US EPA ARCHIVE DOCUMENT

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US EPA ARCHIVE DOCUMENT

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PIRATE®/ALERT® INSECTICIDE-MITICIDE: REGISTRATION APPLICATION AND TOLERANCE PETITION FOR CHLORFENAPYR ON COTTON (PP 5F4456)

Date Submitted 1/29/98 **MRID No.** _____ **Volume: 3**

Book 2 of 2

STUDY TITLE

An Avian Ecological Risk Assessment for Chlorfenapyr in Cotton

DATA REQUIREMENT

444779-01
Volume 2 of 2

Not Required Under 40 CFR158

AUTHOR

American Cyanamid Company

STUDY COMPLETION DATE

January 29, 1998

PERFORMING LABORATORY

American Cyanamid Company
Agricultural Research Division
P.O. Box 400
Princeton, NJ 08543-0400

REPORT NUMBER

CY190

®Registered Trademarks of American Cyanamid Company

RESTRICTED USE PESTICIDE

DUE TO TOXICITY TO AQUATIC AND AVIAN ORGANISMS.

For retail sale to, and use only by Certified Applicators or persons under the direct supervision of a Certified Applicator, and only for those uses covered by the Certified Applicator's certification.

American Cyanamid Company endorses Certification to promote the responsible use of pesticides to insure the protection of man and the environment.

ALERT® Insecticide-Miticide

ACTIVE INGREDIENT:
4-bromo-2-(4-chlorophenyl)-1-(ethoxymethyl)-5-(trifluoromethyl)-1H-pyrrole-3-carbonitrile 21.44%
INERT INGREDIENTS: 78.56%

TOTAL 100.00%

(1 gallon contains 2.0 pounds of active ingredient)

Patent No. 5,010,098
EPA Reg. No. 241-GAI

EPA Est. No. 5905-GA-01

KEEP OUT OF REACH OF CHILDREN

CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail).

STATEMENT OF PRACTICAL TREATMENT

If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

If on skin: Wash with plenty of soap and water. Get medical attention.

If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

If in eyes: Flush eyes with plenty of water. Call a physician if irritation persists.

IN CASE OF AN EMERGENCY ENDANGERING LIFE OR PROPERTY INVOLVING THIS PRODUCT, CALL COLLECT, DAY OR NIGHT, AREA CODE (973) 683-3100

Net Contents: 1 Gallon
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CY190

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS (AND DOMESTIC ANIMALS)

CAUTION

Harmful if swallowed or absorbed through the skin. Do not get in eyes, on skin, or on clothing. Harmful if inhaled. Avoid breathing spray or mist. Causes moderate eye irritation.

Personal Protective Equipment (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves such as barrier laminate or butyl rubber or nitrile rubber or polyvinyl chloride (PVC) or viton neoprene
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining Personal Protective Equipment. If no such instructions for washables, use detergent and hot water. Keep and wash Personal Protective Equipment separately from other laundry.

ENGINEERING CONTROLS STATEMENTS

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations:

Users should:

- *Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.*
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and wildlife.

Drift and runoff may be hazardous to aquatic organisms in neighboring areas. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This product is toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

This product must not be used in areas where impact on threatened or endangered species is likely. Notify state and/or Federal authorities and American Cyanamid Company immediately if you observe any adverse environmental effects due to the use of ALERT Insecticide-Miticide.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible to pesticide regulation. This label must be in the *possession of the user at the time of pesticide application.*

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Chemical-resistant gloves such as barrier laminate or butyl rubber or nitrile rubber or polyvinyl chloride (PVC) or viton neoprene
- Shoes plus socks

STORAGE AND DISPOSAL

STORAGE:
DO NOT store below 32° degrees. DO NOT store in direct sunlight or heat.

PESTICIDE DISPOSAL:
DO NOT contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL:
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration or, if allowed by State and local authorities by burning. If burned, stay out of smoke.

GENERAL INFORMATION

ALERT is a member of the pyrrole class of chemistry. It has a unique mode of action that controls target pests by interfering with the energy-producing process within cells. It has both contact and stomach activity. Although ALERT does not move systemically through the plant, it does move translaminarly from the top to bottom of treated leaves.

SPRAY PREPARATION:
To assure a uniform spray solution, agitate or shake containers of this product immediately prior to use. Prepare no more spray mixture than is needed for the immediate operation. Add one-half to three-quarters of the required amount of clean water to the spray tank. Use a calibrated measuring device to measure the required amount of ALERT. Add ALERT to the spray tank while agitating. Fill the tank with the remainder of the water. If tank mixes are used, ALERT must be fully dispersed in water first, followed by the addition of the tank-mix materials.

