

Management of Bollworms in Bt Cotton in MS: Experiences to Date



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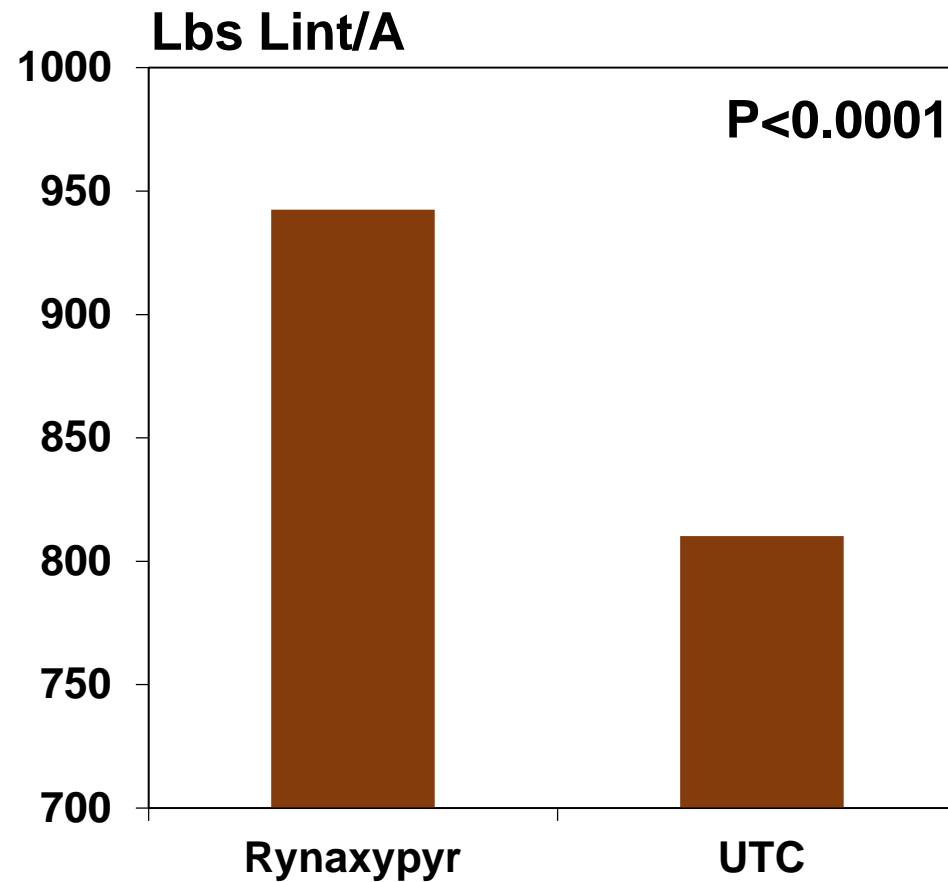
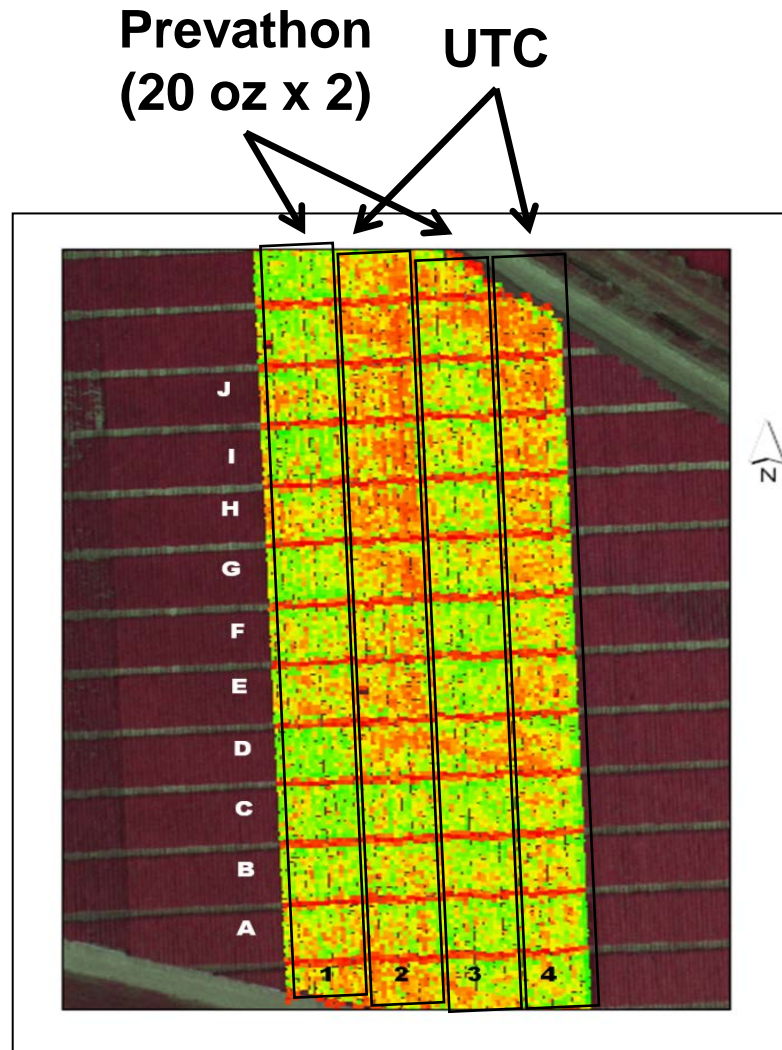
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Yield Map of Bollgard II Cotton - 2010



