

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Label Amendment for Bird Shield® Repellent (EPA Reg. No. 66550-1) containing 26.4% Methyl Anthranilate (Chemical No. 128725) as its Active Ingredient. Review of Product Performance (Efficacy) Studies on Nuisance Birds. DP Barcode D263302; Case No. 008125; Submission No. S575191; MRID Nos. 450209-01 to -04.

FROM: Russell S. Jones, Ph.D., Biologist
Biochemical Pesticides Branch
Biopesticides & Pollution Prevention Division (7511C)

THRU: Freshteh Toghrol, Ph.D., Senior Scientist
Biochemical Pesticides Branch
Biopesticides & Pollution Prevention Division (7511C)

TO: Driss Benmhend, M.S., Regulatory Action Leader
Biochemical Pesticides Branch
Biopesticides & Pollution Prevention Division (7511C)

ACTION REQUESTED

Bird Shield® Repellent Corporation requests a label amendment for the end-use product Bird Shield® Repellent (EPA Reg. No. 66550-1) containing 26.4% methyl anthranilate as its active ingredient. The registrant requests an amendment to permit the use of the product on swallows, starlings, pigeons, sparrows, and woodpeckers. In support of the amendment request, the registrant has submitted four product performance (efficacy) studies and a proposed label.

CONCLUSIONS AND RECOMMENDATIONS

1. BPB supports the request to amend the label to permit use of Bird Shield® Repellent (EPA Reg. No. 66550-1) on swallows, starlings, pigeons, sparrows, and woodpeckers.
2. Based on field efficacy studies using diverse bird species, the end-use product can be considered to be a general bird repellent.

STUDY SUMMARIES

The registrant [Bird Shield® Repellent Corporation (BSRC)] submitted four field efficacy studies for the end-use product, Bird Shield® Repellent (EPA Reg. No. 066550-1), containing 26.4% methyl anthranilate (MA) as its active ingredient. The studies evaluated the repellency of the end-use product against nesting/roosting activity and/or damage by swallows, starlings, pigeons, sparrows, and woodpeckers on residential/commercial buildings and bridges. In each study, the test substance was diluted 1:1 (v:v) with water and applied by means of a backpack sprayer. Following a single application of test substance bird (swallows, pigeons, and woodpeckers) activity (as measured by new nest construction, nests with new eggs, or nests with young birds) on treated structures was reduced by 100% beginning 6 to 24 hours posttreatment; repellency persisted for up to 30 days. In one study, 100% repellency in bird (starlings, pigeons, and English sparrows) activity occurred 35 hours following the last of three, daily applications of test substance. Based on these data using diverse species, the end-use product can be considered to be a general bird repellent. Classification: Acceptable; no additional efficacy data are required.

cc: F. Toghrol, R. S. Jones, D. Benmhend, BPPD Subject File
R. S. Jones: F.T. CM2, (703) 308-5071: 05/04/2000

DATA EVALUATION REPORT

Reviewed by: Russell S. Jones, Ph.D. BPPD
Secondary Reviewer: Freshteh Toghrol, Ph.D. BPPD

STUDY TYPE: Product Performance (Efficacy) Studies:

TOX. CHEM. No.: None

CASE No. 008125

PC CODE: 128725

DP BARCODES: D263302

SUBMISSION No.: S575191

MRID Nos: 450209-01 to -04

TEST MATERIAL: Bird Shield® Repellent (EPA Reg. No. 66550-1) containing 26.4% Methyl Anthranilate as its Active Ingredient

STUDY Nos: BSRC9902

SPONSOR: Bird Shield Repellent Corporation, P. O. Box 785 Pullman, WA 99163

TESTING FACILITY: Bird Shield Repellent Corporation, P. O. Box 785 Pullman, WA 99163

TITLE OF REPORTS: Control of Pest Birds on or in Structures: Swallows (MRID 450209-01); Starlings, Pigeons, and Sparrows (MRID 450209-02); Woodpeckers (MRID 450209-03); and Pigeons (MRID 450209-04).

AUTHORS: Leonard R. Askham, Ph.D.

