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STUDIES OF MULTI MIRROR REFLECTOR AND DISTRESS SOUND PLAYER (AUTO-REVERSE) AS BIRD PEST REPELLANTS

Shahid Hafeez, Zahoor Hussain Khan, Rashid Ahmad Khan, Ihsan Qader and M. Ahsan Khan
Department of Forestry, Range Management and Wildlife, University of Agriculture, Faisalabad.
Department of Agri. Entomology, University of Agriculture, Faisalabad.

Pesticide application on edible plants is disastrous when the user is illiterate and the consumer is ignorant. This situation prevails where mono cropping is practiced. If informed human being can tackle such problem to some extent but it is beyond the tolerance of wildlife. The purpose of present study was to curtail the use of chemical pesticides in the agsro-wildlife ecosystem by evolving and introducing mechanical pest control as well as pest repellent devices. Mechanical devices were found safe and helpful for the conservation of wildlife and the habitats. Multi-mirror reflector made with 6 (six) multidirectional mirrors (wind as well as battery driven) and a distress sound call player (auto reverse) were used for repelling the bird pests from cropped area using reflection webs and bird sounds respectively. Due to adjustable height, the reflector device was found to be very effective against the attack of house sparrows (*Passervs domestics*) on wheat. The use of Distress Sound player reduced the number of house crows, parakeets, mynahs and bulbuls from 40 to 25, 75 to 18, 27 to 15 and 67 to 49 respectively. Whereas the number of house sparrows damaging wheat also decreased from 510 to only 8 when Multi Mirror Reflector was used.

Key words: Multi mirror reflectors, distress sound player, bird pests

INTRODUCTION

Agriculture during the present modern age has become an industry where the investor has deep desire to get the maximum returns by using heavy dozes of fertilizers, weedicides but he overlooks the adverse side effects of the chemicals for increasing crop production. The use of pesticides and other chemicals has raised manifolds today because of insects and other vertebrate attack resulting in heavy damage. All locally used chemical pesticides for plant protection purpose are extremely toxic, persistent and relatively more toxic to mammals (Potts, 1986, Khan, 1990). The field workers using these toxic pesticides are usually not well trained. Moreover, precautions in using these chemicals are hardly taken care. The situation has been reported to be rather more severe in cotton, sugarcane and rice growing belts (Chaudhry, 1994, Khan, 1990). These poisonous chemicals are also victimizing the non-target and useful wildlife. The useful fauna is becoming rare with the passage of time due to direct mortality and high egg failure rate in different species (Khan, 1990).

Many workers tested the use of chemicals as repellent to control different kinds of pests (Garthner, 1992, Mason and Methew, 1996, Moran, 1996, Clark, 1997 and Nolte *et al.*, 1998). They got satisfactory results to some extent with extra ordinary precautionary measures due to the toxic effects of these chemicals.

Many workers have tested the mechanical devices to control pest damage on agricultural crops. For example, Birmingham (1983) tested trapping techniques for the control of wild boar damaging to crops in agriculture area adjoining rivers, irrigated plantations and other thickets along marshy areas. Technique had limited success and its economical use was also questionable. Whereas, Khan (1990) reported different mechanical trapping techniques like panel trap, silo trap, steel jaw trap and netting which were highly effective. He further added that pig sticking; shooting, electric fencing, explosive bombs and hounding were also effective techniques against some mammalian pests but were also risky particularly for unskilled persons in the fields. Hussain (1990) studied the effectiveness of different trapping, netting and scaring techniques for harmful birds. He also tested **paro** trap, mist trap and clip net and found to give encouraging results. Khan *et al.* (2002) studied some indigenous methods like nets and decoys for capturing gray black francolins (*Francolinus pondicerianus*) and migratory quail (*Coturnix coturnix*). The workers reported that these mechanical devices were very useful and effective. Scarecrows are in common use and gave good results Decoying calls were also used for attracting the birds for trapping with effective results (Khan 1998). No considerable work has been done in the past by using multidirectional mirror techniques and distressed sound call techniques for repelling the bird pests. The present study was designed to evaluate the efficacy of different mechanical pest repellants for controlling and reducing the crop damage. Two devices i.e. Multi-mirror reflector and distress sound call repellents were tested as mechanical (Non chemical) devices to control the damage on crops due to bird pests.