Bollworm Resistance to Bt – David Kerns



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Cry1Ac	2016	2017
Reference	1.0	1.0
1	5.1	68.8 *
2	27.5	> 109.8 *
3	5.7	> 109.8 *
4	9.5	> 109.8 *
5	48.3	> 109.8 *
6	1.6	> 109.8 *
7		30.5 *
8		> 109.8 *
9		> 109.8 *
10		> 109.8 *
11		62.0 *
12		> 109.8 *

Cry2Ab	2016	2017
Reference	1.0	1.0
1	4.4	> 50.0 *
2	35.7	> 50.0 *
3	133.3	> 50.0 *
4	4.0	> 50.0 *
5	8.6	> 50.0 *
6	1.0	46.1 *
7		6.1
8		11.4 *
9		3.3
10		> 50.0 *
11		30.9 *
12		1.0

Implications of Sharing *Bt* Proteins Between Crops

Corn	Cotton
VT Double Pro (Cry2Ab + Cry1A.105)	BollGard (Cry1Ac)
Trecepta (Cry2Ab + Cry1A.105 + Vip3A)	BollGard II (Cry1Ac + Cry2Ab)
Herculex (Cry1F)	BollGard 3 (Cry1Ac + Cry2Ab + Vip3A)
Agrisure (Cry1Ab)	WideStrike (Cry1Ac + Cry1F)
Agrisure 3110 (Cry1Ab + Vip3A)	WideStrike 3 (Cry1Ac + Cry1F + Vip3A)
Agrisure 3220 (Cry1Ab + Vip3A + Cry1F)	TwinLink (Cry1Ab + Cry2Ae)
Optima Leptra (Cry1Ab + Cry1F + Vip3A)	TwinLink Plus (Cry1Ab + Cry2Ae + Vip3A)

