METHODS OF CONTROLLING STARLINGS AND BLACKBIRDS

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Most people have accepted the fact that all living things can be beneficial to mankind in some way or other. This is especially true of our wild birds, since they provide enjoyment and wholesome recreation for most of us, regardless of whether we live on farms or in the city. But despite the fact that wild birds are for the most part beneficial, at times individuals or populations of certain species can seriously affect man's interests. When such situations occur, some measures of relief are desirable and usually eagerly sought.

This report is not intended to answer all the questions that may arise concerning problems with blackbirds and starlings; instead, it is merely a summary of measures used to protect agricultural crops from these birds.

For years there has been evident in North America a general aversion to controlling birds by any means. Consequently, there have been relatively few studies conducted to find ways and means of reducing damage by birds or of controlling the birds themselves. Bird control really is in its infancy with few guidelines available. This is especially true with respect to the use of toxicants, repellents, and electronics in bird control.

The Bureau of Sport Fisheries and Wildlife, because of its responsibilities for the protection of migratory birds, has an important obligation for leadership in research on control of bird depredations. This responsibility is shared by agricultural agencies, who conduct research to find ways to protect crops by modifying cultural techniques or by methods such as the development of bird resistant crop varieties. State conservation organizations also are concerned with bird depredations and nuisance problems and encourage the development of damage control methods that cause minimum hazards to wildlife. Public health authorities and others are interested in such research efforts because of the relationship of birds to human livestock diseases.

The Bureau of Sport Fisheries and Wildlife conducts research on control of bird damage primarily to help individuals and communities with their bird problems in ways which safeguard desirable birds, other wildlife, persons, or their property. Population reduction methods are not to be considered when adequate control can be affected by other means.

REGULATIONS

Blackbirds, cowbirds, and grackles are protected under the Federal Migratory Bird Treaty Act. However, Section 16.22, Title 50, Wildlife, of the Federal regulations provides that any person without a permit may kill yellow-headed, red-winged, bicolored red-winged, and Brewer's blackbirds, cowbirds, and all grackles found committing, or about to commit, depredations upon any agricultural crop, or ornamental or shade tree. Starlings are not so protected.

The Federal regulations do not permit killing of any of the above-named birds in violation of any state law or regulation. Before applying reductional control measures, state and local laws relating to the control of birds should be consulted. If a state permit is required, it must be obtained before exercising the privileges conferred by Section 16.22 of the Federal regulations.

Most states and municipalities regulate the sale, transportation, and use of fireworks which at times may be used to alleviate bird damage. Federal law prohibits shipment of such items into states where they are illegal. A prospective user must determine the legal status of fireworks in his own locality, but in most cases permission for their use in bird control can be obtained from proper authorities.

BLACKBIRDS

Blackbirds, cowbirds, and grackles are primarily seed eaters and have found a favorable habitat and a source of food much to their liking in man's cultivated fields. Cereal grains are especially attractive to these birds, and their appetites have evoked the wrath of many a grower. Bird damage problems are very real at certain times and places, but may vary in intensity seasonally or from one area to another. In three western states alone, the damage attributed to blackbirds is estimated at 15 million dollars annually. The birds swarm out of roosts in nearby marshes or woodlands to feed on such crops as rice, corn, small grains, truck crops, nuts, and fruits. They also may cause damage in another way, through pulling up seedlings in forest plantings or sprouts of agricultural crops.

Maturing corn is attacked from the time it reaches the milk stage until it is picked, with the most severe damage occurring while the kernels are still soft. After the grain has hardened, birds peck out individual kernels, so the damage at that time occurs at a slower rate than during the milk and early dough stage. Ears with husks stripped off also become vulnerable to insect attack and mold due to moisture accumulation. Giltz and Stockdale (1960) state: "The increase in the blackbird population in Ohio has created a major threat to some of the state's best cornfields. So severe is the attack in major distress areas that some farmers are taking their land out of corn production and planting other crops in which birds have little interest."

Major damage to the rice crop occurs in late summer and fall during the ripening period. Blackbirds begin to feed upon rice as soon as it reaches the milk stage and continue until the crop is harvested.

