RESULTS OF WILDLIFE MONITORING AS REQUIRED UNDER FURADAN 4F INSECTICIDE/NEMATICIDE SECTION 18 EXEMPTIONS

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Abstract

Cotton aphid control has become difficult with currently registered pesticides. Research has shown Furadan 4F insecticide/nematicide is a very effective aphicide. However, concern has been expressed over the potential negative impact its use would present to avian populations. As a condition for use under Section 18 of Federal Insecticide, Fungicide, Rodenticide Act (FIFRA), as amended, wildlife monitoring programs were conducted where this product was used. Data generated from these programs indicate no adverse effect on wildlife resulted from foliar sprays of Furadan 4F for control of aphid on cotton in 1995.

Introduction

The control of cotton aphids has become increasingly more difficult with currently registered products since 1987. During this period aphids have developed tolerance to several products which often belong to entirely different classes of chemistry. It has been demonstrated in replicated studies by University and FMC researchers that Furadan 4F Insecticide/ Nematicide is a very effective treatment for the control of resistant aphids. The commercial value of Furadan has been further demonstrated during periods when Furadan was available for use under special labels such as Section 18 Specific Exemptions and Section 24(c) Special Local Needs labels as were allowed under provisions of FIFRA, as amended.

When the US EPA approved Section 18 Specific Exemptions for specific states during 1995, it was required that Furadan be used at rates of 0.25 pound active per acre or less and that no more than two applications per crop season be made. Further, the product was to be used only when packaged in 15 gallon or 90 gallon U-Turn, returnable reusable containers and used in conjunction with closed mixing and loading systems.

Additionally, the Section 18 Exemptions required wildlife monitoring programs be implemented to measure the potential wildlife effects of the foliar treatments to aphid infested cotton fields. Exemptions were approved and monitoring programs were conducted in California, Mississippi, Oklahoma and Texas.

This paper reports on the results of these wildlife monitoring programs and summarizes the required reports that have been submitted to the EPA under the terms and conditions of the Section 18 Exemptions.

Methods

The monitoring programs were conducted by several State and Federal agen-cies. The protocol was patterned after a Virginia avian monitoring program. The goal of the monitoring program was to indicate whether or not widespread wildlife mortality would occur as a result of foliar applications of Furadan 4F to cotton for aphid control.

Treated fields were located with the cooperation of aerial applicators and their farmer customers. Efforts were made to ensure sample sites were located adjacent to suitable avian habitats with high bird densities. Efforts were also made to ensure that sampling was done within 48 hours of the application.

Survey work was often done utilizing four wheel drive ATV's to ensure the completion of the survey in a timely fashion. The field perimeters were carefully inspected either on foot or using ATV's. The area inspected varied from thirty to sixty feet perpendicular to the line of travel. Inspection of one transect was to be conducted, on foot, twenty to thirty yards from the field perimeter if the cotton plants had not lapped the middles. Inspectors noted the species and numbers of wildlife present during the survey. Inspectors also noted the vegetative cover types such as: wooded, wetland, riparian, canal bank, adjacent cropland,

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and tree lines. Accurate records were kept, which included field sketches, date and time of the inspection, numbers of specific species observed, and the dimensions of the inspected area. Also noted on the inspection reports were date and time of the application and the total acres treated.

The whole carcasses of dead wildlife were to be collected and stored in labeled plastic containers. The containers were to have data affixed which would have included species, county, farmer name and inspector name. The carcasses were then to be transported on ice to laboratories for analysis.

In consideration of label requirements and personal safety, inspectors utilized proper protective clothing as required by the Furadan 4F Section 18 Exemptions. Inspector safety was further enhanced by conducting the inspections in two or three person teams.

California

In California, the survey was conducted by the California Department of Fish and Game, Pesticide Investigations Unit. All the fields, for which Notice of Intent forms were filed with a county agricultural commissioner (indicating an intended application within the next 24 hours), were surveyed between September 2 and September 22, 1995, within 24 hours of application. The surveys were limited to the field perimeters and approximately ten feet into the treated area due to the large size of the cotton plants which obscured the soil surface.

Mississippi

The USDA/APHIS-Animal Damage Control Unit based at Stoneville conducted the surveys using four wheel drive ATV's. Treated fields were located with the cooperation of aerial applicators and their farmer customers. Survey sites were carefully selected to insure adequate avian and other wildlife species were present.

