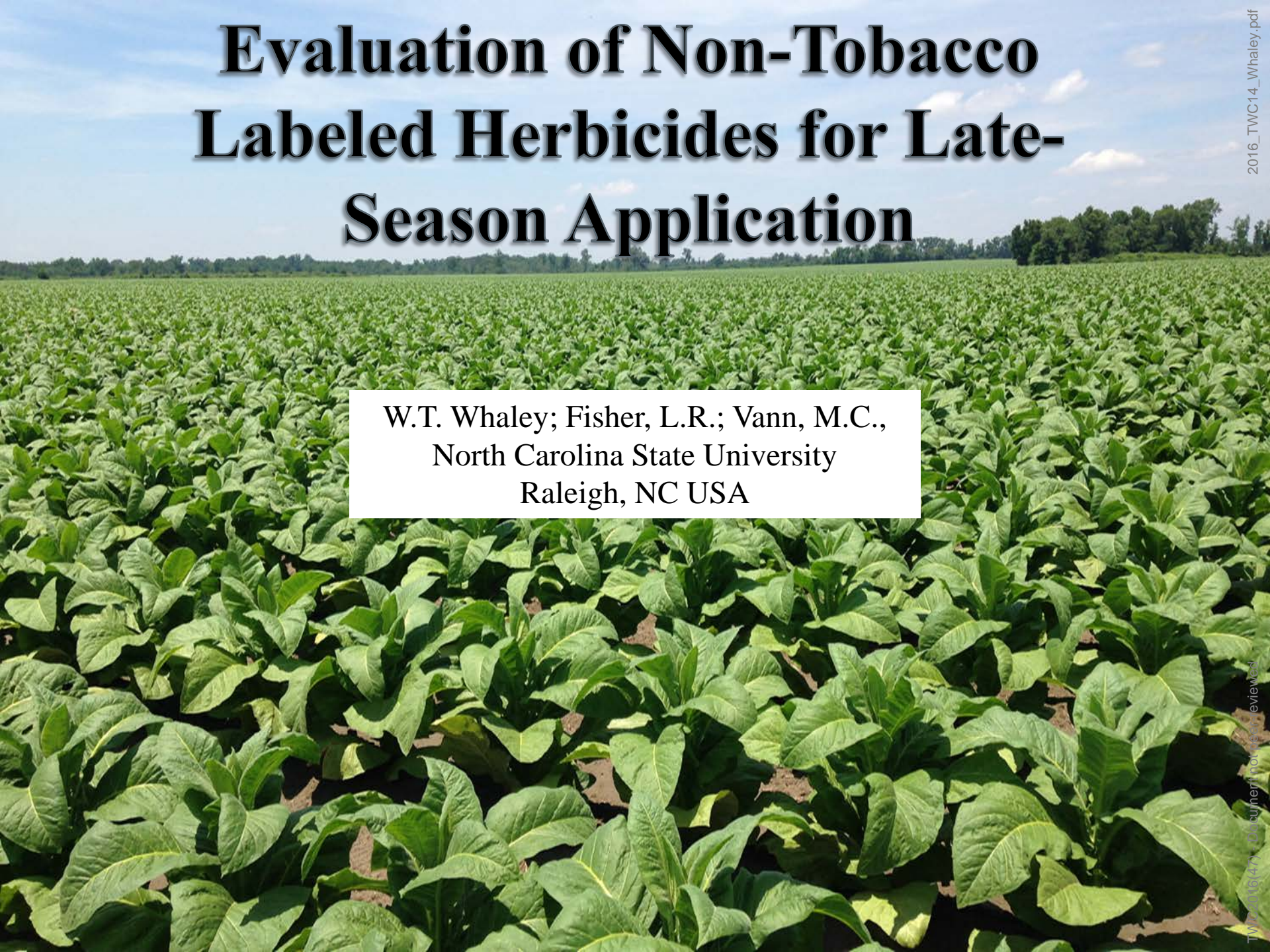


# Evaluation of Non-Tobacco Labeled Herbicides for Late- Season Application



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# Outline

- » Industry Concerns, Purpose of Project
- » Treatments
- » Application Method
- » Results
- » Herbicide Symptomology
- » Conclusions
- » Questions



