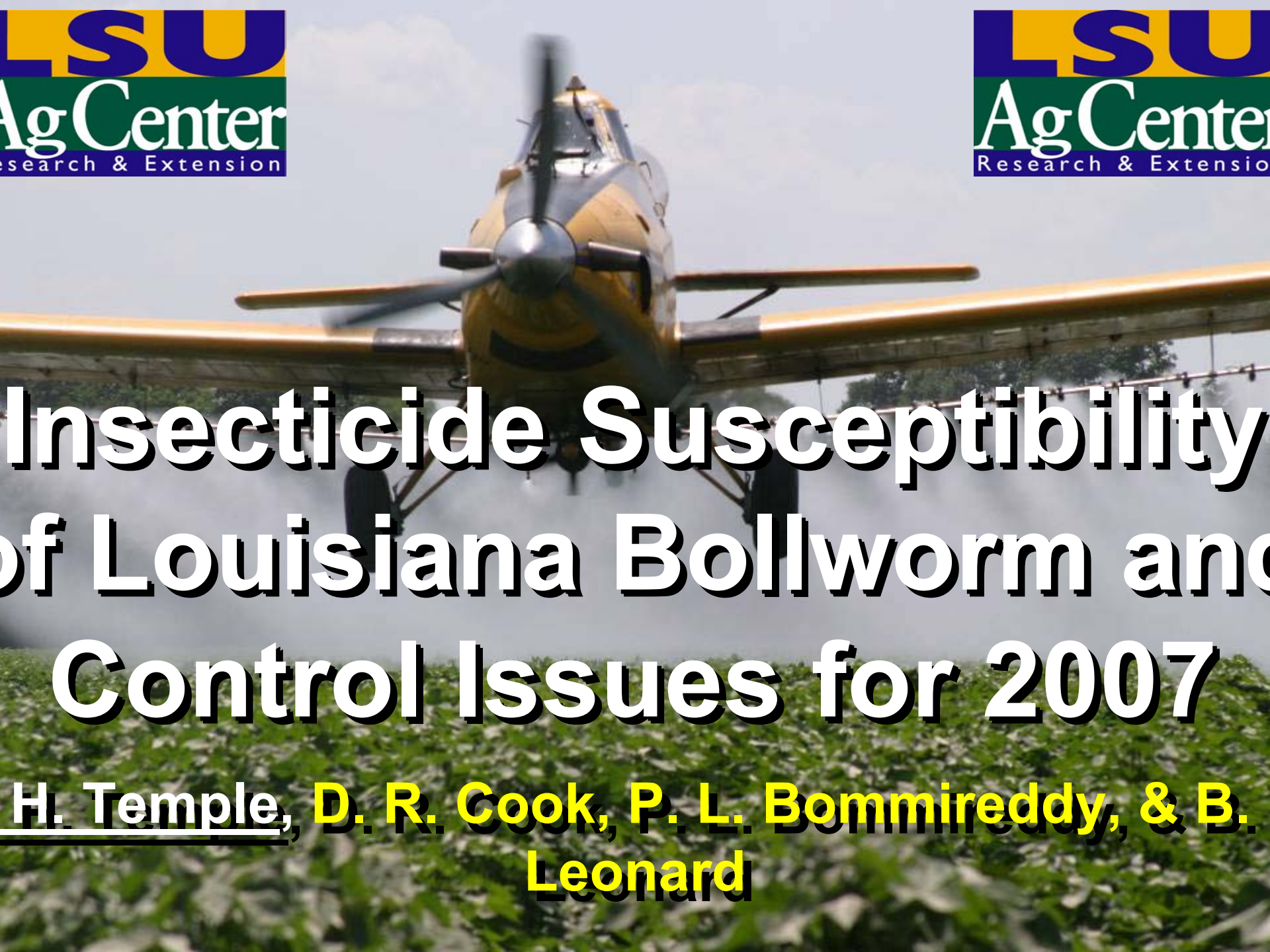


Insecticide Susceptibility of Louisiana Bollworm and Control Issues for 2007

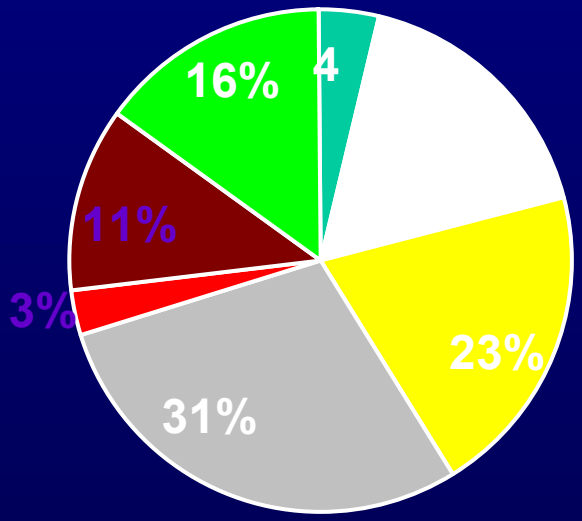
H. Temple, D. R. Cook, P. L. Bommireddy, & B. Leonard

2006 Louisiana Crop Situation

300K

870K

90K



- Wheat
- Rice
- Cotton
- Soybeans
- Sorghum
- Corn
- Sugarcane

630K

350K

115K

435K

According to 2006 NASS Planted Acres

David Y. Lanclos, Ph.D.

Louisiana State University AgCenter

Crop	Maximum Seasonal Total for Either Product Used Alone (pounds active ingredient/acre)		Maximum Seasonal Total When Applying Both Products to the Same Crop (pounds active ingredient/acre)
	beta-cyfluthrin*	cyfluthrin**	beta-cyfluthrin* Plus cyfluthrin**
Alfalfa	0.1	0.2	0.2
Corn (field, pop, seed)	0.0875	0.175	0.175
Cotton	0.25	0.5	0.5
