

# Bird Damage to Sown Seeds or Emerging Seedlings

By Thomas D. Landis

It's spring so most growers are sowing their crops or will be doing so in the next couple of months. Many things can go wrong during sowing (Figure 1), and all gardeners know the anxiety of waiting for those germinating plants to "poke their heads" out of the soil or growing medium. Seeds are small packets of high-energy food and therefore are especially attractive to birds. Trying to keep these critters from eating all your crop seeds is one of those concerns that man has faced since the beginning of recorded time.

It is difficult to quantify the overall impact of animal damage because the incidents are generally episodic. Bird predation is often due to migrating flocks, which can do severe damage in a short time. One nursery that participated in the Container Nursery Survey reported that from 25 to 50% of their sown seeds were eaten by goldfinches (Landis and others 1989). Bird damage is often localized -- losses varied from 0 to 75% of ponderosa pine (*Pinus ponderosa*) seeds in one bareroot nursery (Landis 1976).

Current information on bird predation is hard to locate but the best sources are websites. For instance, up-to-date information on all types of animal damage can be found at the Internet Center for Wildlife Damage Management, which is a non-profit, grant-funded site that provides research-based information on how to responsibly handle wildlife damage problems (Vantassel 2010).

On that site, you can download Prevention and Control of Wildlife Damage, which contains information on diagnosing and controlling all types of wildlife pests including birds (Hygnstrom and others 1994). Not much has been published on bird predation in forest, conservation, and native plant nurseries so much of this article was based on Volume Five: Nursery Pests and Mycorrhizae of the Container Tree Nursery Manual series (Landis and others 1989).

**Hosts** - Birds will eat seeds of all conifer and native plant species but prefer the large-seeded pines such as white pine, sugar pine, and pinyon. Crows and ravens can damage seed beds of large hardwood seeds such as oaks.

**Symptoms/damage** - If seeds cannot be located in the container or seedbed, but the seed covering has been scattered around, then bird predation is a possibility (Figure 1A). However, it can be difficult to distinguish between bird and rodent damage. Birds generally eat seeds immediately leaving spent seedcoats, whereas rodents often cache uneaten seeds. Rodents feed mostly at night, whereas birds usually feed during the day. Rodent predation can occur in open and closed growing areas, but bird predation is more common in open compounds. Birds also cause clipping injury to emerging seedlings by feeding on the seed coat that clings to the cotyledons (Figure 1 B). Larger seedlings can sometimes recover from clipping injury, although severely damaged

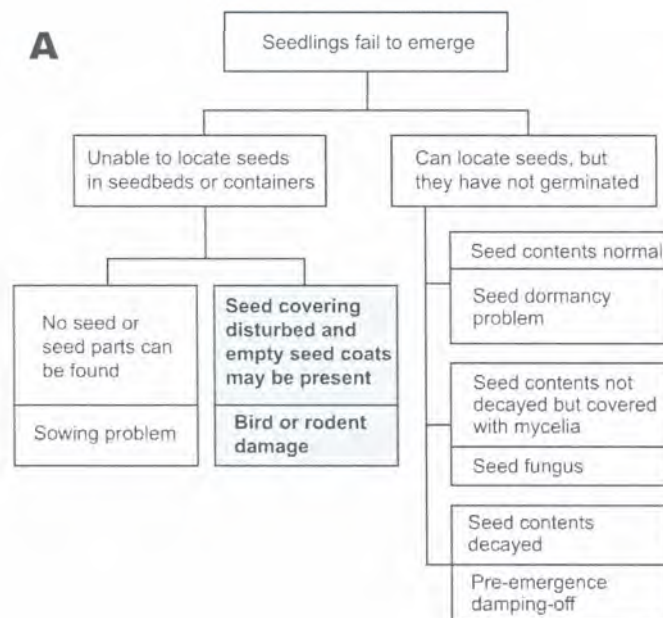


Figure 1 - A damage key is helpful to separate bird predation from the many things that can happen to newly-sown seeds (A). Besides consuming seeds, birds can clip the tops of germinants, which usually results in their death (B) (A, modified from Landis and others 1989).



