its hole, shaken into a plastic container to remove all individuals of subterranean termite handing to the bottom and inside of the trap and transferred to the laboratory in Plant Protection Department, Faculty of Agriculture, South Valley University. Individuals of subterranean termite were counted by using a fine brush, sorted into castes and identified. Each roll trap was then placed back to its hole, severely attacked traps were replaced by new ones. After month of collecting insects was kept for each trap involved the number of workers, nymphs, soldiers, and winged adults and the average number of soldiers per 100 workers were calculated. (Solders / Workers ratio).

RESULTS AND DISCUSSION

Data in Table (1) and Fig (1) show that, the foraging populations of sand subterranean termite, *P. hybostoma* increased gradually from Jan. and its peak (9644 individuals) in April then started decline during May and Jun, then increased again from July to reach the highest peak (12357 individuals) in August, then declined gradually during the remaining months. Ghoniemy *et al.*, (1999) in El-fayoum, found that, the foraging activity of *Anacanthotermes ochraceus* (Burmeicter) increased gradually from January to reach its peak (1289 individuals) in April then decreased sharply to disappear in June and increased again in the subsequent two months, decreased in September then increased gradually during the remaining months. El-Bassyouni (2001) in Ismailia, mentioned that the largest individuals of foraged workers of *P. hybostoma* were during winter season, while the least one was during summer season. Ahmed (2007) stated that the population activity of *P. hybostoma* in Nubaria region had three peaks. The highest peak was in March with (3745 individuals). The moderate peak was in October with (2687

individuals) and the lowest peak was in May with (2492 individuals). Data in Table (1) showed that, in general (70913) individuals were collected from (280 m²) all over the year with an average of 21.1 individuals /m² or (88641.24) individuals as estimated number / feddan. El-Sebay (1993) found that 158984 individuals of *A. ochraceus* were collected from 936 m² during the year with an average (14.2) termite / m² or (59448.2) termite / feddan. Ahmed (2003) mentioned that, 169538 individuals was collected from 30 traps of the experimental area 250 m² all over the year with an average 678.33 individuals /m² or 2848994 individuals as estimated number / feddan. According to Table (1) and Fig.(2), the general average of caste composition were 77.62, 13.96, 4.50 and 3.91% for workers, nymphs, soldiers and winged adults respectively. The percentage was fluctuated through out the year, the highest percentage of workers 85.02 occurred during October and followed by 84.18% during March, while the least percentage was 68.41% during August. The highest percentage of nymphs 19.63% during September and followed by 19.09% during August, while the least percentage was 7.55% during May. The highest percentage of soldiers 9.36% occurred during December and followed by 7.34% during January, while the least percentage was 3.57% during May. The highest percentage of winged adults 7.89% occurred during August and followed by 6.64% during May, while the least percentage was 0.0% through out Jun and July. Ahmed (2003) found that, the cast composition of *A. ochraceus* was 71.32, 28.02, 0.56 and 3.91 % for workers, nymphs, soldiers and winged adults, respectively.

Table (1): Number and percentage of Foraging population of sand subterranean termite *P.hybostoma* from January 2009 to December 2009 at El-Konooz region Qena Governorate.

Inspection date	Number of foraged subterranean termite <i>P. hybostoma</i>									
	Workers caste		Nymphs caste		Soldiers caste		Winged adults		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
January	1286	76.73	214	12.76	123	7.37	53	3.16	1676	2.36
February	2129	77.81	369	13.36	119	4.31	145	5.24	2762	3.89
March	5482	84.18	612	9.39	253	3.88	165	2.53	6512	9.18
April	7641	79.23	1285	13.32	427	4.43	291	3.01	9644	13.59
May	4527	82.21	416	7.55	197	3.57	366	6.64	5506	7.76
June	3180	79.95	593	14.91	204	5.13	0	0.0	3977	5.61
July	6926	81.79	1146	13.53	396	4.67	0	0.0	8468	11.94
August	8453	68.41	2360	19.09	569	4.60	975	7.89	12357	17.42
September	7198	71.26	1983	19.63	373	3.69	546	5.41	10100	14.24
October	4375	85.02	439	8.53	218	4.24	114	2.21	5146	7.25
November	2358	82.36	297	10.37	136	4.75	72	2.51	2863	4.03
December	1490	78.33	189	9.94	178	9.36	45	2.36	1902	2.68
Total	55045	77.62	9903	13.96	3193	4.50	2772	3.91	70913	

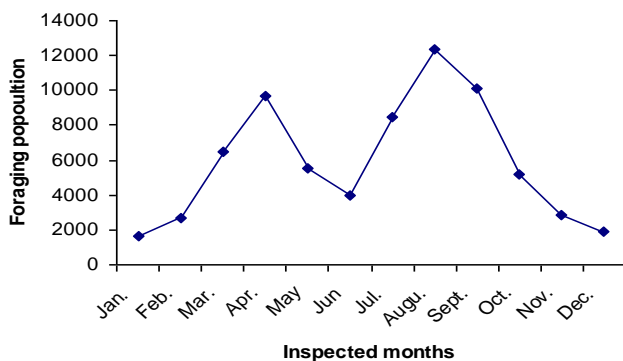


Fig. (1): Foraging population of sand subterranean termite, *P. hybostoma* at El-Konooz region Qena Governorate.

