

**CONTROL OF NUISANCE BIRDS IN THE AIRPORT ARENA
BY FOGGING WITH REJEX-IT® TP-40/WS-40.**

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Abstract

Rejex-it® aerosols offer an efficient tool for the management of nuisance birds without harming target and non-target birds or other animals. It is not a pesticide, but a repellent based on methyl anthranilate (MA), a naturally occurring compound with reduced risk to the environment. As a proactive method it does not depend on birds to taste the repellent by eating treated food. Thermal fogging of Rejex-it® TP-40 or mechanical fogging of Rejex-it® WS-40 relies on the exposure of the birds to the aerosol. As such, thermal fogging has been applied with great success in many hangars, warehouses and baggage handling areas of TWA and American Airline, where roosting and nesting birds have been an ongoing problem. In open areas, such as the airfield at Homestead Reserve AFB or Laughlin AFB, a ULV fogger was very effective to repel the migrating swallows with TP-40. A new development is the automated, battery operated ULV fogger of HH Winkler, which was extremely successful in dispersing all birds from a roof top and a train station with extremely low quantities of WS-40 for up to 500 yards downwind. After several exposures to the fog the birds generally left the area completely and did not return. The automated fogging system inhibits any future re-infestation from new bird populations and assures a total bird free environment.

Key Words: Aerosol, Behavior Modification, Bird repellent, Birds, Fogging, Hangar, Loafing, Rejex-it, Rejex-it TP-40, Rejex-it WS-40, Runway, Structures, Warehouse.

Introduction

Airports are great places for birds to nest and roost. There are wide-open areas with few people around. The buildings are large and high with many structural beams, and not much disturbance. And then there are the planes. They offer another opportunity for roosting and nesting without the disturbance of predators. No wonder birds love these structures. The efforts to control birds on airports are as varied as there are airports. What works on one does not have to work on another. While some have very extensive control programs, others have none (Spence 1995). Despite evidence that ultra sound cannot be detected by or is aversive to birds (Wright 1982, Beuter & Weiss 1986) it is still widely used. Who wants to set up explosives or shoot the birds in the hangars? Or on runways? Whatever the view, the birds are not welcome in this environment. Their droppings are damaging to airplanes and airplane parts and a nest in an engine can cause serious problems, not to mention the potential bird strikes. The need for control has been discussed in many papers and presentations and it is more a question of what is financially and ecologically acceptable at the time. So far, most airports struggle with this bird problems using marginally or non effective methods available just to have a program in place. There is a need for efficient methods to solve the bird problems with environmentally acceptable methods.

Method

The effectiveness of Methyl Anthranilate (MA) as a taste repellent has been demonstrated under many conditions and has been documented in many publications (Kare 1961, Dolbeer 1992, 1993, Mason & Clark 1996, Vogt 1997). The treatment of fruits and berries with Rejex-it[®] AG-145, a micro-encapsulated formulation, works very well in reducing or even eliminating bird depredations. However, the protection is only required for a short period during the final ripening of the fruits (Curtis 1994). The application of Rejex-it[®] AG-36 to turf has shown great results in repelling geese from lawns, golf courses, parks and other manicured grass areas if done at the right time. The grass on the airports is certainly not of the variety that geese like and there are many other birds that do not eat grass. Gulls and crows are effectively dispersed from landfills with Rejex-it[®] AP-50 (Vogt 1994). However, taste repellents are not very effective for roosting and nesting birds and a different approach and another delivery system is needed. The application of the MA formulation to the eye and mucous membranes of the birds via an aerosol has first been demonstrated on some landfills in 1993 (Nachtman 1993). Several large experiments on roosting starlings (*Sturnus vulgaris*) in trees have been shown to be very efficient in dispersing all birds by trained professionals (Lewis 1995, Vogt 1997). The effectiveness of the aerosol to disperse geese

(*Branta canadensis*) and tree swallows (*Stelgidopteryx serripennis*) has been demonstrated (Dolbeer 1996), and migrating waterfowl was effectively diverted from two desulphurization ponds (Stevens 1998).

While the dispersal effect of the repellent is obvious as soon as the birds are exposed to the drifting fog, complete and lasting dispersion of all birds requires more understanding. The product, the fog generator and the specific behavior of the bird, all play an important role in the effective dispersal of the nuisance birds. Best results are obtained by professional applicators trained in the product and method.

Product

The Bird Repellent Rejex-it[®] TP-40, U.S. EPA Reg. No. 58035-7, from Becker Underwood, Inc. (1) is a clear liquid, lighter than water and completely immiscible with water. It is formulated from naturally occurring food grade ingredients listed as Generally Recognized As Safe (GRAS) by FDA. The formulation contains 40% active ingredient Methyl Anthranilate (MA) and has a viscosity of 16 cps. A new development is the low odor formulation Rejex-it[®] WS-40 . It is a clear liquid that has been specially formulated for use in the new ULV fogger "Bico 2000" from HH Winkler GmbH (2).

