A study in campaign for commensal rodents control in Baghdad area [+]

دراسة في حملة لمكافحة القوارض الداجنه في منطقة بغداد

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Abstract:-

Rodents control methods gives possibility to reduce rodent's populations & parasitic diseases. Baited trap method with poisons of zinc phosphide 2.5% crushed wheat grains mixture for single day then substituted with Brodifacoum 0.005% for one month, were used in campaign lasted about one & half year in 21 districts chosen randomly in Baghdad area during 1988-1990. Results showed statistically significant decline $p < 0.05$ in the rodent's total mean density 32.92 ± 4.18 (1st. screening test) to 8.61 ± 2.12 (2nd. screening test) i.e. about 75.69 % general reduction percentage ; Reduction in *Rattus norvegicus* & *Rattus rattus* means was associated with statistically significant $p < 0.05$ increasing in mean of *Mus musculus* in 2nd. screening test ; Weak correlations between means ; Not statistically significant $p > 0.05$ regression between pre-post treatment means were recorded. Given parameters maybe useful for application in control campaigns in various cities of Iraq .

Keys; Rodent, control , Baghdad.

المستخلص:

توفر عمليات السيطرة على القوارض إمكانية في تقليل مجاميعها السكانية وأمراضها الطفيلية. استخدمت طريقة المصائد ذات الطعوم بسموم خليط فوسفيد الزنك ٢,٥ % مع جريش الحنطة لمدة يوم واحد والمستبدلة بسموم بروديفاكوم ٠,٠٠٥ % الجاهزة لفترة شهر ، أثناء حملة مكافحة القوارض التي استمرت لحوالي سنة ونصف في ٢١ محلة اختيرت عشوائيا في منطقة بغداد.

أظهرت النتائج انخفاض ملحوظ إحصائيا بمستوى معنوي ٠,٠٥ > للمعدل الكلي لكثافة القوارض ٣٢,٩٢± ٤,١٨ (اختبار الكشف الأول) إلى ٨,٦١ ± ٢,١٢ (اختبار الكشف الثاني) و بنسبة مئوية عامة (٧٥,٩٦ %) ; كما سجل تناقص في معدلي الجرذ النرويجي و جرذ السقوف رافقهما ارتفاع ملحوظ إحصائيا بمستوى معنوي ٠,٠٥ > بمعدل الفأر المنزلي مع ارتباط ضعيف بين المعدلات وكذلك حدوث انحدار بين معدلي قبل – بعد المكافحة غير ملحوظ إحصائيا بمستوى معنوي ٠,٠٥ < .

المؤشرات المقدمة لها أهمية في إجراء مخيمات لمكافحة القوارض في مختلف المحافظات العراقية وبداية لدراسات مستقبلية أخرى تهتم بالصحة العامة في بغداد والمدن الأخرى .

مفاتيح : قوارض ، مكافحة ، بغداد.

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Introduction:-

The commensal rats and mice are the most successful and abundant mammals on earth , they may utilized as a biological indicators of environmental impact [1] ; & also play important role in the spread of numerous diseases to man and animals i.e. zoonosis ,among these diseases plague was the most notorious [2] .Very often, is the possibility of considerable reducing of infectious rodent populations and their parasites associated diseases by using control methods for rodents .The history of modern rodent control starts with development of anticoagulants and techniques for their effective application .Large scale campaign were launched in Europe against the major urban rodent problems which followed by the second war ; Similar campaign strategies were developed in other industrialized countries [3] ; Arabic countries rodent control campaigns were held in Syria (Aleppo) 1984 [4] , Egypt [5], and Kuwait 1979 -1982 [6] ; with using of different types of acute poison (single dose for 1 day) such as zinc phosphide 1-3% or castrix 0.1% or red squill 0.015% and single or multiple dose of 2nd generation anticoagulant poison Brodifacoum 0.002- 0.005 % or Bromadiolone 0.005% and calciferol 0.1% (vitamin D_2) .

