

Rynaxypyr (Coragen®) Insecticide Performance in Dark Tobacco



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Rynaxypyr (Coragen®)

Source: DuPont Coragen Technical Bulletin

- New class of insecticides: anthranilic diamides
 - Common name chloranthraniliprole
 - Same class and mode of action as Belt SC
- Mode of action: activation of insect ryanodine receptors (RyRs)
 - RyRs critical in muscle function
 - Rynaxypyr binds to RyRs, preventing muscle function, resulting in rapid cessation of feeding, paralysis, and death.
- Currently registered in many vegetable crops
 - tomato, potato, leafy vegetables, etc.
- Not harmful to non-target beneficial arthropods
 - Excellent environmental profile
 - Can be an important component of IPM and IRM programs
- Excellent rainfastness and residual activity
- Translaminar movement into leaf tissue
- Xylem mobile, can translocate from roots to untreated parts

Rynaxypyr (Coragen®)

- May have fit in tobacco insect control programs for budworm and hornworm.
- Research trials in dark tobacco conducted in Kentucky and Tennessee in 2008 and 2009.
- Federal registration for tobacco expected in Spring 2010.

Rynaxypyr (Coragen®) Tobacco Research

- Objective: Evaluate Coragen insecticide for control of *Lepidoptera* (hornworm, budworm) insects compared to registered insecticides in dark tobacco.
- Research included foliar and simulated transplant water applications
- All trials were randomized complete block design with 4 replications. Plots were 4 rows, 40 ft. long.
- Data collected: worm counts throughout season, dark tobacco yield and quality.

Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

MSU West Farm – Murray, KY - 2009

- PD 7318LC set June 10
- 4900 plants/A
- Treatment applications made only at threshold (5 hornworms or budworms per 50 plants)
- Treatments broadcast with hollow cone nozzles
- 2 applications:
 - Application 1: July 1 (15 gal/A)
 - Application 2: August 18 (30 gal/A)

Trt #	Treatment	Rate/A
1	Coragen 20SC	3.5 oz/A
2	Coragen 20SC	5 oz/A
3	<u>Local Standard:</u> Orthene 97 (app. 1) Belt (app. 2)	0.774 lb/A 3 oz/A
4	Untreated Check	0

Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

MSU West Farm – Murray, KY – 2009
Worm Counts – Hornworms and Budworms*

Treatment	<u>Count 1</u> July 16	<u>Count 2</u> July 27	<u>Count 3</u> Aug 3	<u>Count 4</u> Aug 4	<u>Count 5</u> Aug 12	<u>Count 6</u> Aug 21	<u>Count 7</u> Aug 30	<u>Count 8</u> Sept 29
Coragen (3.5 oz/A)	1 a	0.25 a	0 a	0 a	1 a	0 b	0 a	0 b
Coragen (5 oz/A)	0 a	0 a	0 a	0.25 a	1.25 a	0 b	0 a	0.33 b
<u>Loc. Stand:</u> Orthene 97 Belt	0 a	0.75 a	0.25 a	0.25 a	2.0 a	0.25 b	0 a	0 b
Untreated	1 a	1.25 a	0.75 a	0.50 a	2.75	1.5 a	0.25 a	1.0 a
LSD _{0.05}	1.05	1.26	0.92	0.65	2.5	0.55	0.40	0.58

*Treatments applied July 1 and August 18. Worm counts based on approximately 60 plants per plot.

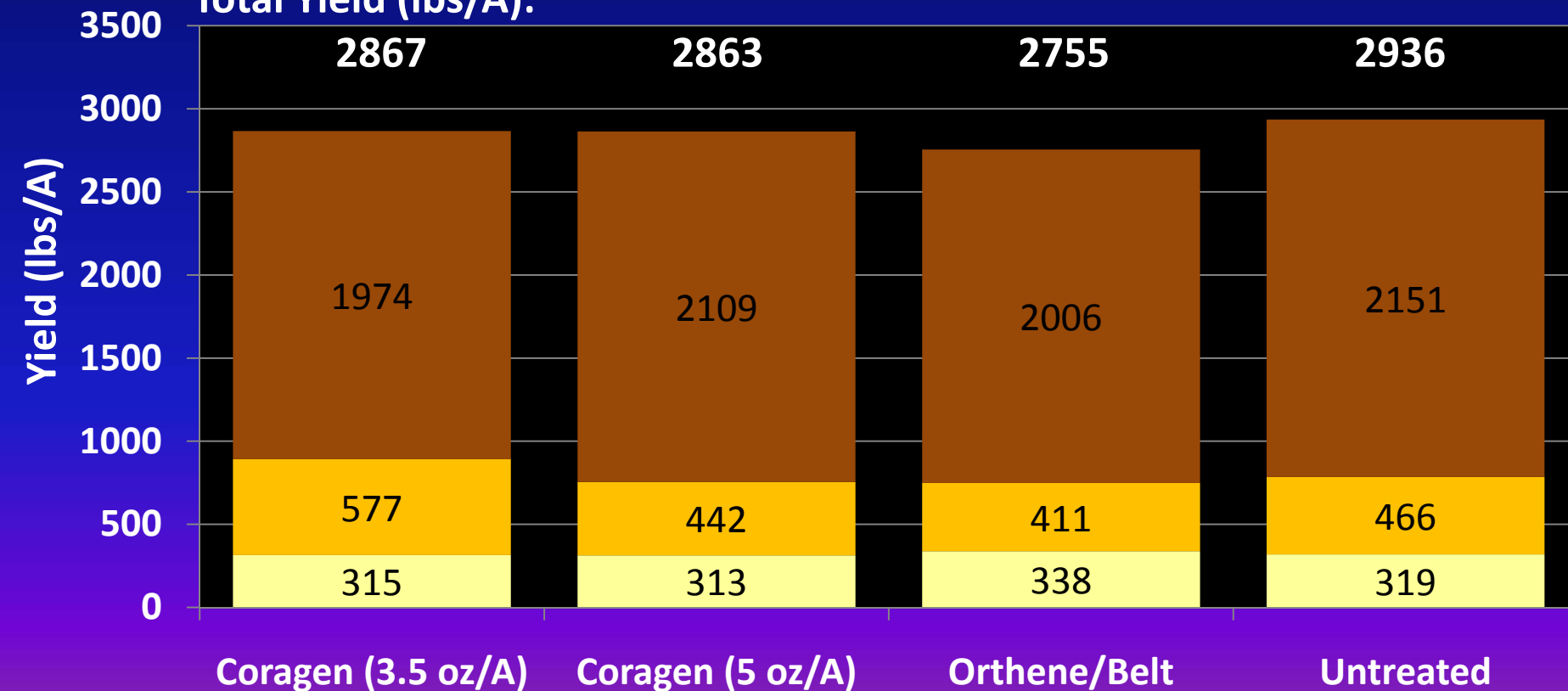
Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

