

Current Status of the Field Testing Program for Pesticide Residues in North Carolina Flue-cured Tobacco

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Outline

- Overview of the Pesticide Residue Testing Program
- Overview of Current Evaluation
- Specific Chemicals Under Evaluation and Results
- Data Summary
- Future Direction of the Program
- Acknowledgements



Pesticide Residue Testing Program at North Carolina State University

- Program is directed by a Pesticide Residue Committee
 - Committee is comprised of University and Industry personnel.
- Committee Meetings:
 - Once per year at the Regional Growth Regulator meeting in Raleigh, NC
 - Once every other year at the Tobacco Workers Conference
- Compound evaluation occurs on a three year cycle.



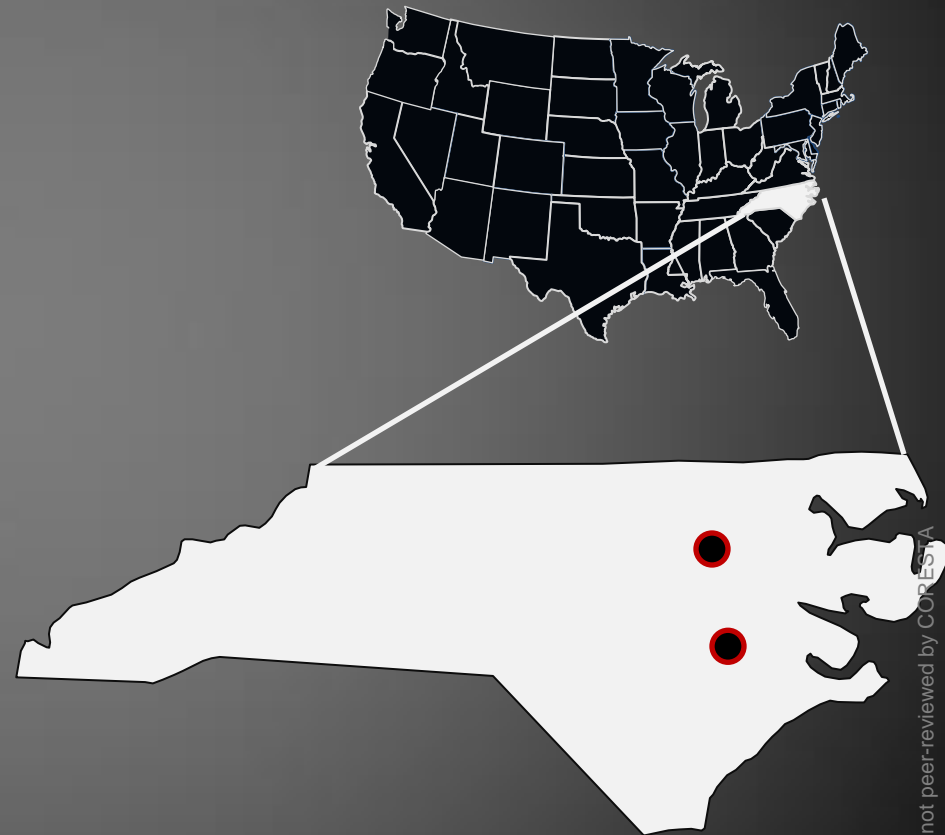
Pesticide Residue Testing Program at North Carolina State University

- Determine the expected residues from maximum labeled applications to flue-cured tobacco.
 - Use the maximum labeled rate and number of applications.
 - Final application, if applicable, applied at the pre-harvest interval specified on the label.
- In the final report, data are reported by individual year, location, compound, and stalk position.
- Once a three year cycle is complete the Pesticide Residue Committee decides which compounds are entered for the next cycle.



Pesticide Residue Testing Program at North Carolina State University

- Trials conducted at Rocky Mount and Kinston, NC.
- Recommended practices for flue-cured tobacco production.
- Variety: NC 71.
- Treatments replicated 4 times in a RCBD for each location.
- 2010, 2011, & 2012 Two-row plots.
- Cured leaf samples collected from four stalk positions.
 - First two positions are combined for a total of three reported positions.
- Residue analysis conducted by Global Labs of Wilson, NC



Compounds Evaluated in the Current Cycle

- Bifenthrin
 - Pesticide Classification : Insecticide
 - Trade Name: Capture[®] LFR 1.5 EC,
 - Company: FMC
 - Target Pest: Piercing, sucking, chewing insects
- Clothianidin
 - Pesticide Classification : Insecticide
 - Trade Name: Belay[®] 2.13 SC
 - Company: Valent[®]
 - Target Pest: Broad spectrum
- Chlorantraniliprole
 - Pesticide Classification: Insecticide
 - Trade Name: Coragen[®] 1.67 SC
 - Company: DuPont[™]
 - Target Pest: Lepidopteran
- Flubendiamide
 - Pesticide Classification : Insecticide
 - Trade Name: Belt[®] 4.0 SC
 - Company: Bayer CropScience
 - Target Pest: Lepidopteran



