International Journal of Zoology Studies
ISSN: 2455-7269; Impact Factor: RJIF 5.14
www.zoologyjournals.com
Volume 2; Issue 4; July 2017; Page No. 42-44

Opinion survey on rodent problems and their management in cropping system in Indo-Gangetic plain of north-eastern part of Haryana

Ombir Singh

Ext. Lecturer in Department of Zoology, Govt. College Safidon, Jind, Haryana, India

Abstract
Rodents are one of the most serious impediments to food production and storage in India. They are extremely destructive to crops/commodities by gnawing and feeding, spoilage, contamination and hoarding at farm level and in storage conditions. Haryana is predominantly an agrarian state in north-western part of India that shelters large rodent pest population. It has both xeric as well as mesic species of rodents. Among these, *B. bengalensis, T. indica, R. meltada, M.booduga, M. platythrix, M. hurrianae and G.ellioti* have been reported from crop fields whereas *R. rattus and M. musculus* have been reported in residential premises, food stores and godowns. The five stripped plam squirrel, *F. pennanti* has been reported to destroy orchards and vegetable crops in different parts of the state. However the commensal forms *R. rattus and M. musculus* have also been found to inhabit the crop fields. Therefore, there is an immediate need to manage these pests effectively in crop fields and storage conditions. Hence an attempt was made to assess the farmers' knowledge and awareness towards rodent problems and their management by conducting opinion survey through personal contact programme.

Keywords: rodent pest, impediments, contamination, gnawing, hoarding

Introduction
In India, rodents' problem in agricultural situations is as severe as in residential premises, groceries, commercial seed stores and godowns. With the development of intensive agricultural practices rodent pest population also growing and causing huge economic losses to crops production. They harm every farmer whether he is growing wheat, paddy, sugarcane, millets, pulses, vegetables or plantation crops like cocoa, coconut etc. These agricultural situations provide ideal food and shelter and unlimited supply of water to survive the pest population. Analyses of reviews on pre-harvest losses of cereal crops due to rodent pest is estimated as 5-15% of total produce. Malik (1987) [8], through questionnaire, assessed the response of 220 rural residential owners, 190 urban residential owners, 45 officials of grain stores/godowns, 134 crop field owners, 40 flourmill owners and 80 grocery store owners and indicated that although rodent infestation was evident in all the reported habitats, but extent of infestations varied in these habitats. As many as 85%, 75%, 90%, 85%, 85% interviewees reported moderate to heavy damage to variety of items by rodent including structural damage in urban residential premises, corp fields, four mills, grocery stores respectively. Dubey and Awasthi (1991) [5] conducted opinion survey of farmers in villages in district Jabalpur of Madhya Pradesh and reported that the farmer's assessment of the yield loss due to rats was to the tune of 26.66kg/ha to 250kg/ha in the wheat crop and 80kg/ha to 200kg/ha in paddy crop every year.
Malik (1987) [8] reported that large number of interviewees implemented chemical methods of rodent management wrongly and also not take required precautions. According to Chopra and Dhindsa (1988), only 33.98%, 8.95% and 4.74% poultry owners were using traps, zinc phosphide bait and anticoagulant bait respectively for the control of rodents. Majority of them did not know proper technical methods of rodent management and, therefore, could not succeed in tackling these pests. Kandhwal (2006) [7] conducted an opinion survey of poultry officials/owners and revealed that only 20%, 7.84%, 20.83% and 12.50% owners/officials were using traps for the control of rodents in layer farms, broiler farms, hatcheries and feed mills respectively

Material and method
During present investigation (Oct. 2013 to Dec.2014), an opinion survey through personal contact was conducted to assess farmers'/people' knowledge, attitude and practices with regard to rodent problems and pest management in rice-wheat based agro-ecosystem. During the survey in all 600 people/farmers (200 from urban and 400 from rural) were randomly selected from the Indo-Gangetic Plain of north-eastern part of Haryana. This study area extends over two districts (Karnal and Panipat) of the North-Eastern Haryana. The farmers were personally contacted and interviewed to record the information given in the questionnaire. During opinion survey major stress was laid on following observations:

i) Farmer's/people' opinion about rodent problems in field crops.
ii) Level of rodent infestation.
iii) Nature and extent of damage caused by rodents.
iv) Proper/improper use of scientific/indigenous methods of rodent management.

