

Density of commensal rodent species in Baghdad area

Raad Hammodi Hasson

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BY

Raad Hammodi Hasson

College of Medicine/University of Diyala

Abstract

Commensal rodents are important medically & economically in human life. Estimation of commensal rodent species densities in districts of Baghdad area. Baited trap/night method campaign lasted about 4 months in 1988; density equation & soft ware statistical analysis programs were applied. Density means were  $30.16 \pm 4.2$ ,  $2.067 \pm 0.989$ ,  $0.695 \pm 0.548$  &  $32.92 \pm 4.18$  for *Rattus norvigeus*, *Rattus rattus*, *Mus musculus* & the sum means of rodents respectively; Only *Rattus norvigeus* & the sum of means have normal distribution (A-D normality test). *R. norvigeus*, *R. rattus*, *M. musculus* & the sum of means, in addition to the negative Correlations between the three species were not significant at 0.05 levels respectively. Differences between *R. norvigeus* and each of *R. rattus* & *M. musculus* or between *R. rattus* & *M. musculus* density means were significant at 0.05 level; where the *R. norvigeus* mean was the highest. Species densities varies among Baghdad's districts, where the *R. norvigeus* mean was the highest then *R. rattus* & finally *M. musculus*. Given parameters are useful for rodents control and minimizing its transmissible diseases.

**Keywords:** Rodent, density, Baghdad.

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### Introduction

There is no real estimation to the number of rodent groups in Iraq; Order Rodentia Contains 30 families with 1700 species plus large no. of subspecies ; the commensal rodents *Rattus rattus* ,*R. norvegicus* & *M. musculus* , existed in Iraq principally with another 23 species belong to 17 genera attributed to 7 families [1] ; Geographically distribution issue of rodent species needs more studies & researches [2] ; In addition to its healthy as a source of zoonotic diseases[3] & economic importance [1] .

The present study is a detailed follow up for the collection of rodent species in Baghdad area during years 1988 – 1990 ; observations based on records of Baghdad endemic diseases department/ Ministry of health . The author is not aware of any other work on the density & distribution of rodents species in various districts of Baghdad area.

### Materials & Methods

The trap/night method used in residential randomly selected blocks districts for at least 5 successive days ; Traps installed at night in at least 50 houses / district with an average distance of 10 – 15 meter between each trap , then collected next day morning . Test time interval implemented early 1988 & lasted about 4 months in the 21 districts chosen randomly in east side of Tigris river e.g. Saadon , Aljamuriya , Abunoas etc. and in west side of Tigris river e.g. Kadhmiya, Karama etc.. .

The equation for density % was used according to Kadhim. [2]:

$$\text{No. of total captured animal} * 100$$

$$\text{Density} = \frac{\text{No. of total captured animal} * 100}{\text{No. of traps} * \text{No. of nights}}$$

$$\text{No. of traps} * \text{No. of nights}$$

Al Mosawi [4] key was used for identify rodents species that collected during research. Statistical analysis tests ( T. test ; Normality test ; charts etc. ) was performed using Minitab 15 [ 5] & Spss 16 [ 6 ] programs soft ware packages .

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Results

The sum of species densities means  $32.92 \pm 4.18$  was not significance A- D normality test  $p > 0.05$  ( $p 0.346$ ), i.e. we accept  $H_0$  that it has normal distribution; the results revealed that mean density of each species were  $30.16 \pm 4.2$ ,  $2.067 \pm 0.989$  &  $0.695 \pm 0.548$  for *R. norvigecus*, *R. rattus* & *M. musculus* respectively, but A- D normality not significance  $p > 0.05$  ( $p 0.344$ ) only for *R. norvigecus* in the all 21th. districts i.e. we accept  $H_0$  that *R. norvigecus* has normal distribution. table (1), fig. (1) & (2). Highest species density means of *R. norvigecus* (50) observed in Saadon; then *R. rattus* (5.8) in Aljamuriya; *M. musculus* (4.8) in Adhmyia in east side river districts; while *R. norvigecus* reached (42) in Karama then *R. rattus* (2) in Kadhmyia; then *M. musculus* (1.1) in Karama in the west side river districts. table (1). Lowest species density means obtained for *R. norvigecus* was (15.3) in Abunoas; while *R. rattus* (0) in 5 districts; and for *M. musculus* (0) in 12 districts in east side river. Regarding west side river districts, the lowest species density means recorded

