Outwitting the House Sparrow [Passer domesticus (Linnaeus)]

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ABSTRACT: With the decline of house sparrow populations during the first quarter of this century, control research attention shifted to other avian species so little new is available on either life history studies or management. Solutions to animal damage control problems are generally through (1) environmental controls, (2) protection of crops and/or sites, and (3) population reduction. In the case of sparrow problems, environmental controls are of limited application as the birds prefer the habitat modifications made by man. Protection of crops or sites relies on repellents which are generally ineffective against this particular species. The only viable population level controls are trapping or poisoning. A comparison of different trap types and bait materials is presented.

INTRODUCTION

The choice of this paper's title was overly optimistic. To outwit anything you have to know more than it does and after working with sparrows (Passer domesticus Linnaeus) for many years, the writer is not sure he qualifies. Summers-Smith (1963) points out the brain weight (1 gram or 4.3%) of the sparrow is proportionally higher than that of many other species. J.P. Porter (1904) ranked them with the white rat and monkey in the ability to solve maze problems by profiting from experience. Sparrows can tolerate man in large doses and yet remain wary of him. They can change life habits to conform with new habitat situations thrust on them by mankind. They are prolific breeders able to exploit the potential ecological niches offered them. Birds aren't supposed to be intelligent so maybe sparrows aren't intelligent, but they certainly have the ability to adapt to new situations.

While considered a pest because of their indiscrete and haphazard disposal of wastes and destruction of grain and other agricultural crops, the sparrow has not drawn the same attention from investigators of control research that it did during the 19th century. This is in part because their numbers have decreased in both urban and rural areas since the start of this century, not because of control efforts, but rather due to the replacement of the horse by the gasoline engine as the main source of transportation and tiller of the soil (Bergtold 1921). The sparrow is associated not so much with man as with his domesticated animals (Rand 1956).

Solutions to most animal damage problems are generally along three broad approaches: (1) environmental controls, (2) protection of crops and/or sites (non-lethal measures), and (3) population reduction (lethal measures).

ENVIRONMENTAL CONTROLS

Environmental controls that affect the basic life necessities of a species are usually more effective over the long run, but most difficult to achieve. In the case of the sparrow, there are very definite limitations on what can be done to make the environment occupied by the sparrow unsuitable for that species. The design of buildings (potential nesting and roosting sites) has
improved considerably over the gingerbread Victorian style that prevailed when the sparrow reached its zenith, but there are still many places today where architects' ignorance of the problem has resulted in furnishing pest birds with ideal roosts. Add to this the availability of sites on older buildings, deterioration and lack of maintenance of other buildings, offset advertising signs, and the suburbanites' love for dense shrubbery and vegetation. There is no real shortage of nesting locations in the sparrow's world.

Food and water which make up the rest of the triad of life's necessities are no problem to such an opportunistic creature. Horse droppings are replaced by the leavings from fast food outlets with outdoor eating facilities. Backyard bird feeders, suburban garden plots, waste food and garbage, spillage of grain in railroad yards, and dedicated humans who feed anything with wings are among the current food sources utilized by this species. Water is also adequately supplied in bird waterers, air condition units, puddles, and park lakes.

The chemosterilant, ORNITROL™, has been found to be an effective birth control chemical for the sparrow in cage tests (Anonymous 1970), but no further field evaluation has come to the attention of this writer. We do not have the necessary expertise to attempt other environmental controls by the use of natural predators and diseases (Kalmbach 1940). The introduction of predatory birds into "asphalt jungles" has received much publicity but has no practical effect on urban pest bird populations. Parasites and disease organisms intentionally introduced in an effort to control a vertebrate species is to open Pandora's box again as the transfer to human hosts is a distinct possibility. Thus we find the use of environmental controls as a measure of sparrow control on about the same status as it was at the turn of the century.

PROTECTION OF CROPS AND/OR SITES

The second approach -- protection of crops and/or sites from these birds -- involving non-lethal control measures is not much more advanced. Repellents of all kinds are probably less effective than for most other birds, due to the limited movements of sparrows and their devotion to a particular nest site. Visual repellents, such as kites and shiny plates around crops though of some temporary value are ineffective over a period of time. Further research with "eyespots" (simulated "predator eyes") may prove of some value (Inglis 1980).