STARLINGS

The European starling was imported into New York City about 1890 and has now spread into every one of the 49 continental states. By 1920 it had become a serious pest in the East through feeding on crops or roosting in immense flocks in trees or on buildings. More recently the birds have invaded the West, and in roosting in holly groves, contaminate what would otherwise be salable foliage. Starlings primarily are insect eaters, but have a liking for cherries, grapes, and other fruits. At cattle and poultry feedlots, they consume and contaminate considerable amounts of food. Objections also have been raised against their habit of usurping the nesting sites of native birds, such as woodpeckers, swallows, and bluebirds.

Many ways have been tried to prevent the objectionable roosting and feeding of these birds. In some instances damage can be prevented by correct and persistent application of one or more of the methods of control mentioned in this paper, but in other situations nothing has worked. The effectiveness of the control procedures depends largely upon selection of the proper devices and the manner in which they are used, as well as alternate sources of food and roosting areas.

CONTROL

Most control measures are designed to frighten birds from crops without harming them. Less frequently control involves local reductions in bird numbers.

Effective control depends on a number of factors; first and foremost is that the operator must want to remove the birds from his field badly enough to apply himself diligently to the job.

It is best to initiate control just before the crop becomes vulnerable and as soon as the first birds begin to feed in the field. The larger a flock becomes and the longer it is allowed to remain, the more costly it will be to drive the birds away. In some fields, birds may alternately feed and loaf throughout the day; in others, they may feed only at certain times in the morning or late afternoon. To make the control measures most effective, it is first necessary to determine the feeding habits of the birds involved.

Persistence is the key to success. Control measures must be applied as long as the crop is vulnerable and birds are present. Efforts during the first weeks of damage will be most productive and may reduce the need for control later on.

No single method will work completely for long periods, and, therefore, a variety of techniques may be necessary. For example, the various frightening devices should be used singly and in combination and their location shifted frequently so the birds do not become accustomed to them.

FRIGHTENING DEVICES

Shotgun and .22 Caliber Rifle

The .22 caliber rifle, with long-rifle, high speed, hollow point ammunition, is one of the best weapons known for frightening blackbirds from open fields. Shooting should be done from an elevated stand which places the shooter above the level of the crop. This gives the shooter a clear vision over a large area, and enables him to place his shots close to the birds. From such a stand near the center of the field, one man with a .22 rifle has successfully kept blackbirds out of a 160-acre field (Neff and Meanley, 1957).

The shotgun with standard shot ammunition is fairly effective along the flight lines where birds are entering and leaving the field, but birds quickly learn that the shotgun is not harmful if they stay out of range.

The exploding shotgun shell is a 12-gauge shotgun shell which contains a king-sized firecracker rather than pellets. The firecracker is projected 100 to 150 yards before it explodes and is more effective than the regular shot shells (Zajanc, 1958).

Control through the use of frightening devices requires time and patience and may be quite costly. The .22 rifle can be a hazard to

neighboring property, livestock, and humans if used by irresponsible people. State and local ordinances regarding shooting must be observed.

Rope Firecrackers

Since 1949, the Bureau of Sport Fisheries and Wildlife has successfully used rope firecrackers in reducing damage by redwings, cowbirds, and grackles in various grain crops. This device has become so widely accepted that a number of states banning firecrackers have revised their regulations to permit their use for crop protection. Detailed information on the rope firecracker is provided in Wildlife Leaflet 365 (Neff and Mitchell, 1955).

The materials needed to make the rope firecracker are cotton rope, cotton twine and firecrackers. The cotton rope is cut to the desired length; the fuses of the firecrackers are inserted between the strands; and the rope assembly is suspended from the top with the twine. The cotton rope serves both as a support and a central fuse for the firecrackers which ignite as the rope burns from the lower end. The interval between explosions is determined by the burning rate of the rope and the spacing of the firecrackers. Burning speed of the rope can be influenced by its diameter and tightness of twist, its chemical treatment, and weather conditions. Firecrackers of the type known as bulldogs, cherry bombs, and cannon crackers are satisfactory for use in this device if they contain approximately 18-grains of powder.

