

Cured Leaf Residues Following Applications of Fluopicolide, Indoxacarb, and Oxathiapiprolin

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Introduction

- Pesticide residues remain a key focus of allied industry
- The Pesticide Committee of the TWC provides oversight and guidance for residue field trials in the US
 - 19 materials evaluated from 2004 – 2015
 - 3 peer-reviewed publications in *Tobacco Science*
- Research was continued from 2016 – 2018 to quantify cured leaf residues of three additional tobacco pesticides



Indoxacarb

- FMC Corporation
- IRAC group 22A
- Target Pests:
 - Tobacco Budworm
 - Tobacco Splitworm
 - Tobacco Hornworm
- Not currently labeled in US for tobacco production
 - Labeled in other crops
- CORESTA GRL = 15 mg/kg

STEWARD[®] EC
INSECTICIDE

GROUP 22 INSECTICIDE

Emulsifiable Concentrate
Contains 1.25 lbs. Active Ingredient per gallon.

Active Ingredient	By Weight
Indoxacarb (S)-methyl 7-chloro-2,5-dihydro-2-[[[methoxycarbonyl]4-(trifluoromethoxy)phenyl]amino]carbonyl]indeno [1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylate	15.84%
Other Ingredients	84.16%
TOTAL	100%

EPA Reg. No. 279-9596
EPA Est. No. 352-GA-001

Nonrefillable Container
Net Contents 2.5 Gallon

Refillable Container
Net: _____

**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 the label, find someone to explain it to you in detail.)

FIRST AID

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by the poison control center or doctor. Do not give anything to an unconscious person.


IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.



Fluopicolide

- Valent USA LLC
- FRAC group 43
- Target Pests:
 - Black Shank
 - Blue Mold
- Currently labeled for US production
- CORESTA GRL not yet established

Supplemental Label



PRESIDIO[®]

FUNGICIDE

EPA Reg. No. 59639-140

For Use in Connecticut, Florida, Georgia, Illinois, Kentucky, Massachusetts, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee and Virginia

PRESIDIO[®] FUNGICIDE FOR USE ON TOBACCO

This supplemental label expires on January 31, 2020 and must not be used or distributed after this date.

THIS LABELING MUST BE IN THE POSSESSION OF THE USER AT THE TIME OF APPLICATION. READ THE LABEL AFFIXED TO THE CONTAINER FOR *PRESIDIO* FUNGICIDE BEFORE APPLYING. USE OF *PRESIDIO* FUNGICIDE ACCORDING TO THIS LABELING IS SUBJECT TO THE USE PRECAUTIONS AND LIMITATIONS IMPOSED BY THE LABEL AFFIXED TO THE CONTAINER FOR *PRESIDIO* FUNGICIDE.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

SPECIFIC REQUIREMENTS			
Restrictions and Limitations <ul style="list-style-type: none"> Maximum rate <i>Presidio</i> Fungicide per application: 4 fl oz per acre. Maximum rate of <i>Presidio</i> Fungicide per year unless otherwise noted under crop specific use instructions: 12 fl oz per acre. 			
Diseases	Application Rates		Minimum Time from Last Application
	fl oz/A	GPA Spray	



Oxathiapiprolin

- Syngenta Crop Protection LLC
- FRAC group 49
- Target Pests:
 - Black Shank
 - Blue Mold
- Currently labeled for US production
- CORESTA GRL not yet established

syngenta.

FIFRA

Section 2(ee) Recommendation

Date: February 1, 2016

Product: Ridomil Gold® SL (EPA Reg. No. 100-1202)
+
Orondis® Gold 200 (EPA Reg. No. 100-1571)

Use: **Recommendation for a Tank Mix of Ridomil Gold SL with Orondis Gold 200 for Control of Black Shank on Tobacco**

State: GA, IN, KY, NC, OH, SC, TN, VA

Directions for Use

- It is a violation of Federal law to use this product in a manner inconsistent with its labeling.
- The user must refer to the federally approved labels for the above noted product and read and follow all directions for use, restrictions, and precautions.
- The user should have this recommendation in its possession at the time of use.
- Use of this product according to this bulletin has not been reviewed or endorsed by the Office of the Indiana State Chemist.
- This recommendation for use of this product is permitted under Section 2(ee) of FIFRA and has not been submitted to or been approved by EPA.