COMPATIBILITY:
ALERT is compatible with a wide range of spray products, however, the full range of compatibilities under local conditions may not be known. Therefore, before using ALERT in any tank mixture, the compatibility of the mixture should be established. Add proportionate amounts of each ingredient to a pint or quart jar, cap, shake, and allow to stand for 15 minutes. Formation of precipitates that do not readily redisperse indicates an incompatible mixture and should not be used.

SPRAYING INSTRUCTIONS
Maintain agitation during application.

Thorough coverage of the cotton plant is essential for effective performance of this product. Apply with ground or aerial equipment using sufficient water to obtain full coverage of foliage. For better coverage increase gallonage and/or use drop nozzles if possible. Use a minimum of 5 gallons per acre with ground equipment or 3 gallons per acre by aircraft. Higher gallonage will provide better coverage. Under extreme pest populations and dense foliage, increase spray volumes to 10 gallons per acre by ground and 5 gallons per acre by air.

The addition of spray adjuvants may enhance coverage and canopy penetration.

Do not apply this product through any type of irrigation system.

APPLICATION TIMING:
Applications should not begin until target pest populations have reached local economic threshold levels. Consult the Cooperative Extension Service or crop advisor to determine recognized economic threshold levels in your area.

For best results of lepidopteran pests, time applications to control small larvae still feeding on leaf surfaces, and before migration to protected areas such as squares, blooms and bolls has occurred.

CROP	PEST	DOSAGE PER ACRE Pounds Active	Fluid Ounces	REMARKS
Cotton (Arizona & California)	Spider Mites (Cotton<12") Twospotted Carmine Pacific Strawberry	0.075 - 0.15	5 - 9.5	Use adequate spray volume to insure thorough coverage. For best results, treat when pest populations are in early stages of development.
	Spider Mites (Cotton>12") Twospotted Carmine Pacific Strawberry	0.15 - 0.25	9.5 - 16	Apply as determined by field scouting.
	Beet Armyworm	0.2	13	Apply ALERT according to local economic thresholds such as 5 active "hits" per 100 row feet.
	Tobacco Budworm Cotton Bollworm	0.2 - 0.25 0.3	8.5 - 10.5 13	**Rates of 8.5-10.5 fluid ounces (0.2 - 0.25 lbs. active) should be used <u>only</u> in tank mixture combinations with larvicides approved for use on cotton at their recommended label rates.** When cotton bollworm is the predominant species, pyrethroid combinations are recommended. **Rate of 13 fluid ounces (0.3 lbs. Active) have been shown to be effective when used alone.** Apply on a 5-7 day schedule or as determined by field scouting. Use higher rates when pest pressure is heavy or large larvae (>¼ inch) predominate. As pest pressure increases, it may be necessary to shorten spray interval. If loopers and other armyworms are present in the field at time of application, these pests will also be controlled.

Resistance and Pest Management: Some insects and mites are known to develop resistance to crop protection products used repeatedly for control. Since the development of resistance cannot be predicted, ALERT should always be used in resistance pest management programs that are suitable for the crop pest complex involved.

Any pest management program undertaken should coordinate different chemistry classes of insecticides in their spray schedules, thorough coverage of targeted crop/pest(s), use of proper chemical rates per label directions, monitoring pest populations, and other factors as conditions warrant.

Do not make more than two consecutive applications of ALERT; then rotate to another product from a different class based on mode of action. ALERT has a unique mode of action and can be an important component of a resistance management program in cotton. Consult your Cooperative Extension Service or crop advisor for suggestions on minimizing insecticide resistance.

USE RESTRICTIONS

Do not allow livestock to graze fields.
Do not apply less than 21 days before harvest.
Do not apply more that 32 fl. oz. (0.5 lbs ai/A) of ALERT per acre per year.

ROTATIONAL CROPS

Do not plant root crops within 60 days of the last application of ALERT. For all other crops, do not plant within 30 days of the last application of ALERT.

SPRAY DRIFT PRECAUTIONS

All aerial and ground application equipment must be properly maintained and calibrated using appropriate carriers.

Spray Drift Management: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Buffer Zone Requirements: Do not apply by ground equipment within 25 feet, or by air within 150 feet of lakes, reservoirs, rivers, permanent streams, marshes or natural ponds, estuaries, and commercial fish farm ponds. Due to the hazard to avian and aquatic organisms, the application of this product by air is prohibited within one mile of designated National Wildlife Refuges. Contact state Fish and Wildlife Service for information on National Wildlife Refuges in your area.

Recommendations for Aerial Applicators: The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.

2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

   Where states have more stringent regulations, they should be observed.

   The applicator should be familiar with and take into account the information covered in the Aerial Drift Reduction Advisory Information.

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of nozzles - Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For aerial applications, the spray boom should be mounted on the aircraft so as to minimize drift caused by wingtip or rotor vortices. For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downward. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind Speed Restrictions: Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Do not apply when wind velocity exceeds 10 mph. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Restrictions During Temperature Inversions: Do not make aerial or ground applications during temperature inversions. Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

Runoff Management: Do not cultivate within 25 feet of aquatic areas to allow growth of a vegetative filter strip.

