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STUDY ON RODENT INFESTATION AND THEIR MANAGEMENT IN BROILER FARMPREMISES IN DISTRICT PANIPAT.

OMBIR SINGH, Research Scholar, Department of Zoology, CMJU.

ABSTRACT

Most of farmers in developing countries are engaging poultry since the industry has become a major source of income. Poor quality of poultry sheds and their vicinity to the crop lands and dwelling habitats result in migration of rodent pest in thepoultry premises. Their menace to poultry facilities is as severe as in crop fields, residential premises and other storage facilities. The commercial poultry facilities such as broiler farms, layer farms, hatcheries and poultry feed mills provide ideal habitat for rat and mice due to unlimited amount of harborage, food and water supply. In poultry premises rodent contributing both qualitative and quantitative lossesby feeding on poultry feed, damaging structural materials such as wooden doors, and windows, insulation and electric cables, and gunny bags etc. Rodents also making significant losses by egg consumption, killing young chicks, and transmitting several microbial diseases like Salmonellosis Mycoplasmosis, Hemorrhagic enteritis, Hymenolepiasis, Ascaridiasis etc. to the poultry birds. Their habits of burrowing, feeding, nibbling, urination, defecation and extensive nocturnal movements lead to overall deterioration of poultry premises environment affecting productivity in the farms. Therefore, there is a need of procedures involved in inspection of the poultry premises and assessing the rodent infestation to facilitate planning the rodent management measures effectively. It is contemplated that both food and health security would be ensured, if there are effective management practices of rodent pests in commercial poultry facilities.

Key words: Nocturnal movement, Broiler farm, Rodent pest, Deterioration, Nibbling and Defecation.

INTRODUCTION

Rodentsare considered as unwelcome associates of mankind because they are serious pests for agricultural crops, grain storage facilities, domestic premises and commercial poultry facilities. Due to their high reproductive potential and extremely adaptive capabilities, rodents have been reported to cause colossal losses in practically all spheres of life. The most distinctive feature of these fur bearing micro-mammals is the presence of ‘chisel like’ teeth with open root system at the front of their mouth. They use them to eat food and gnaw at materials. Hence, these animals are commonly called as gnawing mammals. They can walk on the entire foot or hand. Rodents have a remarkable capacity of adapting themselves to any

environmental condition and generally exist in abundance in most land areas. They live in burrows, sewer, compost, weeds, and in any sheltered place. Rats are cunning and suspicious and have definite preferences for food and thus are abroad at night (nocturnal in habit). They have rather poor vision but the sense of smell, taste, hearing, and touch are highly developed in them. Rodentsare by and large the most destructive vertebrate pests which inflict multivariate losses in poultry farmsby feeding on poultry feed, damaging gunny bags, attacking and killing of young chicks(Parshad et al.1987). Damage to poultry feed is a major cause of economic loss in commercial poultry facilities. (Chopra and Dhindsa 1987)It is reported that on average,rodent consume 0.18Kg to 0.38 Kg poultry feed daily in stores (Chopra and Dhindsa 1987).In addition, these notorious pests cause structural damage to various articles like door and windows, electric wires, wire meshes and several other miscellaneous articles(Gora et al.,1995). Besides,rats also contaminate the poultry feed with urine, fecal pellets and hair leading to various diseases in poultry birds and in workers (Hussain et al., 2006). The spillage and contamination of poultry feed is sometimes much higher than the actual quantity of poultry feed consumed by the rats. Spillage of poultry feed in a semi natural poultry environment has been worked out to be 11.26 g/rat per day (Chopra and Dhindsa 1987).The intensity of the rodent population and the losses caused by them in poultry facilities mainly depend upon the location, structure and the practice of rodent management in poultry farms (Parshad et al.1987). Management of these pests is very intricate and ticklish problem. Various methods (mechanical,chemical and biological control methods) have been in use to control rodents throughout the world but no single method is absolutely effectivein all type of situations(Parshad,1999).

