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Control of roof rats in poultry houses with anticoagulants

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Summary

In this work the controol of roof rats **(Rattus rattus)** in poultry houses by using three anticoagulants was studied. Permanent baiting was made by using warfarin 0.025 % grain bait, coumatetralyl 0.0375 % ready to use bait and chlorophacinone 0.005 % grain bait in three poultry houses and one was held as reference. The study continued 13 months. There was no signiifcant difference in the control effect of these anticoagulants. All of them proved to give a satisfactory control against roof rats and the control effect was found between 98 % - 99 % in comparison to reference unit. Results showed when present factors could not be altered in order to lower the capacity of the environment to support rats, adequate and continuous control of roof rats in poultry houses may be obtained by permanent baiting with anticoagulant rodenticides.

Introduction

Controlling rats in poultry houses is a key factor in maintaining economic productivity. Rat control in poultry breeder houses is more complicated. The chicken are kept for longer periods, warmth and food are available in all around the houses and construction specialities encourage rats to build large populations. In such a case an effective and continous control of these animals is needed.

The use of chemical agents to destroy rats and mice has been one of the key approaches to rodent control (Schoof and Maddock, 1968). Rodent control works inside poultry houses involve several factors. Some of these are safety, acceptability, stability, economics and efficacy.

Anticoagulants are the first choice poisons against most rat infestations (PICL, 1976). The general absence of hazard to birds and mammals (Schoof and Maddock, 1968) secures an important advantage in using these rodenticides. A 95% rodent is not uncommon when using anticoagulant rodenticides (Gramet, 1976).

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Their chemical structures place anticoagulants in two groups (Howard and Marsh, 1974). The hydroxycoumarines (e.g., Warfarin, coumatetralyl) and the indandiones (e.g. chlorophacinone).

From the anticoagulants is current use preference seems largely in favor of warfarin (Schoof and Maddock, 1968). However related compounds such as chlorophacinone, coumatetralyl may be prefered in some places (WHO, 1970).

Different control works against roof rats *(Rattus rattus)* are applied in our poultry breeder farm. In the present work the control of these rats with three anticoagulants warfarin, coumatetralyl and chlorophacinone have been studied.

Materials and Methods

Poultry houses where the work was carried out were in group units of 4. Each 12m width, 111m length, half-open type and 1/2 slats from sides, including an entrance and 9 pens of 12m length each. The units were situated at 20m of distance from each other. Warfarin 0,025% grain bait, coumatetralyl 0,0375% ready to use bait (50% coarse ground wheat, 44,5% fine ground wheat, 5% wheat flour with 0,1% dehydroacetic acid) and chlorophacinone 0,005% grain bait were applied separately in each unit, and one unit was held as reference.

Wooden bait boxes (300x200x150mm) with two holes at ends (50x50mm) were placed in each pen. Adequate bait was laid down in each box and replenished when consumed. Some uneaten bait for long periods or contaminated baits were destroyed. After 11 months of applications the baits were removed for 6 weeks, then baiting continued. The amounts of consumed baits were recorded periodically. The study continued 13 months. Then wheat grain was replaced as census bait for 4 days in all units and removed.

Control effect of applied anticoagulants was determined by comparing census bait consumptions in respect of reference unit in terms of percentage.

To reveal any difference in control between applied anticoagulants 200 g wheat grain was replaced as check bait in each pen for another 4 days in 3 units. Then removed, weighed and statistically analyzed.

Results and discussion

Carcasses of rats were observed first after 3 days of baiting and afterwards from time to time in the 3 units during the study. Even that the amounts of anticoagulant and check baits consumed were different in three units, all

the three anticoagulants proved to give a satisfactory control against roof rats. Control effect was found between 98%-99% in comparison to reference unit (Table I). Total amount of consumed anticoagulant baits were less for chlorophacinone and more for coumatetralyl.

