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## BIRD DAMAGE IN FRUIT CROPS

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This next topic shouldn't take long because we don't know much about it. The topic is bird damage to fruit crops. For some reason, I inherited this, so I'll do the best I can. Yesterday I talked to you about birds in hangars and I said that I felt we had at least a partial solution to this problem. Today's problem is just the reverse. I don't see any solution in sight for fruit damage caused by birds. I think that one of the reasons is that there has been very little research done concerning the relationship between birds and fruit crops. Probably the reason is that those birds responsible are protected species, and they are highly desirable birds in the eyes of the public. For instance, one of the species that is responsible for heavy losses in fruit crops is the robin. It is the state bird in Michigan, yet it causes a number of problems there each year. Another problem is that growing fruit isn't as common as grain production. Wherever you do have fruit in any concentration, the losses are severe in most cases.

Every district in which I've been stationed I've run into this kind of problem. I've seen it in New England, the Southeast, and now the Midwest. Each time the question is: "How do I keep birds from eating cherries, blueberries, grapes, and so forth." And I just don't know. For the most part the problem is birds eating ripe fruit. In two instances, I've seen large roosts of starlings in apple orchards, contaminating fruit through their roosting habits. In Massachusetts, we had trouble with grouse damaging apple orchards by eating the fruit buds. Many of the state game departments would love to have this problem.

For the most part my comments will be limited to those experiences which I've had in Maine, Massachusetts, South Carolina, Michigan, and Ohio. My first association with bird damage concerned seagulls eating blueberries. I ran into seagulls eating cranberries, and recently I hear that they have been caught eating tomatoes. These gull problems took place in Maine. In Massachusetts I had experience with songbirds taking blueberries and peaches; in South Carolina it was starlings in grapes; Ohio has had problems with songbirds in blueberries, cherries, and grapes, and Michigan, again, songbirds in cherries and blueberries.

Most birds seem to sample what's available, and if they like it, they'll keep feeding.

[Mr. Smith showed four slides demonstrating damage.]

Most people don't realize it, but there is a serious problem with birds damaging peaches, especially in some years in sections of Ohio and in the New England states. Strange as it may seem, the culprit in this case is the Baltimore oriole, which is a member of the Blackbird family.

This shows grape damage typical of Michigan and Ohio. The principal damaging species is the starling, but any birds in the planting can do damage, such as the junco, and any of several blackbirds. Such fruit damage troubles are prevalent all across the country from California and Washington, even in Kansas City, Harold Coleman tells me.

There is a variety of species responsible for this kind of damage. If I were to make a list, I would put starlings at the top, they are universally distributed. I think that they are responsible for most of the losses. Second, I would place robins, especially in the eastern part of the country. A problem here is that robins have learned not to fear man, you can use many scaring techniques, and they pay little or no attention to them.

Third, I'd list grackles. Fourth, Baltimore orioles, which may be surprising, but I've seen where a flock of orioles can ruin a vineyard or a peach orchard. Fifth, catbirds, and last, blue jays. There will be a variety of other species, when the west coast is considered. I am not familiar with those. I imagine that there are counterparts out there.

Four of the six that I mentioned are protected by the migratory bird treaty regulations. Blue jays not federally protected are protected by most state regulations. Starlings are not protected.

To find solutions to this kind of situation, we must do considerable work with songbird ecology, and population dynamics at fruit plantings. A lot of work has been done, but none of it related to fruit growing. Few studies have been attempted. To my knowledge, there is only one university that is delving into this matter, and that's the University of Massachusetts. I did hear that New York had some programs, but I do not know the extent of their research.

I was indoctrinated into this program when I was at Massachusetts in the early 1960's. Some of the observations I made (mostly on robins) I'll relate to you. If we can take observations of this type, we can use them to find control tools, and we'll be on the right track.

Number 1: Damage or feeding on the crop usually takes place during a few limited hours of the day. It is most pronounced from daylight to about 9:00 a.m. and then from 3:00 p.m. to dusk. During other daylight hours, plantings are relatively free of birds.