Both formulations are used "as is" without any dilution. They can be dispersed in air with any device that is capable to produce droplets of less than 30 microns. The fog poses minimal risk to bees, mammals and people, and tested benign in inhalation studies. While the odor itself is not effective, the fog irritates the eyes and mucous membranes of the birds sufficiently to leave the site of the bad experience without the desire to come back.

Equipment

Generally, any fogger can be used that is capable to generate a "dry" fog. This can be either a thermal fogger, a mechanical fogger, such as the so called Ultra Low Volume (ULV) foggers, compressed air foggers, or electrostatic fog generators.

Fogging operations have successfully been tested in several thermal foggers of Curtis Dyna-Fog Ltd. (3) such as the thermal foggers "Golden Eagle, Electric Start XL (Model 2610, Series 3)" aerosol generator, Model "Blackhawk," and the big "Model 1200", capable to fog one gallon product per minute. The small "Burgess Portable Propane Insect Fogger" (4) was sufficient to disperse birds from a tree and geese from a pond. The versatile "Golden Eagle" is a thermal fogger with a formulation output of 0-9 gal/hr (0-

34 liter/hr) and a droplet size of 0.5-30 microns. The fogger was set at a maximum fogging rate of 4 gal/hr (15 liter/hr) to produce a dry fog.

Of the ULV foggers, good results were reported with the Model "Hurricane," the Model "Typhoon," and the Model "Nightstar," all from Curtis Dyna-Fog. Very good results have recently been achieved with the low odor formulation WS-40 in the fully automated 12 Volt battery operated fogger, Model "Bic 2000" from HH Winkler with a fogging rate of 10 ml per minute.

Applications

Hangars & Warehouses

The fogging experiments were done on three different hangar sites, three American Airline hangars at La Guardia from November 11-13, 1997, a TWA hangar at La Guardia from June 15-17, 1998, and a TWA warehouse at Newark Airport from November 3-5, 1998. The test sites had a population of about 200 nesting and roosting Pigeons (*Columbia livia*) and 500-1,200 roosting Starlings (*Sturnus vulgaris*). Past bird control was time consuming and did not always work as desired. Not happy with the results, the pest control operator decided in 1997 to test the fogging application of Rejex-it[®] TP-40 as an alternate method with great success.

All fogging applications were done by a fully licensed Pest Control Applicators (5) at 1:30 a.m., when the least number of people were present. The operation and the low risk were explained to the remaining people. Due to the benign nature of Rejex-it[®] TP-40, no special safety equipment was used by the applicator.

After counting and identifying the birds present, the fogging operation was started and continued intermittently for about 30-45 min. until all birds had left the area. No difficulties or problems were encountered during the fogging operation. The skilled operator had no problem to direct the fog into the direction where the birds were roosting. For each fogging operation 64 ounces (1.8 liter) of Rejex-it[®] TP-40 were used.

The dry and dense white fog of Rejex-it[®] TP-40 was highly visible and rose into the beams of the 75 feet (23 m) high ceiling of the hangar. The fog had a strong "Concord Grape" like odor, characteristic of MA which dissipates after a few days. It slowly drifted with time and dissipated completely without wetting any surfaces.

The three American Airline Hangars at LaGuardia, NY of one acre (4,000 sqm) enclosed area (175'x250') and a height of 75 feet (23 m) each, had a

population of 200 pigeons and 1,200 starlings. During the first application of 1.8 liter product on Nov. 11, 1997 all birds left the test sites, but came back later as they had no other place to go for the rest of the night. The second night on Nov. 12, 1997 all pigeons and 90% of the starlings had come back. As during the first application all birds left on fogging and returned later after the fog had subsided. On the third night, Nov. 13, 1997 all pigeons had gone and only 100 starlings were remaining. To assure complete removal of all birds, the third application was done as the two preceding ones. An inspection two weeks and 6 months later showed no birds present in the hangar (see table 1).

The one acre (4,000 sqm) TWA Hangar at LaGuardia, NY had 200 pigeons and 500 starlings. During the first fogging application of 1.8 liter product on June 15, 1998 all birds left and returned after the fog had dissipated. The second night on June 16, 1998 all birds were back in the hangar. Fogging operation proceeded as on the first night. On the third night on June 17, 1998 all pigeons were gone and only 100 starlings had returned. The third fogging application was done as the two preceding ones. No return of the displaced birds was observed. An inspection two weeks and 6 months later showed no birds in the hangar, except two young pigeons that had died of starvation as the adults did not return to feed them.