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DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on research and field use. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use of, or application of the product contrary to label instructions, all of which are beyond the control of American Cyanamid Company. All such risks shall be assumed by the user.

American Cyanamid Company shall not be responsible for losses or damages resulting from use of this product in any manner not set forth on this label. User assumes all risks associated with the use of this product in any manner not specifically set forth on this label.

American Cyanamid Company warrants only that the material contained herein conforms to the chemical description of the label and is reasonably fit for the use therein described when used in accordance with the directions for use, subject to the risks referred to above. **CYANAMID DOES NOT MAKE OR AUTHORIZE ANY AGENT OR REPRESENTATIVE TO MAKE ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, AND EXPRESSLY EXCLUDES AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

BUYER'S EXCLUSIVE REMEDY AND AMERICAN CYANAMID'S EXCLUSIVE LIABILITY, WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, SHALL BE LIMITED TO REPAYMENT OF THE PURCHASE PRICE OF ALERT Insecticide-Miticide. In no case shall Cyanamid or the seller be liable for consequential, special or indirect damages resulting from the use or handling of this product.

American Cyanamid Company
North America Agricultural Products Division
Crop Protection Products Department
One Campus Drive, Parsippany, NJ 07054 ©1997

RESTRICTED USE PESTICIDE

DUE TO TOXICITY TO AQUATIC AND AVIAN ORGANISMS.

For retail sale to, and use only by Certified Applicators or persons under the direct supervision of a Certified Applicator, and only for those uses covered by the Certified Applicator's certification.

American Cyanamid Company endorses Certification to promote the responsible use of pesticides to insure the protection of man and the environment.

PIRATE® Cotton Insecticide

ACTIVE INGREDIENT:

4-bromo-2-(4-chlorophenyl)-1-(ethoxymethyl)-5-(trifluoromethyl)-1*H*-pyrrole-3-carbonitrile 30.83%

INERT INGREDIENTS: 69.17%

TOTAL 100.00%

(1 gallon contains 3.0 pounds of active ingredient)

Patent No. 5,010,098

EPA Reg. No. 241-GAT

EPA Est. No. 5905-GA-01

KEEP OUT OF REACH OF CHILDREN

WARNING / AVISO

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail).

STATEMENT OF PRACTICAL TREATMENT

If swallowed: Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

If on skin: Wash with plenty of soap and water. Get medical attention.

If inhaled: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

If in eyes: Flush eyes with plenty of water. Call a physician if irritation persists.

IN CASE OF AN EMERGENCY ENDANGERING LIFE OR PROPERTY INVOLVING THIS PRODUCT, CALL COLLECT, DAY OR NIGHT, AREA CODE (973) 683-3100

Net Contents: 1 Gallon

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PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS (AND DOMESTIC ANIMALS)

WARNING

May be fatal if swallowed or absorbed through the skin. Do not get in eyes, on skin, or on clothing. Harmful if inhaled. Avoid breathing spray or mist. Causes moderate eye irritation.

Personal Protective Equipment (PPE):

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical resistance category selection chart.

Applicators and other handlers must wear:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves such as barrier laminate or butyl rubber or nitrile rubber or polyvinyl chloride (PVC) or viton neoprene
- Chemical-resistant footwear plus socks
- Chemical-resistant headgear for overhead exposure
- Chemical-resistant apron when cleaning equipment, mixing, or loading

Follow manufacturer's instructions for cleaning/maintaining Personal Protective Equipment. If no such instructions for washables, use detergent and hot water. Keep and wash Personal Protective Equipment separately from other laundry.

ENGINEERING CONTROLS STATEMENTS

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations:

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish and wildlife.

Drift and runoff may be hazardous to aquatic organisms in neighboring areas. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This product is toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.

This product must not be used in areas where impact on threatened or endangered species is likely. Notify state and/or Federal authorities and American Cyanamid Company immediately if you observe any adverse environmental effects due to the use of PIRATE Cotton Insecticide.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible to pesticide regulation. This label must be in the possession of the user at the time of pesticide application.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls over short-sleeved shirt and short pants
- Chemical-resistant gloves such as barrier laminate or butyl rubber or nitrile rubber or polyvinyl chloride (PVC) or viton neoprene
- Chemical-resistant footwear plus socks
- Chemical-resistant headgear for overhead exposure

STORAGE AND DISPOSAL

STORAGE:
DO NOT store below 32° degrees. DO NOT store in direct sunlight or heat.

PESTICIDE DISPOSAL:
DO NOT contaminate water, food or feed by storage or disposal. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

CONTAINER DISPOSAL:
Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, by incineration or, if allowed by State and local authorities by burning. If burned, stay out of smoke.