Number 2: During mid-day hours, robins can generally be found at loafing sites as near as 100 yards or as far as 2 miles from the

planting. If you scout around woody areas or brushy places, you'll find concentrations of robins. If you go into these concentrations of loafing robins, and apply some sort of frightening stress, you can often move this bird population away from the fruit planting and thus reduce loss.

Number 3: I do not believe that there is a daily turnover of robins at the plantings. Birds which feed at such plantings are regular visitors. What happens is that birds in the immediate vicinity, residents, find the location of the fruit and they pay a daily visit to the site to feed. Scouts from surrounding areas also find the food source, and populations begin to build up.

Shotguns may be used to protect crops, by destroying nesting birds in the immediate area before the fruit ripens. I don't know whether this relieves the problem or not; the farmers seem to think so, but this could be a matter of them venting their emotions on the birds.

Number 4: Immature birds are mainly responsible for the damage. This can be very well correlated within a planting. You may find two or three peaks of populations in the plantings. You can correlate these peaks with the dates when young birds are known to have left nests.

Number 5: Damage is caused by resident birds. I do not know how far birds will travel from nesting site to a fruit planting, but I suspect that the distance is considerable. On birds which I had marked, I found them traveling to plantings from 5 to 6 miles away.

Number 6: An important way to stop this kind of fruit loss is elimination of edge habitat. The type of edge will determine the type of bird damage. If one is surrounded by woods, almost any kind of bird may be found damaging fruit. Catbirds will come from brushy edge areas. A planting in the middle of a field will seldom draw a catbird. This suggestion does not hold true for starlings, for they will go most anywhere. The further away you are from the edge or the wooded area, the better off the planting.

Number 7: There are alternative foods which birds will take in preference to fruit plantings. Birds will go to these foods if enough stress is applied. In Ohio there is severe damage to blueberries until chokecherries ripen; then birds leave the blueberries alone. Late blueberries are harvested with little trouble, when all the robins are feeding on chokecherries.

Control techniques are few. I hate to mention how few there are. Basically they can be listed in three major groupings:

1. Enclosures
2. Scaring devices
3. Reductional methods

The only solution that I see lies in the enclosure or exclosure methods. These can be applied to blueberry plantings, though there seems to be no economical or logical way to reduce peach or cherry damage with this method.

In 1960, I ran some estimates of cost to protect blueberry plantings with the enclosure method using netting (examples: fish net, plastic net, etc.). The cost ran close to \$1300 per acre. This is quite expensive. It can be amortized over a number of years to reduce the cost. For roadside fruit stands, this kind of protection can be afforded. But on the wholesale or commercial market, it would not be economical to use this kind of method of mounting netting on poles.

Scaring devices which can be used vary with the species. The only species on which I would use scare methods is the starling. This is a hit or miss kind of operation. Exploders at times will move starlings, and while they are flying they are not eating.

I have been associated with two of the well known repellents in a fruit planting situation: Avitrol and Roost-No-More. Both times we had no success at all stopping damage. With Avitrol, we had robins react, and the other robins would sit around and watch them and continue eating.

I mentioned shooting as a reductional method. Next spring, we will attempt to evaluate shooting as a reductional method. The other reductional method is trapping. In Michigan, the Patuxent Research Center set up a trapping program in southeastern part of the state in cherry orchards. They are quite pleased with the program. They have substantially reduced damage in cherry areas. They were working with resident populations of starlings and grackles. They feel that the expense in time and effort pays off. Don't get impression that this is going to work everywhere. It depends on local conditions.

We tried trapping on one of the Bass Islands in Lake Erie to protect grape vineyards. This was directed at starlings, though it was tied into a redwing banding program. We have been defeated to date in that few birds have shown up. But we expect them to come. Until we set the traps up, grape growers had damage each year. They have not had any damage this year. Not just because of the traps. The traps are there, and in one week in late July we removed about 1200 birds (starlings) which may have been a resident population.

We need much more work in this field. These growers are suffering losses; a lot of them are going out of business because they don't have adequate protection. I don't think that there has been enough effort concentrated in this problem.