Grasses	0.06	0.12	0.12
Peanut	0.0655	0.131	0.131
Sorghum	0.0655	0.131	0.131
Soybean	0.0875	0.175	0.175
Sugarcane	0.1315	0.263	0.263
Sunflower	0.0655	0.131	0.131
Wheat	0.038	0.076	0.076
Tobacco	0.0022	0.0044	0.0044
Brassica (Cole) Leafy Vegetables, CG 5	0.1	0.2	0.2
Cucurbits, CG 9	0.0875	0.175	0.175
Fruiting vegetables, CG 8	0.1315	0.263	0.263
Leafy vegetables, CG 4	0.1	0.2	0.2
Dried Shelled Legume Vegetables, CSG 6C	0.05	0.1	0.1
Pea, Southern	0.0825	0.165	0.165
Potato, and other tuberous and corm vegetables, CSG 1C	0.1315	0.263	0.263
Root vegetables (except sugarbeet), CSG 1B	0.11	0.22	0.22
Sweet corn	0.22	0.44	0.44
Citrus, CG 10	0.05	0.1	0.1
Grape	0.1	0.2	0.2
Hop	0.125	0.25	0.25
Pome fruit, CG 11	0.022	0.044	0.044
Stone fruit, CG 12	0.044	0.088	0.088
Tree nut crops, CG 14	0.022	0.044	0.044