Results and Discussion
During the present study, an opinion survey of 600 individuals randomly selected from urban and rural areas of district Karnal and Panipat was conducted. The survey revealed that 75% and 84% individuals complained about rodent infestation while 25%

and 16.00% individuals from urban and rural areas respectively were not aware of rodent problems in crop fields. These observations are in confirmation with those of earlier research studies that reported 75.00% to 90.00% positive response of interviewees about rodent infestation in different Habitat, i.e. residential premises, flour mills, grocery stores, poultry facilities crop fields etc.

Table 1: Percent response of individuals towards Rodent infestation in the study area.

Individuals From	Number of Interviewees	People's Response	
		Yes	No
Urban area	200	75.00%	25.00%
Rural area	400	84.00%	16.00%

In district Karnal about 66.24% and 65.32% individuals reported moderate damage and 33.76% and 34.68% individuals from urban and rural areas respectively reported heavy damage. In district Panipat of North-Eastern Haryana about 68.42% and 64.28% individuals reported moderate damage to field crops/ commodities, structural damage to irrigation channels and bunds, while about 31.57% and 35.71% individuals from urban and rural areas reported heavy damage (Table 2).

Table 2: Percent response of individuals in relation to extent of rodent damage.

Study area	Individuals From	Percent response	
		Heavy	Moderate
Karnal District	Urban	33.76%	66.24%
	Rural	34.68%	65.32%
Panipat District	Urban	31.57%	68.42%
	Rural	35.71%	64.28%

As far as the management of rodent pest in crop fields is concerned, a maximum of 76.31% and 70.16% individuals from urban and rural areas respectively reported positive response towards the management of rodent pest. These individuals were applying different techniques of rodent management while, the other were not applying any method to tackle with the problem. In district Panipat a maximum of 65.71% and 53.34% respondents from urban and rural areas respectively reported positive towards the use of different chemicals like Zinc phosphide and single-dose anticoagulant rodenticides for the rodent management (Fig. 1). Out of these respondents about 82.40% and 79.32% people from urban and rural areas respectively reported the use of zinc-phosphide and rest of the people reported the use of other chemicals like Celphos and Bromadiolone for rodent management in agricultural situations. In district Karnal a maximum of 63.91% and 55.10% individuals from urban and rural areas reported positive response towards the chemical method of rodent management. Out of these about 81.65% and 80.12% people from urban and rural areas respectively were using zinc phosphide. However, many effective rodenticides like Bromadiolone (single-dose anticoagulant) has been commercially introduced in India for rodent management in fields and in confined conditions, yet the people in the study area of North-Eastern Haryana reported lesser response towards these rodenticides.

