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POPULATION DYNAMICS AND REPRODUCTION ASPECTS OF THE NILE RAT, *ARVICANTHIS NILOTICUS*

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Abstract

Population dynamics, maturity status , sex ratio and female and male conditions of the Nile rat , *A. niloticus* were studied during 1988-1989 in Minia governorate . The adults of the Nile rat appeared more abundant than juvenile individuals during the whole year. Mean numbers of entrapped inidividuals of both stages of the nile rat and their relative percentages recorded in winter, summer, autumn and spring were : 42 individuals and 29.6 %, 43.7 individuals and 28.5%, 48.7 individuals and 30.6% , and 55.3 individuals and 35.8%, respectively . There was no significant difference between the numbers of females and males of *Arvicanthis niloticus* . Pregnant females were found from February to November . Mean of featus per female had a positive correlation with percent of pregnant females. Potent males were found for nearly the whole year which corresponds with the pregnancy cycle of females . Spring and autumn were more suitable for the Nile rat reproduction than summer and winter seasons.

INTRODUCTION

Rodents , in their relation to man , are classified according to Baltzard (1966) to domestic, commensal, field and wild species. Domestic rodents are those which rest in human habitations consuming his food and waste products. Commensal species live in the vicinty of his dwellings but still consume his food and wastes . Field rodents rest in cultivated fields from which they feed. Wild species live away from man , actually avoiding him and feeding on wild plants. This view was confirmed in

Egypt by Arafa (1968) and Salit (1972).

In the present study maturity status, sex ratio and female and male conditions of the Nile rat, *A. niloticus* were studied for a whole year in Abu Qurkas district, Minia governorate.

MATERIALS AND METHODS

Monthly collection of rodents extended for a year that started from the beginning of March 1988 until the end of February 1989 in Abu Qurkas district, Minia governorate. Samples were taken from wheat , sugar cane and bean fields in winter season, and from soya bean , sugar cane and maize fields in summer season, by trapping 50 snap traps for three successive nights. Trapping was repeated four times at the same time in four separated areas of 2 feddans each . Positive snap traps were collected twice daily at 7 a.m. and 6 p.m. Entrapped rodents were counted, classified (to species, subspecies) , sexed and dissected for recording pregnancy , and number of embryoes per female. Males were considered to be participating in reproduction activity if they had scrotal testes (Rao 1977). Mean testes size of mature male was measured in mm. Status of maturity was recorded. Entrapped rodents were categorized into two age classes according to their body weight. Percent of each group in the total population was estimated monthly and seasonally.

RESULTS AND DISCUSSION

Data in Table 1 show that numbers of adult individuals exceeded those of juveniles for a whole year. Omar (1977) pointed out that immature stage and females were restricted to their burrows during winter to avoid low temperature . Asran *et al.*, (1989) stated that the number of young animals of *A. niloticus* per burrow were low in January and high in October.

Mean number of entrapped individuals of the nile rat and its relative percent-

Table 1. Entrapped rodents, age classes , sex ratio and female and male conditions of the Nile rat, *A. niloticus* in Abu Qurkas district, Minia governorate