# Tobacco Industry Concern

- » Weed seed found in tobacco supply
- » Theory is that weed seed is entering supply via mechanical harvesters late season
- » “Zero tolerance” policy by foreign markets (China)
- » Impact on US export demand is uncertain



# Overview of Herbicide Trial

Treatment	Timing	Rate	Mode of Action
Dual Magnum	Pre-Topping	1.33 pt/ac	Inhibition of Cell Division
Dual Magnum	After 1st Harvest	1.33 pt/ac	Inhibition of Cell Division
Spartan 4F	Pre-Topping	8 oz/ac	PPO
Spartan 4F	After 1st Harvest	8 oz/ac	PPO
Envoke	Pre-Topping	0.1 oz/ac	ALS
Envoke	After 1st Harvest	0.1 oz/ac	ALS
Reflex	Pre-Topping	1 pt/ac	PPO
Reflex	After 1st Harvest	1 pt/ac	PPO
Liberty	Pre-Topping	29 oz/ac	Inhibition of Glutamine Synthetase
Liberty	After 1st Harvest	29 oz/ac	Inhibition of Glutamine Synthetase
Callisto	Pre-Topping	3 oz/ac	HPPD
Callisto	After 1st Harvest	3 oz/ac	HPPD
Lorox	Pre-Topping	32 oz/ac	Photosystem II
Lorox	After 1st Harvest	32 oz/ac	Photosystem II
Aim	Pre-Topping	3 oz/ac	PPO
Aim	After 1st Harvest	3 oz/ac	PPO
Poast	After 1st Harvest	2 pt/ac	ACCase
Check (Spartan+Command)	Pre-Transplant	5 oz/ac + 2 pt/ac	PPO + Caretonoid Biosynthesis

# Application Method

- 20 inch boom spacing with one Turbo Teejet Induction Flat Spray Tip nozzle on each side
- Nozzle features
  - 110 degree wide angle, tapered spray pattern
  - Extremely coarse to ultra coarse droplet size depending upon pressure
- 20 gallons per acre of total spray volume
- No shields or hoods were utilized. Idea is to capture worse case scenario



# Application Method



Turbo Teejet Flat Spray Tip Nozzle



Spray coverage during application

**Table 1. Crop Injury and Palmer amaranth control before topping (BT) at the Lower Coastal Plain Research Station and Upper Coastal Plain Research Station in 2014 and 2015.**

Herbicide	LCPRS-2014		UCPRS-2014		LCPRS-2015		UCPRS-2015	
	Injury	Control	Injury	Control	Injury	Control	Injury	Control
	_____ % _____							
<b>Dual Magnum-BT</b>	0.00 a	100.00 a	0.00 c	90.25 a	0.00 c	100.00 a	0.00 c	80.25 c
<b>Spartan-BT</b>	0.00 a	100.00 a	0.00 c	99.75 a	0.00 c	100.00 a	0.00 c	100.00 a
<b>Envoke-BT</b>	0.00 a	100.00 a	0.00 c	98.25 a	0.00 c	100.00 a	0.00 c	92.50 b
<b>Reflex-BT</b>	0.00 a	100.00 a	0.00 c	100.00 a	0.00 c	100.00 a	0.00 c	98.00 ab
<b>Liberty-BT</b>	0.00 a	100.00 a	3.75 b	100.00 a	5.00 a	100.00 a	5.00 b	98.50 ab
<b>Callisto-BT</b>	0.00 a	100.00 a	12.5 a	98.50 a	3.50 b	100.00 a	16.25 a	97.25 ab
<b>Lorox-BT</b>	0.00 a	100.00 a	0.00 c	100.00 a	0.00 c	100.00 a	0.00 c	99.00 a
<b>Aim-BT</b>	0.00 a	100.00 a	2.50 b	100.00 a	0.00 c	100.00 a	2.00 b	95.25 ab
<b>Spartan + Command (PRE-T)</b>	0.00 a	100.00 a	0.00 c	100.00 a	0.00 c	100.00 a	0.00 c	100.00 a