MSU West Farm – Murray, KY – 2009
Dark-Fired Tobacco Yield

LSD_{0.05} = 77 138 226
 Lug Second Leaf

213 (total)

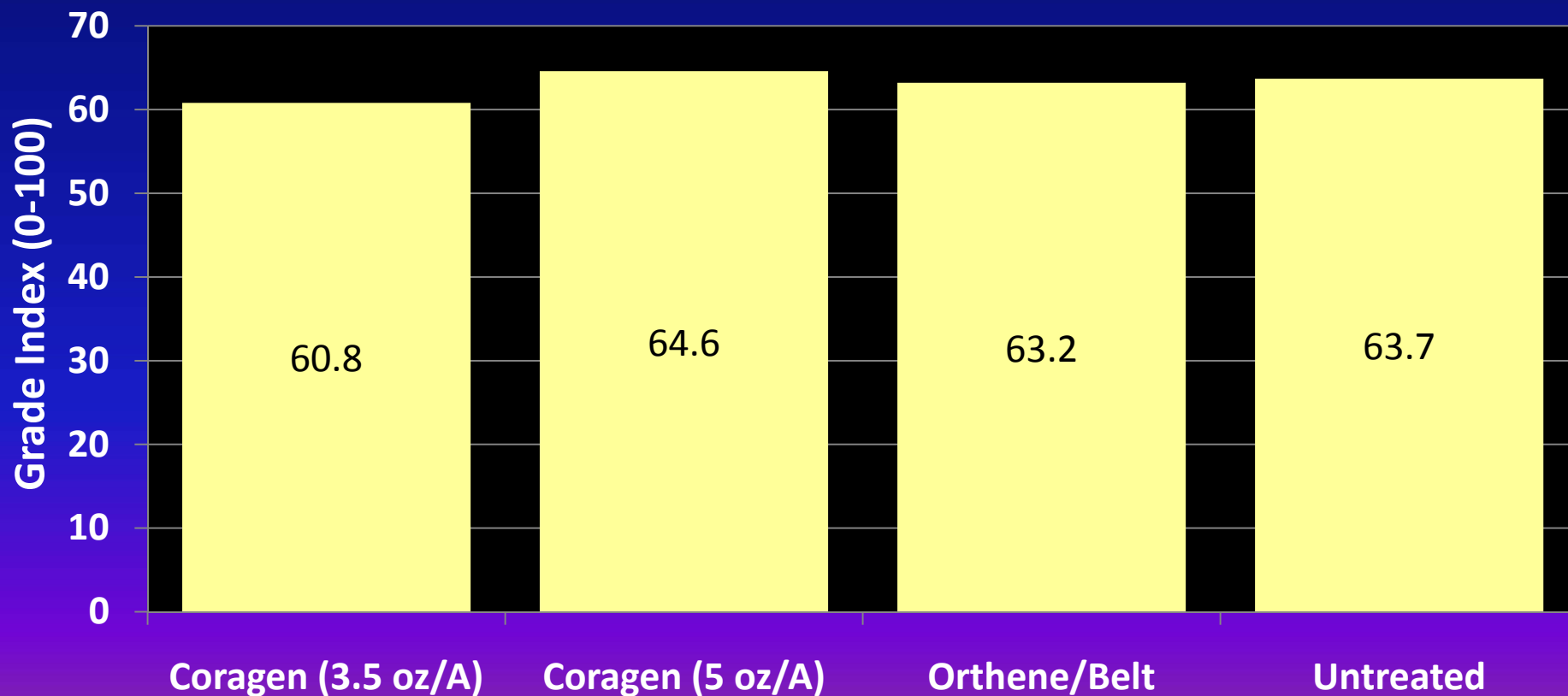
Total Yield (lbs/A):



Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

MSU West Farm – Murray, KY – 2009
Dark-Fired Tobacco Quality Grade Index

$LSD_{0.05} = 5.9$
■ Grade Index



Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

HRREC, Springfield, TN - 2009

- NL Madole set mid-June
- 4614 plants/A
- Treatments applied only when worm (hornworm/budworm) threshold was reached.
- Treatments applied broadcast using hollow cone nozzles.
- 1 application: August 18
- 17 gal/A

Trt #	Treatment	Rate/A
1	Coragen 20SC	3.5 oz/A
2	Coragen 20SC	5 oz/A
3	Exp. DPX-HGW86	13.5 oz/A
4	Exp. DPX-HGW86	27.0 oz/A
5	<u>Local Standard:</u> Orthene 97	0.774 lb/A
6	Untreated Check	0

*Exp. = experimental

Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

HRREC, Springfield, TN – 2009
Hornworms Counts*

Trt #	Treatment	Count 1 Pre-Spray August 18	Count 2 1 WAT August 24	Count 3 2 WAT September 4
1	Coragen 20SC (3.5 oz/A)	6.75 a	0 b	0 b
2	Coragen 20SC (5 oz/A)	5.75 a	0.25 b	0 b
3	Exp. DPX-HGW86 (13.5 oz/A)	5.5 a	0.50 b	0 b
4	Exp. DPX-HGW86 (27.0 oz/A)	8.25 a	0.25 b	0 b
5	Orthene 97 (0.774 lb/A)	6.25 a	0 b	0 b
6	Untreated Check	3.75 a	5.5 a	2.75 a
	LSD _{0.05}	5.1	1.39	1.16

*Hornworm counts based on approximately 60 plants per plot.

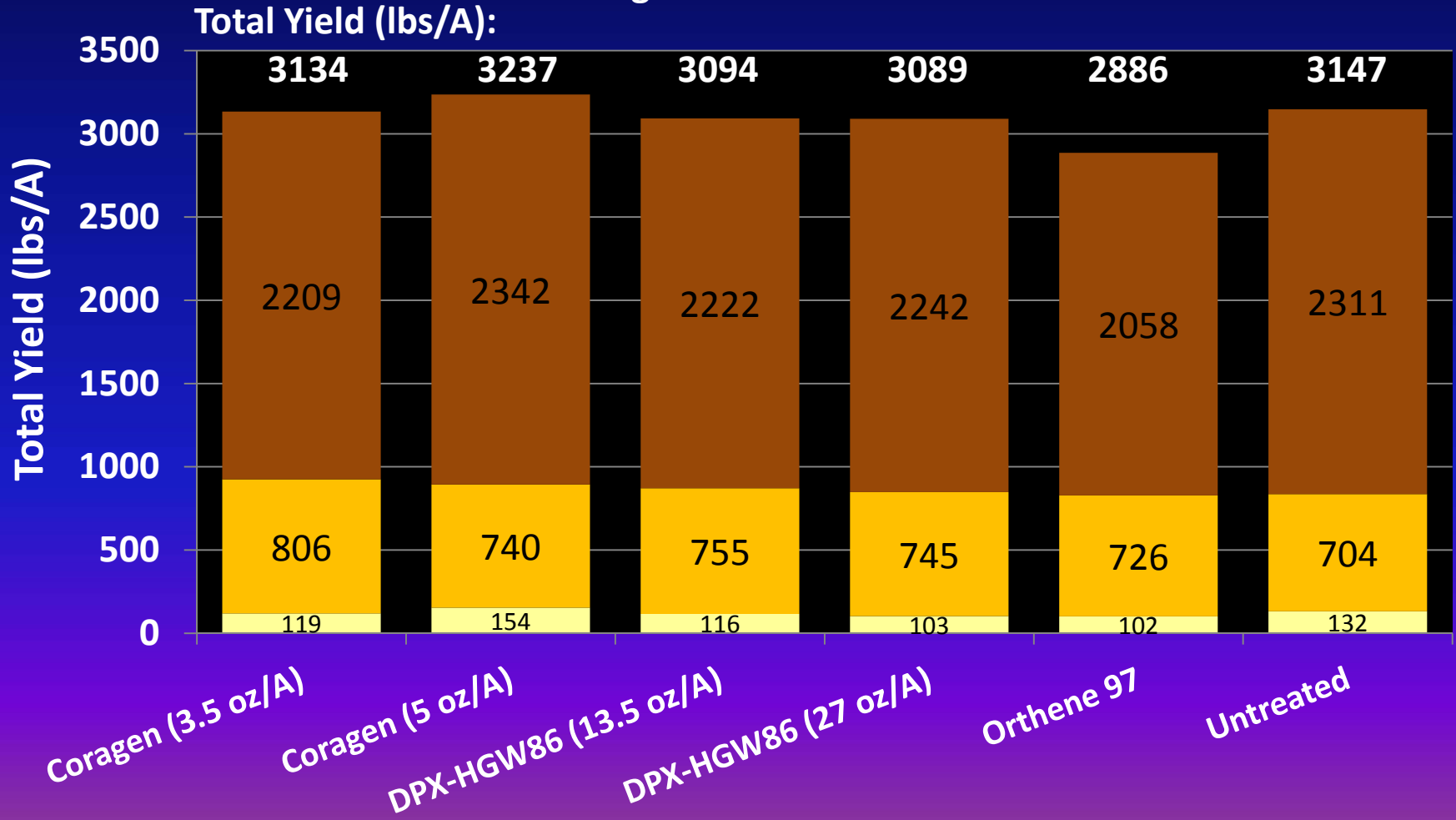
Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