REPORT ISSUED: September 15, 1999

QUALITY ASSURANCE: The efficacy studies were conducted according to Good Laboratory Practice (GLP) standards as contained in 40 CFR 160. Compliance statements were signed by the study author/submitter/sponsor.

SUMMARY:

The registrant [Bird Shield® Repellent Corporation (BSRC)] submitted four field efficacy studies for the end-use product, Bird Shield® Repellent (EPA Reg. No. 066550-1), containing 26.4% methyl anthranilate (MA) as its active ingredient. The studies evaluated the repellency of the end-use product against nesting/roosting activity and/or damage by swallows, starlings, pigeons, sparrows, and woodpeckers on residential/commercial buildings and bridges. In each study, the test substance was diluted 1:1 (v:v) with water and applied by means of a backpack sprayer. Following a single application of test substance bird (swallows, pigeons, and woodpeckers) activity (as measured by new nest construction, nests with new eggs, or nests with young birds) on treated structures was reduced by 100% beginning 6 to 24 hours posttreatment; repellency persisted for up to 30 days. In one study, 100% repellency in bird (starlings, pigeons, and English sparrows) activity occurred 35 hours following the last of three, daily applications of test substance. Based on these data using diverse species, the end-use product can be considered to be a general bird repellent.

CLASSIFICATION: Acceptable; no additional efficacy data are required.

I. Control of Pest Birds on or in Structures: Swallows (MRID 450209-01; Study No. BSRC9902)

Objective: Evaluate efficacy of product in reducing or eliminating nest building activity by swallows on structures.

A. Materials and Methods:

- Test Substance: Bird Shield® Repellent (EPA Reg. No. 66550-1); Lot No. 990309101 (containing 26.4% active ingredient).
- Application Method: Sample diluted 1:1 (v:v) test substance:water (total 2 gallons; concentration – 1320 ppm; 2.29 lbs a.i.) with a hand-pumped, backpack sprayer.
- Target species: Barn swallows (*Hirundo rustica*) and cliff swallows (*Petrochelidon pyrrhonota*)
- Study site: Study 1: Washington State University (WSU) Tree Fruit Research Center (TFS), Columbia View Orchard (three buildings); Study 2: Four bridges along the Tucanon River in SW Washington State.
- Study design: Study 1: Two buildings were selected as treatments and one as a non-treated control. The test substance was applied to existing nests of barn swallows, walls, and roof rafters of the treatment buildings approximately

24 hours after birds arrived and began rebuilding the previous year's nests. Nests lined the South-facing walls of each building and were unoccupied (no eggs or young were present) during the trial. Study 2: Three bridges were selected as treatments; two bridges were completely treated with test substance and one was only treated on the half that had established nests. The remaining bridge was the non-treated control.

Observation: All nests on buildings or bridges were observed for occupancy. Nest building and reconstruction activity were recorded prior to test substance application and at 1, 2, 6, and 24 hours posttreatment. Efficacy was determined as the absence of individual birds returning to existing nests and/or the construction of new nests compared to non-treated controls.

- B. Results: Similar results were observed for both treated buildings and bridges, although the product was more effective on treated buildings, than on treated bridges up to 2 hours posttreatment. By 6 hours posttreatment, the product was equally effective at both test sites and caused a 100% reduction in bird activity which continued to fro up to 24 hours posttreatment. Repellency continued for up to 30 days posttreatment, as measured by the complete absence of new nest construction, active nests, nests with eggs, and/or nests with young birds.

Study 1: The numbers of birds engaged in nest building and/or reconstruction on treated buildings was reduced 0-11% at 1 hour posttreatment, 52-57% at 2 hours posttreatment, and 100% at 6 hours posttreatment. Birds remained absent from treated buildings up to 24 hours posttreatment. Repellency continued for up to 30 days posttreatment: no new nests at 24 hours posttreatment, no active nests at 2 days posttreatment, no nests with eggs at 14 days posttreatment, and no nests with young birds at 30 days posttreatment were observed on the treated buildings.

The untreated control showed no change in bird activity up to 2 hours posttreatment, and bird activity increased approximately 5% to 23% between 6 and 24 hours posttreatment. New nest construction, active nests, nests with eggs, and/or nests with young birds increased up to 30 days posttreatment in the untreated control building.

