

Evaluation of some Rodenticides against Wild Rats (*Rattus rattus*) at Etay El-Baroud Research Station ,Egypt

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ABSTRACT

The field efficiency of three rodenticide baits were evaluated. They were Zinc phosphide 1.5% , Coumatetralyl 0.0375% and Brodifacoum 0.005%. Field trials were carried out in wheat fields at Etay El-Baroud Research Station EL-Behera Governorate infested with wild *Rattus rattus*. The population reduction because of using Coumatetralyl only bait was 63.33% while the efficiency of Brodifacoum bait was 67.66 %. The efficiency of Zinc phosphide bait 1.5%, (crushed maize 98.5%) was only 44.47 %. The efficiency of Zinc phosphide bait 1.5% ,sunflower seeds 96.5%, corn oil 2% and Zinc phosphide bait 1%,sunflower 98% ,corn oil 1% were 57.27% and 34.6% , respectively.

Keywords: Zinc phosphide –Coumatetralyl- Brodifacoum –wild rat *Rattus rattus*

INTRODUCTION

With the sole exception of man the most successful and abundant mammals on the earth are the commensal rats and mice (WHO 1979). In most countries warfarin is undoubtedly the most commonly used anticoagulants, but resistance to warfarin has increasingly become a big problem Meehan (1984). A number of new compounds are capable to control resistant rodents have been developed. Brodifacoum, floucomafin, difenacoum and coumatetralyl. In 1945, Link set up the first field trials to test dicoumarol as a rat poison. After that many anti-coagulants were tested for the effectiveness to control rodents (Hays, 1982). Six field trials were carried out by Row *et al* (1981) was showed that bromadilone bait succeeded against mice infesting farm buildings. Greaves *et al* (1982) found that the performance of bromdiolone and brodifacoum was well below that reported by previous investigators, indicating the possibility of low –grade resistance to those compounds in the difenacoum –resistance strain. El –Gendy *et al* (1996) found that rats population at Koom-Hamada district have developed resistance to coumatetralyl and may also to difenacoum.

The present work aims to evaluate the efficiency of the three rodenticides baits, Coumatetralyl, Brodifacoum and Zinc phosphide against wild *Rattus rattus* under field conditions.

MATERIALS AND METHODS

Tested pesticides:

- 1- Comando 80 % D (zinc phosphide 1.5% as crushed maize, 1.5% and 1% as whole sunflower seeds as abait).
- 2-Coumazed (0.0375 % Coumatetralyl) as wheat.
- 3-Phacomen (0.005% brodifacoum) as whole wheat grains.

The procedure :

The field trials was carried out in wheat crop field at Etay El- Baroud research station district EL-Behera governorate during two months of 2017 (April and May) to evaluate the efficiency of the rodenticides previously.

The treatments were carried out in blocks of two feddan each, using large cement, bait station enough to random plots (0.4 feddan) and another one was left without treatment and used as a control. The population densities of rats were estimated pre and post – treatment using the food consumption method (Rennison 1977). Poison bait was distributed in the infested spots beside rat for 72 h. 20 gram for each treatment after one week, the poison bait was removed then the post using non poison food. The reduction of rat population was calculated by the following formula

$$\text{Population reduction \%} = \frac{\text{Pre-treatment cons. of crushed maize (g)} - \text{post treatment cons. Of crushed maize}}{\text{pre-treatment cons. Of crushed maize}} \times 100$$

(Asran *et al* 1992) .

RESULTS AND DISCUSSION

The evaluation of the tested rodenticides under field conditions was carried out using food consumption method. The population densities of rats were estimated pre and post – treatment using food consumption.

Data in table (1) showed the effect of Coumatetralyl bait 0.0375% and Brodifacoum.005% bait. Efficiency of two baits was estimated by using Population reduction %. Efficiency of coumatetralyl bait was 63.33% while for brodifacoum bait was 67.66 %. Ahmed *et al* (1990) found the total bait consumption during the experimental period for coumatetralyl and brodifacoum were less than control by the values 61% and 68% , respectively. Field trials of brodifacoum, chlorophacinone and coumatetralyl

against desert rodents in India were undertaken by Mathur and Ishwar (1981) who found that the kill overages were 90.5%, 82.2 % and 81.1 % for the three anticoagulants , respectively .

Table 1. Effect of Coumatetralyl .0375% bait and Brodifacoum.005% bait against wild *Rattus rattus* under field conditions in wheat fields at Etay El-Baroud Research Station(2017).

Treatment	Crushed maize consumption(g/fadden)		Population reduction %
	Pre-treatment	Post - treatment	
Coumatetralyl	780	286	63.33
Brodifacoum	600	194	67.66

Table 2. Effect of 1.5% Zinc phosphide bait (crushed maize 98.5%) against wild *Rattus rattus* under field conditions in wheat field at Etay El-Baroud Research Station (2017).

Treatment	Crushed maize consumption(g/fadden)		Population reduction %
	Pre-treatment	Post-treatment	
1.5% Zinc phosphide	760	422	44.47

Data in table (2) shows the effect of Zinc phosphide bait 1.5%, (crushed maize 98.5%) . Efficiency of Zinc phosphide bait 1.5% was 44.47 %.