HRREC, Springfield, TN – 2009

Dark-Fired Tobacco Yield

LSD_{0.05} = 80 138 484
 Lug Second Leaf

528 (total)



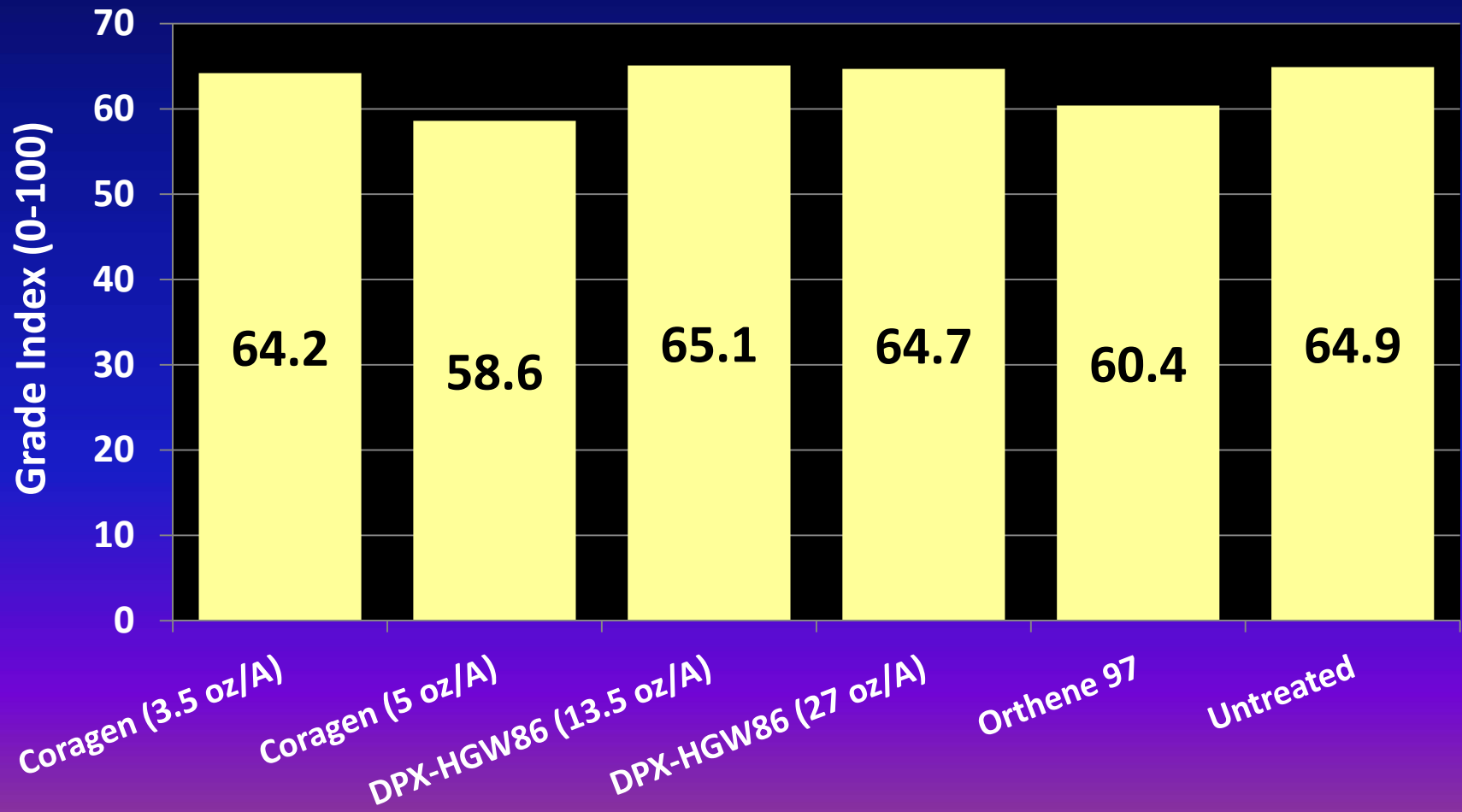
Evaluation of Coragen Insecticide for Worm Control in Dark Tobacco

HRREC, Springfield, TN – 2009

Dark-Fired Tobacco Quality Grade Index

$LSD_{0.05} = 5.2$

■ Grade Index



Evaluation of High-Volume Foliar Applications of Coragen Insecticide

HRREC, Springfield, TN - 2009

- NL Madole set mid-June
- 4614 plants/A
- 1 application made August 13 at 17 or 57.4 gal/A.
- Objective of trial: determine if high volume foliar sprays will deposit enough Coragen to soil to allow root uptake and extended worm control in the plant compared to standard lower volume applications.