**Table (1) : Density means of *Rattus norvigecus*, *Rattus rattus*, *Mus musculus* & the sum of means.**

city	<i>R.norvigecus</i>	<i>R. rattus</i>	<i>M. musculus</i>	Sum
aljamhuryia1	34.2	4.4	0	38.6
abunoas1	40	5	0	45
abunoas2	15.3	2.7	0	18
aljamhuryia 2	20	5.8	0	25.8
aljamhuryia 3	25.1	2	1.5	28.6
kefah1	30.1	0	0	30.1
aljamhuryia 4	20	0	0	20
kefah2	21	5.8	0	26.8
karada	32.8	0	0	32.8
kelani	49	3.2	0	52.2
saadon	50	0	0	50
adhmyia1	27	3	3	33
adhmyia2	29.1	4.9	0	34
adhmyia3	29.6	0	4.8	34.4
khalij	35	3.6	0	38.6
karama1	32.2	0	0.8	33
karama2	42	1	1.1	44.1

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khulod2	27	0	0.7	27.7
khulod1	23	0	0.9	23.9
karama3	28	0	0.8	28.8
Kadhmyia	23	2	1	26
Sum	633.4	43.4	14.6	691.4
mean	30.16	2.067	0.695	32.92

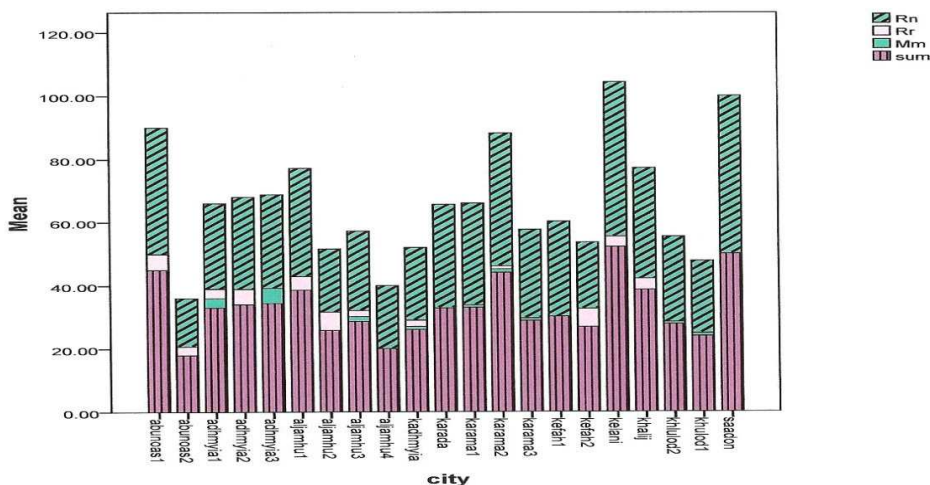


Fig (1) show means of 3 rodent species & sum of means

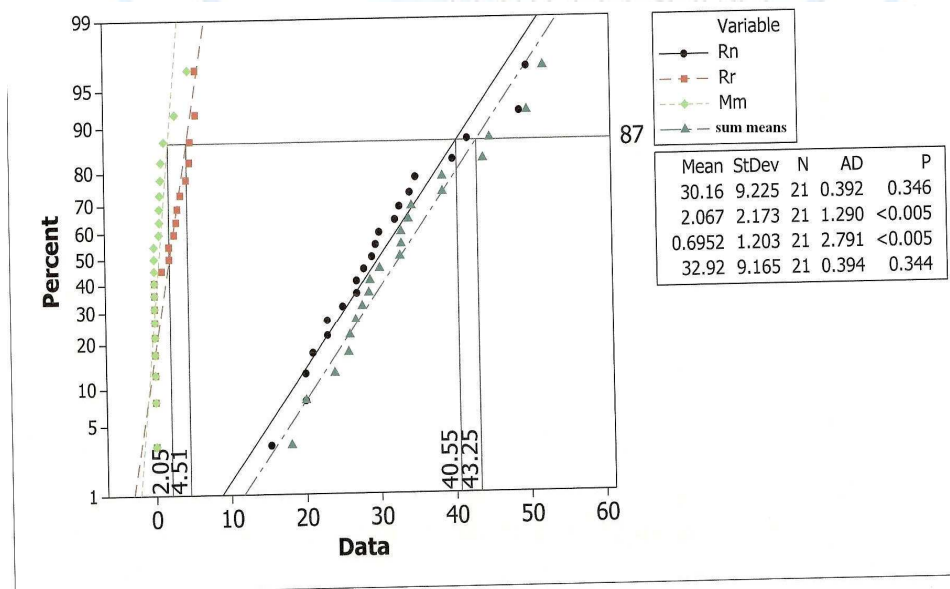


Fig.(2) show normality of 3 rodent species & sum of means.

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for *R. norvigecus* was (23) in two districts & for *R. rattus* ( 0) in four districts then *M. musculus* ( 0.8) in two districts. table (1).

One sample T . test showed that all means of densities were not significant  $p < 0.05$ , i.e. we have insufficient evidence to show that the true means of densities are not those reported in this study. table (2) .

Paired samples T . test showed significant  $p > 0.05$  differences between species density means of *R. norvigecus* and each of *R. rattus* & *M. musculus* & between *R. rattus* & *M. musculus*; where the *R. norvigecus* mean was the highest. table (2) .

Correlations were negative between the three species but not significant  $p < 0.05$  for *R. norvigecus* and each of *R. rattus* & *M. mus.* & between *R. rattus* & *M. mus.* ; i.e. we have insufficient evidence to show that the true correlations equal to 0 ( P . significance = 0.708 , 0.659 & 0.205 appeared respectively ) ; leading to say there were species variation , reverse correlations & negative feedback species domination among different districts . table (3).

**Table (2) : Show data of T test results for *Rattus norvigecus* , *Rattus rattus* , *Mus musculus* & the sum of means.**

one sample T. test			paired sample T. test		
species	t. value	Sig.	species	t. value	Sig.