MATERIALS AND METHODS

The research was carried out in the cultivated area of Chak No. 33/JB (Viroana) that occur in the West of Faisalabad City. Along the eastern side of this village was Maduana water tributry. The land of this village was intensively cultivated. Soil was mostly clay-loam and rich in nutrients. Underground water was fit for irrigation. Small land holding were generally cultivated as mixed crops. Cotton, sugarcane, wheat and fodder were the major crops grown seasonally. The cropland of this village represented the best picture of agro-forestry producing Shesham, (*Dalbergia sisso*), Kikar (*Acacia nilotica*), Seris (*Albizzia lebbek*), Poplar (*Populus deltoids*), Simal (*Bombix ceiba*), Beri (*Zizyphus jujoba*) and mulberry (*Morus alba*) trees species alongwith the crops. Multi-Mirror Reflector thereafter called MMR and Distress sound player (auto-reverse) were tested as repellant devices. MMR was used to estimate reduction in the number of House Sparrows, which causes reduction in wheat yield very significantly due to its serious attack. In studies the wheat damage ranged from 2 to 11%, being more prominent at the maturity stage of the crop (Shafi *et al* 1990). During current study the number of house sparrows visiting the field (one acre) during morning (08.00-9.00 hours) and evening (17.00.18.00 hours) hours were counted for five days (control) and average birds per day was calculated. Then MMR device was fixed at the same place in the wheat field and number of birds visiting per acre was counted and average was compute (treatment). Battery driven MMR was used during this study. See figure 1.

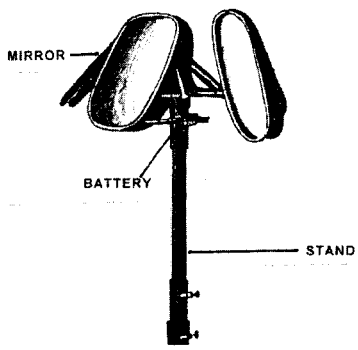

Fig. 1. Battery Driven Multi-Mirror Reflector

A fruit garden having an area of 1.5-Acre with considerable length and width was selected to test the effectiveness of distress sound player automatically operating at suitable intervals. Efficacy of the technique was evaluated by recording the reduction in the number of individual's bird pest population e.g. Mynah (*Acridotheres tristis*), Common Crows (*Corvus splendens*), Rose-ring Parakeet (*Psittacula krameri*) and Red-verted Bulbul (*Pycnontus cafer*) who visited the garden. Bird counting was done for five days as control and then for five day using the device. During the prescheduled hours and averages of the number of the birds were calculate. Total record of all observations was tabulated and statistically analyzed to access the effectiveness of the devices (Steel *et al 1982*).

RESULTS AND DISCUSSION

Multi-Mirror Reflectors (MMR)

The MMR were placed in such a position that they could create reflection web over the selected part of the field. Battery driven MMR was used and found to be the best in operation. It was allowed to run during scheduled hours for five day and the House Sparrows were counted for control and treatments. Data showing the effectiveness of the device by her presented in graph. (Figure No.1)

The results showed that before using the device, 370 to 510 house sparrows visited the wheat field per day, which declined, surprisingly to 8-9 only during the use of device. The results also revealed that the number of house sparrows damaging wheat crop decreased with the continuous use of MMR for five days. The resultant data was very much encouraging as the numbers of house sparrows visiting the study site were reduced to a greater extent. The specified result justified the use of this device as repellent against house sparrows.

