

韓國의 驅鼠事業現況*

<綜 說>

<Review>

全 淳 杓**

Rodent Control in Korea*

Chyun, Soon Pyo**

Abstract

Grain losses due to rodents are annually estimated to be about twenty percent of the whole grain production in Korea. The brown rat (*Rattus norvegicus*), the roof rat (*Rattus rattus*), the house mouse (*Mus musculus*) and the striped field mouse (*Apodemus agrarius*) are primary species among eleven species found in the country.

Rodent control has been conducted by the government since 1962. As for the poison, anticoagulant was used at first, but no satisfactory results were obtained due to limited funds. Since 1970, zinc phosphide has been introduced for the national campaign, but the degree of efficiency have been decreased year by year because of increased poison shyness.

In order to overcome this problem, the author has improved zinc phosphide effectiveness by the microcapsuling method with paraffin wax which increase intake of poison by masking the taste and delaying the onset of symptom. This method can be used efficiently for national campaign in future.

However, more attention to this problem, more research, training and funding are required for the development of rodent control in Korea.

Introduction

It is well known that rodents, birds and other vertebrate animals cause extensive damage to both growing crops and stored products throughout the world, even though the problem situation differs from place to place. Korea is certainly not exempt.

In Korea, rodents are one of the most important pest problems in agriculture. However, because of the geographical situation, losses to stored grains due to rodents are generally regarded as being higher than losses to growing crops.

Grain losses due to rodents are annually estimated

in the amount of 345,000 M/T which represents twenty percent of the whole grain production of the country.

Rodent Biology

No systematic research works on the ecology of rodents have been conducted because specialized rodent research organizations have been established in Korea. According to the research works conducted by various Government organizations and universities so far, however, four primary species are found to be the most important among the 12 species found in Korea.

* Present at the Regional Seminar on Field Rat Control and Research, March 4-15, 1974, Manila, Philippine.

1974年 3月 4-15日, 마닐라에서 開催된 國際啮齒類驅除 및 研究에 關한 세미나에서 發表됨.

** National Agricultural Economics Research Institute, Seoul, Korea.

韓國 서울. 國立農業經濟研究所.

They are brown rat (*Rattus norvegicus*), the roof rat (*Rattus rattus*), and house mouse (*Mus musculus*) as commensal rodents and the striped field mouse (*Apodemus agrarius*) as field rats, affecting rice, barley, corn and other crops.

The brown rat, weighting about 130-150 gr., is widespread throughout the country, especially within the interior. Its rate of distribution is about 70 percent of the three commensal rodents. And the brown rat is found to be the main species related to the damage of stored grains. The roof rat occurs in the same relatively high numbers as the brown rat along the coast, while the house mouse is confined to warehouses. The striped field mouse occurs along field perimeters adjacent to houses and wooded or bushy areas.

The brown rat shows a very high pregnancy rate, averaging 39.7 percent. This rate is higher in urban rats than in rural rats. The average litter size is 7.26 young-ranging from 3 to 12 young-with larger litter sizes occurring in rural areas.

As for food, the brown rat feeds extensively on grains and vegetables in the following order; rice barley, corn, wheat, potatoes. However, this food pattern varies according to the environment and to the foods available.

History of Rodent Control

Rodent control methods used in Korea over the last three decades have included trapping, predator and poisoning techniques. After World War II, 1080 was the only poison for rodenticide. Therefore most farmers used this poison extensively together with the trapping method and the use of predators.

As a result, a large number of human deaths can be attributed to this poison with farm animals including predators such as cats and dogs perishing as well. Consequently the infestation of rodents became worse.

Realizing their significance, the government began to make multisided efforts to tackle these problems.

In 1962, the Ministry of Agriculture and Fisheries undertook, for the first time, a series of rodent control programs in a whole province using anticoagulant for a pilot project. The results revealed that rodent control with a multiple baiting method could be efficiently and safely carried out if the economic cost was not considered.

During the following three years, the ministry conducted a nationwide rodent control campaign using anticoagulant. All of the poisoned baits were supplied to each household without charge. But, because of limited funds and the large amount of bait materials required, no satisfactory results were obtained.

From the economic point of view, it was concluded that anticoagulant rodenticide was not suitable for a large scale rodent control program for this country. Consequently, the government suspended the national control campaign from 1966 to 1967

Since 1970, with the increasing damage by rodents, the Ministry of Agriculture and Fisheries have again conducted nation-wide control campaigns against commensal rodents using zinc phosphide in place of anticoagulant once year. The results of the first year were satisfactory with 80 percent killed in 1970. But from the following year, the results have decreased year by year, and it decreased to 60 percent kill in 1973, according to the post bait census method (Table 1).