MATERIAL AND METHODS

The present study is conducted in tehsils Modlouda, Israna, Panipat, Bhapoli and Smalkha of district Panipat (Haryana). Observations are made from broiler farms situated in urban and rural area.During present investigation, an opinion survey through personal contact is conducted to assess farmer's knowledge, attitude and practices with regard to rodent pest management in broiler farms. The survey is carried out, in all, 100 broiler farms, randomly selected 50 from urban area and 50 from rural area. The farmers are personally contacted and interviewed to record the information given in the questionnaire. The answers to different queries raised in questionnaire were recorded and data were later statically analyzed to draw valid inferences. To observe species composition of rodent pest trapping is conducted by

using catch and multi-catch wonder traps.For this purpose, 10 broiler farm premises (5 from semi-urban/urban and 5 from rural) are randomly selected. Before trapping, pre-baiting is done for 2-3 dayswith cracked wheat grains smeared with 2% vegetable oil to lure the infesting rodents.Trapped rodents areidentified following Jain et.al. (1992) and Chopra et.al. (1996) and their per cent relative abundance is calculated.

Statistical Analysis:

Data collected during the experimental observations are statistically analyzed to draw valid inferences of various parameters concerning different questions explained in the questionnaire. *Chi square* test is used for the sample test.

Chi square Analysis:

$$\chi^2 = \sum \frac{(O - E)}{E}$$

Where O = Observed Frequency Value

E = Expected Frequency Value

$$Degree\ of\ Freedom = (C - 1, n - 1)$$

OBSERVATIONS AND RESULTS During the present study, an opinion survey of 150 individuals is conducted to have information regarding their perceptions towards level of rodent infestation and knowledge, attitude, damages caused, practices of management etc. In all, 50 individuals from urban and 100 individuals from rural are personally contacted and interviewed in the study area to collect necessary information on various queries raised in questionnaire.During investigation about 76.00% poultry farmers from urban localities and 84.00% from rural are complained about rodent infestation in broiler farms. While 24.00% and 16.00% farmers/owners are not aware of rodent problems in urban and rural areas respectively. As far as the level of rodent infestation is concerned, moderate damage to various commodities is reported by 68.42% and 64.28% owners/farmers and heavy damage by 31.57% and 35.71% owners in urban and rural areas respectively (Table-1). Rodent damage to poultry feed, gunny bags, and even killing of young chicks are reported by owners/farms in different broiler farms. As many as 68.42% and 76.19% farmers are reported about attacking and killing of young chicks and 10.52% and 17.67% individuals are reported about attacking of birdsin urban and rural areas respectively.

In all, 63.15% farmers from urban and 71.42% from rural are complained about consumption and contamination of poultry feed. During present investigation majority of farmers/owners are reported about structural damage caused by rodents to various articles in the premises of broiler farms. About 47.36%, 21.05%, 15.78%, 23.68% and 52.63% farmers from urban and 83.34%, 30.95%, 21.42%, 28.57% and 69.04% farmers from rural reported the structural devastation to gunny bags, doors, windows, wire meshes and miscellaneous articles respectively.

Besides, about 55.26% individuals from urban and 80.95% individuals from rural are complained about structural damage to insulation of electric supply in poultry sheds that may occasionally leads to short circuiting and fire hazards. Furthermore, some interviewees, 60.52% from urban and 88.09% from rural are reported about formation of burrows in foundation walls, roof of sheds, vicinity of poultry shed and feed stores Fig.1). During rainy season, these burrows resulted in leakage of water which caused deterioration of poultry house and stored materials including poultry feed.

Table-1 Percent response towards rodent infestation and nature of damage.

Farmer's Response	Location of study area	
'Yes' or 'No'	Urban	Rural
'Yes'	76.00%	84.00%
'No'	24.00%	16.00%
Nature of Damage		
Moderate damage	68.42%	64.28%
Heavy damage	31.57%	35.71%

As far as the management of rodent pests is concerned, a maximum of 76.31% and 71.42% owners are reported about different techniques of rodent management in broiler farms of urban and rural areas respectively. Rest of the Owners are not applying any method to tackle rodent pests in these broiler farms.