Study 2: The numbers of birds engaged in nest building and/or reconstruction on treated bridges was reduced approximately 3-6% at 1 hours posttreatment and approximately 67-84% by 2 hours posttreatment. At 6 hours posttreatment, no birds were present in/on treated bridges (100% reduction) and they remained absent up to 24 hours posttreatment. Repellency continued for up to 30 days posttreatment, as measured by: no new nests at 24 hours posttreatment, no active nests at 2 days posttreatment, no nests with eggs at 14 days posttreatment, and no nests with young birds at 30 days posttreatment were observed on the treated buildings.

The untreated control showed no change in bird activity up to 24 hours posttreatment. New nest construction, active nests, nests with eggs, and/or nests with young birds increased up to 30 days posttreatment in the untreated control bridge and on the untreated half of the "half-bridge" study.

On the bridge on which the North half was treated and the South half untreated, product application was virtually ineffective in reducing bird activity up to 1 hour posttreatment, but reduced bird numbers by approximately 65% by 2 hours posttreatment. At 6 hours posttreatment, there was a 100% reduction in birds on the treated (North) half of the bridge.

- C. Conclusions: Based on the data, the end-use product (50% water dilution of MA concentrate) is effective in repelling swallows from treated structures (buildings, bridges) for up to 30 days posttreatment; 100% repellency occurred at 6 hours posttreatment.
- D. Deficiencies: Although it is clear that substantial treatment differences occurred as a result of product application, the studies were inadequately replicated (two treatment reps and one control at each site). However, BPB notes that the number of replications was probably constrained by the number of building available to use as test sites. Inappropriate statistics were used to determine statistical significance. At both study sites, unaveraged treatment results were combined with control observations in the calculation of standard deviations. Since the number of nests/birds at each structure were not equivalent at the start of the study, treatments and controls cannot be compared against one another for each day of the study. It is more appropriate to compare the percentage reduction of bird activity for each building/building on each day with its own pretreatment bird/nest counts. Furthermore, in the bridge study, the "half-bridge" site should have been considered a separate study and not included in the standard deviation calculations for all bridges. BPB notes that although it is not clear what statistical analysis method could be applied to better analyze these data, the statistical treatment by the study author is inappropriate.

However, BPB notes that due to the large treatment effects (bird repellency) shown by application of the test substance, these deficiencies did not affect the outcome of the study nor the conclusions drawn from the data.

Classification: Acceptable; no additional study is required.

- II. Control of Pest Birds on or in Structures: Starlings, pigeons, and sparrows (MRID 450209-02; Study No. BSRC9702)

Objective: Evaluate efficacy of product in reducing or eliminating nest building activity by Starlings (*Sturnus vulgaris*), pigeons (*Columbidae*), and English sparrows (*Passer domesticus*) on structures.

A. Materials and Methods:

- Test Substance: Bird Shield® Repellent (EPA Reg. No. 66550-1); Lot No. 990309101 (containing 26.4% active ingredient).
- Application Method: Sample diluted 1:1 (v:v) test substance:water (total 9 gallons of concentrate used; concentration = 1320 ppm; 20.61 lbs a.i.) with a gas-powered, motorized, 3-gallon, backpack sprayer.
- Target species: Starlings (*Sturnus vulgaris*), pigeons (*Columbidae*), and English sparrows (*Passer domesticus*)
- Study site: Washington State University (WSU) College of Animal Sciences, M.E. Ensminger Beef Cattle Center, Pullman, WA (three buildings). Each of the three buildings contained nests of hay, straw, sticks, and feathers of the target birds; nests lined the roof supports, stringers, and wall caps. Building 1: 75 x 400 ft, open wall construction with exposed rafters and beams; interior contained cattle stalls, feed bunkers, water tanks, and an enclosed office (50 x 50 ft). Building 2: 200 x 200 ft, closed wall construction with exposed rafters and beams; interior contained cattle stalls, feed bunkers, and water tanks. Building 3: 50 x 75 ft, closed wall construction with exposed rafters and beams; interior contained cattle feed (hay and grain).
- Study design: Two buildings (1 and 2) were selected as treatments and the remaining building (3) as a non-treated control. All livestock were removed from the buildings each evening prior to treatment and returned the following morning. Animal feed was removed from feeding troughs prior to application of the test substance. Treatments were applied to nests and nesting sites in buildings 1 and 2 approximately 30 minutes after local sunset (about 9:30 p.m.) for three consecutive nights.
- Observation: All nests occupied with birds were counted in each building prior to the start of the study, and re-inspected for occupancy on the mornings of each day following an application, and again at 14 and 30 days posttreatment. New nests and new nesting activity was also recorded. All nests were re-inspected for young birds at the end of the study period.