Bifenthrin

- Two applications
 - Foliar (2) – 0.10 lb ai acre⁻¹ (8.5 oz product acre⁻¹)
 - Foliar (2) – 112.14 g ai ha⁻¹ (0.621 L product ha⁻¹)
- Total of 0.20 lb ai acre⁻¹ (17.0 oz product acre⁻¹)
 - 224.28 g ai ha⁻¹ (1.24 L ha⁻¹)
- Application (foliar)
 - 20 GPA (186 L ha⁻¹)
 - Three nozzle boom (TX-12 hollow cones)
- Final application at layby as per label



Bifenthrin

	2010			2011			2012				
	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Composite	
LOQ=0.500 mg/kg GRL=2.50 mg/kg	-----mg/kg-----										
Kinston	Maximum	8.385	3.339	1.306	2.695	0.500	0.500	--	--	--	0.855
	Mean	3.339	0.500	0.500	1.567	0.500	0.500	--	--	--	1.300
	Minimum	1.306	0.500	0.500	0.500	0.500	0.500	--	--	--	0.500
	95% CI	0.032	--	--	0.470	--	--	--	--	--	0.497
		6.646	--	--	2.664	--	--	--	--	--	1.213
Rocky Mount	Maximum	3.016	0.687	3.380	2.665	1.008	0.500	5.140	0.580	0.520	--
	Mean	1.737	0.579	1.817	2.418	0.696	0.500	3.745	0.520	0.505	--
	Minimum	0.500	0.500	0.500	2.049	0.500	0.500	2.330	0.500	0.500	--
	95% CI	0.710	0.501	0.314	2.154	0.456	--	2.601	0.481	0.495	--
		2.764	0.657	3.320	2.682	0.936	--	4.889	0.559	0.515	--



Clothianidin

- Four applications
 - Foliar (3) – 0.067 lb ai acre⁻¹(4.0 oz product acre⁻¹)
 - Foliar (3) – 75.13 g ai ha⁻¹ (0.292 L product ha⁻¹)
- Total of 0.201 lb ai acre⁻¹(12.0 oz product acre⁻¹)
 - 420.52 g ai ha⁻¹ (1.64 L ha⁻¹)
- Application (foliar)
 - 20 GPA (186 L ha⁻¹)
 - Three nozzle boom (TX-12 hollow cones)
- Final application 14 day prior to harvest as per label



Clothianidin

LOQ=0.125 mg/kg GRL=N/A	2010			2011			2012				
	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Composite	
-----mg/kg-----											
Kinston	Maximum	1.240	0.725	0.312	1.297	0.496	0.125	--	--	--	0.350
	Mean	1.014	0.405	0.207	0.857	0.293	0.125	--	--	--	0.223
	Minimum	0.714	0.188	0.125	0.510	0.222	0.125	--	--	--	0.170
	95% CI	0.788	0.155	0.131	0.481	0.161	--	--	--	--	0.140
		1.240	0.655	0.283	1.233	0.425	--	--	--	--	0.306
Rocky Mount	Maximum	0.311	0.142	0.125	0.742	0.172	0.125	0.260	0.125	0.125	--
	Mean	0.254	0.129	0.125	0.576	0.137	0.125	0.186	0.125	0.125	--
	Minimum	0.193	0.125	0.125	0.454	0.125	0.125	0.125	0.125	0.125	--
	95% CI	0.206	0.120	--	0.456	0.114	--	0.123	--	--	--
		0.302	0.138	--	0.696	0.160	--	0.249	--	--	--



Chlorantraniliprole

- Three applications
 - Transplant Water – 0.091 lb ai acre⁻¹(7.0 oz product acre⁻¹)
 - Transplant Water – 102.05 g ai ha⁻¹ (0.512 L product ha⁻¹)
 - Foliar (2) – 0.055 lb ai acre⁻¹(4.2 oz product acre⁻¹)
 - Foliar (2) – 61.68 g ai ha⁻¹ (0.0.307 L product ha⁻¹)
- Total of 0.201 lb ai acre⁻¹ (15.4 oz product acre⁻¹)
 - 225.40 g ai ha⁻¹ (1.13 L ha⁻¹)
- Application (foliar)
 - 20 GPA (186 L ha⁻¹)
 - Three nozzle boom (TX-12 hollow cones)
- Final application 1 day prior to harvest as per label