Fireworks, exploders, and other types of noisemakers have an immediate effect but the attraction for the site brings a quick return of the birds on the cessation of the activity. In a 6-day field study, the writer was able to move sparrows from a patio tree with fireworks, but they took up a new residence in an undisturbed tree only 25 yards distant. Ultrasonic devices are ineffective as Brand and Kellogg (1939) indicate the range of sparrow hearing falls well within the limits of human hearing -- 675-11,500 cps compared to 20-16,000 cps for humans -- so if humans can't hear it, neither can sparrows. While sparrows do make distress-alarm notes (Bremond 1980), no practical application has been found as yet. Methiocarb has proven satisfactory in protecting plantings such as peas (Porter 1977) as it elicits a gustatory response.

An old remedy for disrupting indoor roosts has been the liberal application of naphthalene as a deterrent to roosting by pest vertebrates, including
sparrows. But the most effective repellents are those of a mechanical nature, such as glues or sticky repellents applied to roost ledges, stainless steel wires in a bristling arrangement to make uncomfortable sitting, and electromagnetic fields. Even more effective where practical is closing off roost sites by netting, screening, or other blocking materials like glass, plastic, metal, or wood to prevent bird access to enclosed areas. Covering ivy-covered walls with fine netting like mist nets has been successful in reducing their use as night roost and nesting areas.

POPULATION REDUCTION

The emphasis on sparrow control still lies in population reduction though today this approach has more public opposition than it did earlier in this century. People have become isolated from the facts of life. There is a decided reluctance to kill vertebrate animals even though excessive numbers result in serious economic and health losses. Under this philosophy, EPA has made the cost of developing new chemicals for vertebrate pest control so prohibitive the returns on the investment for a minor problem species like sparrows would never repay the investor.

In lethal control methods, shooting with low calibre rifles and shotguns has long been advocated. Spreading small grain in a windrow and shooting No. 8-9 bird shot into long narrow flock patterns has been suggested (Barrows 1889; Grussing 1980). However, as the birds are wary, it doesn't take much persecution to teach them to stay in front of large glass areas safely out of range. So we are left with really only two alternatives -- trapping and poisoning.

Trapping

In the first extension booklet on animal damage control in this country, Hill (1889) mentions the use of the clap trap which dates back to ancient Egypt. Later extension leaflets (Dearborn 1910) illustrated sieve and nest box traps. Even later, (Dearborn 1917) hand-operated and an automatic nest box (Tesch) traps were described. The latter had a delicately-balanced tube into which the sparrow entered to nest only to find itself dumped precipitously into a holding bag. There was also a Miller trap which had narrow upright partitions in the top (same principle of the Australian crow trap). This was more complicated and never used very much. A two-funnel opening trap was also described and this has been used more extensively. The Tesch trap and the two-funnel traps are the only two recommended in more recent publications by the U.S. Fish and Wildlife Service (Anonymous 1948).

The writer recently completed a series of comparative tests on the effectiveness of sparrow traps with the following results:

<table>
<thead>
<tr>
<th>TABLE I. COMPARATIVE EFFECTIVENESS OF SOME TYPES OF TRAPS</th>
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</thead>
<tbody>
<tr>
<td>Juveniles caught</td>
</tr>
<tr>
<td>Adults caught</td>
</tr>
<tr>
<td>Adult/Juvenile ratio</td>
</tr>
<tr>
<td>Trap days</td>
</tr>
<tr>
<td>Birds/Trap day</td>
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</table>
From the above data it can be seen the funnel trap manufactured by the National Live Trap Company was most effective in the number of birds caught per trap day, followed closely by the Havahart elevator (made by Alco Manufacturing Company now a part of Woodstream Corporation). While the other three traps evaluated were generally poor, the Trio drop door was able to catch a significantly higher percentage of adult birds than all the other traps. A description and discussion of sparrow traps currently available is given below:

Funnel I - National Live Trap Co., P.O. Box 302, Tomahawk, WI 54487

This trap consists of two half-cones pointing into the holding cage. It is discouraging to see birds get out of this as easily as they enter it. However, it still had the best trapping record of the group. In an earlier study, the writer banded and released birds which helped create a sophisticated attitude towards the traps on the part of the sparrows. A female was once observed darting into the trap, picking up a piece of grain, squeezing back out the opening, and feeding a juvenile quivering with anticipation outside the trap. She repeated this operation several times. In the current study, though birds were sometimes left in the traps for several hours, the traps were emptied frequently and the birds disposed of so this behavior would not be encouraged.