GENERAL INFORMATION

PIRATE is a member of the pyrrole class of chemistry. It has a unique mode of action that controls target pests by interfering with the energy-producing process within cells. It has both contact and stomach activity. Although PIRATE does not move systemically through the plant, it does move translaminarly from the top to bottom of treated leaves.

SPRAY PREPARATION:
To assure a uniform spray solution, agitate or shake containers of this product immediately prior to use. Prepare no more spray mixture than is needed for the immediate operation. Add one-half to three-quarters of the required amount of clean water to the spray tank. Use a calibrated measuring device to measure the required amount of PIRATE. Add PIRATE to the spray tank while agitating. Fill the tank with the remainder of the water. If tank mixes are used, PIRATE must be fully dispersed in water first, followed by the addition of the tank-mix materials.

COMPATIBILITY:
PIRATE is compatible with a wide range of spray products, however, the full range of compatibilities under local conditions may not be known. Therefore, before using PIRATE in any tank mixture, the compatibility of the mixture should be established. Add proportionate amounts of each ingredient to a pint or quart jar, cap, shake, and allow to stand for 15 minutes. Formation of precipitates that do not readily redisperse indicates an incompatible mixture and should not be used.

SPRAYING INSTRUCTIONS:
Maintain agitation during application.

Thorough coverage of the cotton plant is essential for effective performance of this product. Apply with ground or aerial equipment using sufficient water to obtain full coverage of foliage. Use a minimum of 5 gallons per acre with ground equipment or 3 gallons per acre by aircraft. Higher gallonage will provide better coverage. Under extreme pest populations and dense foliage, increase spray volumes to 10 gallons per acre by ground and 5 gallons per acre by air. The addition of spray adjuvants may enhance coverage and canopy penetration.

Do not apply this product through any type of irrigation system.

APPLICATION TIMING:
Applications should not begin until target pest populations have reached local economic threshold levels. Consult the Cooperative Extension Service or crop advisor to determine recognized economic threshold levels in your area.

For best results on lepidopteran pests, time applications to control small larvae still feeding on leaf surfaces, and before migration to protected areas such as squares, blooms and bolls has occurred.

PESTS CONTROLLED:

CROP	PEST	DOSAGE PER ACRE Pounds Active	DOSAGE PER ACRE Fluid Ounces	REMARKS
Cotton (Except AZ and CA)	Tobacco Budworm Cotton Bollworm	0.2 - 0.25	8.5 - 10.5	**Rates of 8.5-10.5 fluid ounces (0.2 - 0.25 lbs. active) should be used <u>only</u> in tank mixture combinations with larvicides approved for use on cotton at their recommended label rates.** When cotton bollworm is the predominant species, pyrethroid combinations are recommended.
		0.3	13	**Rate of 13 fluid ounces (0.3 lbs. active) have been shown to be effective when used alone.** Apply on a 5-7 day schedule or as determined by field scouting. Use higher rates when pest pressure is heavy or large larvae (>¼ inch) predominate. As pest pressure increases, it may be necessary to shorten spray interval. If loopers and other armyworms are present in the field at time of application, these pests will also be controlled.
	Beet Armyworm	0.2	8.5	Apply Pirate according to local economic thresholds such as 5 active "hits" per 100 row feet.
	Mites	0.15 - 0.2	6.5 - 8.5	Use adequate spray volume to insure thorough coverage. For best results, treat when pest populations are in early stages of development. Apply as determined by field scouting.

<u>Resistance and Pest Management</u>: Some insects and mites are known to develop resistance to crop protection products used repeatedly for control. Since the development of resistance cannot be predicted, PIRATE should always be used in resistance pest management programs that are suitable for the crop pest complex involved.

Any pest management program undertaken should coordinate different chemistry classes of insecticides in their spray schedules, thorough coverage of targeted crop/pest(s), use of proper chemical rates per label directions, monitoring pest populations, and other factors as conditions warrant.

PIRATE has a unique mode of action and can be an important component of a resistance management program in cotton. Consult your Cooperative Extension Service or crop advisor for suggestions on minimizing insecticide resistance.

USE RESTRICTIONS

Do not allow livestock to graze fields.
Do not apply less than 21 days before harvest.
Do not apply more that 21 fl. oz. (0.5 lbs. ai/A) of PIRATE per acre per year.

ROTATIONAL CROPS

Do not plant root crops within 60 days of the last application of PIRATE. For all other crops, do not plant within 30 days of the last application of PIRATE.

SPRAY DRIFT PRECAUTIONS

All aerial and ground application equipment must be properly maintained and calibrated using appropriate carriers.