**Table 2. Crop Injury and Palmer amaranth control as affected by herbicide application at the Lower Coastal Plain Research Station, 2014-2015**

Treatment	LCPRS-2014		LCPRS-2015	
	Injury	Control	Injury	Control
	%			
<b>Dual Magnum-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Dual Magnum-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Spartan-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Spartan-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Envoke-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Envoke-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Reflex-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Reflex-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Liberty-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Liberty-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Callisto-BT</b>	0.00 a	100.00 a	3.50 a	100.00 a
<b>Callisto-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Lorox-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Lorox-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Aim-BT</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Aim-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Poast-AH</b>	0.00 a	100.00 a	0.00 b	100.00 a
<b>Spartan + Command (PRE-T)</b>	0.00 a	100.00 a	0.00 b	100.00 a





**Table 3. Crop Injury and Palmer amaranth control as affected by herbicide application at the Upper Coastal Plain Research Station, 2014-2015**

Treatment	UCPRS-2014		UCPRS-2015	
	Injury	Control	Injury	Control
	%			
Dual Magnum-BT	0.00 b	87.50 bc	0.00 d	80.00 g-i
Dual Magnum-AH	0.00 b	89.25 abc	0.00 d	81.25 f-i
Spartan-BT	0.00 b	96.25 abc	0.00 d	100.00 a
Spartan-AH	0.00 b	98.25 a	0.00 d	95.75 a-d
Envoke-BT	0.00 b	97.25 ab	0.00 d	89.50 b-f
Envoke-AH	0.00 b	90.75 abc	0.00 d	75.00 i
Reflex-BT	0.00 b	93.75 abc	0.00 d	96.50 a-d
Reflex-AH	0.00 b	96.00 abc	0.00 d	92.75 a-e
Liberty-BT	0.00 b	97.25 ab	0.00 d	98.50 abc
Liberty-AH	0.00 b	98.00 a	2.75 c	95.25 a-e
Callisto-BT	12.50 a	98.75 a	25.00 a	92.25 a-e
Callisto-AH	0.00 b	94.00 abc	0.00 d	85.75 e-h
Lorox-BT	0.00 b	98.50 a	12.00 b	99.50 ab
Lorox-AH	0.00 b	97.50 ab	1.25 cd	88.75 c-g
Aim-BT	0.00 b	95.00 abc	0.00 d	93.75 a-e
Aim-AH	0.00 b	97.50 ab	0.00 d	88.75 c-g
Poast-AH	0.00 b	85.75 c	0.00 d	77.50 hi
Spartan + Command (PRE-T)	0.00 b	98.25 a	0.00 d	87.50 d-g



**Table 4. Tobacco yield, quality, and value as influenced by herbicide application at the Lower Coastal Plain Research Station in 2014 and 2015**