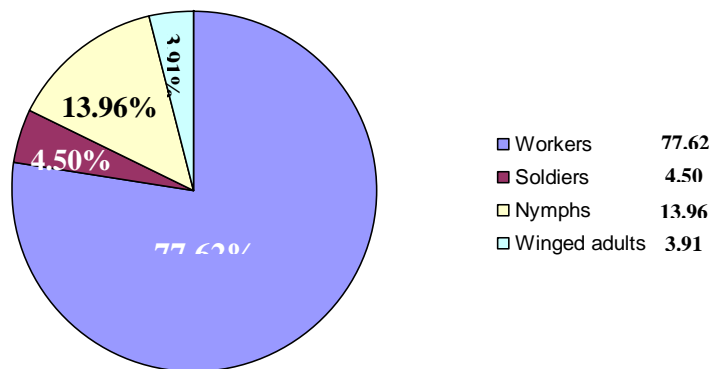


Fig. (2): Ratio of caste composition of *P. hybostoma* at El-Konooz region, Qena Governorate from January to December 2009.

The obtained data in Table (2) showed that the total number of workers and soldiers were 58238 individuals, The total number of soldiers were 3193 represented 57.82% of all individuals. These numbers were collected from 235 p.v.c. traps represented 247.82% individuals per trap. The number of individuals termite per trap in this study was higher than those recorded previously by Badawi *et al.* (1985) who found that, the ratios of 26.4% and 16.4% were recorded for *Amitermes* sp. While the lower ratio of 6.2% was recorded for *Anacanthotermes* sp. Ahmed (2008) showed that, the ratio of soldiers /1000 worker of *P. hybostoma* reached 14.20% and 13.47% in two regions.

Table (2): Dispersal, number of individuals termite per trap and the ratio of soldiers/1000 worker of *P.hybostoma* during January to December 2009.

Subterranean termite Species	Number of Workers & Soldiers	Number of Soldiers	Number of attracted traps	Subterranean termite individuals per trap	Soldiers /1000 Workers
<i>P. hybostoma</i>	58238	3193	235	247.82	57.82

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دراسات حقلية على تعداد السروح و تركيب المستعمرة لنمل الرمال تحت الأرضي
Psammodermes hybostoma (Deseneux) بمنطقة الكنوز
بمحافظة قنا

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إستهدفت هذه الدراسة التعرف على تعداد السروح وايضا" تركيب المستعمرة لنوع نمل الرمال تحت الأرضي (*Psammodermes hybostoma*(Deseneux) وقد بينت النتائج المتحصل عليها من خلال إستخدام مصادد p.v.c. والمطعمه بالكرتون المضلع والذي يمثل مصدر رئيسي لغذاء الحشرات أن تعداد السروح لهذا النوع يختلف خلال مواسم العام حيث سجل اقل تعداد في يناير (1676) فرد بينما كانت هناك قمتين لتعداد السروح (9644 و 12357) فرد في إبريل وأغسطس ثم حدث إنخفاض لهذا السروح خلال مايو ويونيو ثم حدثت زياده في يوليو اعقبه إنخفاض تدريجي بدايه من سبتمبر الى ديسمبر .
كما اظهرت النتائج ان التعداد الكلى لافراد النمل السارحه والمنجذبه لعدد 40 مصيده في مساحة 280 متر مربع هو (70913) فرد ، ووصلت كثافة الافراد الى متوسط 21.1 فرد لكل متر مربع (100 و 21 فرد/كم²) او عدد 88641.24 فرد لكل فدان . والنسبه العامه لتكوين المستعمرة كانت ممثله ب 77.62% لطانفة الشغالات 13.96% لطانفة الحوريات 4.50% لطانفة الجنود 3.91% لطانفة الافراد الخصيه المجنحه على الترتيب .وقد تم تقدير متوسط تعداد النمل ب 247.82 فرد لكل مصيده ومتوسط تعدد الجنود لكل 1000 شغاله يمثل 57.82 جندى .

قام بتحكيم البحث

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