Oklahoma

The USDA/APHIS-Animal Damage Control Unit cooperated with Oklahoma Department of Agriculture personnel to conduct the monitoring program. Prior to actual field surveys, a field inspection training program was conducted which included classroom and field exercises. During the field portion of the training exercise, inspectors practiced locating simulated bird and mammal carcasses made from small painted blocks of wood. In field perimeter search simulations, 82% of the simulated carcasses were recovered. In cotton field search simulations, 68% of the simulated carcasses were recovered (Table 1). Pre-application and post-application (48 hour) surveys were conducted on randomly selected fields from information supplied to the Oklahoma Department of Agriculture by aerial applicators. Surveyors from both USDA/APHIS Animal Damage Control and Oklahoma Department of Agriculture were at each of the survey sites.

Texas

In Texas, the field surveys were conducted by the Texas Department of Agriculture, Texas Department of Parks and Wildlife, the US Fish and Wildlife Service and the Texas A&M Extension Service. Fields selected for survey were recently treated and adjacent to desirable avian wildlife such as shelter/roosting sites, food sources and water sources. The Texas surveys were conducted on foot beginning June 1 until completion on September 1.

Results and Discussion

Mississippi

In Mississippi, seventeen sites in five different counties were surveyed which were representative of 5129 surveyed acres treated with Furadan 4F (Table 2). There were 79.8 perimeter acres (Table 3) surveyed which included cotton treated with Furadan 4F and adjacent crops which include cotton, soybeans, wheat, corn and rice. Other surveyed adjacent areas included woods, riparian, tree line, pasture, and canal bank.

During the Mississippi surveys, 479 individual birds were sighted represent-ing twenty-one different avian species (Table 4). Rabbits, snakes, frogs, rats and squirrels were also sighted. One report noted "a mud puddle with a thousand tadpoles" next to a treated field. Also observed and noted were tracks of deer, coyote, bobcat, raccoon, armadillo, and rabbit (Table 5). In this rich wildlife habitat, no effected individuals were observed or collected.

California

In California, 43 sites were surveyed in five counties in the San Joaquin Valley which include Fresno, Kern, Kings, Merced, and Tulare. These sites represent 6191 surveyed acres of cotton treated with Furadan 4F (Table 2). This program recorded data in miles of perimeter inspected which totaled 87.40 miles (Table 3). Surveyed areas included: wooded, pasture, power line rights of way, canal bank, and brush land. Also, observations were made to fields adjacent to treated cotton which included: cotton, alfalfa, rice and fallow land.

There were 633 individuals observed representing 15 different avian species (Table 6). Also observed were honeybees, mosquito fish, snails, frogs, grasshoppers, ground squirrels, earthworms and one dog (Table 7).

All wildlife and fish carcasses were transported to the Pesticide Inspection Unit laboratory for analysis. Feather puffs were observed in two fields. Analysis of seven fox sparrows recovered from a Kern County field (Table 6) indicated significant levels of an organophosphate insecticide. Minor fish kills were observed in ponds and irrigation canals adjacent to fields in Kings, Tulare, and Kern counties. At one site, the water sample from an adjacent irrigation canal contained low levels of carbofuran and an organophosphate insecticide. Five carp from two

separate sites were collected and gill tissue indicated an organophosphate insecticide as the causative agent. At a third site, two sunfish were collected and gill tissue indicated an organophosphate insecticide as the causative agent. Carbofuran was not identified as the causative agent for any of the observed aquatic or avian losses (Table 7). The losses observed occurred in, or adjacent to, fields in which an organophos-phate insecticide was applied in conjunction with Furadan 4F. Large numbers of live aquatic invertebrates, fish and amphibians as well as substantial numbers of birds of various species were observed in and around the cotton fields during the post-application surveys.

Oklahoma

In Oklahoma, eight sites in seven counties were surveyed. Forty-six of the 463 surveyed acres treated with Furadan 4F were inspected (Table 2). The avian sightings were ranked: light, less than 25 sightings; moderate, 25 to 50 sightings; and heavy, more than 50 sightings. Table 8 shows the avian sightings of the fields surveyed: two as light, five as moderate and one as heavy. No avian or other wildlife carcasses were found during these surveys.

Texas

In Texas, 86 fields were inspected in 23 counties. Over 150 linear miles were surveyed in and around 10,481 surveyed acres of cotton treated with Furadan 4F (Table 2). Thirty-five different avian species were sighted in and around the treated fields (Table 9) with no mortality or moribund of avian or any other wildlife species (Table 10) found or reported.