Spray Drift Management: Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Buffer Zone Requirements: Do not apply by ground equipment within 25 feet, or by air within 150 feet of lakes, reservoirs, rivers, permanent streams, marshes or natural ponds, estuaries, and commercial fish farm ponds. Due to the hazard to avian and aquatic organisms, the application of this product by air is prohibited within one mile of designated National Wildlife Refuges. Contact state Fish and Wildlife Service for information on National Wildlife Refuges in your area.

Recommendations for Aerial Applicators: The following drift management requirements must be followed to avoid off-target drift movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downwards more than 45 degrees.

   Where states have more stringent regulations, they should be observed.

   The applicator should be familiar with and take into account the information covered in the Aerial Drift Reduction Advisory Information.

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

- Pressure - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- Number of nozzles - Use the minimum number of nozzles that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is released parallel to the airstream produces larger droplets than other orientations and is the recommended practice. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For aerial applications, the spray boom should be mounted on the aircraft so as to minimize drift caused by wingtip or rotor vortices. For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downward. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind Speed Restrictions: Drift potential is lowest between wind speeds of 2-10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Do not apply when wind velocity exceeds 10 mph. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. NOTE: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Restrictions During Temperature Inversions: Do not make aerial or ground applications during temperature inversions. Applications should not occur during a temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Sensitive Areas: The pesticide should only be applied when the potential for drift to adjacent sensitive areas (e.g. residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is minimal (e.g. when wind is blowing away from the sensitive areas).

Runoff Management: Do not cultivate within 25 feet of aquatic areas to allow growth of a vegetative filter strip.

DISCLAIMER

The label instructions for the use of this product reflect the opinion of experts based on research and field use. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the use of, or application of the product contrary to label instructions, all of which are beyond the control of American Cyanamid Company. All such risks shall be assumed by the user.

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Information on the Mode of Action of Chlorfenapyr

Chlorfenapyr is a member of a class of insecticide-miticides called pyrroles. *In vitro* studies have shown that it is converted to AC 303268. This molecule targets the mitochondria and the fatal biochemical effect is due primarily to uncoupling of oxidative phosphorylation (Treacy *et al.* 1994). The proton gradient across mitochondrial membranes is disrupted and the ability of the mitochondria to produce ATP from ADP is impeded. The impediment leads to cell death and may ultimately lead to the death of the organism (Treacy *et al.* 1994).

In order for a compound to act on the mitochondria in the manner described above, it must be lipophilic to pass the membrane and weakly acidic to disrupt the proton gradient (Treacy *et al.* 1994). AC 303630 is lipophilic, but it is not weakly acidic. Indeed, studies have shown that AC 303630 is a "pro-insecticide" that is activated by oxidative removal of the N-ethoxymethyl group. The dealkylation of AC 303630 results in the lipophilic and weakly acidic AC 303268, which uncouples oxidative phosphorylation (Treacy *et al.* 1994).

This mode of action is supported by the following information. First, herbivorous insects generally are known to be able to oxidize xenobiotics (Hung *et al.* 1990). Second, AC 303268 has been identified in tobacco budworm (*Heliothis virescens)* larvae (Treacy *et al.* 1994). Third, Colorado potato beetle (*Leptinotarsa decemlineata*) adults, exposed to the microsomal mono-oxygenase inhibitor piperonyl butoxide were significantly less sensitive to AC 303630 than adults that were not exposed to piperonyl butoxide (R. M. Hollingworth, unpublished). Piperonyl butoxide would inhibit oxidative metabolism and the transformation of AC 303630 to AC 303268. And fourth, AC 303268 has been shown to be a potent uncoupler of oxidative phosphorylation in mouse liver mitochondria. AC 303268 stimulated state-4 respiration and decreased respiratory control in mouse liver mitochondria. Stimulation of state-4 respiration continued until oxygen was depleted. The UC_{50} for AC 303268 in this system was 2.4 nM (nanoMolar), whereas the UC_{50} for AC 303630 in the same system was >1000 nM (Treacy *et al.* 1994).

Differences in sensitivity between species could arise due to differences in oxidative activity or in the ability of AC 303268 to uncouple oxidative phosphorylation. It should be noted that the mitochondria are broadly similar ("conserved" in an evolutionary biology sense) across many taxa. Thus the site for action of AC 303268 should occur across many taxa and be similar as well. The consistent toxicity profile exhibited by chlorfenapyr *in vivo* suggests that such similarity occurs.

In mammals, there tends to be a lower titer of mixed function oxidases, and chlorfenapyr is metabolized by pathways such as dehalogenation, oxidation, and ring hydroxylation. This results in metabolites other than the potent uncoupler AC 303268. In the rat, approximately 85% of the administered dose is excreted in the feces within 48 hours. More sensitive taxa, such as insects, metabolize chlorfenapyr to AC 303268 to a greater degree than mammals.