In all 3 units bait consumption was higher for the first months of the study. Then consumption dropped and continued in lower levels. It is interesting to note that there was a parallelism in bait consumption between warfarin and chlorophacinone applied units (Fig. 1). For coumatetralyl applied unit bait consumption continued in higher levels. Thus, it may be seen that control of roof rat populations was achieved faster with warfarin and chlorophacinone and later with coumatetralyl. This delay might not be due to any lesser efficacy of the poison against these rats but from the bait carrying it. Since this bait was in different composition than the others and resembling in texture to our convertional mash poultry feed, it was assumed that rats fed on it in lesser quantities and prolonged time. Results obtained by same workers on bait preferences of roof rats in poultry houses revealed that the rats were less interested in feeding with ground baits (Hazan and Dias, in preparation).

An incomprehensible point seen in this study is that baits consumption of warfarin and chlorophacinone showed a sudden increase after 3 months. However the case may be explanied with a change in population structure. Observations showed that only the adult rats were feeding and were affected from baits. As the adults disappear young litter do not feed on bait, consequently a decline will be seen in bait consumption. But when this new litter generation reach the adult stage, than begin to feed from baits and this causes a temporary increase in consumption until their population comes again under control.

After a 6 weeks of nonbaiting interval, bait consumption in 3 units rose much more than previous levels (Fig 1.), making clear that rat populations got free from suppression.

No any statistically significant difference appeared in control effect of these anticoagulants (Table II).

Our results gave the conclusion that chlorophacinone at 0.005% concentration was practically at least as effective as warfarin in 0,025 against roof rats.

The control effect of three anticoagulants on roof rats were observed in many different ways. No complaints due to rat damage ex., gnawing of materials, destruction of sacs and mechanical breakdowns were reported in

three units where anticoagulants were applied. But in reference unit the above mentioned damages occured frequently. In addition rats were visible during the day time in the reference unit, but rarely during the night in others. In all the units no harmful effects on birds were observed during the application in spite of boxes found sometimes overturned and partial bait eaten by birds.

It must be remembered that when using anticoagulant rodenticides against rats in poultry houses larger quantities of baits might be needed to obtain an effective control since the rats feed normally on poultry feed that contains Vit KI a powerful antidote of these chemicals (Bentley, 1972).

Results showed that when present factors could not be altered in order to lower the capacity of the environment to support rats, adequate and continuous control of roof rats may be obtained by anticoagulant rodenticides in poultry houses only by permanent baiting.

Although a complete eradication is not attained, the control achieved in our poultry houses with anticoagulants was found satisfactory. As pointed out by Shuyler (1972) the significance of their damage is reduced to that point at which the continuing losses not economically justify additional activity to further reduce the damage.

Özet

Kümeslerdeki kara sıçanların antikoagulant ilaçlarla kontrolu

Kümeslerde uygun yaşama koşulları bulan sıçanlar hızla çoğalarak tavukçular için büyük bir sorun olmaktadır.

Bu çalışmada kümeslerdeki kara sıçanlara (**Rattus rattus**) karşı mücadelede üç değişik antikoagulant ilaç kullanılmıştır.

Denemeye alınan dört kümesten birincisinde % 0,025 oranında Warfarin buğday tanesi ile, ikincisinde % 0,0375 oranında Coumatetralyl hazır yemle, üçüncüsünde yine buğday tanesi ile % 0,005 oranında Chlorophacinone kullanılmıştır. Dördüncü kümes tanık olarak ilaçsız tutulmuştur.

Bu çalışma 13 ay devam etmiş, çalışma sonunda yapılan değerlendirmelerde kullanılan bu antikoagulantların sıçanlarla mücadelede aynı etkiyi gösterdiği görülmüştür. Her üç antikoagulant da kara sıçanlara karşı mücadelede başarılı olduğu saptanmıştır. Tanık kümes ile karşılaştırmada bu başarının % 98-99 oranında olduğu görülmüştür.

