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RODENT MANAGEMENT IN FIELD CROPS

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ABSTRACT

Rodents, particularly rats cause significant damage in field crops and forage production fields in the Middle East. Left uncontrolled, these pests can be a serious threat to farming operations. Fortunately, there are tools that are effective in reducing populations and damage. Habitats can be manipulated, and traps and toxicants can be used to lessen damage to acceptable levels. These three rodent pests are reviewed along with appropriate control methods. It is important to use an integrated pest management approach, thus assuring that the situation is defined and understood, pest populations are monitored, legal methods are used, socio-political concerns are addressed, and the environment and non-target resources are protected.

Keyword: *Rodents, field crops, forage production, Middle east, traps, non-target resources.*

INTRODUCTION

Many species of wildlife can cause damage to agricultural resources, including ungulates, carnivores, rabbits, rodents, and birds. The types of damage include crops in the field; reforestation, nurseries, and orchards; rangeland forage; property, structures and cables; stored commodities; natural resources; and disease hazards. Rodents, in particular, cause serious problems that need to be addressed. The species of rodents feed on above parts of plants. Additionally, their burrowing and mounding disrupts irrigation and maintenance operations, and can cause damage to harvesting equipment. Finally, mounds cover and kill nearby plants and open the stand for weed invasion. Burrowing can damage structures, roads, and pathways. This damage is expensive to repair, and may even result in livestock, pet or human injury when a burrow system is stepped on. (Witmer and O'Brien, 2006).

HABITAT MANAGEMENT

Intensive agricultural practices often create a setting that does not support abundant rodent populations. Annual plowing, burning, mowing, grazing, crop residue removal, and herbicide application can result in the

disruption of burrow systems and /or the absence of forage and protective cover during portions of the year. This results in periodic reductions in rodent populations, and hence, less damage is likely to occur.

In some situations, the land manager can consider other options or land practices that can help avoid serious rodent damage situations, including crop and variety selection, planting time, periodic flooding. For example, the root structure of some varieties of alfalfa is less prone to damage by rodents. Land managers can also control the areas bordering their crop fields. These areas (fencerows, permanent grass cover areas, woodlots) often provide year round harborage for rodents. Rodents can survive here even when conditions in the crop fields are not ideal for rodents. Then, when conditions in the crop fields improve, they can quickly invade those fields to exploit new resources. With their high reproductive potential, rodent numbers can rapidly increase and serious crop damage can result. Agreement with (Cleary and Dolbeer 1999)

POPULATION MANAGEMENT

Unfortunately, when perennial crops are grown or no-till agriculture is practiced, rodent populations often flourish because there is less disruption of the soil and forage and cover is almost always available to rodents. In these situations, direct population control is often needed to prevent serious crop losses.

Encouraging natural predation can help reduce rodent populations, but seldom results in significant reduction of crop damage. This is because, in most cases, prey populations usually drive predator populations, not the other way around. If foxes or hawks eat most of the rodents in an area, the predator populations will crash and will be very slow to recover (because of their normal low densities and relatively low reproduction potential) even when the rodent population eventually recovers. Nonetheless, raptor perches and nest boxes can be placed at various locations around one's property to encourage the presence of birds of prey (hawks and owls). Also, some hay bails can be left about for protective cover for foxes and any dens of foxes and other carnivores on the property can be protected to encourage the presence of mammalian predators.

A variety of rodenticides are also available for the direct control of rodent populations. Some people want to start control efforts whenever pests occur or even when they think they might cause a problem. While this is appropriate in certain situations, a good IPM program is based on monitoring the pest to determine when control is necessary. When the population density reaches the threshold level-the level at which control is economically justified-control should be undertaken. Threshold levels for rodents and other vertebrate pests in alfalfa are not

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generally established although the experiences of growers give us some ideas about when and if control measures should be taken. Because of the nature of rodent damage (killing plants and interfering with harvest) and the fact that they remain in the general area for life, the tolerable level is very low, in some cases, nearly zero. Rodent populations can be monitored by mound or burrow counts, by trapping, and, in the case of ground squirrels, by animal counts during daylight hours.

The timing of a control program and the methods and materials to use depend on (1) the pest species, (2) how the area is managed, (3) the availability of equipment and labor and (4) other site and situation specific factors. We will discuss specific rodenticides used for each featured rodent group in those subsections. Agreement with (Singleton *et al.*, 1999; Witmer *et al.*, 1995)

PRELIMINARY CONSIDERATIONS

Toxicants (rodenticides and fumigants) are important tools in the management of rodent pests. These chemicals are potentially dangerous to people, pets, livestock, and non-target animals. They are carefully regulated by the EPA and state agencies. The use of some rodent toxicants are restricted to certified pesticide applicators; others products are available “over the counter” and can be used by anyone. In either case, however, the EPA label instructions that accompany the product must be fully and carefully followed to avoid problems and to be compliant with the law. In integrated pest management (IPM) approach should be used when addressing rodent pest problem situations.

This involves (among other things) that the pest is properly identified, its ecology and behavior is understood, the damage situation understood, the pest population size is monitored, all available methods are considered, legal methods are used, socio-political concerns are addressed, and the environment and non-target resources are protected. Following the principles of IPM resulted in effectively resolving pest problems while assuring that resources, including dollars, are not wasted and the health of the agro-ecosystem is safe-guarded. Agreement with (Desokey, 2007 and Singleton *et al.*, 1999)

RECOMMENDATIONS

Rodents cause significant damage to agricultural resources each year. Fortunately, tools are available to greatly reduce losses. Importantly, pest populations and damage need to be monitored so that appropriate action can be taken in a timely way. Rodenticides are an important part of the rodent IPM toolbox, but are carefully regulated and should be used with care. Traps are also useful in rodent monitoring and, in some cases, can be used to reduce populations.

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Many other methods, such as frightening devices, repellents, and barriers, are not very effective in preventing rodent damage. Research continues, however, to improve these tools and to develop new methods. Research is also underway to improve delivery systems and traps, and for rodent fertility control.

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