Figure 2 – Netting has been effective in preventing bird damage in both bareroot (A) and container nurseries. Noise repellents, such as the propane cannon (B) work initially, but birds soon become tolerant.

germinants are weakened and prone to other pests, such as damping-off fungi.

Management - Bird predation is best controlled through prevention: exclusion through proper growing area design and use of screens, and elimination of suitable habitat around the growing area. Control measures include (Fuller and others 1984):

1. Netting - Plastic bird netting is available in several lengths and widths. It is applied over sown containers or seedbeds (Figure 2A) and physically protects seeds and germinants until they are established. Wire

hoops support the netting and the mesh size is large enough to allow rain or irrigation to reach the plants. A system for mechanically applying bird netting to bareroot seedbeds has been developed (Skakel and Washburn 1989).

2. Trapping and baiting - Birds are opportunists and can sometimes be lured away from crop seeds if you supply another more desirable food source away from the nursery. Surplus seeds can be scattered around to attract birds and keep them from reaching the crop seeds.

Table 1 - Characteristics of chemical bird repellents used in forest and conservation nurseries *		
Product	Active Ingredient	Remarks
Dithianon	Antraquinone	A quinone fungicide that is registered by the EPA for bird control. It also occurs naturally in some plants, such as aloe, senna, rhubarb, and Cascara buckthorn
Mesuro <sup>®</sup> 75 W	Methiocarb	Registered by EPA as an insecticide and molluscicide. Commonly used by homeowners to kill snail and slugs
Thiram <sup>®</sup> 50 WP, Arasan, Tersan 74	Dithiocarbamate	Registered by EPA as a fungicide that is applied as a seed treatment
Rejex-It, Bird Shield <sup>™</sup>	Methyl anthranilate	Several formulations are available that make birds sick without killing them. Active ingredient is found in concord grapes, and is used as a flavoring in grape soda
Hot Sauce <sup>®</sup> Animal Repellent, Deer Away	Capsaicin	Available commercially in concentrations from 2.5 to 6.2% Homemade formulations are made by grinding dried, ripe <i>Capsicum frutescens</i> chili peppers into a fine powder and mixing with a solvent.
* Modified from Colorado State University Extension, 2007. All pesticide information is subject to change so be sure to check the labels or on-line sources		



3. Chemical repellents - You might think that the simplest and most effective way to prevent bird predation of seeds is to apply a repellent before sowing. Several chemicals have been used to repel birds in nurseries (Table 1).

Unfortunately, birds and mammals apparently have large differences in tolerances to various repellents. For instance, pen studies have shown that capsaicin products have effectively repelled deer and elk but other observations have shown that birds will readily consume seeds treated with capsaicin concentrations as high as 2% (Colorado State University Extension 2007).

4. Visual repellents - Altering the appearance of seeds may help delay or prevent predation. Aluminum powder has traditionally been used in forest nurseries to keep conifer seeds from sticking together during mechanical sowing. More recently, some nurseries coat their seeds with DayGlo® paint pigment to make sown seeds easier to see in the furrow or container. No published research exists, but changing the color of seeds may be an effective bird repellent.

5. Noise repellents - Many devices have been used for frightening birds including portable propane cannons (Figure 2B). While initially effective, most birds eventually become accustomed to the noise.

A good source for all types of animal control chemicals and equipment can be found on-line (Hygnstrom and others 1994).

## Final Thoughts

Considering the cost of seed and the amount of time and energy expended during the sowing process, it only makes sense to try and protect newly-sown crops from bird predation:

1. Effectiveness is a factor of motivation and habituation. Repellents are less effective when birds are hungry or other sources of food are unavailable. All animals are creatures of habit, and habituation can complicate repellent efforts.

2. Phytotoxicity, worker safety, and environment hazards. Any chemical applied to seeds has the potential to adversely affect seed germination or young seedlings. Pesticides registered as safe for other crops may not have been tested on trees and other native plants. The repellents listed in Table 1

vary widely in their potential toxicity to nursery workers or other animals.

3. Availability & cost. Most commercial repellents are readily available through garden centers or reforestation suppliers, and their cost is minimal compared to the potential crop damage. Others, such as pepper sprays, can be homemade.

## References

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