B. Results:

The numbers of birds engaged in nest building and/or reconstruction on treated buildings was reduced 30-47% after the first application, 21-43% after the second application, and 83-84% after the third application. Repellency continued to be observed and was 89-92% at 21.5 hours after the last application, and 100% at

35 hours after the last application. Birds remained absent from treated buildings up to 45.5 hours after the last (third application) of MA. Repellency continued for up to 30 days posttreatment, as measured by: no new nests at 48 hours posttreatment, 3-5 nests with eggs at 14 days posttreatment, and 1-2 nests with young birds at 30 days posttreatment were observed on the treated buildings.

The untreated control showed no change in bird activity up to 21.5 hours posttreatment, and bird activity increased approximately 4% to 160% between 35 and 69.5 hours posttreatment. New nest construction, active nests, nests with eggs, and/or nests with young birds increased 53%, 160%, and 153%, respectively, up to 30 days posttreatment in the untreated control building.

- C. Conclusions: Based on the data, the end-use product (50% water dilution of MA concentrate) is effective in repelling starlings, pigeons, and English sparrows from treated buildings for up to 30 days following the last of three consecutive, daily treatments; 100% repellency occurred 35 hours following the last of three treatments with the end-use product.
- D. Deficiencies: Although it is clear that substantial treatment differences occurred as a result of product application, the studies were inadequately replicated (two treatment reps and one control). However, BPB notes that the number of replications was probably constrained by the number of building available to use as test sites. Inappropriate statistics were used to determine statistical significance. At both study sites, unaveraged treatment results were combined with control observations in the calculation of standard deviations. Since the number of nests/birds at each structure were not equivalent at the start of the study, treatments and controls cannot be compared against one another for each day of the study. It is more appropriate to compare the percentage reduction of bird activity for each building/building on each day with its own pretreatment bird/nest counts. Furthermore, in the bridge study, the "half-bridge" site should have been considered a separate study and not included in the standard deviation calculations for all bridges. BPB notes that although it is not clear what statistical analysis method could be applied to better analyze these data, the statistical treatment by the study author is inappropriate.

However, BPB notes that due to the large treatment effects (bird repellency) shown by application of the test substance, these deficiencies did not affect the outcome of the study nor the conclusions drawn from the data.

Classification: Acceptable: no additional study is required.

III. Control of Pest Birds on or in Structures: Woodpeckers (MRID 450209-03; Study No. BSRC990401)

Objective: Evaluate efficacy of product in reducing or eliminating woodpecker (*Colaptes cafer*) damage to wood-sided structures.

A. Materials and Methods:

Test Substance: Bird Shield® Repellent (EPA Reg. No. 66550-1); Lot No. 990309101 (containing 26.4% active ingredient).

Application Method: Sample diluted 1:1 (v:v) test substance:water (total 1 gallon; concentration = 1320 ppm; 2.29 lbs a.i.) with a hand-pumped, 3-gallon, backpack sprayer.

Target species: 'Red-shafted flicker' woodpecker (*Colaptes cafer*)

Study site: Study 1: 300 Turner Drive, City of Pullman, WA (three commercial residential buildings); Study 2: Klemgard County Park, Whitman County, WA (five service buildings).

