Auburn University
Southern Forest Nursery
Management Cooperative

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THE EFFICACY OF COMMERCIAL BIRD REPELLENTS TO DETER SEED PREDATION

by
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INTRODUCTION

Bird predation of newly sown conifer and hardwood seed has been a problem as long as nurseries have been in existence. In 1938, Burleigh noted that meadowlarks, mourning doves, quail, cowbirds and blackbirds have a preference for longleaf pine seed. Initially, nurseries used "bird patrols" - using shotguns and firecrackers to frighten the birds - with marginal success (King 1958, Kingsley 1958). There are four methods of protecting seed from birds: (1) physical barriers, (2) frightening devices, (3) poisonous chemicals, and (4) repellent chemicals (Fuller et al. 1984).

Physical barriers are not practical in forest seedling nurseries due to the large contiguous area that would require protection. Skakel and Washburn (1989) described a mechanized application method for spreading bird netting over a nursery with the labor cost to cover and remove the netting (adjusted to 2009 dollars) at $0.68 per thousand seedlings. Frightening devices are also expensive and difficult to manage over a large nursery. King (1958) reported the cost of "bird patrols" at the W.W. Ashe Nursery, MS was approximately $0.79 per thousand seedlings (adjusted to 2009 dollars). Poisonous chemicals are problematic in that both target and non-target birds are potentially affected and may not be either feasible or recommended for nurseries located near urban areas.

The use of chemicals as a seed treatment prior to sowing appears to be the easiest and most cost effective method of repelling birds and minimizing seed predation. Conifer seed is routinely treated just before sowing to control diseases and/or facilitate mechanical sowing. Hardwood

seeds, although not normally chemically treated, are hand sorted prior to sowing thus providing an opportunity for seed treatment.

Registered chemicals for exclusive use as bird repellents are limited. Some pesticides serve a dual purpose, acting as a bird repellent while also controlling disease. Thiram has been frequently used in forest nurseries as both a bird repellent and a fungicide to control seed borne diseases (Derr 1968, Mony 1958, Jorgensen 1968, King 1958). Linz et al. (2006) reported the insecticide chlorpyrifos significantly reduced bird predation. Werner et al. (2008) tested several commonly used fungicides for blackbird repellency.

With the recent re-registration of the most commonly used repellant, thiram, there was some concern of losing this tool to minimize seed predation by birds. Thus, the purpose of this study was to evaluate several new products currently marketed as having bird repellent properties. In addition, kaolin clay was also tested as it has been shown to be a bird repellent (Daneke & Decker 1988, Cummings et al.1998). Our goal was to compare the consumption of bird seed treated with these various products using a number of different application rates.

METHODOLOGY

Products tested:

The products tested in Table 1 are either registered pesticides or naturally occurring compounds. Of the products tested, anthraquione and thiram have been previously used in forest nurseries with varying degrees of success.

Bait preparation:

Each product, with the exception of kaolin clay, was tested at the 1x label rate by diluting the product in 100 ml of tap water. The solution was mixed with 65 g of bird seed, and allowed to air dry. A 2.5 ml slurry of thiram (made from 25 parts thiram to 1 part latex) was also mixed with 65 g of bird seed. An untreated control with 65 g of bird seed was included in each trial. If the treated bird seed was eaten at the 1x rate, then a 4x rate was tested for each product three additional times.

Kaolin clay was also used by mixing 7 g of kaolin clay with 5 ml of latex. This suspension was then added to 65 g of bird seed and allowed to dry.

Each 65 g of treated bird seed was placed in an 18” x 18” wooden frame with a wire screen base and set out on a concrete pad in an open area approximately 75’ from a wooded area. The birds observed over the course of the study were doves, woodpeckers, cow birds, crows, finches and a hawk. The positions of the wooden trays were set out randomly on the concrete pad each time seed was added. After 24 hr the trays were collected and the remaining seed in each tray weighed and recorded.