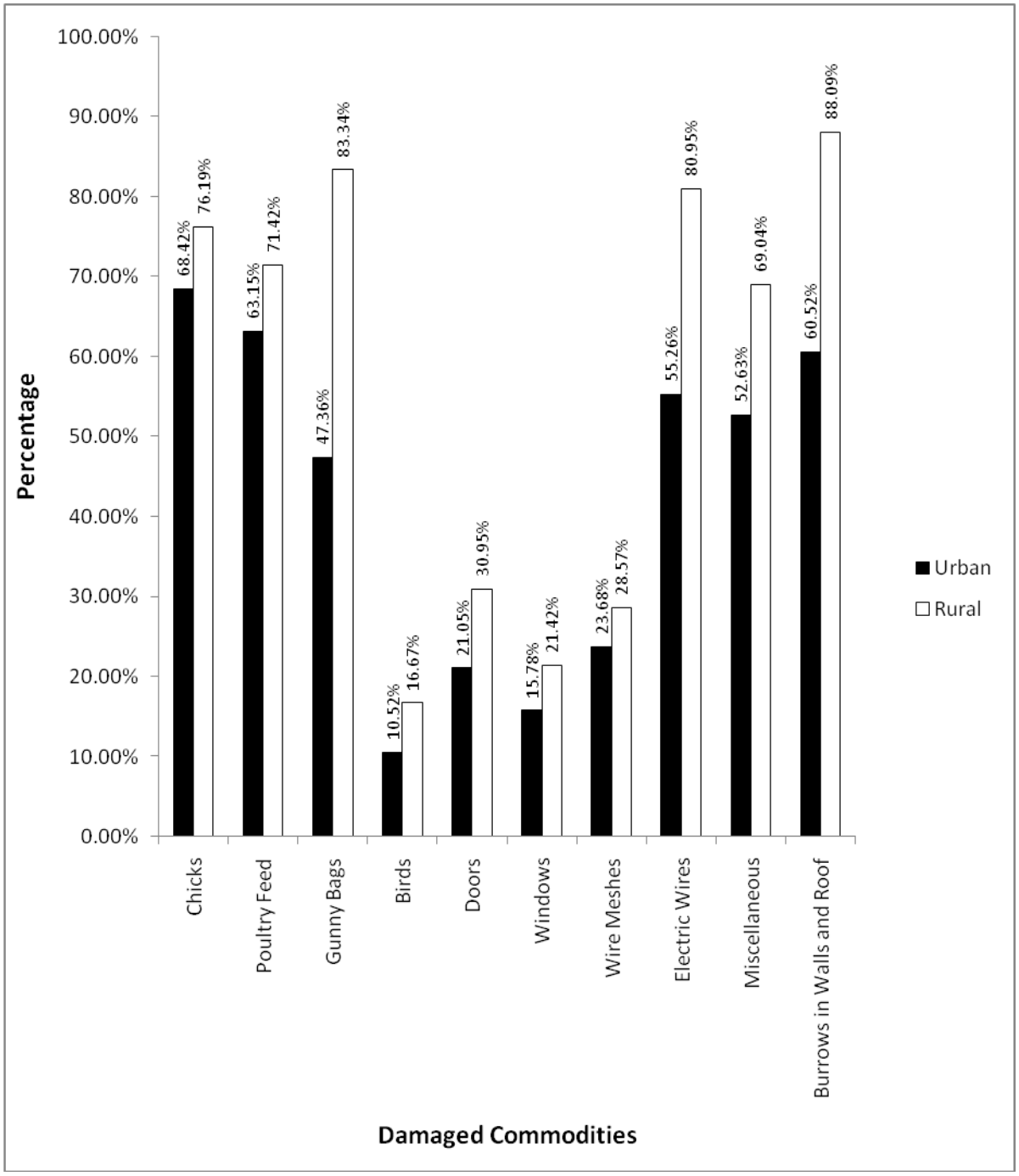

Fig.1 Response towards rodent damage to various commodities in broiler farm.

Further, only 31.04% and 30.00% respondents are reported about the use of mechanical methods like trapping, and 13.79% and 26.67% about manual killing of rodents in urban andrural areas respectively (Table-2). However, these owners are not familiar with proper trapping techniques and, thus complained of failure of trapping method of rodent management in broiler farms. During present opinion survey, a maximum of 55.17% and 43.34% respondents are given positive response towards the use of chemical method for

rodent management in broiler farms in urban and rural areas respectively. Out of these respondents about 81.25% and 76.92% owners are reported the use of Zinc Phosphide and only 06.25% and 15.38% owners reported the use of celphos (fumigant) in urban and rural areas respectively. Although, bromadiolone (Single-dose anticoagulant rodenticide) has been commercially introduced in India since 1988 for rodent management in fields and in confined conditions, but during present survey only 12.50% and 7.69% owners are reported the use of such kind of rodenticides in broiler farms of urban and rural areas respectively.

Table 2 Different measures of rodent management in broiler farms

Study Area	Control measures for Rodent Management		
	Trapping	Chemical Method	Manual Killing
Urban	(9) 31.04%	(16) 55.17%	(4) 13.79%
Rural	(9) 30.00%	(13) 43.34%	(8) 26.67%

Table -3 Different chemicals used for rodent management in broiler farms.