Efficacy information for the target pests which are sensitive to AC 303630 can provide insights into the potential effects of the compound on non-target organisms. Laboratory screening tests employing the technique of dipping leaves into solutions of AC 303630 in water and acetone showed that it is toxic to larvae of Lepidoptera (butterflies and moths), adult and larval Homoptera (leafhoppers), and adult and nymphal Acari (mites) (Lovell *et al.* 1990). The compound exhibited translaminar activity against mites, as demonstrated by spraying only the top surfaces of lima bean leaves, but caging mites on both the top and the under surfaces of the leaves. Mite mortality was 62% on the top surfaces and 46% on the under surfaces. This translaminar activity may be expressed in the field, but is a complex function of leaf morphology (cuticle thickness, number of pores) (Treacy *et al.* 1993). The activity observed in the laboratory translated into effective control of Lepidoptera, Coleoptera, Homoptera, and Acari in an extensive series of field efficacy tests (Miller *et al.* 1990).

One very important result from the laboratory evaluations was the relative toxicity of the compound by the oral and the dermal routes of exposure. Screening work had shown that the compound is toxic to insects by both routes of exposure (Lovell *et al.* 1990). Treacy *et al.* (1990) evaluated the toxicity of chlorfenapyr to 5th instar tobacco budworm larvae by oral gavage and by topical application. The 48 hour oral LD_{50} was 5.7 mcg/gram, whereas the 48 hour dermal LD_{50} was greater than 450 mcg/gram. For tobacco budworm larvae, it is not clear if the difference between oral and dermal toxicity is due to activation of the AC 303630 to AC 303268 in the hindgut, or to limited adsorption through the cuticle, or to some combination of these factors (Treacy *et al.* 1990). The low vapor pressure of AC 303630 strongly suggests that insects will be not be exposed by the inhalation route. The work by Treacy *et al.* (1990) also provides a working level for concentrations in dying insects. This value, 5.7 mcg/gram wet weight, was obtained in tobacco budworm larvae that averaged 212 mg in weight.

Treacy *et al.* (1990) also demonstrated the expected decrease in susceptibility of non-molting tobacco budworm larvae as they age. In leaf dip bioassays with 1st instar larvae, expected weight 0.7 mg, (C. Kukel, Unpublished Data), the LC_{50} was 2.75 ppm. The same bioassay with 3rd instar larvae, expected weight 11 mg, (C. Kukel, Unpublished Data) resulted in an LC_{50} of 7.5 ppm. Another decrease in susceptibility can certainly be expected for 5th instar larvae as well. These facts explain why applications of chlorfenapyr for control of tobacco budworm are timed to the hatch or to early instar larvae.

Report Title:	**14-Day Acute Toxicity Test With AC 303630 Technical in Red-winged Blackbirds (*Agelaius phoeniceus*)**
Report Number:	ECO 95-126; MRID No. 43887004
Authors:	Gagne, J.A., J.P. Sullivan, L.W. Brewer, L.C. Taliaferro.

Report Summary

Red-winged Blackbird, *Agelaius phoeniceus*. The acute toxicity of AC 303630 has been determined for adult Red-winged Blackbirds. The test conformed to EPA Guideline 71-1 for testing acute oral toxicity of a compound to a passerine. The test was conducted using six groups of 10 male Red-winged Blackbirds. Nominal dosages were 0, 0.1, 0.25, 0.63, 1.5, and 4.0 mg test substance/kg body weight. Dosing solutions prepared for use in this test were confirmed to contain 103% and 99.7% of their nominal concentrations, so nominal dose levels were used in the analysis. The dose was administered via capsules. Test birds were observed for 14 days following dosing. Birds were observed daily for mortality and changes in clinical observations. Body weights and feed consumption were measured periodically during the test. All birds that died on test and all survivors from each test group underwent complete post-mortem examinations.

No mortalities were recorded in the control group or in the 0.1 and 0.63 mg a.i./kg body weight groups. One of 10 birds died in the 0.25 and the 1.5 mg a.i./kg body weight groups, and 10 of 10 died in the 4.0 mg a.i./kg body weight group. Clinical signs, in the way of decreased activity, were observed in the 4.0 mg a.i./kg body weight group, only. No difference were noted in body weights or feed consumption. The single bird from the 0.25 mg a.i./kg body weight group that died was noted to be emaciated during the post-mortem examination after its death. This finding and the death of this bird was considered incidental and not related to the test substance. Two birds in the 1.5 mg a.i./kg body weight group had excessive bile in the gall bladder. This finding was considered treatment-related. A no-observed-effect level (NOEL) based upon mortality was determined to be 0.63 mg a.i./kg body weight.

AC 303630 was very highly toxic to Red-winged Blackbirds with an acute oral LD_{50} of 2.21 mg a.i./kg body weight and a 95% confidence interval of 1.50 to 4.00 mg a.i./kg body weight.