One properly located firecracker rope can protect a block of approximately 4 acres of standing corn. However, if the assembly is suspended so that the explosions occur above the corn tassels, about twice as much acreage can be protected.

An aerial bomb known as the 2-shot repeating bomb is manufactured especially for crop protection. It consists of a wooden block with two upright units connected by a fast fuse. The fuses of the bombs are inserted at intervals between strands of cotton rope set in a horizontal holding board. As the rope burns, the fuses ignite, and each bomb produces two intense explosions in the air about five seconds apart. The intervals between the paired explosions are determined by the spacing of the bombs along the cotton rope. The repeating aerial bombs may protect up to 20 acres of standing corn (Mitchell and Linehan, Wildlife Leaflet 385).

Fireworks of this type can seriously maim or kill and should be handled with the respect due explosives. State and municipal regulations should be checked before using fireworks.

Gas Exploders

Several types of exploders have been used effectively to reduce crop destruction by blackbirds and starlings and to deter them from their roosting areas. The various machines--which range in price from $60 to $130--are similar in principle but differ somewhat in construction; all depend on a buildup of acetylene gas for the explosion. Their generators are composed of two compartments: the lower compartment is the generating chamber and contains the calcium carbide; the upper compartment contains water. Either a wick or a jet regulates the flow of water to the carbide, thereby determining the date at which the gas is generated and the explosions occur. As the gas is produced, it swells a rubber diaphragm which in turn actuates a release mechanism and allows gas to escape to the exploding chamber.

When the diaphragm returns to its original position, it triggers a lever which ignites the gas in the exploding chamber by means of a spark from a flint. The blast produced by this device far surpasses that of a 12-gauge shotgun. One refilling per day of 1 to 1-1/2 pounds of carbide is usually sufficient for explosions at 2- to 5-minute intervals. If birds are persistent, however, it may be necessary to adjust the explosion rate to once per minute, which would necessitate servicing the machine twice daily, morning and afternoon. The operating costs are small, since carbide can be purchased at approximately 10 cents per pound at most welding shops.

Most models now on the market can be modified for use with small portable tanks of acetylene gas. More than 3,000 explosions can be obtained from a 40-cubic foot tank of acetylene.

One of the newer models has been designed to operate electrically. The current operates a solenoid valve which releases the gas into the exploding chamber where it is ignited by an electrical spark. The machine has desirable features, but a major disadvantage is that it must have a source of 115-volt current which is seldom available around fields. A battery-operated model would be better.

In frightening birds from fields, the exploder should be placed on a stand so the sound is projected over the crop. A 30-gallon barrel attached to the muzzle of the exploder will greatly increase its sound. For maximum efficiency exploders should be moved frequently and used with other control methods such as the distress call. Properly employed, the exploder is considered the best and mose economical device for combatting bird depredations in agricultural areas.

Distress Call

Limited tests have been conducted with amplified blackbird distress calls as a means of frightening birds from fields. Giltz and Stockdale (1960) report that distress calls disturb blackbirds, causing them to leave the field, at least temporarily. They tape-recorded the distress call of a young blackbird held by one wing and played the recording on a special repeating machine connected to a loudspeaker. When this sound was directed toward flocks of feeding birds, the flocks were frightened. The amplified sounds also temporarily disrupted nesting chores. However, when the distress call was used at roosts at night, the birds merely milled around.

The distress call has been used more extensively by Frings (1954) as a means of dispersing starlings. Wild starlings were forced to give distress calls which were recorded on tape; the recordings were directed at starling roosts through an amplifier and loud speakers. Preliminary tests showed possibilities with this apparatus. A later report (Frings, Jumber and Frings, 1955) states: "As a whole, these results seem promising. Four out of seven attempted clearances (State College, 1953, Millheim, 1953, 1954; York, 1954) were completely successful. The others all showed partial success, varying from delayed effects (Easton) to temporary clearances of varying duration (Rochester, Mt. Vernon)."