In consideration of these data, it is evident that cotton fields and their bordering areas are rich with wildlife. Results based on extensive, well planned monitoring programs conducted by trained wildlife personnel also indicate Furadan 4F Insecticide/Nematicide was applied to cotton as a foliar treatment and did not pose a threat to avian or other wildlife species or individuals present.

References

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Table 1. Results of simulated carcass search.

Search Area	Percent Carcass Recovery
Field Perimeter	82%
Cotton Field	68%

Table 2. Treatment sites surveyed.

State	Counties Surveyed	Sites Surveyed	Surveyed Treated Acres	Acre Treatments
California	5	43	6191	107,200
Mississippi	5	17	5129	199,920
Oklahoma	7	8	463	176,000
Texa	23	86	10481	960,000
Total	40	154	22264	1,443,120

Table 3. Treatment areas and distance surveyed.

State	Surveyed Area
Mississippi	79.80 Acres
Oklahoma	46.00 Acres
California	87.40 Miles
Texas	150.00 Miles

Table 4. Mississippi avian species observed.

Species	# Observed	Carbofuran Mortality
Redwinged Blackbird	122	0
Morning Doves	100	0
Cowbird	79	0
Sparrows	58	0
Indigo Bunting	20	0
Cardinal	18	0
Bluebirds	17	0
Egret	15	0
Swallows	10	0
Blue Jays	10	0
Brown Thrashers	10	0
Mockingbirds	10	0
Others*	10	0
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TOTAL OBSERVED	479	0

* One each of Red Tail Hawk, Kingfisher, Hummingbird, Meadow Lark, Woodpecker, Great Horned Owl, Wren, blue Heron, Grackle

Table 5. Mississippi wildlife observations and mortality observed.

Species Observed	Number of Observations	Carbofuran Mortality
Snakes	4	0
Rabbit	2	0
Fox Squirrel	1	0
Rat	1	0
Frogs	10	0
Deer Tracks	3	0
Coyote Tracks	2	0
Bobcat Tracks	2	0
Raccoon Tracks	2	0
Armadillo Tracks	1	0

Table 6. California avian species observed.

Species	Number Observed	Carbofuran Mortality	Other Mortality
Redwinged Blackbirds	310	0	0
Finches	100	0	0
Water Pipit	50	0	0
Morning Doves	43	0	0
Killdeer	35	0	0
Starlings	25	0	0
Sandpipers	20	0	0
Sparrows	15	0	7*
Herons/Egrets	12	0	0
Swallows	10	0	0
Crows	5	0	0
Ravens	4	0	0
Burrowing Owl	2	0	0
Hawk	2	0	0
Pheasant	1	0	0
Duck	1	0	0
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TOTAL OBSERVED	633	0	7

* Causative factor identified as organophosphate insecticide

Table 7. California wildlife observations.

Species Observed	Number of Observations	Carbofuran Mortality	Other Mortality
Honeybees	1000+	0	0
Mosquito Fish	900+	0	0
Snails	200+	0	0
Frogs	167	0	0
Grasshopper	100+	0	0
Ground Squirrels	20	0	1*
Earthworms	20	0	0
Carp	5	0	5**
Sunfish	2	0	2***
Dog	1	0	0

* Causative factor identified as vehicle impact
** Causative factor identified as organophosphate insecticide
***Causative factor identified as organophosphate insecticide

Table 8. Oklahoma avian monitoring results.

County	Pre-Application Avian Activity	Post-Application Mortality
Greer	Light*	None
Jackson	Light	None
McClain	Moderate**	None
Harmon #1	Moderate	None
Harmon #2	Moderate	None
Kiowa	Moderate	None
Caddo	Moderate	None
Tillman	Heavy***	None

* Less than 25 sightings
** 25 to 50 sightings
*** More than 50 sightings

Table 9. Texas avian species observed.

Redwinged Blackbird	Grackle	Killdeer
Scissortail	Plovers	Sparrow
Mourning Dove	Swallows	Egrets
Mockingbird	Dicksissel	Herons
Hummingbird	Crow	Wren
Brownheaded Cowbird	Hawks	Martin
Meadowlark	Finch	Duck
Roadrunner	Inca Dove	Quail
Kingbird	Turkey Vultures	Nighthawk

Table 10. Other Texas wildlife observations.

Jackrabbit	Squirrel	
Frog	Fish	
Tadpoles	Deer Tracks	
Raccoon Tracks	Feral Hog Tracks	
Snails		