Gene bu çalışma neticesinde, belirli bir süre yapılacak ilaçla mücadelede çevre koşulları değiştirilmedikçe yeterli başarı elde edilemiyeceği, ancak antikoagulantlı yemlerle devamlı olarak yapılacak mücadele ile başarılı sonuç alınabileceği anlaşılmıştır.

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Table - I
Anticoagulant and census baits consumption and their relative control percentage

	Unit 1 Warfarin 0,025%	Unit 2 Chlropha-cinone 0,005%	Unit 3 Coumatet-ralyl 0,0375%	Unit 4 Reference
Total bait consumption during the work (g)	9430	7360	10060	—
Census bait consumption at the end of the work (g)	190	110	260	10460
Relative % Control	98,2	99	97,5	—

Table - II
Check bait consumption (gms) in 3 units

Pen No:	Applied anticoagulants Warfarin 0,025%	Chlorophacinone 0,005%	Coumatetralyl 0,0375%
1	—	45	—
2	80	—	—
3	—	—	10
4	35	—	5
5	70	—	—
6	10	40	—
7	10	—	120
8	—	—	—
9	20	—	—
Total (gms)	225	85	135
Means (gms)	28.1	9.4	15.0

Means were not significantly different at $p<0.05$ level.

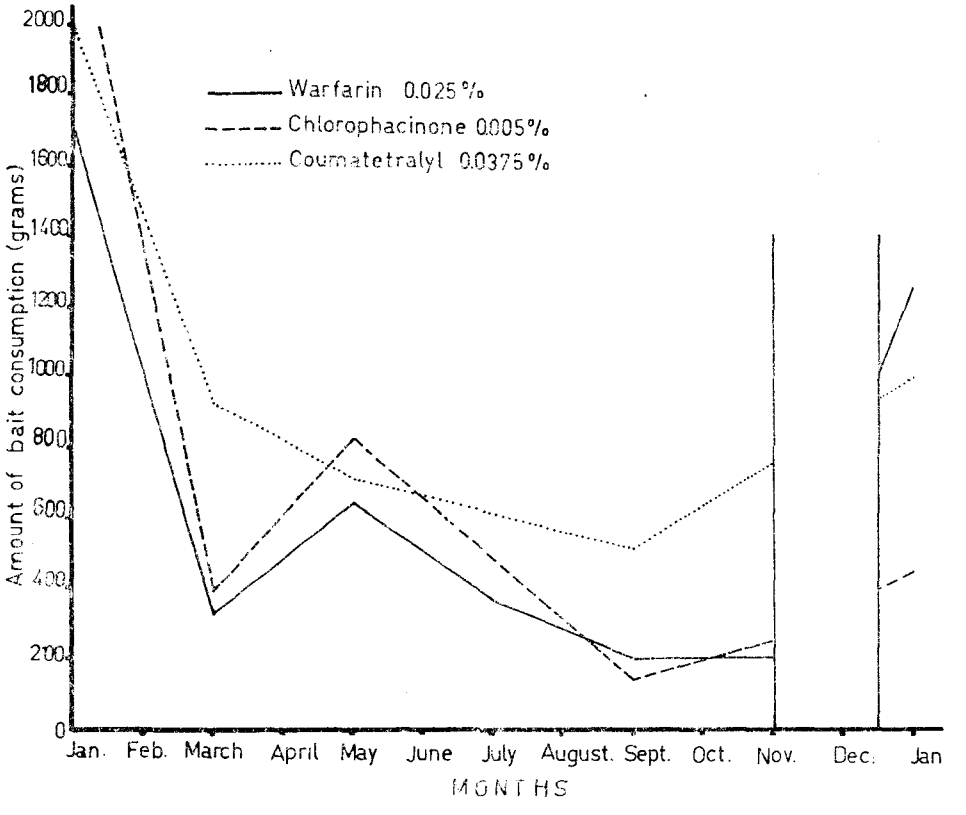

Fig.1. Periodically bait consumption by roof rats in units treated with three different anticoagulants.