For control of black shank on tobacco, tank mix Ridomil Gold SL at 8.0 fl oz/A with Orondis Gold 200 at 4.8 fl oz/A and apply as a soil-directed or banded spray at first cultivation or layby.

Shake Orondis Gold 200 container well before using. Follow all directions for use, restrictions and precautions given on the Ridomil Gold SL and Orondis Gold 200 labels.



Table 1. Application rates, spray programs, and pre-harvest intervals (PHI), of the selected crop protection agents.

Active Ingredient	Total Applications num./season	Application Method	Application Rate L/ha	Application Rate		PHI ^b Days
				g ai/ha/app.	g ai/ha/season	
Fluopicolide	3	Soil-Band (1) + Foliar (2)	0.29	140	420	7
Indoxacarb	4	Foliar	0.83	124	496	17
Oxathiapiprolin	1	Soil-Band	0.35	71	71	n/a

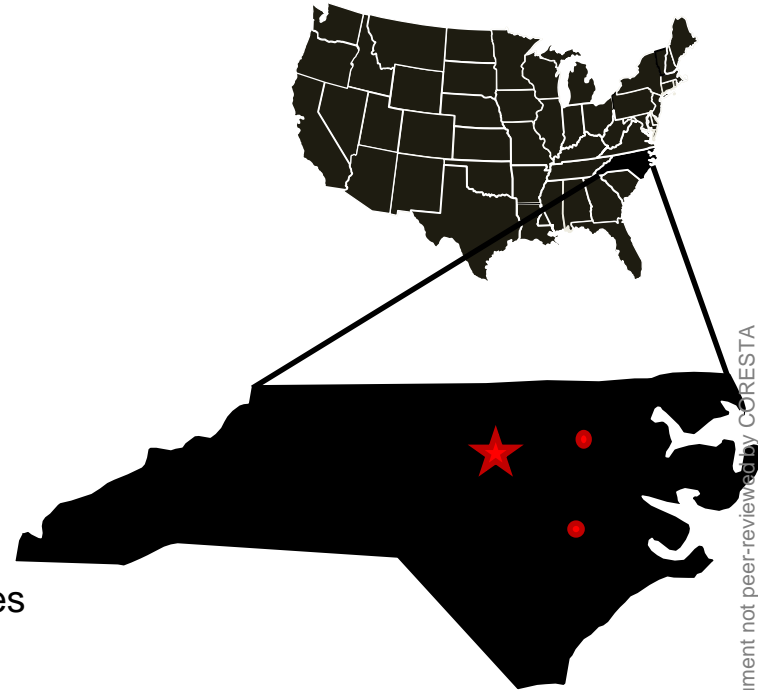
^a Soil-Band; banded application to row middles at the layby growth stage.

^b Target PHI used to establish each respective spray program. Oxathiapiprolin has a 7 day PHI, which was not considered due to mid-season Soil-Band application.



Materials & Methods – Treatment Application

- Six growing environments
 - RCBD experimental design, four replications per environment
 - Individual plots consisted of four treated rows
 - Center two rows harvested and cured for sample collection
 - Cultivar was NC 196 in each environment
- Spray programs established based on EPA label or suggested use pattern from chemical manufacturer
 - Soil-Band: single wide angle flat nozzle (TK-VS2)
 - Foliar: three nozzle, 26-cm boom with hollow cone nozzles (TX-12)
 - Outside nozzles oriented inward at 45°
 - Both application methods were calibrated to 187 L/ha



Sample Collection & Data Analysis

Sample Collection

- Four stalk positions harvested separately
 - Lugs, cutters, leaf, tip
- 100 gram lamina samples collected as follows:
 - Lower = Lugs + Cutters
 - Middle = Leaf
 - Upper = Tips
- Analyses conducted by Global Laboratory Services, Inc.