More recent tests by the author indicate that a combination of the starling distress call and gas exploders was effective in driving starlings from holly roosts.

Electric Perch

Pfeifer (1956) made an electric perch by suspending two wires, spaced 2 to 2-1/2 inches apart, some 10 to 14 feet above a grain plot. He recommended that such wires be suspended over the entire plot at 25-yard intervals and that at least a 15,000-volt transformer be used. If good control can be obtained by shocking without killing the birds, a 15- to 30-milliampere transformer is satisfactory. If more than 2,000 feet of perch line are built, a 60-milliampere transformer is recommended (Pfeifer, 1957).

This apparatus was reported to be effective against blackbirds at a distance of 50 yards and provided control of bird damage at a minimum cost.

Chubb (1959), however, reports the Pfeifer perch was tested over a small (49 x 69-foot) isolated area of sunflower plots. Two wires, separated about 2.5 inches by porcelain spacers and charged with 15,000 volts, were suspended about 14 feet above ground level, across the middle of the area. Use of this apparatus provided only partial protection from sparrows and finches and was completely ineffective against red-winged blackbirds. Furthermore, some of the installations of this device have been so destructive to beneficial birds, particularly doves, that the users have been forced to cease their operation.

Ultrasonics

Work at Cornell University and elsewhere has shown that a number of our common birds have a hearing range more restricted than that of humans. Tests indicate that pigeons have a hearing range of 200 -

7,500 cycles per second; sparrows, 675 - 11,500 cycles per second; and starlings, 700 - 15,000 cycles per second. In comparison, the average person can perceive sound in the frequency range of 20 - 16,000 cycles per second.

In tests by the author, equipment producing 20,000 cycles per second had no visible effect on starlings feeding in a cattle feedlot, nor did this frequency discourage English sparrows from nesting in a barn.

There are many unanswered questions regarding the use of ultrasonics in bird control, and much research is still needed in this field. It would appear, however, that the ultrasonic vibrations (those above our hearing range) are not received as sounds by birds; if so, then sounds used for bird control will have to be within the range audible to humans.

Airplanes

Light aircraft equipped with horns or sirens have been used to some extent to herd blackbirds from fields. The pilot attempts to fly low and herd the birds from the field. The method has limitations, as many of the birds merely move from one location in the field to another, rather than departing from the field. The plane would be more effective if used with a crew of men in the field to drive the birds out of their cover, and if exploders and firecracker ropes also were employed.

Repellents

Crops can be made unattractive to birds by use of chemical repellents, but no such materials are known that can be used on foods destined for human or livestock use. Chemicals have been found that will protect planted conifer seed, but are not as effective for protecting seed corn, ears of corn, or exposed grain such as sorghum, rice or sunflowers. A repellent must not be phytotoxic to the seed or growing plant, yet must be inexpensive and easy to apply. When the crop is used as a food, the repellent must not be toxic, distasteful, or in any way discolor the marketable product.

Miscellaneous Devices

Scarecrows such as garbed crosses are generally ineffective. The more elaborate, lifelike creations with moving parts are better, but should be used with other methods such as shooting and rope firecrackers.

Spiroleum twirlers, shiny propellers, and other objects that flash in the sunlight or rustle and rattle as they spin in the breeze are useful in small areas.

Light-weight muslin rags, about 18 x 36 inches, tied between rows in a corn field are recommended as a temporary measure by Cardinell and Hayne (1945). Two corners of a rag were tied to cornstalks as high as was convenient without risk of breaking the tops of the plants. The rags thus lay in different directions, and were not clearly visible from a distance; human observers saw only an occasional flash of white and were left with the impression that a person was in the field.

Low-cost paper fiber netting has given horticulturists good protection against depredations on fruit crops. This is probably the best method of keeping the birds from damaging a crop, but is limited to small areas because of the expense of installation.

Wildlife Leaflet 409, "Bird Control Devices Sources of Supply," can be obtained free of charge from the United States Department of Interior, Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Washington 25, D. C.