The TWA Warehouse, Newark Airport, NJ of 1/2 acre (2,000 sqm) with a height of only 25 feet (8m) had a population of 750 starlings roosting in the structural beams. The first application at 1.8 liter product was done in the night of Nov. 3, 1998. All birds left and returned after the fog had subsided. On the second night on Nov. 4, 1998 only half of the starlings had returned and on the third night no birds were observed. To assure no hidden birds, the warehouse was fogged once more as on the first day. An inspection two weeks later as well as 6 months later showed no birds in the warehouse.

*Table 1: Summary results for the fogging of Starlings (*Sturnus Vulgaris*) and Pigeons (*Columbia livia*) in several hangars and one warehouse*

	AAA Hangar, LaGuardia		TWA Hangar, LaGuardia		TWA Warehouse, Newark	
	Starlings	Pigeons	Starlings	Pigeons	Starlings	Pigeons
Day 1	1,200	200	500	200	750	0
Day 2	1,000	200	500	200	400	0
Day 3	0	0	100	0	0	0
2 Wks	0	0	0	0	0	0
6 Month	0	0	0	0	0	0

Airfields

Migrating swallows have been an ongoing problem at the Homestead Reserve Air Base, with most of the swallows selecting the site for nesting, compounding the problems. Limited by funding, the site had decided in 1998 to fog the swallows with Rejex-it TP-40 in an old ULV fogger of the type "Typhoon" with one fogging nozzle. After two months of fogging operation up and down the runway straight into the air, the Homestead Air Reserve Base reported no more gulls on the airfield, a reduction in the ibis numbers from several hundred to four, vultures flying around the airfield rather than through it, wading bird numbers significantly reduced and no more nesting swallows on the airport (Dunaway 1998, Peterla 1999).

At the Laughlin Air Base the applicator drove out to the center of the flock of thousands of arriving swallows sending the birds flying into the air. With the fogger loaded in the back of the truck and an on/off switch in the cab, the applicator released the fog. The first couple of birds that were hit by the fog let out a distress call, sending the remainder of the flock into a tornado like mass which immediately left the airfield. Within 30 minutes of applying the fog of Rejex-it TP-40 the swallows were gone. The fogging was repeated on two other occasions with the same effect. By the third application, only 500 swallows were present and the birds were dispersed within one hour of arriving at the airfield (Willis 1999).

Discussion

In all applications the fogging operation was very successful in driving all the birds out of the effected areas after three fogging operations on consecutive days, without a single fatality. Two weeks after completion of the fogging operation no birds had returned. Due to the nature that all applications in the hangars were done during the night, where the birds did not have enough light to fly to an alternate roosting site, they returned to the hangar once the fog had dissipated. Therefore, several fogging operations had to be performed to teach the birds that the habitat was not inviting anymore. Fogging operations in the early evening with some daylight still available are generally more efficient on the first and subsequent fogging operations (Vogt 1998).

Depending on the location and the applicator's skills, it can take from 1-6 applications to repel established flocks of birds for the season. It is not always easy to get the irritating aerosol to the eyes and mucous membranes of the birds in sufficient quantity to initiate the desired behavior modification without the problems of habituation. For best results, it is important to expose as many birds as possible to the aerosol and have enough daylight available for them to find an alternate feeding, roosting, or nesting sites. As with any other

animal training method, it takes time to be 100% effective and generally cannot be accomplished in one operation. Therefore, at least three applications should be planned to get 95% effectiveness or an automated system should be considered, which uses less product. Automated fogging operations are generally set at 30 seconds every 30 minute during the time of bird activity. Usually, successive applications use less product than the first application as operators learn to become more efficient. In open areas as little as 2.5 ounces (70 g) of product are sufficient to fog a one acre area. With Rejex-it[®] WS-40 as little as 30 ml in the "Bico 2000" can cover an area in excess of one acre.

The fogging of Rejex-it[®] TP-40 or WS-40 represents a very direct method that has an effectiveness well in excess of 95% and is applicable in most areas where birds represent a hazard or nuisance (Table 2). Success or failure is not a function of the product but rather a result of the training and experience of the operator. Fully trained applicators nearly always achieve 100% success rate with results lasting from 6-12 months.

Acknowledgments

- (1) Rejex-it[®] is a registered trademark of Becker Underwood, Inc., 801 Dayton Ave., Ames, Iowa 50010.
- (2) HH Winkler GmbH, Ahrensfelder Weg 7, D-22926 Ahrensburg, Germany.
- (3) Curtis Dyna-Fog, Ltd., P.O. Box 297, Westfield, IN 46074-0297.
- (4) Burgess Products, Chadwicks, NY.
- (5) Tony Kurtz, MLK Termite & Pest Control, P.O. Box 954, Levittown, NY 11756-0912.

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