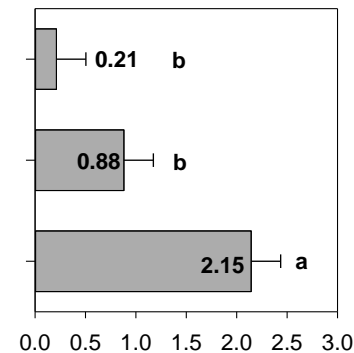
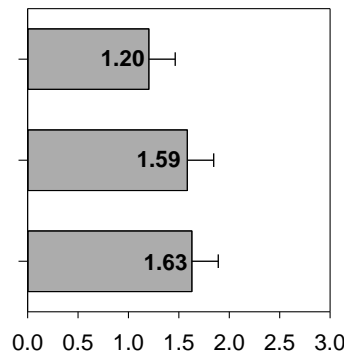
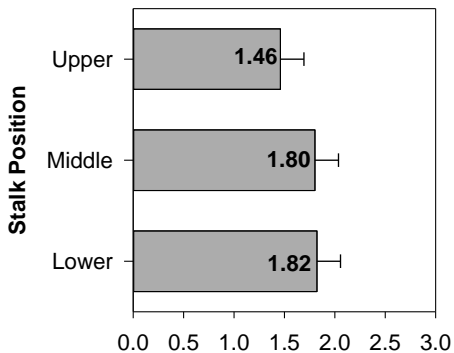
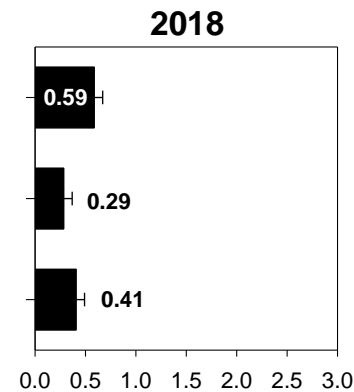
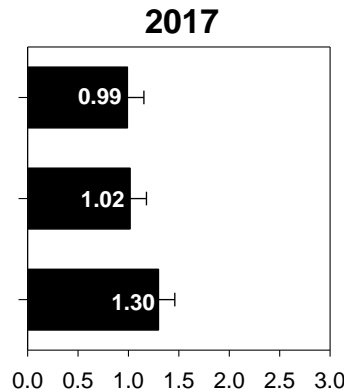
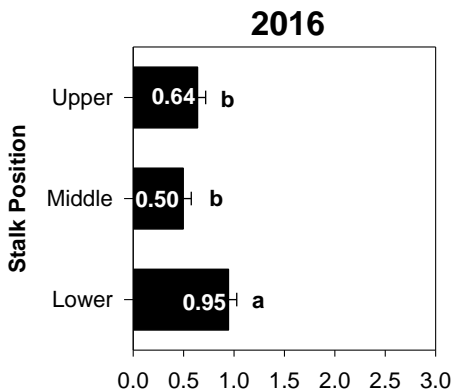
Data Analysis

- ANOVA
- PROC Mixed procedure
 - SAS ver. 9.4
 - Fisher's $LSD_{0.05}$
- Significant residue x environment interactions
 - Individual environments reported
- Figures created in Sigma Plot ver. 14.0



Indoxacarb

LOQ=0.09 mg/kg



Cured Leaf Residue (mg/kg)