## DISCUSSION

J. DILL: Did I understand you correctly that the Fish and Wildlife Service is selling strychnine baits? Can I get a price list, and shipping point information?

R. SMITH: Where are you from?

J. DILL: Michigan.

R. SMITH: You're in a ticklish spot. We sell baits but not in Michigan. (Laughter) The reason is that it is illegal to use toxicants there unless you have a permit from the state conservation officer. If you get a permit in this state, we can sell the material to you. You have to convince the conservation department that you are reliable in using this material. This rule covers any of these baits which are used in rural areas.

J. DILL: What baits are available besides strychnine on corn?

R. SMITH: Strychnine on whole corn, and on cracked corn groats, and the mouse baits. Fred Courtsal could give you a price list. This will have to be handled through the conservation department. We will not ship material into Michigan without the knowledge that you have a permit. What is registered in Michigan, Fred?

F. COURTSAL: We have two Bureau registrations: 0.6% strychnine alkaloid on whole corn and on cracked corn. These are available to the public with these exceptions. Mr. Smith's arrangements. If I get an order from Michigan or Ohio, Mr. Smith determines whether that shipment will be made or not, because he is more familiar with the laws in those states than I am. The order needs his approval before I ship anything into Michigan.

C. FAULKNER: You might point out that these have to have state registrations. These are federally registered but they must be registered in the state in which they are sold. If the state prohibits the use of toxicants, then we cannot sell that in that state.

R. SMITH: The Michigan registrations include: red squill, strychnine treated corn, field mouse bait, woodchuck cartridges. Except that we can't use woodchuck cartridges there. Anything that's sent to Michigan from our Ohio office won't be sent unless a Michigan conservation permit has been obtained.

F. COURTSAL: If you wish a price list from Lafayette, just drop us a line there: Fish and Wildlife Service, Agricultural Experiment Station, Purdue University, West Lafayette, Indiana.

J. STECKEL: You mentioned robins and the fact that you can move them by applying stress. What kind of stress?

R. SMITH: The way I moved them was by catching them. The fact that you catch robins and release them is a stress. But you could get into a robin loafing area and raise enough commotion that would be stressful

and they would leave. This is just a thought.

J. STECKEL: Has anybody had any experience raising commotion in robin loafing areas?

R. SMITH: I have had some experience with robin roosts within large starling roosts. Sometimes robins will roost in a distinct group within a larger starling roost. In this case they don't move.

C. FAULKNER: We had a similar situation with 800,000 starlings and 300 robins in one roost. The robins were off by themselves within the masses of starlings. We were doing a wetting agent test, so we located the robin roost and when we flew over, we simply separated the spray swath and went back over the starlings again. We probably were not ten feet from the robins and they didn't leave. But this was a roost situation and not a daytime loafing area. At night robins take a whale of a lot of stress to move them.

R. SMITH: In my situation, I caught the robins in nets in the daytime. After catching a certain percentage, they left, and the rest left also.

DR. GRANETT: New York may have some information on this, because I know they were working in the cherry orchards with distress cries which make stress. Through the day they have a loafing area right next to the orchard, but what their final results were I don't know.

R. SMITH: You can boil this fruit problem on the east coast down to about three states, which is part of the reason we don't have as much activity going on as we should.

DR. BALSER: There is a private operator in California who has made a number of distress call recordings and playback units. His name is Gordon Boudreau. He has made some tapes of robins and house finches, which are two difficult species to repel by distress calls, or alarm calls, or by ground predator calls, or whatever you want to call them. We saw one demonstration of the effectiveness of his calls on finches and we were amazed. He also has a robin alarm or ground predator call that's also very effective. He went into the business of renting these machines to fruit growers who were in trouble during short damage periods. I mention this because of the possibilities for many of the fellows who might be here, and might like to look into this area. This guy was rather successful and is now working for a private laboratory. His former job required a lot of running around the state and timing his units with the damage. It was quite a tangled mess to schedule each grower according to when he expected damage. But he has effectively protected a number of types of fruit orchards.