In present study an assessment carried out for species variations in the pre- post treatment stages and for the application methods , poisons that were used in the rodents control campaign held in Baghdad during 1988 -1990 ; a part of plane of ministry of health which implemented by Baghdad endemic diseases dept. / rodents and insects control by using acute poison zinc phosphide 2.5% with Crushed wheat grains mixture plus anticoagulant poison Brodifacoum 0.005% in, addition to distribution of clarification posters and training of civilians on the control programs . the study also try to establish an a pilot project could be applied in various cities of Iraq. the author is not aware of any other work on the control of rodents species in various districts of Baghdad .

Materials and Methods:-

Two screening tests done by using trap/night method before and after application of rodenticides by randomly selection of 50 houses in each of the 21 districts randomly chosen in Baghdad city in order to estimate rodents species density according to equation of Kadhim 1988 [7].

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

Time interval between the two screening tests was more than one year .

Field trails methods used as described in the guide line of the annual plan of endemic diseases institute / Iraqi ministry of health for rodents control &medical insects. preparation of the toxin (25gm. crude Zinc phosphide + 50 gm. vegetable oil + 925gm. Crushed wheat grain) ; Brodifacoum 0.005% (Klerat®) readymade pellets . Preliminary baiting without poison for 3 successive days were applied in the all districts.

In stage one , a quantity of 50 grams mixture acute poison of Zinc phosphide 2.5% with crushed wheat grains & vegetable oil putted in paper tray as average 3 points / house was distributed for single day as an attacking phase.

In stage two , a quantity of 50 grams anticoagulant poison of Brodifacoum 0.005% pellets (Klerat®) putted in paper tray as average 3 points / house was distributed for 30 days with substitution of consumed quantities and used as maintenance phase for the control. both Stages took about one &half year.

Districts covered e.g. Karada , Abunoas ,Kelani ,Kadhmyia and Karama etc.. about 51720 houses , hospitals ,disposal places & other public sites were treated in one year &half period ;

about 6.8 ton of 2.5% zinc phosphide mixture with crushed wheat grains , and more than 2.5 ton of Brodifacoum 0.005% pellets (Klerat®) were provided by Health Ministry &were used by well trained health officers .
Associated program of continuous training in Baghdad endemic disease depart. / insect & rodent control to the official & civilian organizations reinforced by public culturing & posters .
Statistical analysis tests was performed using Minitab 15 [8] & Spss 16 [9] program soft ware packages .

Results :-

The density total mean of rodents in the 1st. screening test of Baghdad's 21 districts was 32.92 ± 4.18 (30.16 ± 4.2 , 2.067 ± 0.989 & 0.695 ± 0.548 for *Rattus norvegicus , Rattus rattus* and *Mus musculus* respectively) which was statistically significant $p < 0.05$ had been declined to total of 8.61 ± 2.12 (3.52 ± 1.113, 1.602 ± 1.088 , 3.488 ± 1.407 for *Rattus norvegicus , Rattus rattus* and *Mus musculus* respectively) in the 2nd. screening test ; i.e. a general reduction percent (75.69%) , but with weak correlation (0.039) .table (1 &2) fig (1).

Table (1) : Screening test 1 & 2 for *R. norvegicus* ,*R. rattus* , *M. musculus* & total means.