Trt #	Treatment	Rate/A	Spray Volume (gal/A)
1	Coragen 20SC	3.5 oz/A	57.4
2	Coragen 20SC	5 oz/A	57.4
3	Coragen 20SC	3.5 oz/A	17
4	Coragen 20SC	5 oz/A	17
5	Belt SC	3 oz/A	17
6	Untreated	0	0

Evaluation of High-Volume Foliar Applications of Coragen Insecticide

HRREC, Springfield, TN – 2009

Hornworm Counts*

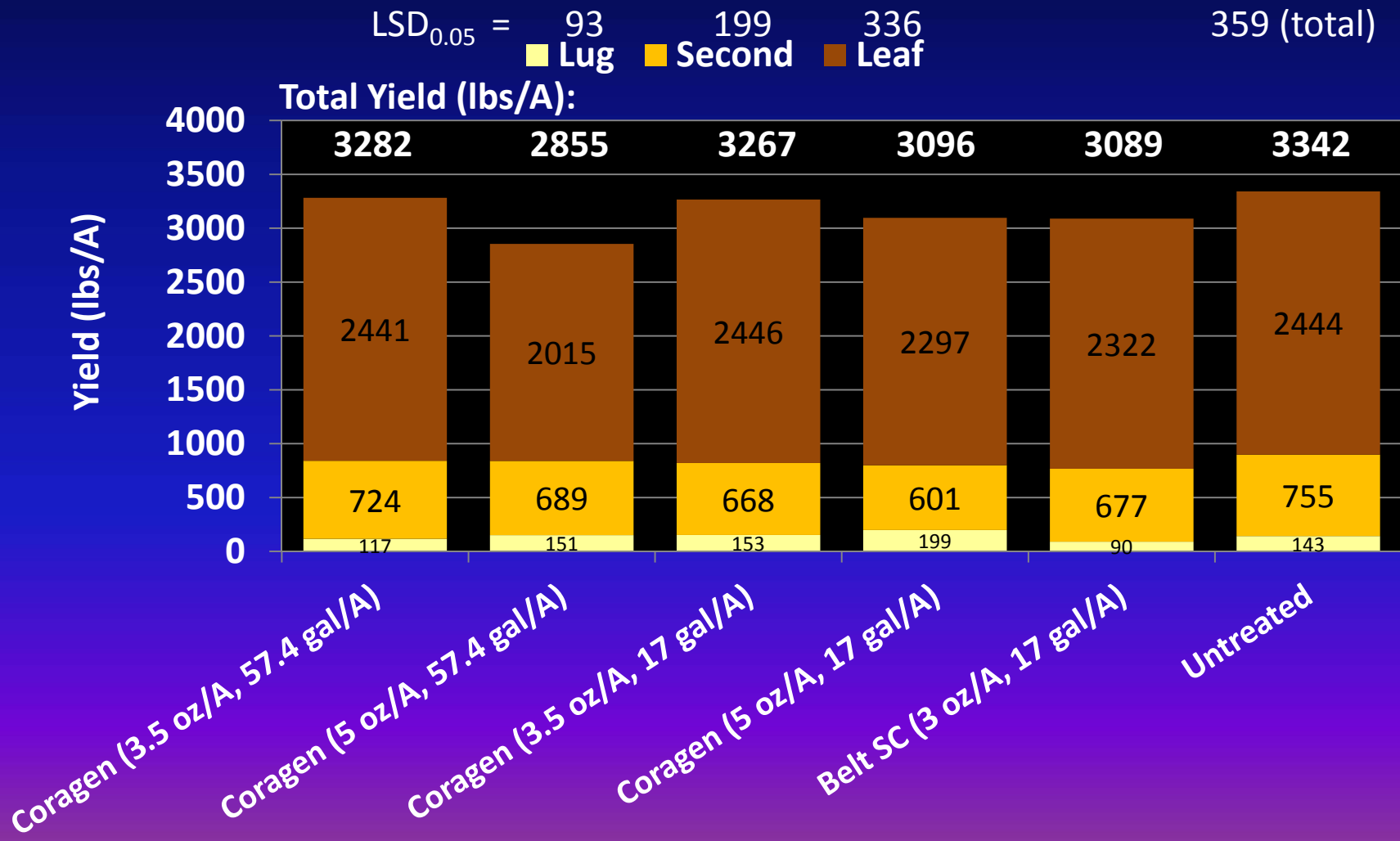
Trt #	Treatment	Rate	Spray Vol (gal/A)	Count 1 Pre-App Aug 13	Count 2 1.5 WAT Aug 24	Count 3 3 WAT Sept 4	Count 4 5 WAT Sept 22
1	Coragen 20SC	3.5 oz/A	57.4	3.0 a	0 b	0 b	0 a
2	Coragen 20SC	5 oz/A	57.4	1.75 a	0 b	0 b	0 a
3	Coragen 20SC	3.5 oz/A	17	2.5 a	0.75 b	0 b	0 a
4	Coragen 20SC	5 oz/A	17	3.5 a	0.25 b	0 b	0 a
5	Belt SC	3 oz/A	17	1.75 a	0 b	0 b	0.25 a
6	Untreated	0	0	2.25 a	7.5 a	3.5 a	0 a
	LSD _{0.05}			2.58	0.78	1.18	0.31

*Hornworm counts per plot are based on approximately 60 plants per plot.