RESULTS

The amount (proportion) of treated seed consumed for the 1x and 4x tests is shown in Figure 1. The 4x rate is the average of three separate trials that were conducted over a period of three days. The 1x rate of the Thiram 42-S treatment effectively reduced bird seed consumption in these trials and, because it is the standard seed treatment, would be considered the base line for the other seed treatments. Seed consumption of the 1x and 4 x rates of the Bird Shield, Flight Control, GWN-4770 and Goose Stopper were all similar to the non-treated controls and indicate a total lack of efficacy in deterring seed predation.

In our examination of the kaolin clay, it was found that a mixture of test products and kaolin clay plus latex significantly reduced consumption of the bird seed compared to the non-treated seed (Figure 2). There was no significant difference in seed predation with the addition of clay to Flight Control, Thiram 42-S or Bird Shield. However, the combination of GWN-4770 and clay did result in significantly less seed predation than the other treatments. Thiram 42-S and clay, did not reduce seed predation compared to the Thiram 42-S alone treatment.

To test if latex had any effect on seed predation, two additional trials were conducted in which latex alone was applied to the control. In these tests, there was no difference in the seed consumption of the non-treated control seed with latex and non-treated seed without latex. For some reason, seed predation was only reduced when kaolin clay was added. Goose Stopper plus kaolin clay was not tested in this study.

DISCUSSION

These studies indicate that bird repellent products marketed specifically for that purpose (Flight Control, Bird Shield, Goose Stopper) were not effective in deterring seed predation by birds. Thiram, a fungicide, was the only product which showed efficacy (reduced seed predation) in all trials conducted on the Auburn Campus. Thiram has been the most frequently used and most effective chemical to repel birds in nurseries (Derr 1968, Mony 1958, Jorgensen 1968, King 1958) and is also an effective fungicide for controlling seed borne diseases. GWN-4770, a fungicide, was not at all effective at the 1x and 4 x rates but was effective at reducing seed predation when mixed with clay and latex.

Not surprisingly, when the seed was coated with kaolin clay seed predation and consumption was reduced in all trials. This is consistent with other studies in which rice and lettuce seeds were coated in clay to reduce bird damage (Daneke and Decker 1988, Cummings et al.1998).

MANAGEMENT IMPLICATIONS

Registered chemicals for use as bird repellents are limited and the development of new chemicals, specifically as a bird repellent, is costly and slow due to the voluminous amount of data required by EPA (Linz et al. 2006). Linz et al. (2006) advocates the testing of other

currently registered pesticides to determine if the product repels birds and their feeding activities as EPA requires less data for the registration of a new use for a previously registered compound with a proven active ingredient.

The two products most effective in these trials were the two fungicides, thiram, and flutolanil. Although the Southern Forest Nursery Management Cooperative has not specifically tested chlorpyrifos, the potential use of this insecticide as a bird repellent described by Linz et al.(2006) is interesting since this insecticide is widely used in the nursery community.

Although the results with the chemicals were variable, it was apparent that in all cases, the addition of clay and latex to the seed reduced bird predation. We are not sure whether the clay deterred the birds because of an alteration in the visual appearance of the seed or if the deterrent was as a result of taste. If mangers are interest in trying either clay or pesticides such as chloropyrifos or flutolanil, as a bird repellant over that of thiram, a small section of the nursery should be used over the course of a couple of growing seasons. Once the application is shown to be effective on a small area, a larger test section such as several nursery beds or a riser should be tried before wide scale use is warranted.

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Table 1. Test products, manufacturers and active ingredients

Product	**Manufacturer**	**Active ingredient**
Bird Shield	Bird Shield Repellent Corporation	methyl anthranilate 28.4%
Flight Control Plus	Akrion Life Sciences LLC	9,10-anthraquione
Thiram 42-S	Gustafson	thiram 42%
GWN-4770	Gowan Company	flutolanil 70%
Goose Stopper	Messina Wildlife	Putrescent whole egg solids 5.8%; Mint Oil 3.37%; Rosemary Oil 3.37%
Kaolin Clay	Thiele Kaolin Company	hydrous aluminum silicate