Kinston
 Rocky Mount



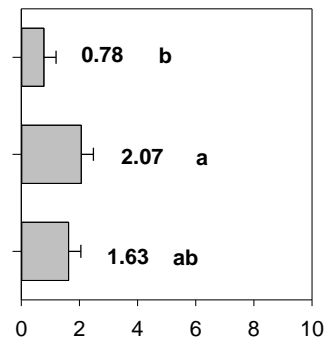
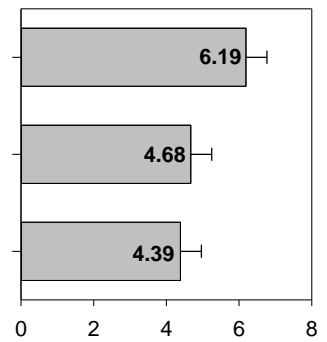
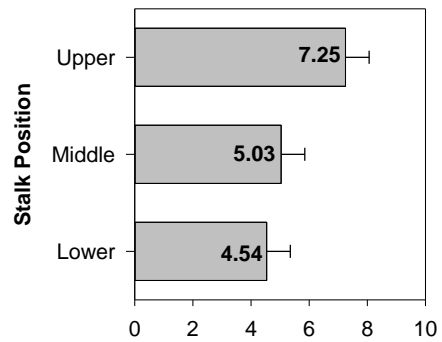
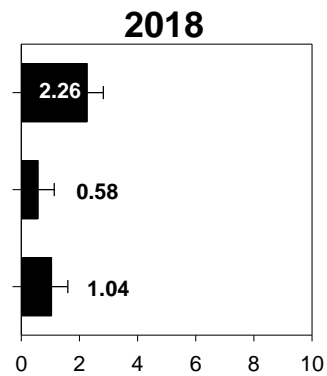
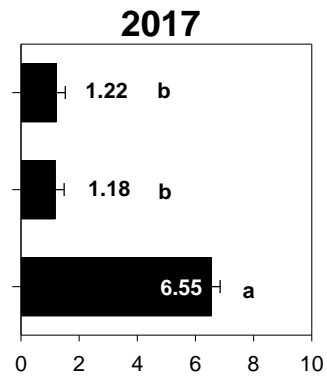
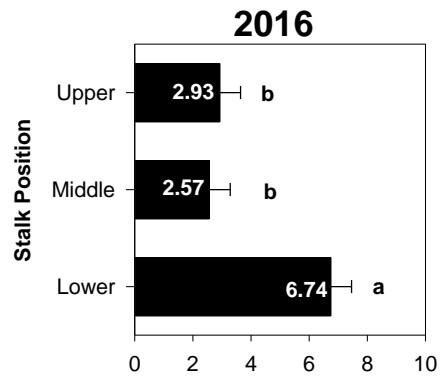
Indoxacarb

- PHI ranged from 17 to 28 days
- Residues typically highest in lower-stalk samples
- Much lower than CORESTA GRL (15 mg/kg)
- Very promising for US market
- Currently in Smoke Sensory Program
- Complimentary to current Lepidoptera insecticides
 - Chlorantraniliprole, Spinosad, and Bt



Fluopicolide

LOQ=0.08 mg/kg



Fluopicolide Residue (mg/kg)

Kinston
 Rocky Mount



Fluopicolide

- PHI ranged from 7 to 18 days
- Lower-stalk samples had highest residues
 - 0.85 to 5.37 greater than upper-stalk samples
- 3 to 5 times lower than current MRL's for food crops in the US
- Foliar applications are uncommon in US FCV