Table 1 : Summary of rodent control campaigns programmed by government, using zinc phosphide 25% from 1970 to 1973.

Year	Date of baiting	Total household to be baited	Estimated kill (%) by post bait method	Amount of poison used
1970	Jan.	5,428,000	80	20 gr. per household
"	May	6,480,000	77	
1971	Mar.	5,975,000	78	
1972	Mar.	6,070,000	no data	15 gr. per household
1973	Oct.	6,510,000	60	

* All the expenses of the poison were paid by the government.

Improvement of Redenticide

In spite of many difficulties, rodenticides were the only feasible method available until more safe and efficient methods of control were developed. With this consideration new lethal agents or substances, more effect and safe but less laborious, expensive and time consuming, must be developed as early as possible.

Although zinc phosphide exhibits potential primary hazard to nontarget animals as well as the development of bait shyness, this poison has many advantages including its fairly good safety record, its low cost and its reasonably high effectiveness.

Therefore the author has developed the microencapsulating method of zinc phosphide with paraffin wax for improving its efficiency. With this method, it is possible to increase the intake of the active ingredient and subsequently to obtain a higher kill of rats by masking the taste and delaying the onset of symptoms. At the same time, the life time of zinc phosphide prepared with bait can be extended to more than six months in exposed field conditions by this encapsulating method.

If larger scale field tests show satisfactory results, this encapsulating method can be efficiently introduced for national campaigns in the future.

Conclusion

It is essential to reduce the damage by rodents, birds and other vertebrate animals to growing crops and stored products in order to increase the human food supply in Korea. We consider that necessary steps for the future fall under the following three categories to solve these problems effectively.

- 1) The seriousness of vertebrate pest problems should receive adequate attention at the national level.
- 2) Problem solving research should be strengthened and continued on the biology, the ecology and the control of vertebrate pests for the purposes of developing more safe, selective and efficient methods of control.
- 3) Necessary efforts should be made for strengthening the program through increased personnel training and improved funding.

To achieve these goals, we in Korea very much

need the regional coordinated programs in cooperation with international organizations.

摘要

韓國에 있어서 쥐로 인한穀物の被害는年間穀物總生産量の 20%에 達한다. 우리나라의 쥐種類는 12種으로 알려져 있으며 그중 집쥐(시궁 쥐), 지붕쥐(곰쥐), 생쥐 및 등줄쥐가 代表的이다.

1962年 以來 驅鼠事業은 政府의 主管下에 實施되어 왔다. 殺鼠劑로서는 당초 抗血液凝固劑를 使用하였으나 豫算의 制約때문에 기대하는 結果를 얻지 못하였고 그後 1970年以後 磷化亞鉛劑로 代替하여 繼續사용하였던 결과 忌避性으로 因하여 事業成果는 每年 떨어지고 있는 現實이다.

筆者는 이러한 問題를 해결하기 爲하여 「파라핀 왁스」를 使用하여 磷化亞鉛劑의 粒子를 被覆하여 本劑의 獨特한 맛을 除去하고 또한 藥劑의 分解를 지연시키므로서 好食性을 增加시켜 殺鼠率을 높이는 데 成功하였다. 앞으로 이러한 方法이 驅鼠事業에 도입된다면 藥效를 尙當히 增加시켜줄 것으로 尙料된다. 그러나 보다 根本的인 驅鼠對策을 爲하여는 本事業에 對한 國民들의 보다 많은 關心과 이에 對한 철저한 研究, 訓練 및 充分한 資金의 뒷받침이 수반되어야 할 것이다.

Literatures Cited

1. Bai, Dai-Han, Young-Moo shn & Mi-Ryoung Yook. (1971). Studies on the ecology and control of Rodent. Inst. of Agri. Science, Office of Rural Development, Suweon. Korea. 839p.
2. Chyun, S.P. (1971). Studies on the Food Habits of Rat. Journal of Agr. & Fores. Science (V-4), Dong Guk Univ., Korea.
3. Chyun, S.P. (1973). Studies on the ecology and Control of *Rattus norvegicus* in Korea, Dcng-Guk University.
4. Cornwell P.B. (1970). Studies in microencapsulation of Rodenticides. Proceedings Fourth Vertebrate Pest Control, California. U.S.A.
5. Ministry of Agr. & Fisheries. (1970-1973). Report on Rodent Control (Ⅳ-Ⅳ). Seoul, Korea.
6. Shin, Young-Moo. (1974). Influence of Rice ripening time and neighboring Habitats on Rodent species composition and damage. The Korean Society of Plant Protection, Suweon, Koreae
7. Wcn, P. H. (1961). Studies on the ecological observation of Rodentia in Manchuria and Korea(1) (2) Dong-Guk University.