Report Title:	**8-Day Acute Dietary Test With AC 303630 Technical in Red-winged Blackbirds (*Agelaius phoeniceus*)**
Report Number:	ECO 96-152; MRID No. 44452613
Authors:	Brewer, L.W., J.A. Gagne, R.R. Troup.

Report Summary

Red-winged Blackbird, *Agelaius phoeniceus*. The short-term dietary toxicity of AC 303630 has been determined for adult Red-winged Blackbirds. The test conformed to EPA Guideline 71-2 and OECD Method 205. Nominal dietary concentrations were 5, 7, 10, 14, and 19.5 mg test substance/kg diet (ppm). Measured dietary concentrations were 4.5, 6.9, 9.8, 13.6, and 17 ppm. Test birds were observed for 5 days while receiving treated diet and for a subsequent three-day period while receiving an untreated diet. An additional satellite group received the 14 ppm diet for only three days and untreated diet for a subsequent five days. Birds were observed daily for mortality and changes in clinical observations. Body weights and feed consumption were measured periodically during the test. All birds that died on test and up to four survivors from each test group underwent complete post-mortem examinations.

The concentrations of AC 303630 in the treated diet were measured and acceptably close to the nominal values. Nine of ten birds survived in the control group. Ten of 10 birds survived in the 5 ppm and 7 ppm groups. There were five mortalities in the 10 ppm group, seven mortalities in the 14 ppm group, and 10 mortalities in the 19.5 ppm group. All ten birds survived in the satellite group that received the 14 ppm diet for three days followed by the untreated diet for five days. No clinical signs were observed in the control group or any of the treatment groups. Birds found dead in aviaries in the treatment groups were all found on the aviary floor in a state of tetanus-like full-body rigidity characterized by legs and neck fully extended with back, neck, and head arched sharply backward (opisthotonus). Post-mortem examinations revealed few abnormalities. The single bird from the control that died was emaciated and had excessive fluid in the intestines. These are symptoms of *Salmonella* poisoning, a very common problem in captive Red-winged Blackbirds. Other findings included pox marks on feet or legs and, in some cases, near the base of the beak. This was apparently avian pox infection, also common in captive Red-winged Blackbirds. The infection appeared to be at a low level and was not producing negative health impacts. A no-observed-effect concentration (NOEC) based upon mortality and clinical signs was determined to be 7 ppm AC 303630 in the diet.

AC 303630 was very highly toxic to Red-winged Blackbirds with an 8-day acute dietary LC_{50} of 11.26 ppm and a 95% confidence interval of 9.4 to 13.1 ppm.

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Report Title:	**Feeding and Tissue Residue Study Using AC 303630 Technical in Northern Bobwhite (*Colinus virginianus*)**
Report Number:	ECO 94-132;MRID No. 44452610
Authors:	Brewer, L.W., J.A. Gagne, J.P. Sullivan, S.L. Tank, L.C. Taliaferro.

Report Summary

Tissue Residues in Northern Bobwhite: A non-guideline GLP study was carried out to determine whether quantifiable residues were present in various tissues of Northern Bobwhite following exposure via the diet for various durations and at various dietary concentrations. The purpose of the study was to determine the residues of AC 303630 present in blood, gastrointestinal (GI) tracts, liver, and fat tissues following exposure to treated diet.

AC 303630 technical was administered via the diet at nominal dietary concentrations of 0.0, 1.5, 15, and 150 ppm to four groups of 32 ten-week-old Northern Bobwhite and at a nominal concentration of 1500 ppm to one group of 23 ten-week-old Northern Bobwhite. Apparent repellency to the test substance in the diet caused the group receiving 1500 ppm to consume very limited amounts of treated diet. Therefore, an additional group of eight 16-week-old Northern Bobwhite received an equivalent amount of diet, as was consumed by the other groups, treated with 1500 ppm force-fed via size 0 gelatin capsules. The birds received capsules containing the treated diet at three separate times daily until all birds in this group died.

Stability and homogeneity of AC 303630 in the diet were verified. Samples of the 1.5 ppm and 1500 ppm diets were tested for homogeneity, animal room stability, bulk storage stability, and freezer storage stability. The overall average homogeneity in the 1.5 ppm and 1500 ppm diets were 93.4% and 101% of nominal, respectively. All stability samples at all sampling intervals for both levels were greater than 100% of nominal.

The dietary concentrations used in this study also were verified. Measured concentrations based on the amount of active ingredient in the 1.5, 15, 150, and 1500 ppm treated diets were found to be 155%, 107%, 101%, and 90.7% of nominal, respectively. Therefore, nominal concentrations were used in the analysis.