TRAPPING

Blackbirds and starlings are difficult to trap except when food is scarce in the fields. Trapping cannot be considered a practical means of reducing blackbird populations around rice and corn fields, but is more effective against both blackbirds and starlings around localized areas such as cattle feedlots, hog pens, and corrals.

Cage Trap for Starlings

A self-operating cage trap has been found effective for capturing starlings. The trap is simple in principle; the starlings enter through small holes in the welded-wire center section of the V-shaped cage top. Once inside, they endeavor to escape by going to the outer walls rather than through the top openings. Four of these traps were used by the author and co-workers of the Bureau of Sport Fisheries and Wildlife to capture over 15,000 starlings near a cattle feedlot at Caldwell, Idaho, during the winter of 1960-61. This trap can also be used for trapping blackbirds, grackles, and cowbirds. It is a modification of the Australian Crow Trap used for capturing crows, magpies,

and white-necked ravens. The basic design is described in U.S.D.A. Wildlife Leaflets BS-27 and BS-51, and U.S.D.I. Wildlife Leaflets 252 and 268.

For best results, use bait materials on which the birds in the vicinity of the trap are accustomed to eating. Baits which have been successful in various localities are French fried potatoes (where used in cattle feedlots), canned corn, dry fox chow, crumbled or pelletized poultry feed, beet pulp meal and pellets, linseed oil meal, soybean meal, and chopped, dried fruits (raisins, prunes, etc.). Whole grains may also be used, but generally are not as attractive to starlings. Place baits in generous amounts inside the trap, as well as on the slats in the center of the V-shaped top. After the first starlings have been captured, leave several in the trap to serve as decoys. A good diet for maintaining decoy birds in the trap is 28 percent protein turkey starter crumbles.

If large numbers of starling are caught, and no banding or other use of the birds is intended, they can easily be killed by fumigation with hydrogen sulfide. To do this, remove the decoy birds, enclose the trap in an air-tight plastic or canvas cover, and release a small quantity of hydrogen sulfide gas under the cover. The birds will succomb in a few minutes. Remove dead birds for burial or incineration. Hydrogen sulfide can be purchased in small containers (6" x 21" size contains 100 cubic feet of gas) sufficient for a number of operations.

Caution must be exercised in using hydrogen sulfide, as it is toxic to humans and livestock.

Light Trap

A light trap has been developed by the Patuxent Wildlife Research Center of the Bureau of Sport Fisheries and Wildlife which consists of a series of arches of aluminum pipe covered by cotton or nylon netting. The arches taper in height from 35 feet in front to 10 feet at the back, and are arranged to form a funnel when covered with netting. A canvas-covered, air-tight holding cage, approximately 8 x 8 x 10 feet, serves as a gas chamber at the small end of the funnel. A battery of five or six 1000-watt incandescent lights, powered by a portable generator or municipal power, is placed in the holding cage as the attractant.

Drives should be carried out on a dark, moonless night to be most effective. Several "drivers" scare the birds from the branches of the roost trees; at the same time, the lights are turned on to attract the birds into the net. Once in the holding cage, those birds not wanted for laboratory use or banding can be destroyed with hydrogen sulfide gas or calcium cyanide dust. Mitchell (1961) reports catches ranging from zero to 120,000 birds, with starlings outnumbering blackbirds.

Elevator Trap

The elevator trap is a small, portable cage approximately 24" long x 16" wide x 8" high with a weighted elevator at one end. A small wire cage with two sides open is affixed to the elevator, with a bait box just beyond to attract the birds. In attempting to get to the bait, the bird must step into the wire cage; its weight forces the elevator down to the base of the trap where the only escape route is into the

main part of the cage. As the bird leaves, the elevator returns automatically to its original position. Leaving decoy birds in the trap will attract others. Preliminary tests indicate this trap might be useful for trapping young starlings during the summer months in orchards and vineyards.

POISONED BAITS

Poisoning as a means of bird control has been tried by many farmers, but generally with little success because of lack of understanding of the requirements of this control technique. Among the most frequent errors are: (1) the use of an ineffective poison, (2) the use of the wrong bait, (3) the use of an inadequate formula in preparing the bait, and (4) unwise selection of baiting sites (Neff and Meanley, 1957).