By the same token, using distress calls, we at Denver have kept starlings out of fig orchards and cherry orchards. Charles Siebe, of the California Department of Agriculture. I think that he can attest to the success of the recording technique in a number of instances.

Another one has been the use of traps. There have been a number of successes in protecting fruit orchards with traps, even against small birds like the house finch by modifying the Australian trap to one-inch mesh. We've caught many house finches in these traps. We can find little difference in success between trapping and the old method of strychnine on rape seed.

R. SMITH: One thing that we should be aware of at all times is that we are dealing with a group of birds which the public thinks highly of. Any destructive type of control is frowned upon.

DR. GILTZ: Dick, as you know we are trying to use the recorded distress call against starlings on the North Bass Island to protect grapes, if the starlings do indeed damage grapes this year. Your trapping just may have solved their problem, we'll see. We suspect that the damage to grapes might be associated with juncos, because our grape damage is greatest in Ohio when the grape maturation coincides with the migration of the junco. This happens in about one year out of seven. In regard to these distress cries, we have done some of the first work on that with the fish and wildlife department on the blackbird distress cry. This one works better on starlings in a roost or in a corn field than a starling distress cry does. We've tried the technique on robins and it worked sometimes. It doesn't work on robins nesting during the blueberry season. We're hoping that this new distress cry mechanism will be one that will go off all day after being set in the field. We would hope it will be inexpensive, yet will not wear down nor out. These ones for sale in California sold for \$450 and would rent for \$30 per week. We will probably supplement one that the North Bass Island people rent for our use with another. Then with our research instruments we can see how effective this is.

R. SMITH: Before you use any of these you had better know your population dynamics, know if you have any population turnover.

DELEGATE: What is the name of the company which is selling these machines?

R. SMITH: We can get it. Somebody want to mention these distress call units since we are not here to endorse any products?

DELEGATE: Biosonics, Inc. Gordon Boudreau is associated with the Santa Rita Technology Institute at Menlo Park, California, now.



D. SCHNEIDER: The point made earlier was unclear. A commercial operator buying strychnine alkaloid, and wanting to put it on pellets of his own choosing can not because you do not have a use registration?

C. FAULKNER: That is correct. We do not have a use registration. This like many others, DDT in bat control, some of these other materials have been used for years and are in the literature, now with new pesticide regulations and registration for use, we have it for DDT. If we can justify and satisfy that we need this use of strychnine alkaloid sulfate on pellets, we can justify it to the pesticide review committee, we can get a registration. This one to my knowledge, has not been discussed, by any of us to our people. [DDT for bat control is now registered. Ed.]

DR. SCHWAB: I'm from California. We have been doing bird control work in orchards and vineyards on certain birds for the last 30 years, based on work done in California by Piper and Neff in the late 1930's. This work is not done by the general public, and it is not aimed at the overall bird population. It is aimed at the species of bird doing the damage and the particular population of that species doing the damage. I don't want to get involved in a long discussion of this, but if anyone wants to talk further, I'll be glad to discuss it.

R. SMITH: Charlie, let's see these four slides. I mentioned netting to protect fruit. This is the kind of installation you have to put in. This is the reason they cost so much. It has to be taken down each year because of the snow problem. One thing I noticed in Ohio is that the plantings are so far apart, about twice that of what it would be in Massachusetts.

This slide shows the netting up. Once it's constructed you don't have to worry about any type of birds. The reason the netting is so high is that you have to get machinery in under the netting. Many growers have mechanical pickers.

Here is a starling trap. A best bait we found is watermelon. The trap has to be tended daily. A certain percentage of birds must be removed each day. In Michigan, some fellows get together, and they've hired some people to spend the summer trapping birds. The growers chip in enough money to rent the traps. Last year they caught about 15,000 birds. One large blueberry grower swears by these traps.

This is the redwing decoy trap. A large trap will catch more birds. The bait seems to have nothing to do with the number of birds you catch. The bait just keeps the birds alive while they are in the trap. We have set the traps up and have not put decoys, water, nor bait in the traps, and come back in the afternoon and find 150 birds in the traps.