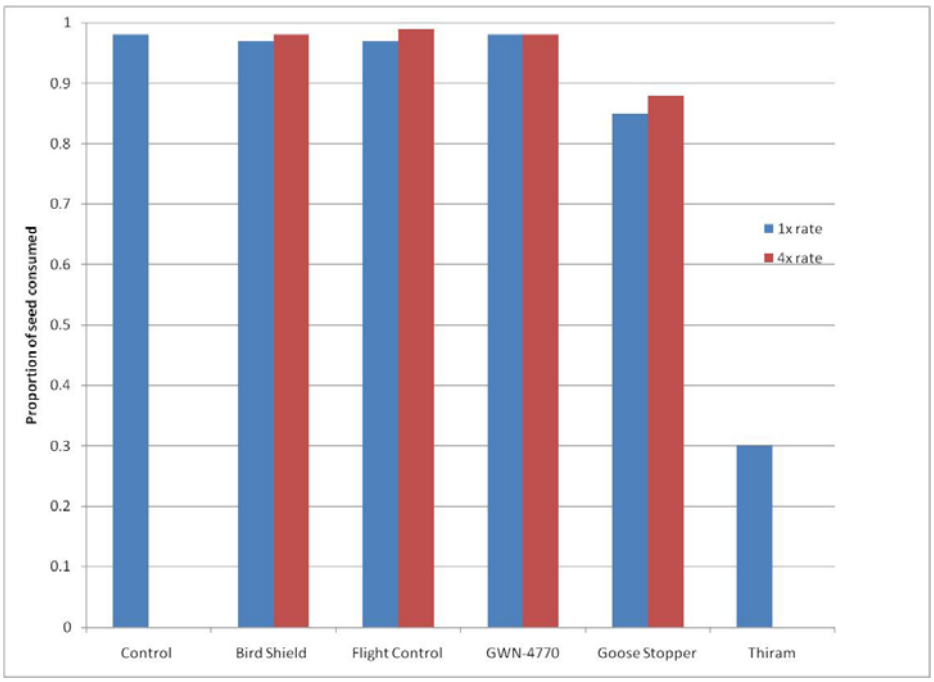

Figure 1. Bird seed consumption at 1x and 4x label rate as compared to untreated control.

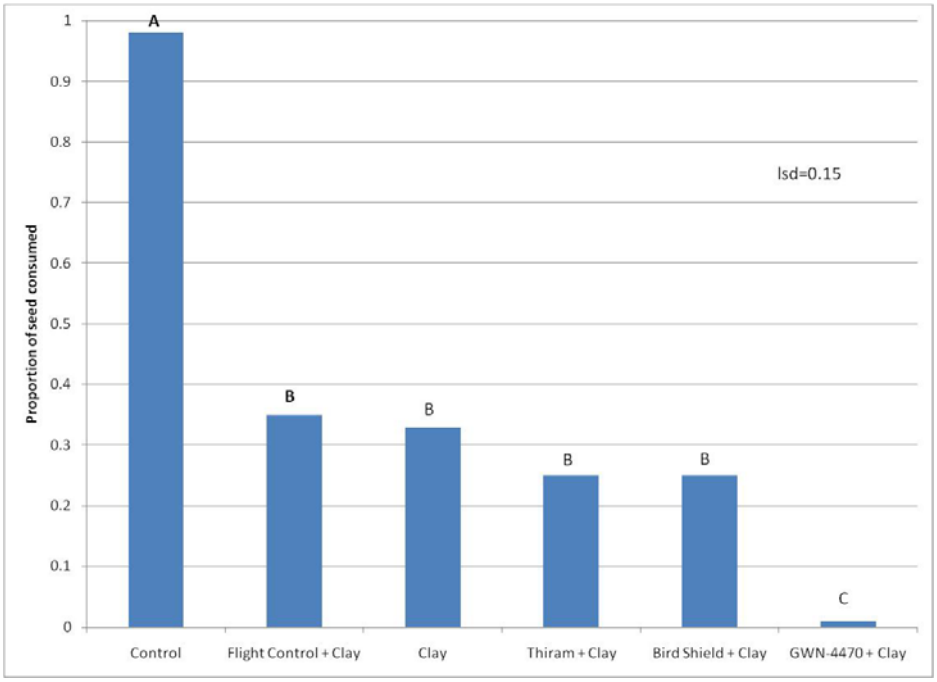

Figure 2. Proportion of bird seed consumed using test products plus kaolin clay and latex average over six trials.