Evaluation of High-Volume Foliar Applications of Coragen Insecticide

HRREC, Springfield, TN – 2009

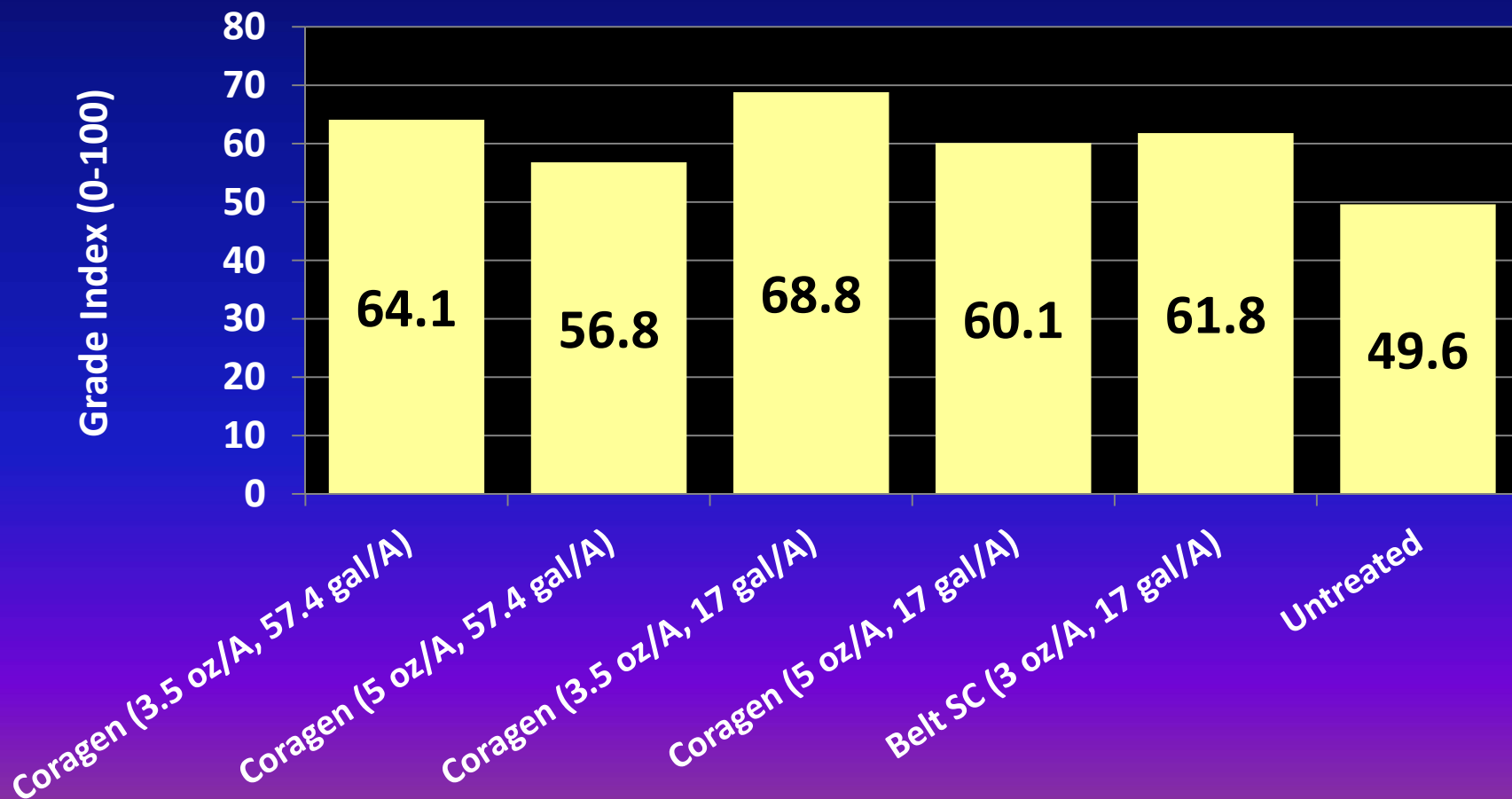
Dark-Fired Tobacco Yield



Evaluation of High-Volume Foliar Applications of Coragen Insecticide

HRREC, Springfield, TN – 2009
Dark-Fired Quality Grade Index

$LSD_{0.05} = 14.9$
■ Grade Index



DuPont Coragen Transplant Water Trial

HRREC, Springfield, TN - 2009

- NL Madole set June 1
- 4614 plants/A
- Plant drench applications used to simulate transplant water
 - Based on 200 gal/A setter water volume.
 - 5.55 oz insecticide solution applied to soil around base of each plant in treated plots immediately after setting on June 1.
 - Untreated check received 5.55 oz water per plant.