Each damage situation may present a different problem. Season of year, weather conditions, terrain, bird activity, and the number of protected species present are all important factors to consider.

Snyder (1961) used strychnine unsuccessfully in attempting to control redwing blackbirds in the Lake Erie region of Ohio. Experimental baiting with cracked corn and whole oats in and along cornfields and other types of fields where birds regularly fed, in the vicinity of roosts, and along flyways regularly used by the blackbirds in leaving and returning to roosts was unsuccessful during the corn damage season.

Although poison baits have been used effectively in reducing blackbird flocks locally, particularly in California where provision

has been made for its exposure under close supervision of the County Agricultural Commissioner or of officials of the State Department of Agriculture, its use by the general public is frowned upon because of the associated hazards and uncertainties. Many states and municipalities prohibit the use of toxic substances in bird or mammal control, and therefore, the legal status of poisons must be determined by the prospective user.

Hockenyos (1959) cited an example to show how serious and sometimes unavoidable secondary poisoning can be. A farmer treated 25 pounds of black molasses pellets with 1080 for starling control and put the bait in a trough on top of a shed. He was warned of the secondary hazard, but the farmer was convinced he and his two boys could gather up all the fallen birds before they could be eaten by any of the farm pets. An hour after feeding on the poisoned bait, however, the birds rained down so heavily that the farmer and his boys couldn't pick them up fast enough, and they lost two cats, one dog, and two hogs. There is no mention of the number of neighboring cats, dogs, and other animals that also may have been killed.

Poisoned bait, carelessly exposed, may directly jeopardize beneficial wild birds, domestic poultry, and livestock. There may also be a secondary hazard to dogs, cats, pigs, and other animals, depending upon the lethal agent used.

ROOST CONTROL

Bombing, spraying, or gassing of winter roosts may be developed in the future as a means of controlling both blackbirds and starlings.

Hundreds of thousands of the birds concentrate nightly in small roost areas. Satisfactory method of control in a roost is not easy to plan, because the roosts are established in a wide variety of habitats. Some are in very remote marsh land, others in brush, coniferous trees, or too close to cities or human habitation. The most important factor to consider in poisoning roosts is the hazard to people, livestock, and beneficial wildlife, for no chemical agent known at present is specifically toxic to birds alone.

Roost bombing in the Arkansas rice fields is described by Neff and Meanley (1957). Shrapnel-loaded bombs were placed well above the ground in the roost. During two consecutive winters, a total of 23 bomb tests were carried out in a red haw-persimmon thicket, all between February 20 and March 20. Several different types were tested; the most effective results were finally produced when a 10-bomb series was detonated that resulted in an average kill of 2,320 birds per bomb at a cost of seven-tenths of one mill per bird.

Neff and Meanley (1957) further state that "The economics of mid-winter roost bombing in eastern Arkansas is highly questionable. The total kill from the series of bombing tests conducted between February 20 and March 20 in this thicket in two consecutive seasons ran approximately 300,000 redwings, grackles, cowbirds, and starlings; only one bird of any other species was found dead. This heavy kill of roosting birds did not visibly affect the later spring and summer nesting population in the surrounding rice country."

Roost bombing is considered hazardous and is not a safe operation for an amateur. It should be carried out only by a trained operational crew, with good equipment.

SUMMARY

Damage by starlings and blackbirds is becoming more serious and widespread. Various control measures are being used, but a satisfactory answer to many bird problems is still to be found.

Frightening devices are useful in many situations, but lose their effectiveness as birds become familiar with the frightening principle. Effective reduction in bird numbers is difficult to achieve because of the inaccessibility of the birds, the costs, and the dangers involved.

Until more is known about the habits and movements of blackbirds and starlings, or until new or improved techniques are evolved, it is hard to see how present difficulties are to be quickly overcome; in the meantime, perseverance with the measures that can be used conveniently and safely seems to be the most logical course. It must be emphasized that a combination of two or more methods increases the efficiency of each. Strong publicly supported and planned programs would certainly help to reduce the problem.

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