Study design: Study 1: Two buildings were selected as treatments and one as a non-treated control. All buildings had been seriously damaged by woodpeckers. Damage varied from chipped wood to 4-in diameter holes containing nest residue from previous years. The test substance was applied directly below eaves where damage was most prevalent. Study 2: Three buildings were selected as treatments and two buildings were the non-treated controls. Two treated and two nontreated buildings had identical dimensions (6 X 20 ft) and were paired together for the test. The third treated building (20 x 20 ft) was isolated from the other four. All buildings had been seriously damaged by woodpeckers. Damage varied from chipped wood to 4-in diameter holes containing nest residue from previous years. The two control buildings were given applications of the test substance (inert ingredients) minus the active ingredient (MA). The entire surface of each building was treated with the test substance or the control substance.

Observation: Study 1: Each building was inspected for areas where wood siding had been damaged or open holes had been made by woodpeckers. None of the nest sites contained eggs or young birds. Bird activity was recorded for three days posttreatment. Damage and/or nest activity was evaluated at 30 days posttreatment. Study 2: Each building was inspected as above. Damaged sites were painted with a water-based stain and bird activity was determined by the removal of stained wood from each painted site. Bird activity was recorded for three days posttreatment. Damage and/or nest activity was evaluated at 30 days posttreatment.

B. Results:

In both studies, the numbers of open woodpecker holes were reduced 100% at 24 hours posttreatment on treated residential buildings. Repellency of birds from open holes persisted for up to 72 hours posttreatment. The number of damaged sites was also reduced 100% at 24 hours posttreatment on treated buildings. Repellency (as measured by the absence of new wood damage around painted sites) also persisted for up to 72 hours posttreatment. No nests with eggs or young birds were observed for up to 30 days posttreatment.

In study 1, the number of active woodpecker holes and/or nests with eggs or young birds on the untreated building was unchanged, whereas damaged wood sites increased from 48 hours to 30 days posttreatment (approximately 400%). In study 2, the number of active woodpecker holes and/or nests with eggs or young birds on the untreated building increased from 48 hours to 30 days posttreatment (approximately 29-33%) and damaged wood sites increased in the same time period (approximately 13-60%)

BPB notes that in study 1, pretreatment woodpecker activity (2 birds at building 1, and 1 bird at buildings 2 and 3) and pretreatment woodpecker damage (3 sites at building 1, 4 sites at building 2, and 1 site at building 3) was low. Similarly, in study 2, pretreatment woodpecker activity, although somewhat higher (5-7 birds in treated buildings; 3-7 birds in untreated buildings) and pretreatment woodpecker damage (9-15 sites in treated buildings; 5-23 sites in untreated buildings) was low. these low pretreatment observations tended to skew the percent reductions in bird activity/damage to be very high.

- C. Conclusions: Based on the data, the end-use product (50% water dilution of MA concentrate) is effective in repelling woodpeckers and reducing woodpecker damage on treated buildings for up to 30 days posttreatment; 100% repellency occurred at 24 hours posttreatment.
- D. Deficiencies: At both study sites, unaveraged treatment results were combined with control observations in the calculation of standard deviations. Since the number of nests/birds at each structure were not equivalent at the start of the study, treatments and controls cannot be compared against one another for each day of the study. It is more appropriate to compare the percentage reduction of bird activity for each building/building on each day with its own pretreatment bird/nest counts (which the study author did for this study). BPB notes that although it is not clear what statistical analysis method could be applied to better analyze these data, the statistical treatment by the study author is inappropriate.

However, BPB notes that due to the large treatment effects (bird repellency) shown by application of the test substance, these deficiencies did not affect the outcome of the study nor the conclusions drawn from the data.

Classification: Acceptable; no additional study is required.

IV. Control of Pest Birds on or in Structures: Pigeons (MRID 450209-04; Study No. BSRC990401)

Objective: Evaluate efficacy of product in reducing or eliminating roosting activity by pigeons (*Columbidae*).

A. Materials and Methods:

Test Substance: Bird Shield® Repellent (EPA Reg. No. 66550-1); Lot No. 99050101 (containing 26.4% active ingredient).

Application Method: Sample diluted 1:1 (v:v) test substance:water (total 1 gallons of concentrate used; concentration = 1320 ppm; 2.29 lbs a.i.) with a hand-pumped, backpack sprayer.

Target species: Pigeons (*Columbidae*)

Study site: Five commercial buildings in the central business district of Lewiston, ID. Most roosting activity occurred on the South sides of the buildings and had been occurring for 30+ years.