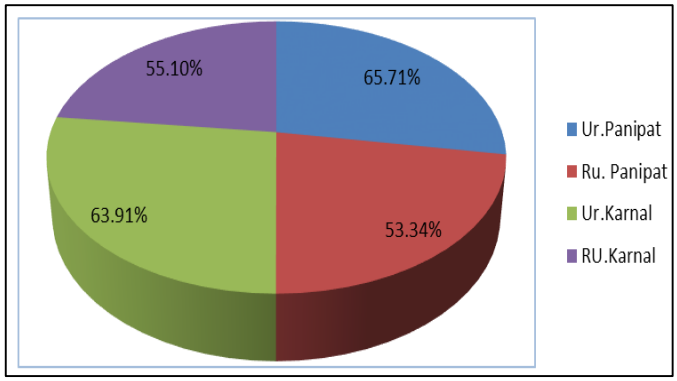

Fig 1: Percent Response of People towards chemical method of Rodent Management

In agricultural situations damage caused by rodents is evident from the day the crops are shown, it is generally severe during tillering and maturity stages of the crops particularly in paddy, wheat, millet and vegetables etc. Rodents cause damage from their burrowing activities which can result in levee failure, flooding of fields, loss of water resources and the undermining of structures and foundations (Josh *et al*. 2000; Stuart *et al*. 2008). Burrows and burrow openings can result in damage to farm equipment and injury to workers and their live-stock. During present investigation majority of farmers/owners reported the multiple damage caused by rodents to various commodities associated with agricultural farming practices i.e., stocks of wheat and paddy straw used for cattle feed, structural damages to irrigation channels, bunds, and various articles related to farmhouses etc. Thus increasing the maintenance cost of farming practices. Therefore, there is an immediate need to manage these pests effectively in agro-ecosystem.

Analysis of opinion survey, further revealed that almost all of the interviewees/ farmers neither obtain any training from the established centres, not they were aware of proper procedure of the use of rodenticides. Thus they complained of the failure of the rodenticides in controlling rodent population in their farms. The possible reason of failure might be that these owners were unaware of pre-baiting, proper bait formulations and proper disposal of dead rodents. Majority of farmers are often unaware of the extent of the problem and the economic losses caused by these micro-mammals and accept it as normal features in agricultural farming practices.

References

1. Barnett SA, Prakash I. Rodents of Economic Importance in India. Arnold Heinemann Publ. New Delhi, 1975, 175.
2. Bhadauria M, Kanwar N, Bhadauria AS. Survey of Rodent menace and their Control in the residential Area. Rodent Newsl. 1995; 19(1):10.
3. Chopra G, Kaur P, Guraya SS. Rodents' ecology, biology and control. R. Chand and Co. Publication New Delhi, India, 1996.
4. Corbet GB, Hill JE. A world list of mammalian species. London (British *Museum*, National History), 1986.
5. Dubey OP, Awasthi AK. Opinion survey on rodent control, *Rodent Newsl*. 1991; 15:11-12.

6. Ellerman JR. The fauna of India, Mammalia, (Rodentia), part 1 and 2. Govt. of India, Delhi. 1961; 3:849.
7. Kandwal S. Ecology and management of Rodents in commercial Poultry facilities in District Jind (Haryana) Ph.D. Thesis, Kurukshetra University, Kurukshetra, 2006.
8. Malik M. Positivity of opinion survey of rodent problems and their management in district Kurukshetra, Jind and Hissar of Haryana, M.phil. Dissertation, K.U.K, 1987.
9. McDonald D. Rodent damage in Agriculture, In: Rodent control in tropics. Pest control. 1983; 25(3):86-87.
10. Meerburg BG, Singleton GR, Kijlstra A. Rodent- borne diseases and their risks for public health. Critical reviews in Microbiology. 2009 b; 35:221-270.
11. Parshad VR, Singh N, Kocher DK, Kaur R. The lesser Bandicot Rat (*Bandicota bengalensis* Gray and Hardwicke, 1983). ICAR (Indian Council of Agricultural Research). Central Aid Zone Research Institute, Jodhpur, Tech. Bulletin No. 2007; 14:8-18.
12. Singleton GR. Impacts of rodents on rice production in Asia. Los Banos, Philippines: IRRI Discussion Paper series No. 45, International Rice Research Institute, 2003, 30.
13. Zang Y, Li B. Change in community composition and population dynamics of commensal rodents in farmhouses in the Dongting Lake region of China. In : Rats, mice and people : Rodent Biology And Management (eds) G.R. Singleton, I.A. Hinds, C.H. Kreb & D. Spratt, ACIAR, Canberra. 2003, 256-259.