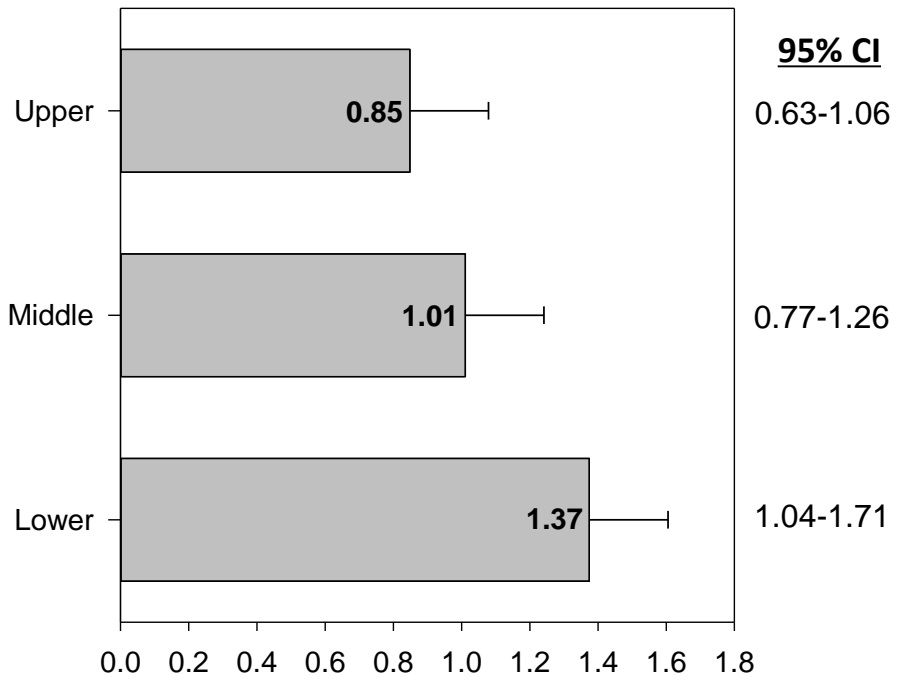
Oxathiapiprolin

- Below LOQ (0.09 mg/kg) in 5 environments
- Detected in lower-stalk tobacco in Kinston-2017 environment (0.10 mg/kg)
 - Not detected in middle and upper-stalk samples
- Precise applications should not result in residue concerns
- Further evaluation needed for TPW and foliar applications

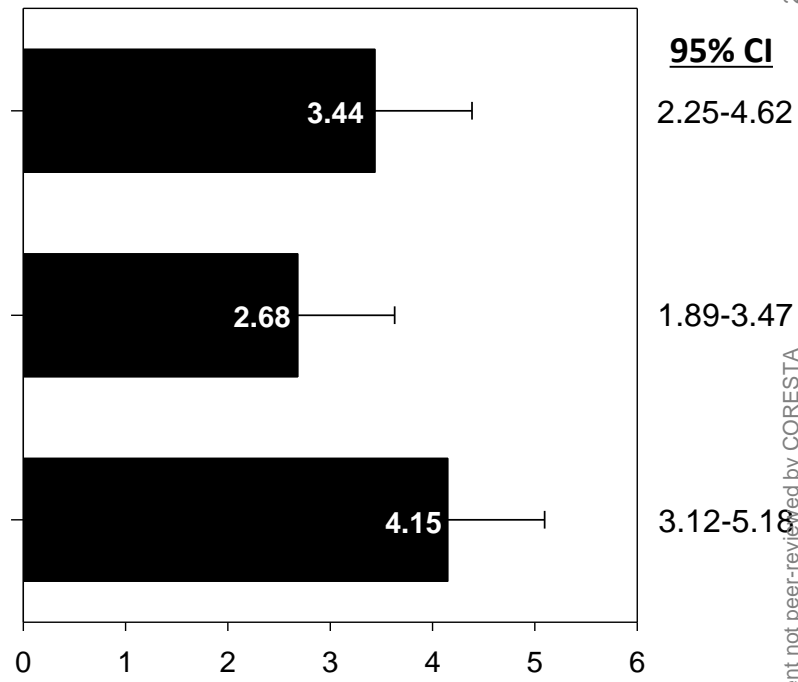


Stalk Position

Indoxacarb



Fluopicolide



Cured Leaf Residue (mg/kg)



Final Thoughts

- Additional research should focus on “real-world” residues
- More transparency and communication needed for production decisions based on residues
- Be mindful that tobacco isn't the target crop for most CPA manufacturers



Acknowledgements

- Pesticide Committee of the Tobacco Workers Conference
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Questions??

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