Study design: Three buildings were designated as treatments and two as control; control buildings were treated with test substance (inerts) minus the active ingredient (MA).

Observation: Prior to treatment, the average number of birds at each perch site was recorded for 30-seconds at 5-minute intervals for a period of 1 hour. These numbers were then aggregated for a daily average. The counts were then repeated at 1, 2, 3 and 30 days posttreatment.

B. Results:

The numbers of roosting birds was reduced 100% by 24 hours posttreatment at all three treated buildings; repellency persisted for up to 30 days. Roosting activity varied slightly on the nontreated buildings, but was essentially unchanged from controls by 30 days posttreatment.

C. Conclusions: Based on the data, the end-use product (50% water dilution of MA concentrate) is effective in pigeons from treated buildings for up to 30 days posttreatment; 100% repellency occurred by 24 hours posttreatment.

- D. Deficiencies: Inappropriate statistics were used to determine statistical significance. At both study sites, unaveraged treatment results were combined with control observations in the calculation of standard deviations. It would have been more appropriate to separately average the treated and non-treated site data, then apply comparative statistics. Since the number of roosting sites at each structure were not equivalent at the start of the study, treatments and controls cannot be compared against one another for each day of the study. It is more appropriate to compare the percentage reduction of bird activity for each building on each day with its own pretreatment roosting counts (which the study author did for this study). BPB notes that although it is not clear what statistical analysis method could be applied to better analyze these data, the statistical treatment by the study author is inappropriate.

However, BPB notes that due to the large treatment effects (bird repellency) shown by application of the test substance, these deficiencies did not affect the outcome of the study nor the conclusions drawn from the data.

Classification: Acceptable; no additional study is required.

EFFICACY OF BIRD SHIELD REPELLENT TO REDUCING NEST BUILDING ACTIVITY OF SWALLOWS ON BUILDINGS AND BRIDGES.

Trial Dates: April 5 through May 5, 1999

Date: 5-Apr 7-Apr 19-Apr 5-May

Site	0 hr.	1 hr.	2 hr.	6 hr.	12 hr.	24 hr.	New nests 24 h. post-treatment	Active nests two days post-treatment	Nests with eggs 14 days post-treatment	Nests with young birds 30 days post-treatment
Bldg. No. 1 (treated)	35	35	15	0	0	0	0	0	0	0
Bldg. No. 2 (treated)	27	24	13	0	0	0	0	0	0	0
Bldg. No. 3 (untreated)	43	43	43	45	50	53	9	53	52	52
Total	105	102	71	45	50	53	9	53	53	52
Standard Deviation	8	9.54	16.77	25.98	28.87	30.60	0.00	0	0	0

MRID 75020901 lot 1

Site	7-Apr	8-Apr	10-Apr	20-Apr	5-May
Bridge No. 1 (treated)	76	0	0	0	0
Bridge No. 2 (treated)	55	0	0	0	0
Bridge No. 3 North half (treated)	34	0	0	0	0
Bridge No. 3 South half (untreated)	34	69	72	71	65
Bridge No. 4 (untreated)	74	74	74	79	76
Total	273	143	150	145	141
Standard Deviation	20.51	34.83	26.19	41.18	38.81

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EFFICACY OF BIRD SHIELD REPELLENT TO REDUCING NEST BUILDING ACTIVITY BY STARLINGS, PIGEONS AND SPARROWS IN STRUCTURES.

Trial Dates: May 19 through June 20, 1994

Date	19-May	20-May	21-May	22-May	22-May 3-Jun	20-Jun
	Retreat	Retreat	Retreat			
Site	Pre-treatment	Post-treatment	Total			
	birds @ 2100 hr.	birds @ 0830 hr.	birds @ 1900 hr.	birds @ 0830 hr.	birds @ 1900 hr.	birds @ 1900 hr.
Bldg. No. 1 (treated)	145	76	82	25	11	92
Bldg. No. 2 (treated)	73	51	58	12	8	89
Bldg. No. 3 (untreated)	47	47	47	49	50	51 + 50 + 122 + 72 = 275
Total	265	174	187	86	69	122
Standard Deviation	50.77	15.72	17.90	18.77	23.43	68.13
						67.84
						130
						5
						3
						1
						119

Handwritten notes: 21, 35, 44, 46

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Table 1. EFFICACY OF BIRD SHIELD REPELLENT FOR REDUCING WOODPECKER DAMAGE TO BUILDINGS: Commercial Structures.