Elevator - Woodstream Corporation, Lititz, PA 17543

Birds enter this trap onto a counterbalanced elevator in front of a baited ledge. The weight of the bird drops the elevator to a lower level in which there is a one-way door. The bird pushes the door inward to find itself in a large holding cage. When the bird's weight is off the elevator, it springs back into place for the next victim. As the entrance is off the ground, a platform feeding tray should be added to encourage the birds to feed near the baited ledge. While possible, birds rarely escape from this trap. The elevator can be stuck sometimes lowering trap catch.

Top entrance - Woodstream Corporation, Lititz, PA 17543

Birds drop down through the bottom of the V-shaped top to feed on the bait below. When they attempt to fly out they tend to go up into the dead-end wings of the V rather than out the throat. Possibly because the V is so close to the ground, birds were finding their way out of this trap when left in it for any length of time. Those birds caught were taken out soon after they were seen in the trap. While the principle will work on a larger trap (Royall 1969), this type and a similar one by another manufacturer were felt ineffective. Birds did not enter this type as readily as Funnel I.

Drop door - Nature House, Griggsville, IL 62340

The Trio trap is not an automatic trap as the doors must be reset after each catch. It consists of an enclosed cage for a decoy bird with a trap on either side. The bird drops onto a perch over the feed tray upsetting the trigger and causing the trap door to close over him. This caught a better ratio of adult (smarter?) birds than the other traps.
Funnel II - Roy Vail Co., 103 Wentworth Road, Antwerp, OH 45813

This is a two-funnel compartmented trap. Both funnels point upwards and back with the bait tray in the middle compartment and the holding area in the last compartment. This has a good record according to the manufacturer, but New Mexican sparrows are dumber than Ohio ones as only 2 were able to negotiate the funnel maze, though the first compartment was readily entered. A decoy bird left in the trap for 9 days managed to escape back out through both funnels.

The following traps were not tested:

Kroener Martin/Bluebird House Trap - Grand Rapids Audubon Club, 54 Jefferson Ave. S.E., Grand Rapids, MI 49503

This is a specialized martin or bluebird house which uses the Trio compartment door hole to admit a bird smaller than the martin/bluebird but prevents it from getting back out.

Last Perch - Last Perch, P.O. Box 426, Mitchellville, IA 50169

This trap has two holes facing into a perch that drops the bird via a clear plastic chute into a holding cage. It was received too late to be included in the above study.

Funnel traps

Ground funnel traps are most popular worldwide. In the funnel trap plans given by the U.S. Fish and Wildlife Service (Anonymous 1948), the birds enter through a ground funnel into the first compartment (like Funnel I) and then move into a holding compartment through a cone pointing upwards (like Funnel II). This would seem to embody the best features of both National and Vail traps. The British use funnel traps (Bateman 1971) where several ground funnels empty into a quonset type holding cage.

Trap Notes

Traps and/or trap sites should be baited for several days before starting to trap. Decoy birds should be placed in Trio or elevator traps or in separate cages on the trap site to entice other birds onto the site. Traps should be left open for several days and well-baited. While sparrows will use elevated feeding areas more readily than most native species, unless absolutely necessary to get away from interference with cats, they are more effective when placed on the ground. Use a minimum of bait outside trap entrances. Summers-Smith (1963) stated only rarely are individuals retrapped. When the writer was banding and releasing he retrapped only 2 out of 33 birds over a 4 week period. Depending upon the number of traps used and the times they are emptied, it appears the birds can be cleared out of a small area in about 3 weeks. In that time, the writer took 270 birds out of a flock originally estimated at about 75 birds. However a flock of 30 birds reappeared briefly about two weeks after the trapping ceased. Within the following two weeks, there appeared to be about as many birds on the site as had been seen previous to the trapping operation. The conclusion is that trapping is expensive from labor costs. Trapping can produce impressive body counts, but their effectiveness is questionable around an attractive site during the breeding season.

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Poisoning sparrows is probably as effective and certainly less expensive than trapping. Bait, toxicant, and placement are equally important factors in getting results. The size of the bait particles is about as important as the type of grain used. The late Johnson Neff (1959), whose work on bird control is the basis for much of our present recommendations, states particle size should be within 1/16 to 3/16 of an inch (1.6 - 4.8 mm). This observation was clearly supported by the writer's field baiting tests in which this preference for smaller-sizes of corn was shown:

**TABLE II. PREFERENCE SHOWN BY SPARROWS FOR DIFFERENT PARTICLE SIZES OF CORN BAIT**

<table>
<thead>
<tr>
<th>Particle Size</th>
<th>Amount (gms.)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 1/4&quot; (6.4 mm)</td>
<td>14</td>
<td>03</td>
</tr>
<tr>
<td>2/16 - 4/16&quot; (3.2 - 6.4 mm)</td>
<td>85</td>
<td>20</td>
</tr>
<tr>
<td>1/16 - 2/16&quot; (1.6 - 3.2 mm)</td>
<td>253</td>
<td>61</td>
</tr>
<tr>
<td>Under 1/16&quot; (1.6 mm)</td>
<td>65</td>
<td>16</td>
</tr>
</tbody>
</table>

Neff (op. cit.) also points out..."There is no practical 'standard' bait formulation uniformly effective nationwide, or even in states or smaller subdivisions." He then goes on to recommend canary grass seed as coming the closest (his work was mainly in California). Geis (1980) in a study of bird feeders in the East found white proso millet was the best bait for sparrows followed by German millet, red proso millet, sunflower pieces, wheat, canary seed, black striped sunflower seeds, and fine cracked corn. In New Mexico the writer found the following preferences after exposing 4 baits from 8 candidate choices by random number selections for 24-hour periods:

**TABLE III. PREFERENCE SHOWN BY SPARROWS FOR EIGHT CANDIDATE BAIT MATERIALS**

<table>
<thead>
<tr>
<th>Bait Materials</th>
<th>Amount (gms.)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White millet</td>
<td>618</td>
<td>26.9</td>
</tr>
<tr>
<td>Cracked corn (1.6 - 3.2 mm)</td>
<td>471</td>
<td>20.5</td>
</tr>
<tr>
<td>Whole milo</td>
<td>435</td>
<td>18.9</td>
</tr>
<tr>
<td>Cracked corn (3.2 - 6.4 mm)</td>
<td>396</td>
<td>17.2</td>
</tr>
<tr>
<td>Cracked corn (-1.6 mm)</td>
<td>177</td>
<td>7.7</td>
</tr>
<tr>
<td>Wheat</td>
<td>145</td>
<td>6.3</td>
</tr>
<tr>
<td>Cracked corn (+6.4 mm)</td>
<td>32</td>
<td>1.4</td>
</tr>
<tr>
<td>Lab chow*</td>
<td>26</td>
<td>1.1</td>
</tr>
</tbody>
</table>

* Lab chow - subsistence diet used for caged bird studies at the Denver Wildlife Research Center (USFWS)

In another study on a California poultry farm, the writer found watergrass seed from rice screenings was slightly better than the poultry mash the birds were accustomed to feeding on.
There is not much choice in the selection of toxicants as so few are available for use in sparrow control. The most widely used toxicant and the only one registered by the U.S. Environmental Protection Agency is strychnine. Of the newer chemicals since Neff's time, 4-aminopyridine (AVITROL™) with a toxicity of 3.8 mg/kg for the sparrow offers more promise than 3-chloro para-toluidine hydrochloride (STARLICIDE™) with 366 mg/kg. Toxicants used in roost perches such as RID-A-BIRD™ are endrin and fenthion. Schafer (1972) indicates endrin is the most toxic against the sparrow:

<table>
<thead>
<tr>
<th></th>
<th>House sparrow</th>
<th>Feral pigeon</th>
<th>European starling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endrin</td>
<td>1.8 mg/kg</td>
<td>5.6 mg/kg</td>
<td>2.4 mg/kg</td>
</tr>
<tr>
<td>Fenthion</td>
<td>5.6 mg/kg</td>
<td>1.8 mg/kg</td>
<td>5.3 mg/kg</td>
</tr>
</tbody>
</table>

But both baits and the most effective toxicant are useless if they are not placed so the birds will feed on them. If possible, thinly scatter the bait in the areas the birds are accustomed to feed. Prebaiting with untreated bait may divert them to other locations for safer handling of toxicant materials. Place the bait in several small spots rather than in one large one. If trays or v-shaped troughs can be used, the bait can be more readily picked up at the conclusion of a project. Exclosures with open tops can be used in poultry yards providing the bait is placed far enough away from the sides so the chickens cannot get to it. Usually birds do not feed on roost areas, but the writer had some success (Fitzwater 1957) in baiting first and second story ledges in an Indiana city with a strychnine-treated corn/wheat bait. Counts made during the project indicated a 90% reduction of sparrow numbers during the five days of baiting. This figure dropped to 86% reduction 5 days after treatment stopped and to only a 63% reduction 4 weeks after baiting. This was done in the wintertime when recruitment would be at a low point.

LITERATURE CITED


BERGTOLE, W.H. 1921. The English sparrow (Passer domesticus) and the motor vehicle. Auk 38:244-250.


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