Trt #	Treatment	Rate/A
1	Coragen 20SC	5 oz/A
2	Coragen 20SC	7 oz/A
3	Exp. DPX-HGW86	10.3 oz/A
4	Admire Pro	3 oz/A
5	Untreated (water only)	0

*Exp = Experimental

Objective: Determine plant response and residual insect control from Coragen insecticide in simulated transplant water applications compared to standard Admire Pro treatment.

DuPont Coragen Transplant Water Trial

HRREC, Springfield, TN – 2009

Insect Counts per plot*

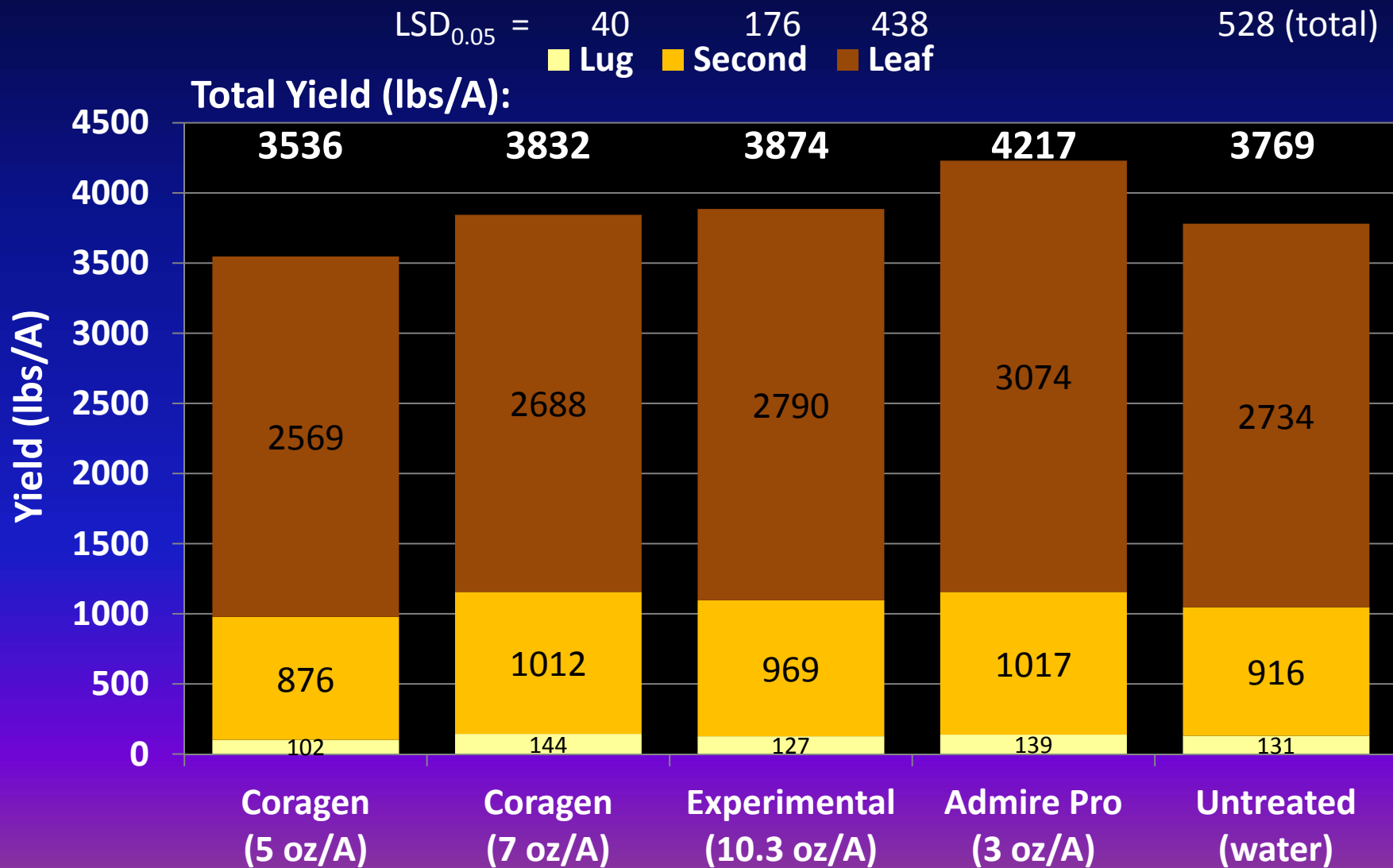
Trt #	Treatment	Hornworm July 7 (5.5 wks)	Budworm July 15 (6.5 wks)	Budworm July 24 (8 wks)	Aphid Colonies July 30 (9 wks)	Hornworm Aug 11 (11 wks)	Plants w/ Aphids Aug 11 (11 wks)	Hornworm Aug 18 (12 wks)
1	Coragen 20SC (5 oz/A)	0 a	0.25 a	0.25 a	2 a	0 a	4.25 ab	1.5 ab
2	Coragen 20SC (7 oz/A)	0 a	0.25 a	0 a	0.5 a	0 a	5.25 a	0.25 b
3	Exp DPXHGW86 (10.3 oz/A)	0.25 a	0 a	0 a	1.5 a	0.25 a	6 a	1 ab
4	Admire Pro (3 oz/A)	0.5 a	0.25 a	0 a	0 a	0 a	0.5 b	1.75 a
5	Untreated (water only)	0 a	1.25 a	0.25 a	1 a	0.25 a	3.5 ab	1.5 ab
	LSD _{0.05}	0.56	1.53	0.51	2.05	0.51	3.85	1.28

*Counts based on 30 plants per plot.