Trial Dates: April 5 through May 5, 1999

Open Holes (Nest sites)

Site	Pre-treatment		Post-treatment		Nests with eggs or young birds 30 days	Change (%)
	Total Number of open holes	Number of active holes	48 hr.	72 hr.		
Bldg. No. 1 (treated)	2	0	0	0	0	-100.00
Bldg. No. 2 (treated)	1	0	0	0	0	-100.00
Bldg. No. 3 (untreated)	1	1	1	1	1	0.00
Total	4	1	1	1	1	
Standard Deviation	0.58	0.58	0.58	0.58	0.58	

Damaged Wood

Site	Pre-treatment		Post-treatment		30 days	Change (%)
	Total Number of damaged wood sites	Damaged wood sites	48 hr.	72 hr.		
Bldg. No. 1 (treated)	3	0	0	0	0	-100.00
Bldg. No. 2 (treated)	4	0	0	0	0	-100.00
Bldg. No. 3 (untreated)	1	1	2	4	5	400.00
Total	8	1	2	4	5	
Standard Deviation	1.53	0.58	1.15	2.31	2.89	

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Table 2. EFFICACY OF BIRD SHIELD REPELLENT FOR REDUCING WOODPECKER DAMAGE TO BUILDINGS: Service Buildings.

Trial Dates: April 5 through May 5, 1999

Open Holes (Nest sites)

Site	Pre-treatment	Post-treatment		72 hr.	Nests with eggs or young birds 30 days	Change (%)
	Total Number of open holes	24 hr.	48 hr.			
Bldg. No. 1 (treated)	5	0	0	0	0	-100.00
Bldg. No. 2 (untreated)	3	3	3	4	4	33.33
Bldg. No. 3 (treated)	7	0	0	0	0	-100.00
Bldg. No. 4 (untreated)	7	7	8	8	9	28.57
Bldg. No. 5 (untreated)	5	0	0	0	0	-100.00
Total	27	10	11	12	13	
Standard Deviation	1.67	3.08	3.49	3.58	3.97	

Damaged Wood

Site	Pre-treatment	Post-treatment		72 hr.	30 days	Change (%)
	Total Number of damaged wood sites	24 hr.	48 hr.			
Bldg. No. 1 (treated)	9	0	0	0	0	-100.00
Bldg. No. 2 (untreated)	5	5	8	8	8	60.00
Bldg. No. 3 (treated)	15	0	0	0	0	-100.00
Bldg. No. 4 (untreated)	15	14	14	15	17	13.33
Bldg. No. 5 (untreated)	23	18	18	19	21	-8.70
Total	67	37	40	42	46	
Standard Deviation	6.84	8.23	8.12	8.62	9.63	

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**Table 1. EFFICACY OF BIRD SHIELD REPELLENT TO REDUCE THE
NUMBER OF PIGEONS ROOSTING ON BUILDINGS.**

Trial Dates: July 14 through August 15, 1999

Site	Pre- treatment		Post- treatment			Change (%)
	Number of roosting birds					
	0 hr.	24 hr.	48 hr.	72 hr.	30 days	
Bldg. No. 1 (treated)	36	0	0	0	0	-100.00
Bldg. No. 2 (treated)	15	0	0	0	0	-100.00
Bldg. No. 3 (treated)	22	0	0	0	0	-100.00
Bldg. No. 4 (untreated)	35	33	36	34	37	5.71
Bldg. No. 5 (untreated)	28	29	27	28	23	-17.86
Total	136	62	63	62	60	
Standard Deviation	8.87	17.04	17.54	17.11	17.16	



13544

R140550

Chemical: Benzoic acid, 2-amino-, methyl ester

PC Code:
128725

HED File Code: 41600 BPPD Other

Memo Date: 5/9/2000

File ID: DPD263302

Accession #: 000-00-9002

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