Study Area	Zinc Phosphide	Celphos	Anticoagulant
Urban	(13) 81.25%	(1)6.25%	(2)12.50%
Rural	(10) 76.92%	(2) 15.38%	(1) 7.69%

Table-4 Species composition and relative abundance of trapped rodents.

S. No.	Relative Abundance	Study Area	
		Urban	Rural
1	*R. rattus*	83.33%	94.43%
2	*M. musculus*	5.88%	6.25%
3	*B. bengalensis*	5.26%	6.65%
4	*S. murinus*	0.00%	1.38%

Furthermore, almost all of the poultry farmers are neither obtained any training from the established training centers, not they are aware of proper procedure of the use of rodenticides. These owners are unaware of the pre-baiting, proper bait formulations and proper disposal of dead rodents. Such unawareness may lead to accidental secondary poisoning in non-target animals.

During the study, the captured rodents are identified as house rat *(Rattus rattus)*, the house mouse (*Mus musculus)*, lesser bandicoot rat (*Bandicota bengalensis)* and insectivore mammal (*Suncus murinus*). The house rat, *R. rattus*, the house mouse, *M. musculus* and the Indian mole rat, *B. bengalensis*are trapped in almost all of the randomly selected broiler farm premises. But the insectivore, *S. murinus*is rarely observed in the premises located in the study area. Out of these *R. rattus* was reckoned to be the most predominant rodent pest. In all,83.33%, 5.88%, 5.26% and 0.00% relative abundance of *R. rattus, M. musculus, B. bengalensis* and *S. murinus* are observed in the premises of poultry farms located in urban, and 94.43%, 6.25%, 6.65% and 1.38 *R. rattus, M. musculus, B. bengalensis* and *S. murinus* are observed in rural (Table-4).

DISCUSSION

Rodents are considered to be most adaptive mammals on the earth that surpass the others, both in terms of species and abundance. It is evident from the fact that about 40 per cent of mammalian species and genera are constituted by rodents (Anderson and Jones, 1984). On Worldwide basis, nearly 3000 species belonging to 351 genera and 35 families are included in order Rodentia (Walker, 1968). Owing to diverse climatic conditions as well as vegetative diversities, the rodent fauna of Indian sub-continent is remarkable varied. It is represented by 46 genera and 128 species (Roonwal 1987). Their habitat, distribution, abundance and economic significance varies in different situations i.e. crop field, storage facilities, poultry farm and residential premises. During the present study, field survey is carried out to determine the species composition, relative abundance and methods of rodent pest management applied by the farmers in the premises of commercial facilities located in urban or semi-urban and rural area in district Panipat. For this purpose, periodic trapping experiments are conducted. It is found that the relative abundance of rodent pests in broiler farms are greater in rural area than the urban. Due to the presence of Sharp incisors and exploratory nocturnal habit, these micro-mammals inflict considerable economic losses to poultry farming practices. They are known to have an easy access to large amount of well-balanced food available in the form of poultry feed and water in the broiler farm premises. They consume and contaminate the poultry feed with their urine, faecal pellets and hairs Chopra and Dhindsa 1987). In this study, structural damage to various articles e.g. gunny bags, doors, windows, wire meshes etc. results in the increase of maintenance cost of poultry farming (Parshad et al. 1987, Chopra et al. 1996, Hussain et al. 2006, kandhwal 2006). The extent damage to gunny bags are variable in different poultry premises from urban to rural.

Structural mutilation of electric wires insulation is occasionally observed. This may result in short circuiting and fire hazards in the poultry premises(Malhi, 1997). The holes made by rats in the roof of kacha sheds cause leakage during the rainy season and the water deteriorate bird's sheds and the feed stores.The poultry birds are also not free from the attack of rodent pests. The hose rat, *R. rattus*, in particular, has been reported to attack and kill young chicks in poultry farms (Malik et al. 1970, Gupta and Mangat 1977). Most of the farmers are using traps, zinc phosphide bait and anticoagulant bait for the control of rodents. Majority of them are found lack of information about proper technical methods of rodent management and, therefore, could not succeed in tackling these pests.Similar observations are also reported during opinion survey of farmers in crop fields (Dubey and Awsthi 1991) and in residential premises (Bhadauria et al. 1995, Munjal 2000).

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