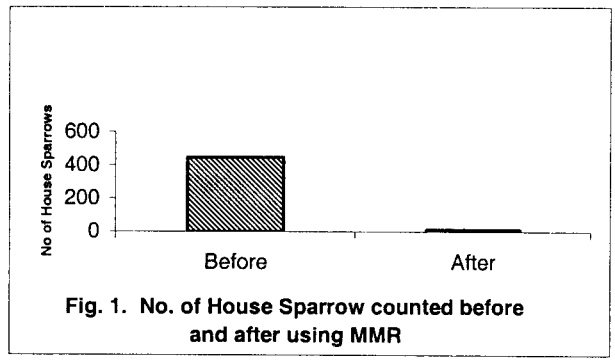

Fig. 1. No. of House Sparrow counted before and after using MMR

This bird damage to wheat crop was especially at milky stage. It is expected that the same device could prove to be equally effective and useful against other pestiferous birds, which cause damage to other kinds of agricultural crops.

As repellent tool, distress sounds, were used in many cases to reduce crop losses. For this study, distress sound calls of parakeets, crows, mynahs and bulbuls

were recorded by keeping the caught birds under stress condition. These sound calls were found to play a vital role as repellent while replayed in the areas to be protected from damage against these pest birds. Such recorded cassettes were produced in different voice combinations and individually for the birds namely parakeets, crows mynahs and bulbuls, which are, regarded as harmful and damaging birds for fruit gardens. Number of these birds visiting the said garden was continuously observed and counted for five days before (control) and during the use of device (treatment).

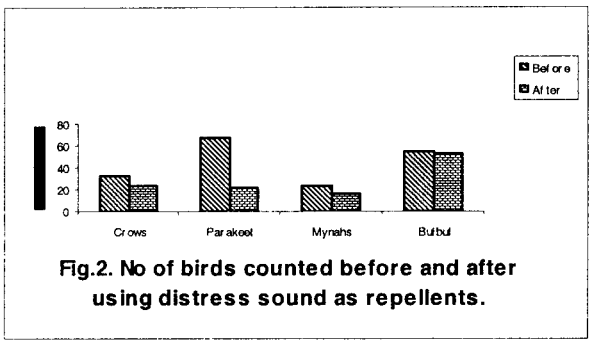

Fig.2. No of birds counted before and after using distress sound as repellents.

The parakeet, mynahs, house crows and bulbul were observed as regular visitors in the garden area. The concentration of bird pests was found more during 8-9 hours in the morning and 5-6 hours in the evening. Data were collected during high activity hours of the harmful birds. All such birds visiting the site were counted within pre-scheduled timing. During collecting observations for the control and the treatment data, all the birds entering the garden were counted. The gardeners disturb the birds by using different techniques like explosives materials and catapult. The birds leaving the garden due to such disturbances and coming back again were considered as new comers and subtracted from the total counts as correction factor. According to predetermined plan, the auto reverse distress sound player was set in the garden along with six (6) speakers uniformly placed through out the garden. Recorded sounds were replayed alternately for each bird singly and collectively at reasonable intervals of 10 minutes. The collected data is presented her diagram as in figure.2.

The selected garden was an ideal site for bird pests like house crows, parakeet, mynahs and bulbul to damage the fruit crop. These birds decreased in number from 40 to 25, 75 to 18, 27 to 15 and 67 to 49 respectively before and during the use of Distress Sound Calls.

It is an established fact that use of poisonous chemicals for controlling harmful vertebrate pest is very dangerous for human being as well as for the wildlife and cannot be advocated as safe control measure. The selected pesticides also proved very harmful especially for breeding female. The chicks were found more susceptible and vulnerable to be damaged due to multidimensional side effects of the chemicals (Potts. 1968).

The research studies have revealed substantial decline in the population of parakeets, house crows, mynahs and bulbul as a result of using Distress Sound Call system, a mechanical bird repellent. Similar observations were also reported by Woff (1978) for attracting game birds in USA. He commented that recorded sound calls were useful when replayed, especially during the breeding season. He also reported that when replayed un-naturally, the birds were found to show a repellent action. Such reaction of the birds towards defectively recorded sound calls strengthened the idea that distress sound calls which have been shown in this study to serve as an effective repellant for pestiferous birds. In the light of the quoted reference and the results obtained, it can safely be concluded that the use of MMR and Distress Sound Call could be used as the best mechanical technique against pestiferous birds.

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