Chlorantraniliprole

LOQ=0.125 mg/kg GRL=10.00 mg/kg		2010			2011			2012				
		Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Composite	
-----mg/kg-----												
Kinston	Maximum	3.154	0.126	0.125	4.711	0.375	0.125	--	--	--	1.300	
	Mean	2.119	0.125	0.125	3.949	0.220	0.125	--	--	--	0.855	
	Minimum	0.655	0.125	0.125	2.985	0.125	0.125	--	--	--	0.500	
	95% CI		1.090	0.124	--	3.087	0.103	--	--	--	--	1.303
			3.148	0.126	--	4.811	0.337	--	--	--	--	2.103
Rocky Mount	Maximum	5.584	1.568	5.026	7.048	0.569	0.870	11.850	0.490	0.180	--	
	Mean	2.937	0.674	2.638	4.760	0.274	0.484	7.425	0.380	0.153	--	
	Minimum	0.216	0.125	0.125	1.794	0.125	0.125	4.770	0.140	0.125	--	
	95% CI		0.744	0.027	0.506	2.596	0.069	0.086	4.373	0.217	0.122	--
			5.130	1.321	4.770	6.924	0.479	0.882	10.477	0.543	0.184	--



Flubendiamide

- Four applications
 - Foliar (4) – 0.094 lb ai acre⁻¹ (3.0 oz product acre⁻¹)
 - Foliar (4) – 105.41 g ai ha⁻¹ (0.219 L product ha⁻¹)
- Total of 0.376 lb ai acre⁻¹ (12.0 oz product acre⁻¹)
 - 421.64 g ai ha⁻¹ (0.88 L ha⁻¹)
- Application (foliar)
 - 20 GPA (186 L ha⁻¹)
 - Three nozzle boom (TX-12 hollow cones)
- Final application 14 days prior to harvest as per label



Flubendiamide

LOQ=0.125 mg/kg GRL=N/A	2010			2011			2012				
	Lower	Middle	Upper	Lower	Middle	Upper	Lower	Middle	Upper	Composite	
-----mg/kg-----											
Kinston	Maximum	30.320	13.820	10.130	24.176	20.189	23.073	--	--	--	9.253
	Mean	25.835	10.930	7.270	19.355	12.678	11.362	--	--	--	14.050
	Minimum	20.740	8.960	6.070	13.867	6.466	3.233	--	--	--	0.510
	95% CI	21.953	8.916	5.387	15.135	6.441	3.167	--	--	--	3.390
		29.717	12.944	9.153	23.575	18.915	19.557	--	--	--	15.116
Rocky Mount	Maximum	18.520	15.070	7.757	24.524	9.309	6.408	18.390	7.110	3.120	--
	Mean	15.769	6.193	5.610	21.069	5.946	5.217	10.335	4.058	3.120	--
	Minimum	12.844	1.780	3.377	17.182	4.288	4.428	2.190	1.950	1.740	--
	95% CI	13.082	0.285	3.756	17.547	3.694	4.360	3.134	1.922	1.942	--
		18.456	12.101	7.464	24.591	8.198	6.074	17.536	6.194	4.298	--



Summary of Results

- **Bifenthrin**

- Maximum Observed Residue:
8.385 mg/kg
- 95% Confidence Interval:
0.39 to 3.16 mg/kg
- Lower Stalk Position @ Kinston in
2010

- **Clothianidin**

- Maximum Observed Residue:
1.297 mg/kg
- 95% Confidence Interval:
0.788 to 1.240 mg/kg
- Lower Stalk Position @ Kinston in
2011

- **Chlorantraniliprole**

- Maximum Observed Residue:
7.048 mg/kg
- 95% Confidence Interval:
2.596 to 6.924 mg/kg
- Lower Stalk Position @ Rocky
Mount in 2011

- **Flubendiamide**

- Maximum Observed Residue:
30.320 mg/kg
- 95% Confidence Interval:
13.082 to 18.456 mg/kg
- Lower Stalk Position @ Kinston in
2010



Future Efforts of the Pesticide Residue Testing Program

- 2012 was the final year for the referenced products
- Results have been published in Tobacco Science
 - 50:25-30 (Online Issue in Progress)
- For 2013:
 - Two products entered for NCSU Program
 - Spinosad and Cyantraniliprole
 - Five compounds entered for CORESTA initiative
 - Chlorantraniliprole, Fenamidone, Difenoconazole, Indoxacarb, and Tebuconazole



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Thank You for Your Attention