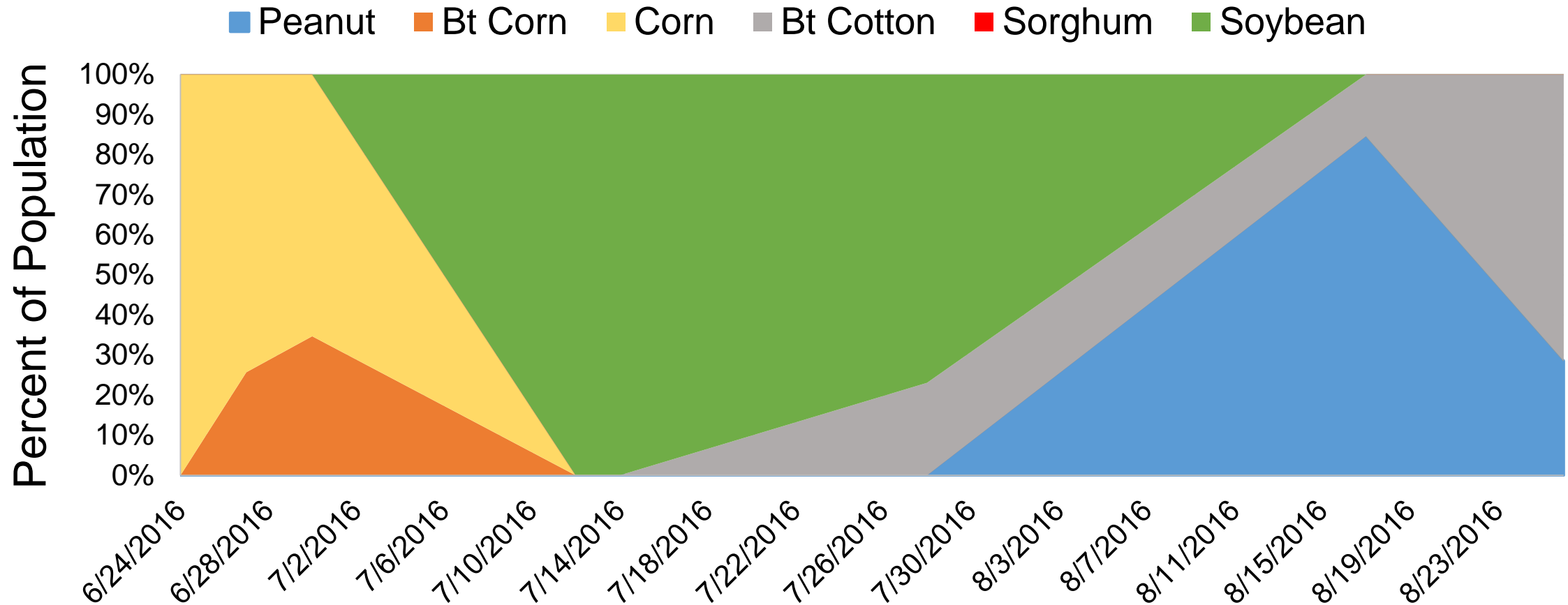
~95% of *H. zea* filters through corn before moving on to other hosts (cotton, soybean, etc.)

This causes selection pressure on shared *Bt* proteins between hosts

Corn: Driving The Problems in Cotton?