<i>R.norvigecus</i>	0.00	0.999	<i>R.norvigecus &amp; R. rattus</i>	13.329	0.000
<i>R. rattus</i>	- 0.00	0.999	<i>R.norvigecus &amp; M. musculus</i>	14.329	0.000
<i>M. musculus</i>	0.00	0.999	<i>R. rattus &amp; M. musculus</i>	2.268	0.035
sum of means.	0.00	0.998			

**Table (3) : Correlation coefficients for *R.norvigecus* , *R. rattus* , *M. musculus* at 0.05 level.**

Species pair	N	correlation	P. Significance
<i>R.norvigecus &amp; R. rattus</i>	21	• 0.087	0.708
<i>R.norvigecus &amp; M. musculus</i>	21	• 0.102	0.659
<i>R. rattus &amp; M. musculus</i>	21	• 0.288	0.205



**Density of commensal rodent species in Baghdad area**Discussion

The results showed that mean density of *R. norvegicus*  $30.16 \pm 4.2$  was higher than means of *Rattus rattus* & *Mus musculus* respectively in all districts of Baghdad, which may be due to species preference inhabited areas that have high rates of crowded vertical buildings with basements nearby Tigris river, mass markets stores, hotels & abundant food etc. such as Saadon district in east side; & Karama district in west side in order to made channels or debris, burrows in between soft earth along walls & concrete slabs; the present study noticed that *R. norvegicus*, *Rattus rattus* & *Mus musculus* only found among districts houses in addition to recording that *R. norvegicus* was the major species of commensal rodents captured, our results resembled with the study results of Ku & Lin [7] in Taiwan. Generally *M. musculus* mean was lowest than *R. rattus* mean in both sides river districts in present study results which agreed somewhat with study of Ieradi et.al. [8] in the description of distribution & rodent life model in Rome with Tiber river, & about the life of *Rattus rattus* & *Mus musculus* which lives wild; *R. rattus* prefers shores with trees & shrubs & sometimes makes typical nests in trees; *R. norvegicus* is directly associated with stream, their banks & sewages system.

There were weak negative correlations between species density means appeared in this study, which could leading to say that there was reverse variation by increasing of specific species mean confronted by decreasing in density mean for another among the same district in the all 21 districts investigated in Baghdad area.

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