city	Screen test 1 (pre- treat.)			Screen test 2 (post- treat.)			Total of test 1	Total of test 2
	*R. nor.*1	*R. rat.*1	*M.mus.*1	*R.nor.* 2	*R.rat.* 2	*M.mus.* 2		
aljamhu1	٣٤,٢	٤,٤	٠,٠	٩,٦٠	٤,٠٠	١,٠٠	٣٨,٦٠	١٤,٦٠
abunoas1	٤٠,٠	٥,٠	٠,٠	٧,٢٠	٤,٢٠	٧,٨٠	٤٥,٠٠	١٩,٢٠
abunoas2	١٥,٣	٢,٧	٠,٠	٠,٠٠	١٠,٨٠	١,٣٠	١٨,٠٠	١٢,١٠
aljamhu2	٢٠,٠	٥,٨	٠,٠	٤,٤٠	٠,٨٠	٦,٤٠	٢٥,٠٨	١١,٦٠
aljamhu3	٢٥,١	٢,٠	١,٥	٥,٦٠	١,٦٠	٣,٢٠	٢٨,٦٠	١٠,٤٠
kefah1	٣٠,١	٠,٠	٠,٠	١,٢٠	٠,٦٠	٠,٤٠	٣٠,١٠	٢,٢٠
aljamhu4	٢٠,٠	٠,٠	٠,٠	٥,٣٠	٠,٦٠	٢,٩٠	٢٠,٠٠	٨,٨٠
kefah2	٢١,٠	٥,٨	٠,٠	٢,١٠	١,٧٠	١,٥٠	٢٦,٨٠	٥,٣٠
Karada	٣٢,٨	٠,٠	٠,٠	٠,٧٢	٠,١٤	٠,١٤	٣٢,٨٠	١,٠٠
Kelani	٤٩,٠	٣,٢	٠,٠	٤,٨٠	٠,٧٠	٢,١٠	٥٢,٢٠	٧,٦٠
Saadon	٥٠,٠	٠,٠	٠,٠	٣,٣٠	٠,٦٠	١,٢٠	٥٠,٠٠	٥,١٠
adhmyia1	٢٧,٠	٣,٠	٣,٠	٥,٢٠	٢,٤٠	٢,٦٠	٣٣,٠٠	١٠,٢٠
adhmyia2	٢٩,١	٤,٩	٠,٠	٤,٣٠	١,٣٠	٤,٦٠	٣٤,٠٠	١٠,٢٠
adhmyia3	٢٩,٦	٠,٠	٤,٨	٦,٢٠	٠,٤٠	٢,٥٠	٣٤,٤٠	٩,١٠
khalij	٣٥,٠	٣,٦	٠,٠	٠,٢٠	٠,٠٠	٠,٦٠	٣٨,٦٠	٠,٨٠
karama1	٣٢,٢	٠,٠	٠,٨	٢,١٠	٠,٥٠	٨,٢٠	٣٣,٠٠	١٠,٨٠
karama2	٤٢,٠	١,٠	١,١	٢,٢٠	٠,٩٠	٨,٥٠	٤٤,١٠	١١,٦٠
khlulod2	٢٧,٠	٠,٠	٠,٧	٢,٠٤	٠,٦٠	١,٢٠	٢٧,٧٠	٣,٨٤
khulod1	٢٣,٠	٠,٠	٠,٩	٢,١٠	٠,٥٠	٨,٢٠	٢٣,٩٠	١٠,٨٠
karama3	٢٨,٠	٠,٠	٠,٨	٣,٢٠	٠,٤٠	٠,٤٠	٢٨,٨٠	٤,٠٠
Kadhmyia	٢٣,٠	٢,٠	١,٠	٢,٢٠	٠,٩٠	٨,٥٠	٢٦,٠٠	١١,٦٠
Sum	**633.4**	**43.4**	**14.6**	**73.96**	**33.64**	**73.24**	**691.4**	**180.84**
Mean	**30.161**	**2.067**	**0.695**	**3.522**	**1.062**	**3.488**	**32.92**	**8.61**

The reduction in means of *Rattus norvegicus* was statistically significant $p < 0.05$,but it was not $p > 0.05$ for *Rattus rattus* , in addition to a weak correlations (pre- post treatment means) between each of these spices . table (1 &2).

Table (2) : Statistics tests results of *R. norvegicus* , *R. rattus* , *M. musculus* & total means..

Object	T. test value	T. test Sig . p	Correlation (Pearson) value	Correlation (Pearson) Sig. p	regression Sig . p
Total Means of screen. test 1& 2	**10.84**	**0.00**	**0.039**	**0.866**	**0.866**
Means of *R.nor*.1 & *R. nor*. 2	**12.79**	**0.00**	**0.186**	**0.420**	-
Means of *R.rat*.1 & *R. rat*. 2	**-0.66**	**0.51**	**0.332**	**0.142**	-
Means of *M.mus*.1 & *M.mus*.2	**-3.86**	**0.007**	**0.089**	**0.701**	-

An a statistically significant $p < 0.05$ increasing of *Mus musculus* post treatment mean was noticed in the present study but with weak correlation with pre -treatment mean. table (1 &2) .

The regression equation revealed in the this study $y = 7.96 + 0.02 * x$ (not statistically significant $p > 0.05$) between the total pre –post treatment total means (screening tests) .table (1 &2); fig. (1).