Temporal Distribution of Larval Hosts of *H. zea* MS Delta – 2016



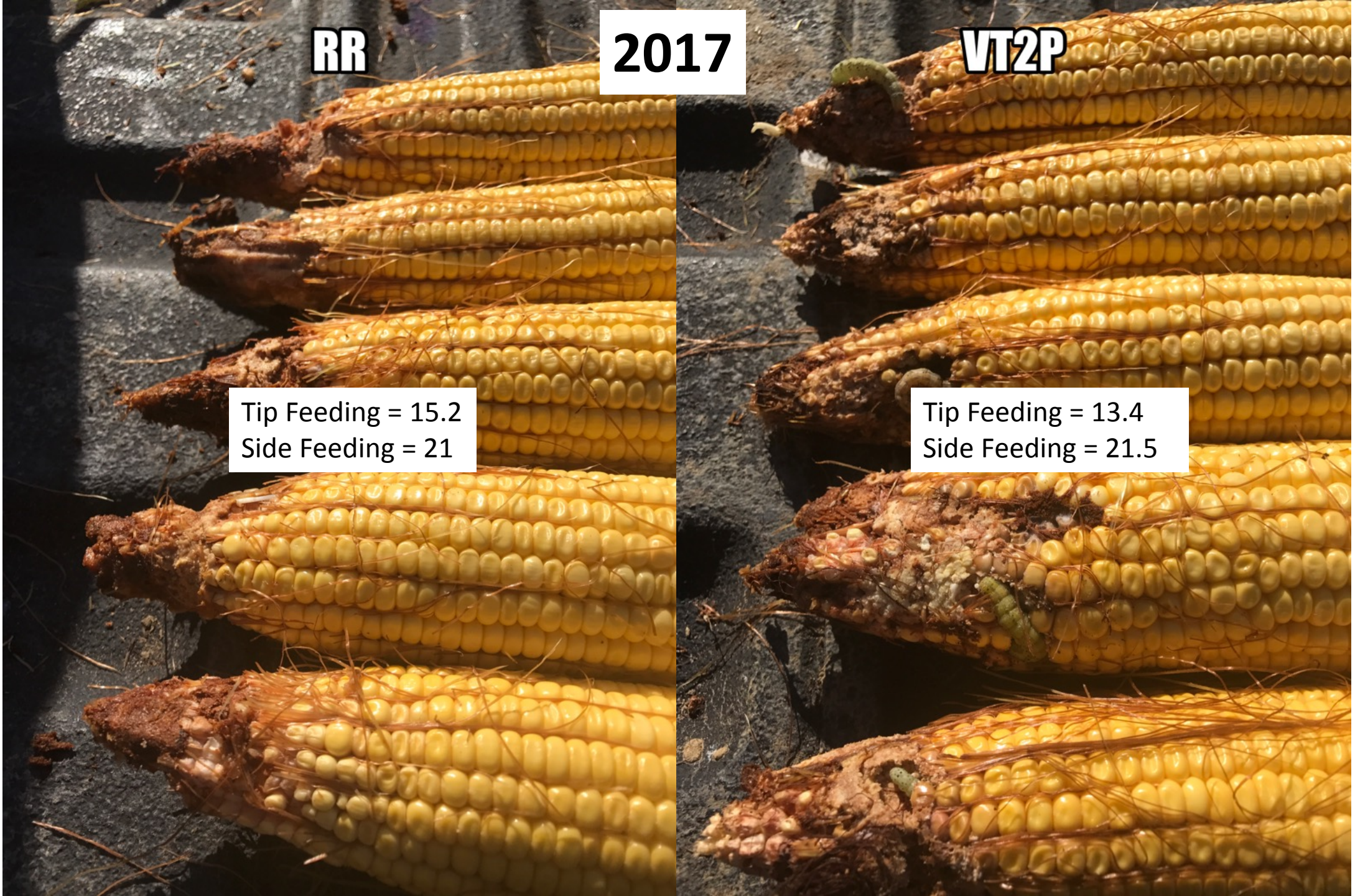
RR

2017

VT2P

Tip Feeding = 15.2