Body weights of birds in each group were measured on days 1, 3, 7, and 14 of the test. There were no significant differences in mean body weight between the control and the 1.5 ppm or 15 ppm treatment group. The 150 ppm treatment group's mean body weight was significantly lower than the control group's throughout the test. The

1500 ppm group weighed significantly less than the control group on day 1 and day 3, but by day 7, the 1500 ppm group did not have enough surviving members to allow comparison.

Food consumption was measured daily. There were no differences in food consumption between the control group and the 1.5 ppm or the 15 ppm groups throughout the test. Feed consumption in the 150 ppm treatment group was significantly lower than the control group on days 1, 2, 4, 5, 7, 10, 11, 12, and 13. The 1500 ppm treatment group had significantly lower feed consumption than the control group on all days of the test that birds in this treatment group were alive.

Behavioral observations were recorded twice daily, except on week-ends when one observation was conducted each day. Seven categories of abnormal behavior were observed and recorded: unkempt appearance, piloerection, wing droop, tremors, ataxia, inactivity, and being prostrate. Unkempt appearance was recorded in birds in the control, 1.5 ppm, 15 ppm, and 150 ppm groups. Piloerection was recorded in the 1.5, 15, 150, and 1500 ppm groups. Wing droop, tremors, ataxia, and inactivity were recorded in the 15, 150, and 1500 ppm treatment groups. In the 150 ppm group, birds were recorded as being prostrate.

One bird in the 15 ppm treatment group died on day 4 of the test of a condition determined to be unrelated to the test substance. Two birds in the 150 ppm treatment group died on day 14 of the test. Post-mortem examinations showed the only obvious abnormality to be lower than normal body fat deposits. There were a total of seven birds in the 1500 ppm group that died during the test. During post-mortem examinations, all of these birds were noted to be emaciated, with no body fat deposits.

Eight birds, four males and four females, from each dietary concentration were sacrificed via CO_2 asphyxiation on days 1, 3, 7, and 14 for removal of tissues. Any birds that died during one of these periods were used in place of birds to be sacrificed. For tissue residue analyses, the limit of quantification for AC 303630 in tissues was 0.05 ppm, except for blood, which had a limit of quantification of 0.005 ppm. No residues were found in control group samples, except for blood samples.

No residues above the level of quantification were found in the GI tract samples for the 1.5 ppm group during any sampling period, except the day 7 samples. Of the eight samples collected on day 7, six contained residues above 0.05 ppm, to a maximum of 0.0764 ppm AC 303630. In the 15 ppm treatment group, five of 32 GI tracts samples contained residues above 0.05 ppm. These concentrations ranged up to 0.591 ppm. Day 7 again had the highest residue concentrations of the 4 collection periods. All samples from the 150 ppm group contained residues in excess of 0.05 ppm. The range was 0.291 ppm in day 3 samples to 8.30 ppm in day 7 samples. In the 150 ppm treatment group, the day 7 samples had the highest residues among the four sampling periods. GI tract samples were available from the 1500 ppm treatment group birds on days 1, 3, and 7. Tissues from all three of these sampling periods contained similar residue values, ranging from 1.36 ppm to 22.2 ppm. Samples from the capsule-dosed group contained substantially higher GI tract residue concentrations than any other samples. Six of the eight samples had residue concentrations of > 50 ppm. These birds survived a maximum of two days during capsule administration. The

concentrations are higher than the group that received 1500 ppm in their diet because the group exposed through their diets ate very little.

No liver samples from the four treatment groups or the control group contained AC 303630 residues above the level of quantification. Residues from the capsule-dosed group ranged from < 0.05 to 0.0672 ppm.

Analyses were conducted on skin with associated fat tissue from the control group, 150 ppm and the 1500 ppm treatment groups. No residues were detected in the control group samples. Residues from the 150 ppm group ranged from <0.05 to 0.281 ppm. Nine of 23 sample from the 1500 ppm group contained quantifiable residues that ranged from 0.0520 to 0.414 ppm. Samples from the capsule-dosed group ranged from 0.358 to 2.26 ppm.

One of the blood samples from the 1500 ppm group contained quantifiable residues of 0.566 ppm. No residues were found in the 150 ppm group. Three of seven control samples were reported to have concentrations greater than 0.005 ppm. All other samples were reported as < 0.005 ppm. No blood samples were drawn from the capsule-dosed group because all were found dead in their cages.

No correlations were detected between the amount of AC 303630 ingested and the residue concentrations in any tissue.

The dietary concentrations used in this study were sufficient to produce signs of toxicity or mortality at all concentrations. Analysis of AC 303630 in body tissues may provide limited information regarding the level of exposure in wild birds. Clearly, if residues are found in the GI tract, exposure has occurred. However, tissue residue data will probably not quantify exposure of wild birds. It is unlikely that, under normal field conditions, birds will be exposed to enough AC 303630 to achieve ingestion levels that resulted in detection of the test substance in liver, blood, or skin/fat tissues in this study.