	Total No. of entrapped rodents (3 nights/50 traps 4 places	No. and age classes of *A. niloticus*				Sex ratio	Female Condition			Male Condition	
		Total	Relative Adult		Juvenile	♀ ♂	Total No. of females	Pregnant	Mean of featus/ female	Total No of Male	Mean of Testes size in mm.
		NO	%	%	%						
March	147	50	34.0	54.0	64.0	1.1 : 1	26	33.3	9.1	24	25.5
April	162	64	39.5	68.8	31.2	1.2 : 1	35	48.3	10.5	29	24.4
May	154	52	33.8	67.3	32.7	1 : 1	26	7.7	7.0	26	21.7
Spring	154.3	55.3	35.8	63.4	36.6	1.1 : 1	29.0	29.8	8.9	26.3	23.9
June	156	45	28.8	71.1	28.9	1 : 1	23	9.1	8.5	22	21.9
July	150	43	28.7	58.1	41.9	1.4 : 1	25	5.6	7.2	18	22.1
August	154	43	27.9	55.8	44.2	1.3 : 1	24	15.8	7.3	19	20.6
Summer	153.3	43.7	28.5	61.7	38.3	1.2 : 1	24.0	10.2	7.7	19.7	21.5
September	158	48	30.4	77.1	22.9	1.3 : 1	27	57.1	9.5	21	26.1
October	153	45	29.4	68.9	31.1	1 : 1	23	22.7	9.0	22	21.3
November	166	53	31.9	50.9	49.1	1 : 1	27	23.1	8.5	26	17.2
Autumn	159.0	48.7	30.6	65.6	34.4	1.1 : 1	25.7	34.3	9.0	23	21.5
December	160	48	30.0	66.0	34.0	1.2 : 1	26	0.0	0.0	22	10.5
January	124	32	25.8	65.6	34.4	1.3 : 1	18	0.0	0.0	14	10.3
February	140	46	32.9	67.4	32.6	1.3 : 1	26	15	7.5	20	19.0
Winter	141.3	42	29.6	66.3	33.7	1.3 : 1	23.3	5.0	6.6	18.7	13.3

ages in winter, summer ,autumn and spring were 42 individuals and 29.6% , 43.7 inividuals and 35.8% , respectively . Mourad (1972) reported that the pattern of seasonal and monthly fluctuation of rat index in various species was mainly attributed to the dominant species in the concerned area. Abdel - Gawad (1972) indicated that *A. niloticus* was the dominating species in cultivated areas.

Male-female ratio ranged between 1: 1 and 1:1.4. The abundance of females during certain periods of the year coincided with the breeding season when females tended to stay in burrows. Males however , were charcacterized by marked activity outside burrows.

Percentages of pregnant females were 5.0%, 10.2% , 29.8% 34.3% from winter , summer spring and autumn, respectively . Pregnant females started to appear in February to November, then declined thereafter (Table 1) . Mean of featus per female had a positive correlation with percent of pregnant females.

Mean of testes size of the mature male in winter, autumn, summer and spring seasons were 13.3, 21.5. 21.5 and 23.9 mm., respectively. Potent (fertile) males were found during nearly the whole year corresponding with the pregnancy cycle of females . The numbers of fertile males and pregnant females ran parallel to each other throughout the year.

It was apparent that spring and autumn were more preferable for the Nile rat reproduction than summer and winter . Mourad (1972) and Asran *et al* ., (1985) showed that the highest rat index for *A. niloticus* was in autumn and spring with two peaks , whereas the lowest occurred during winter and summer. Seal and Bangerji (1966) reported that rats breed throughout the year and yet there might be a special breeding season when a maximum number of offspring was generally born.

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التذبذبات العددية وخصوبه فأر الحقل *A. niloticus* بمحافظة المنيا

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معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقي

أجريت تجارب حقلية بمحافظة المنيا في عام ١٩٨٨ – ١٩٨٩ لدراسة التذبذبات العددية والنسبه الجنسية والخصوبة في فأر الحقل. أوضحت النتائج المتحصل عليها ما يلي :

– أن نسبه الأفراد البالغه للفأر النيلي كانت أعلي من الأفراد الغير بالغة خلال العام.

– متوسط أعداد الفأر النيلي ونسبتها المئوية في مواسم الشتاء والصيف والخريف والربيع كانت (٤٢ فرد ، ٢٩,٦٪) ، (٤٣,٧ فرد ، ٢٨,٥٪) (٤٨,٧ فرد ، ٣٠,٦ ٪) ، (٥٥,٣ فرد ، ٣٥,٨٪) علي التوالي .

– لم تكن هناك فروق واضحه بين أعداد إناث أو ذكور الفأر النيلي .

– وجدت الإناث الحوامل في الفتره من فبراير حتي نوفمبر.

– يوجد إرتباط موجب بين متوسط أعداد الأجنة للأنثي الواحده ونسبه الإناث الحوامل.

– كانت الذكور لها حيويه طوال العالم تقريباً متمشية في ذلك مع فترات حمل الإناث.

– وبوجه عام كان الربيع والخريف أكثر ملائمة لتكاثر الفأر النيلي عن موسمي الصيف والشتاء.