DuPont Coragen Transplant Water Trial

HRREC, Springfield, TN – 2009

Dark-Fired Tobacco Yield

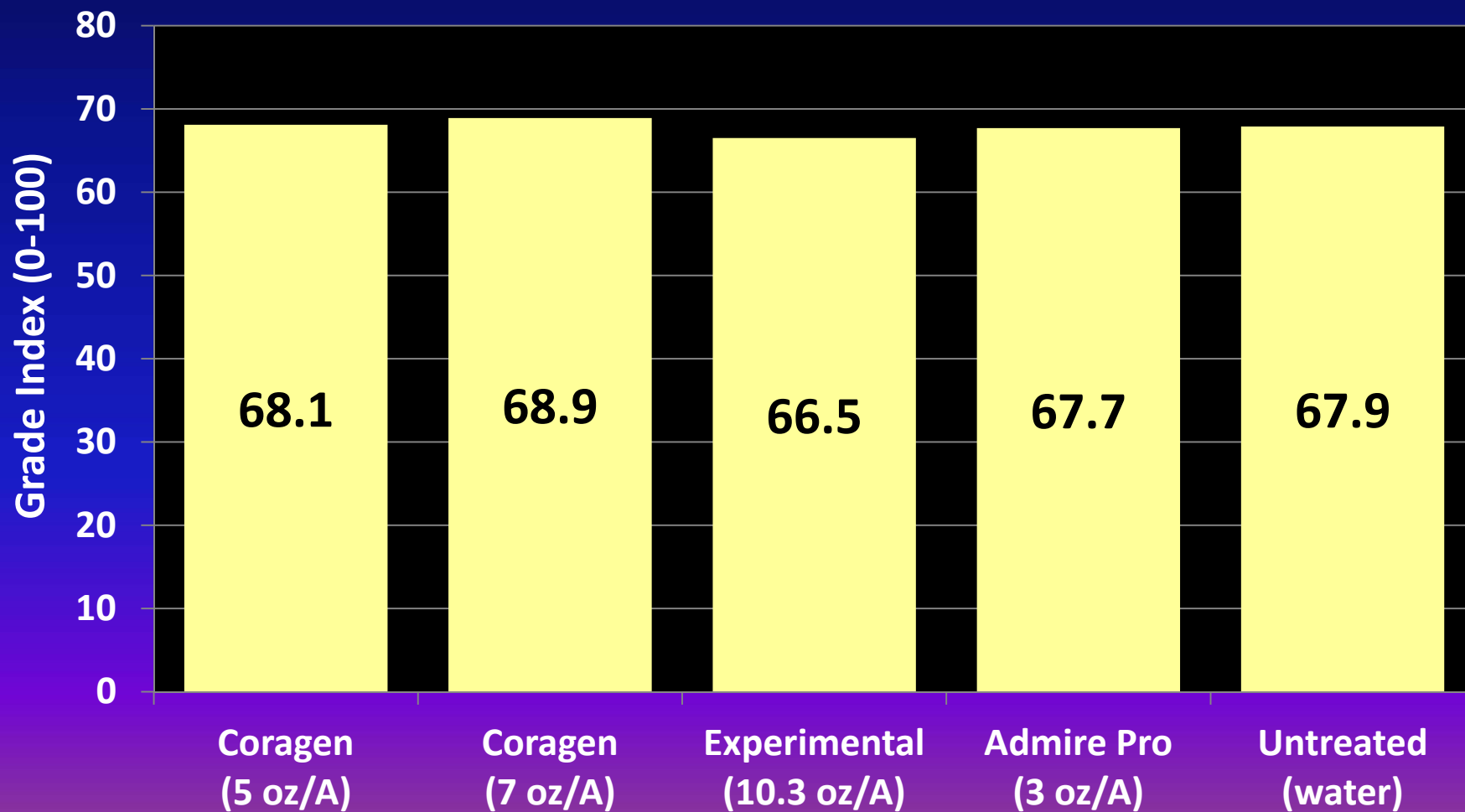


DuPont Coragen Transplant Water Trial

HRREC, Springfield, TN – 2009

Dark-Fired Tobacco Quality Grade Index

$LSD_{0.05} = 6.0$
■ Grade Index



Rynaxypyr (Coragen®) Research Summary

- Excellent crop safety from Coragen in all trials.
- Coragen was at least comparable to Orthene 97 and Belt SC for control of hornworms and budworms.
- No effect was observed for higher spray volume on worm control.
- Low worm pressure made it difficult to fully evaluate residual worm control from simulated transplant water applications.
- Coragen not as effective as Admire Pro on aphids.
- Very few yield effects of treatment due to low worm pressure.
- Higher tobacco quality in treated tobacco compared to untreated tobacco in some trials.

Acknowledgements

DuPont Crop Protection