Side Feeding = 21

Tip Feeding = 13.4
Side Feeding = 21.5

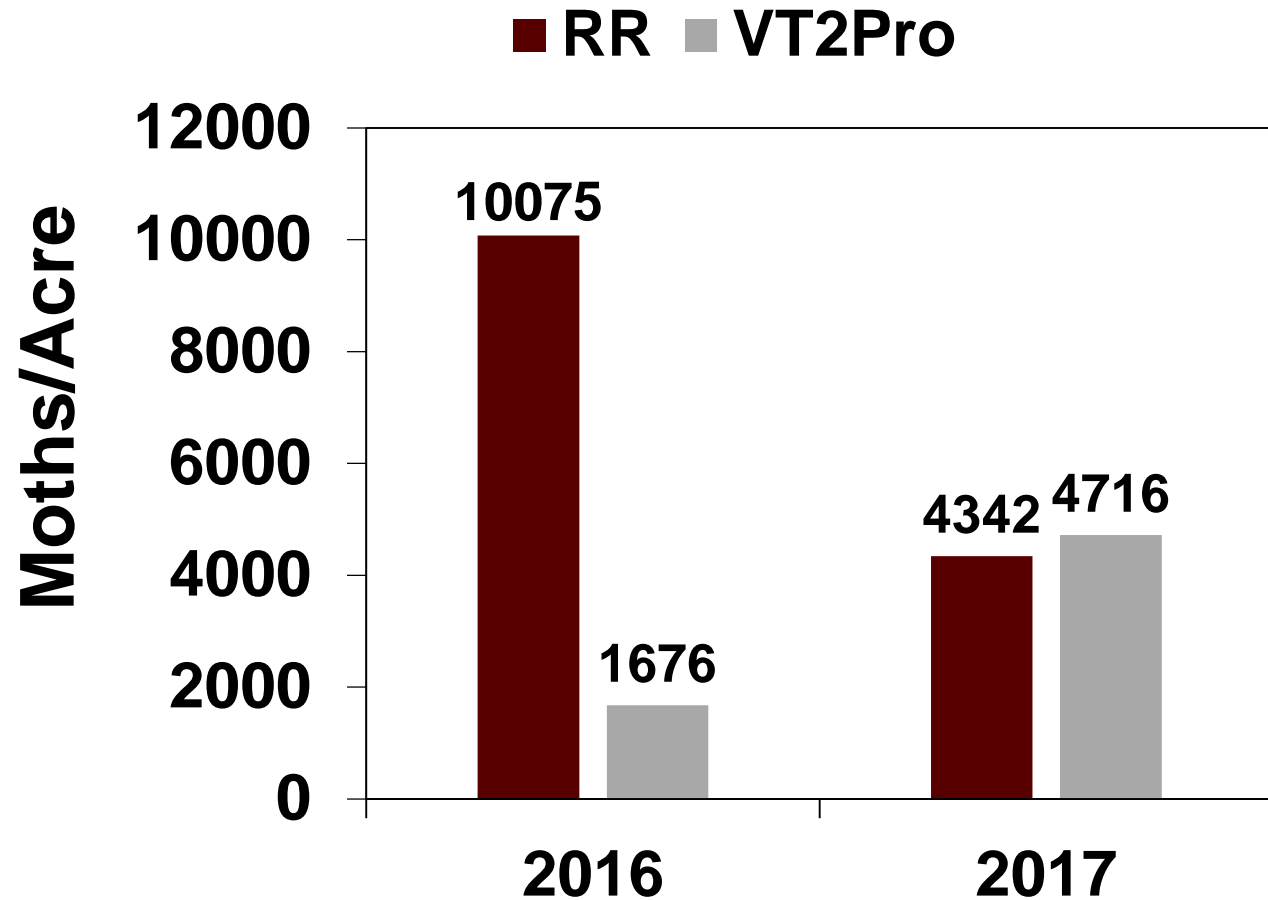


Landscape Level Contribution of *H. zea*