Table 3. Effect of 1.5% Zinc phosphide bait (sunflower seeds 96.5% ,2% corn oil) and1%Zinc phosphide bait(sunflower seeds 98%, 1%corn oil) against wild *Rattus rattus* under field conditions in wheat field at Etay El-Baroud Research Station(2017).

Treatment	Crushed maize consumption(g/fadden)		Population reduction %
	Pre-treatment	Post-treatment	
Zinc phosphide 1.5% bait	440	188	57.27
Zinc phosphide 1% bait	419	274	34.61

Data in table (3) shows the effect of Zinc phosphide bait 1.5% ,sunflower seeds 96.5%, corn oil 2% and Zinc phosphide bait 1%,sunflower 98% ,corn oil 1%.Efficiency of Zinc phosphide bait 1.5% was 57.27 % while zinc phosphide bait 1%caused 34.61% .

Abdul- Rauf *et al* (1999) found that brodifacoum bait was the most effective compound and caused an average of 93.14 % reduction in rodent,while zinc phosphide was less effective causing 75.38% reduction in rodent .

REFERENCES

- Abdu- Rauf K. , P. Amjad, W.A. Syed and I.Shoaib (1999) : Rodent infestation and its control in plantation forest at Pasni, Balochistan.Pakistan Journal of Zoology 31 (1): 65-67 .
- Ahmed, N. S., K. S. El – Gendy , A. S. El- Bakary and R.K. Abou El-Khear (1990) : Evaluation of Brodifacoum , Coumatetralyl ,and chlorophacinone anticoagulants against wild rats (*Rattus rattus*) . J. of Agricultural Sciences Vol. 21 (4) : 3- 17 .
- Asran, A. A.; H. I. El-Deeb and M. A. El- Halafawy (1992) : Field trials on certain anticoagulant rodenticides against the field rat, *Arvicanthis niloticus* .Egypt J. Agric. Res. ,70 (2): 461 - 467 .
- EL-Gendy ,K.S. ; R. K. Abou –EL-Khear and a.k. El-Sebae (1996) :Laboratory and field trials of anticoagulants and the detection of rodent resistance. Alex. Sci. Exch. ,17 (2): 155- 165 .
- Greaves, J.H.; D. S. Shepherd and R. Quay (1982) : Field trials of second generation anticoagulants against difenacoum resistant Norway rat population .J.Hyg.(Camb.) . 89 : 295- 301 .
- Hayes, W.G.(1982) : Pesticides studied in man. In organic phosphorous pesticides. Baltimore : Williams and Wilkins , Chapt. 7 , pp. 409 – 411 .
- Link ,K.P.(1945) : The anticoagulant 3,3 –methyl bis -4 hydroxy coumarin . Fed. Proc. US. : 176 -182 .
- Mathur , R. P. and Ishwar (1981) : Comparative efficacy of three anticoagulant rodenticides against Indian desert rodents . Prot. Eco. , 3 : 327 – 331 .
- Meehan, A. P. (1984) : Rats and mice ,their biology and control . Publ. by :Rentokil Limited , Felcourt, East Grinstead, W.Suiss. R. H. 192 JY Pp. 141 - 213 .
- Rennison,B.D. (1977): Methods of testing rodenticides in the field against rats. Pesticides Science 8(4) : 405- 413 .
- Row, F. P. ;C. J.plant and A.brodifield (1981) : Trials of anticoagulant rodenticides bromadiolone and difenacoum against the hous mouse *Mus musculus* . J. Hyg. (lond.) 87 (2) : 171 – 177 .
- WHO(1979): Commensal rodent control, Report series No. VBC/79 -726(Ed. Brooks,J.E. and Row,F.P.) : 1- 109 .

تقييم كفاءة بعض مبيدات القوارض على الفأر البري المتسلق في محطة البحوث أبيتاي البارود، مصر نعمة محمد العبد و إيمان عبد الرازق عبد الهادي معهد بحوث وقاية النبات – مركز البحوث الزراعيه – دقي - جيزة - مصر

أجريت التجارب الحقلية لتقييم كفاءة ثلاثة طعوم مبيدات قوارض . كانت الطعوم فوسفيد الزنك % 1.5 ، كوماتيترايل % 0.0375 وبروديفاكوم % 0.005. أجريت التجارب للتقييم في ظل ظروف حقلية في حقول القمح في محطة بحوث أبيتاي البارود محافظة البحيرة حيث تغزوها القوارض البرية . وقدرت الكثافات العددية للفئران قبل وبعد المكافحة باستخدام طريقة استهلاك الطعوم . تم تقدير كفاءة طعم كوماتيترايل وبروديفاكوم باستخدام النسبة المئوية لانخفاض عدد الفئران . كانت كفاءة طعم كوماتيترايل % 63.33 في حين كانت كفاءة طعم وبروديفاكوم % 67.66 . كانت كفاءة طعم فوسفيد زنك % 1.5 المحمل على (الذرة % 98) هي % 44.47 . وجد كفاءة طعم فوسفيد زنك % 1.5 المحمل على بذور دوار الشمس % 96.5 زيت ذرة % 2 وطعم فوسفيد زنك % 1 المحمل على بذور دوار الشمس % 98 وزيت ذرة % 1 هي % 57.27 ، % 34.61 على التوالي .