Treatment	LCPRS 2014			LCPRS 2015		
	Yield (lb/A)	Quality	Value (\$/A)	Yield (lb/A)	Quality	Value (\$/A)
<b>Dual Magnum-BT</b>	2509 a	89 a	4627 a	3035 abc	87 a	5539 abc
<b>Dual Magnum-AH</b>	2331 a	89 a	4295 a	3081 ab	88 a	5750 ab
<b>Spartan-BT</b>	2374 a	89 a	4387 a	2581 def	88 a	4823 c-e
<b>Spartan-AH</b>	2596 a	89 a	4818 a	3297 a	89 a	6204 a
<b>Envoke-BT</b>	2790 a	89 a	5051 a	2816 bcd	89 a	5299 bc
<b>Envoke-AH</b>	2280 a	88 a	4107 a	2948 a-d	88 a	5506 abc
<b>Reflex-BT</b>	2467 a	89 a	4584 a	2972 abc	88 a	5513 abc
<b>Reflex-AH</b>	2153 a	89 a	3948 a	2783 bcd	87 a	5089 bcd
<b>Liberty-BT</b>	2718 a	89 a	4999 a	2680 c-f	89 a	4998 b-e
<b>Liberty-AH</b>	2568 a	87 a	4636 a	2776 bcd	88 a	5151 bc
<b>Callisto-BT</b>	2616 a	90 a	4899 a	2886 bcd	87 a	5310 bc
<b>Callisto-AH</b>	2649 a	90 a	4932 a	2755 b-e	86 a	4992 b-e
<b>Lorox-BT</b>	2625 a	90 a	4903 a	2351 f	87 a	4316 e
<b>Lorox-AH</b>	2457 a	88 a	4501 a	2798 bcd	89 a	5230 bc
<b>Aim-BT</b>	2621 a	91 a	4909 a	2836 bcd	89 a	5314 bc
<b>Aim-AH</b>	2630 a	90 a	4927 a	3011 abc	87 a	5519 abc
<b>Poast-AH</b>	2646 a	89 a	4869 a	2857 bcd	88 a	5315 bc
<b>Spartan + Command (PRE-T)</b>	2548 a	89 a	4684 a	2385 ef	88 a	4364 de



**Table 5. Tobacco yield, quality, and value as influenced by herbicide application at the Upper Coastal Plain Research Station in 2014 and 2015**

Treatment	UCPRS-2014			UCPRS-2015		
	Yield (lb/A)	Quality	Value (S/A)	Yield (lb/A)	Quality	Value (\$/A)
Dual Magnum-BT	2935 a	83 a	4871 a	2947 a	86 a	5393 a
Dual Magnum-AH	3322 a	86 a	5946 a	3037 a	88 a	5630 a
Spartan-BT	3317 a	86 a	6108 a	3012 a	87 a	5511 a
Spartan-AH	3248 a	87 a	6003 a	3153 a	89 a	5904 a
Envoke-BT	3129 a	86 a	5902 a	3171 a	88 a	5884 a
Envoke-AH	3334 a	87 a	5953 a	2650 a	87 a	4835 a
Reflex-BT	3184 a	87 a	5927 a	3086 a	86 a	5624 a
Reflex-AH	3198 a	87 a	5724 a	3065 a	87 a	5695 a
Liberty-BT	3450 a	86 a	6279 a	2912 a	85 a	5263 a
Liberty-AH	3538 a	87 a	6476 a	3165 a	86 a	5813 a
Callisto-BT	3104 a	87 a	5309 a	2969 a	87 a	5445 a
Callisto-AH	3253 a	86 a	5807 a	3327 a	86 a	6030 a
Lorox-BT	3633 a	86 a	6778 a	3139 a	85 a	5672 a
Lorox-AH	3593 a	87 a	6439 a	3136 a	86 a	5739 a
Aim-BT	3490 a	87 a	6537 a	3266 a	83 a	5683 a
Aim-AH	3446 a	87 a	6483 a	3097 a	85 a	5547 a
Poast-AH	3346 a	87 a	6314 a	3050 a	86 a	5602 a
Spartan+ Command (PRE-T)	3439 a	88 a	6247 a	3308 a	89 a	6245 a



# Herbicide Symptomology

## Liberty (*glufosinate-ammonium*)



# Aim (*carfentrazone*)



# Callisto (*mesotrione*)



# Callisto (*mesotrione*)



# Lorox (*linuron*)





# Conclusions

- » A late season herbicide application is needed in a comprehensive weed management program in tobacco to reduce weed seed contamination
- » Currently, only one herbicide labeled for use late season; hence additional options with various modes of action are needed
- » Products perform well late season, but potential injury is of primary concern
- » Depending upon product, rotational restrictions must be considered to avoid potential carryover issues (further research needed)
- » Due to resistance issues, growers must use control measures (herbicides, deep tillage, cultivation, hand weeding) economical in tobacco to prevent problematic weeds from producing seed

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- » Staff at the Upper Coastal Plain Research Station



# Questions?