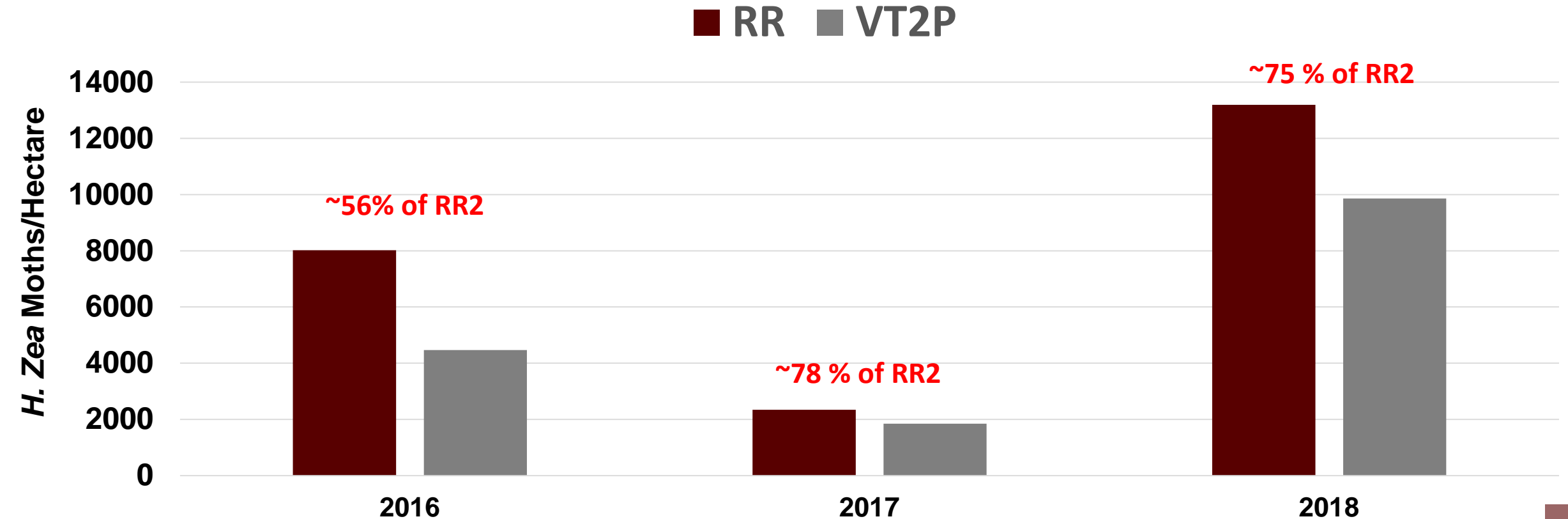




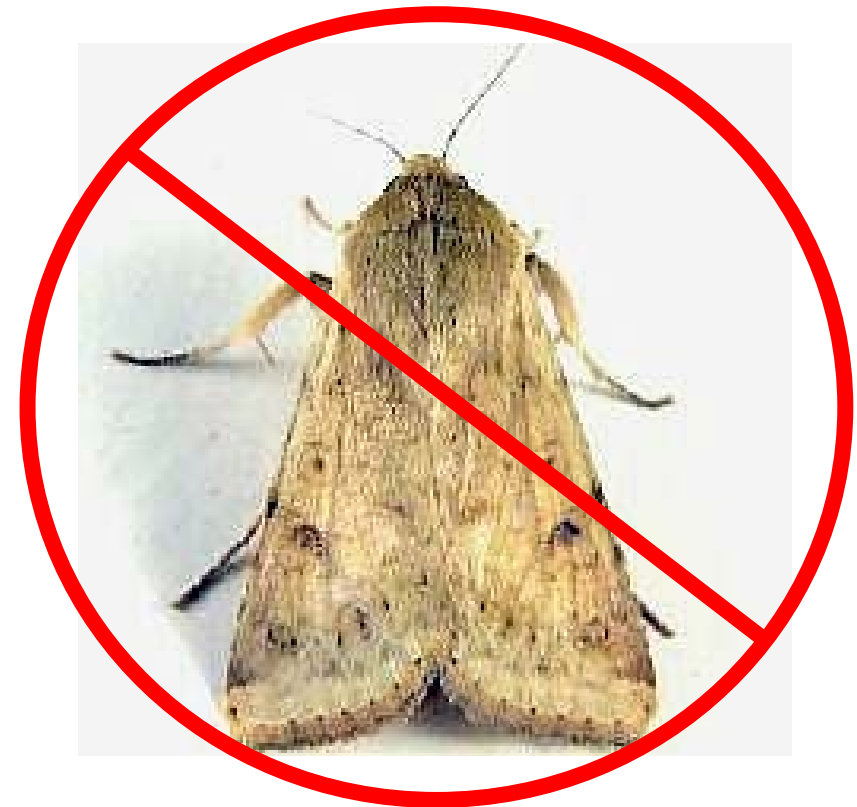
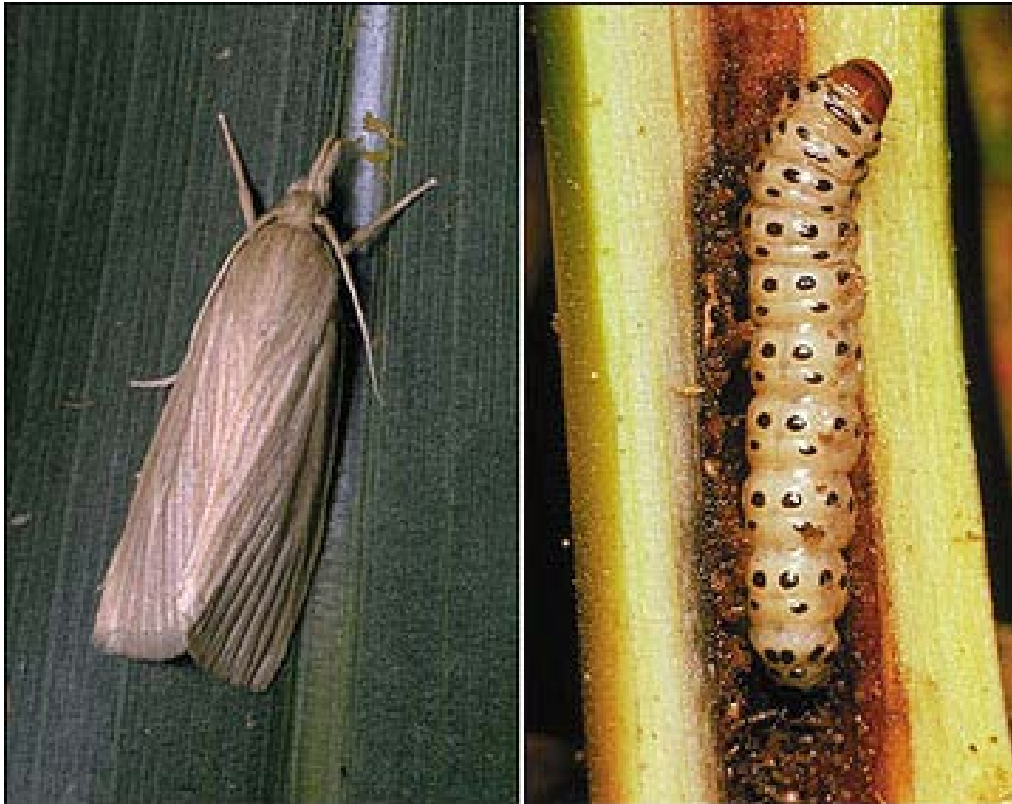
Bollworm Emergence from Bt Corn