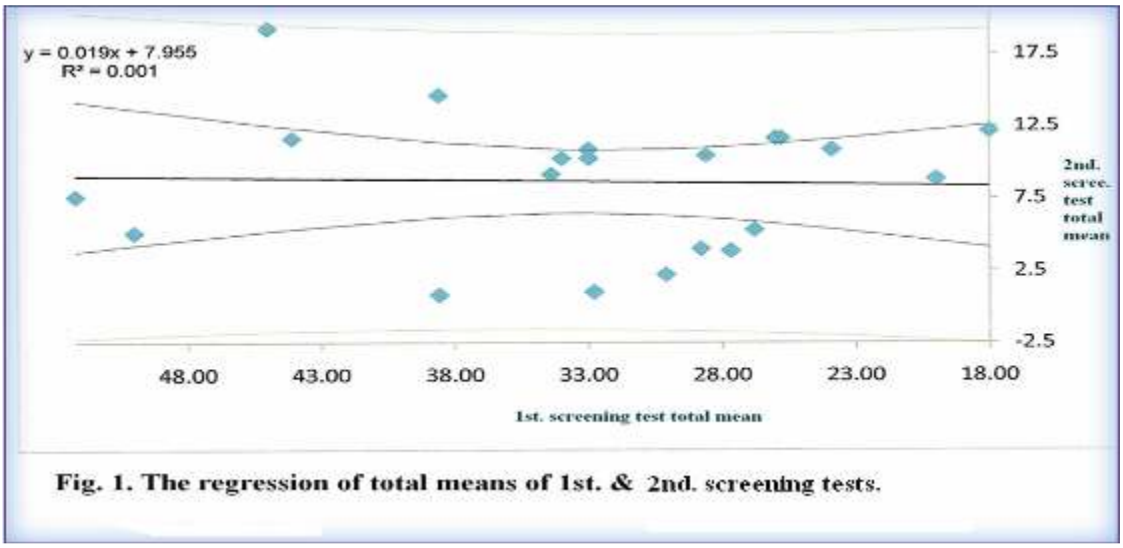

Fig. 1. The regression of total means of 1st. & 2nd. screening tests.

Discussion :-

A statistically significant $p < 0.05$ decline in the density total mean of rodents 32.92 ± 4.18 (1^{st}. screening test) to 8.61 ± 2.12 (2^{nd}. screening test) was obtained in the of Baghdad's 21 districts i.e. about 75.69% general reduction percent which agreed with anther studies' results of rodent control campaigns held in many countries , Kuwait 1979 -1982 (from 50.7% to less than1 %) [6]; Syria & brazil 1984 (total reduction 90-95%) ; China & Burma1977(total reduction 92-99%) [4]; Taiwan (total 49- 75 %) between years 1981 -84 [10],and in Pakistan 1971-1980 (total reduction80-100 %) [11]. Results in present study showed that the reduction in density of *Rattus norvegicus* & *Rattus rattus* means had been associated with statistically significant $p < 0.05$ increasing of *Mus musculus* mean from 0.695 ± 0.584 to 3.488 ± 1.407,

which is a problem noticed in our study had been faced by anther control projects e.g. Kuwait [13] & Taiwan [10] which it my be attributed to the greater reproductive potential of mice compared with other commensal species & environmental factors e.g. abundant food ; the explanation for that problem in our works agreed somewhat with those opinions & we lean more to results of Zaghlol & Zakria 1986[14] in that the calciferol 0.1% most suitable of those biocides tested for the field control of the house mice & also to lack of competition.
Corporate civilian organization & media capabilities , in addition to training official officers on the objectives of the control campaign plus the improving environmental conditions all assist in successful integrated rodent control programs [12].
Weak correlations between means & also the regression (not statistically significant $p > 0.0$) which revealed in our study differ with study of Grodzinski *et al.* 2007[15] in Poland where they noticed no correlation was found between the number of baits consumed and the number of rodents on a given point & also the estimate of population numbers was made by the regression method, obtaining satisfactory results in 17 cases out of 18 possible.
Given pioneer parameters may be useful for application in anther control programmers conducted in various Iraqi provinces ; in addition to open access for further studies concerning public health in Baghdad and other Iraqi cities.

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