Total Number of *H. zea* Moths by Technology (2016-2018)

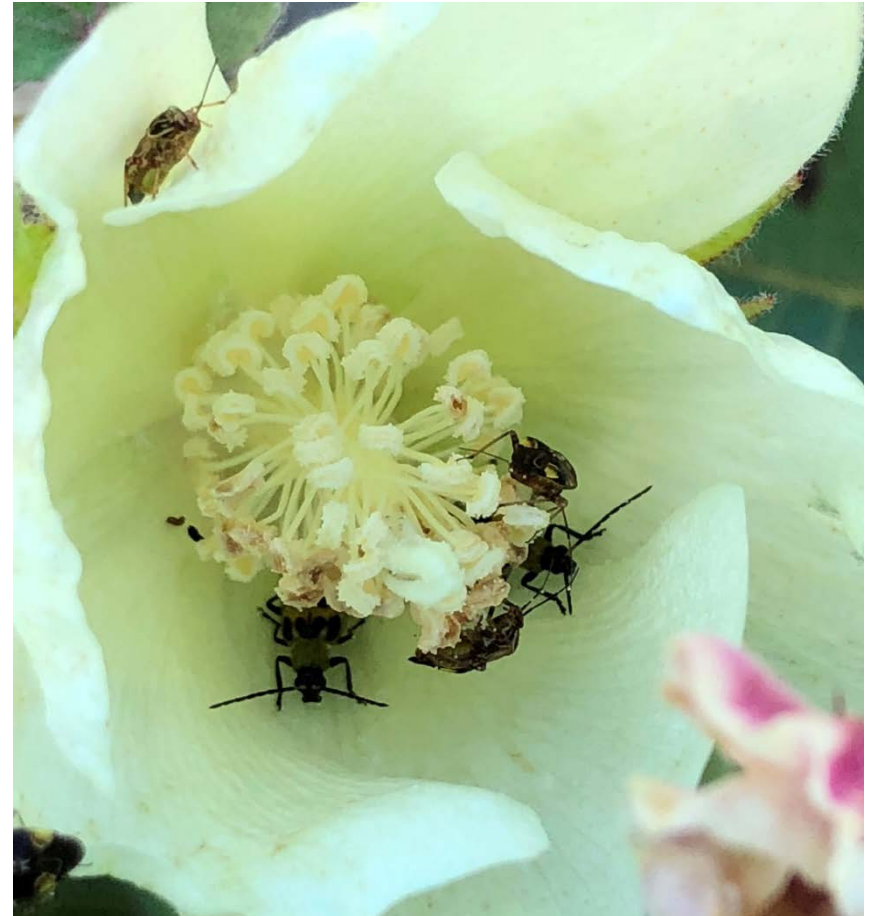


Why Do We Plant Bt Corn in the Mid-South?



Implications of Resistance in Cotton Driven by Selection in Corn in the Mid-South

- Greater economic burden on cotton farmers
- Very few foliar chemistries
- Adjustment of thresholds (reactive)
- Poor control of secondary pests in cotton (indirectly)
- Diminishing effectiveness for Cry genes in future stacks



2019 Bollworm Thresholds

THRESHOLD:

- **Non-Bt, WideStrike, TwinLink, and BG2 cotton varieties:** Before bloom: Treat when population reaches or exceeds 8 larvae/100 plants or 6% fruit injury of any kind. After bloom: Treat when you find 20 eggs/100 plants or 6% fruit injury of any kind. Regardless of size of larvae, treatment may be warranted if damaged-boll counts exceed 2 percent and significant numbers of larvae are present and continuing to cause damage

*If treating on eggs with a diamide insecticide, do not make additional diamide applications on eggs sooner than 12-14 days apart.

- **WideStrike 3, TwinLink Plus, and BG3 cotton varieties:** Before bloom: Treat when population reaches or exceeds 8 larvae/100 plants or 6% fruit injury of any kind. After Bloom: Treat when larvae 1/8-inch long or longer exceed 4 larvae/100 plants or 6% fruit injury of any kind. Regardless of size of larvae, treatment may be warranted if damaged-boll counts exceed 2 percent and significant numbers of larvae are present and continuing to cause damage

Contact Information



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