Baythroid XL Label

Pyrethroid Failures Against Bollworms

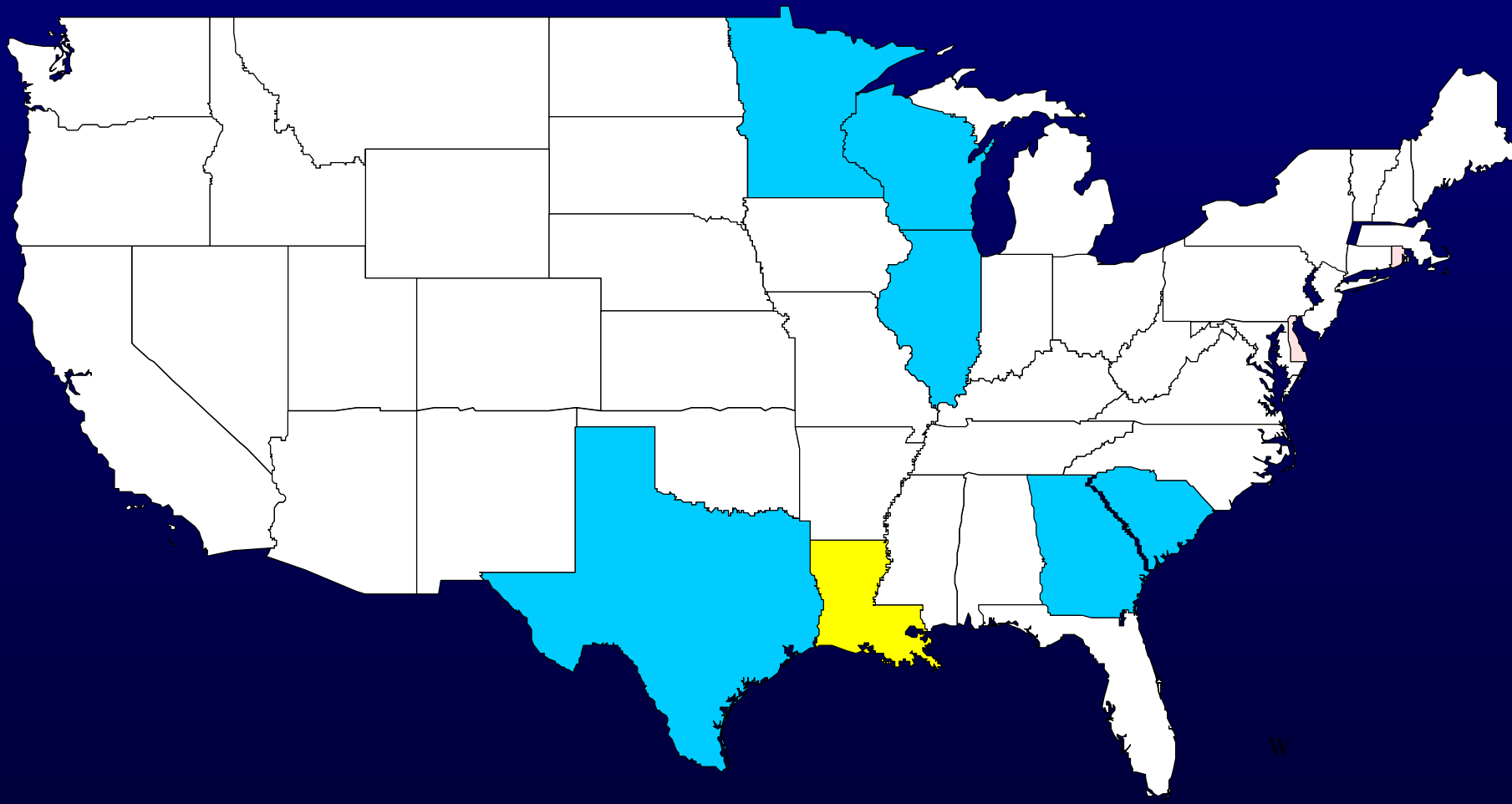
South Carolina (1996) Control failures in Estill fields treated
-6 times, cyhalothrin, deltamethrin, and cypermethrin.

Texas (2004) Control failures in Corpus Christi fields, contr
achieved using alternate chemistries.

Midwest (MN, IL, WI, IN, 2005) % Control of bollworm in swe
corn averaged 19-37% in university insecticide trials.

Georgia (2005) Unsatisfactory control reported, pyrethroids
applied as much as 5 times on bollworm populations.

Bollworm Control Issues



Trends in Midwest: Pyrethroid Efficacy in CEW Declines: %

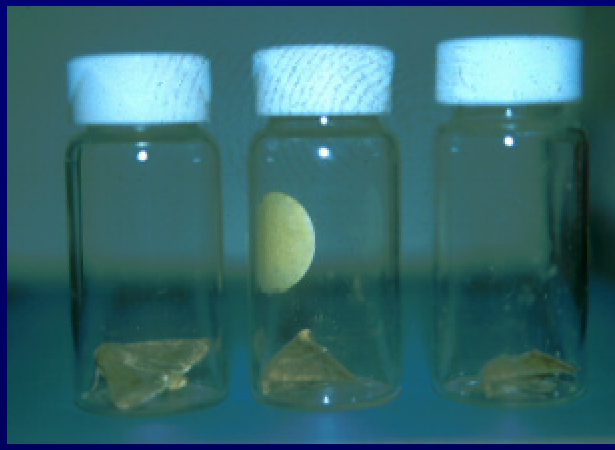
Larval Control in Sweet Corn (Capture/Warrior; WI, MN)

Year	Mean
1997	93
1998	88
1999	81
2000	49
2001	17
2002	41
2003	40
2004	69
2005	40
2006	61

Discussion Topic

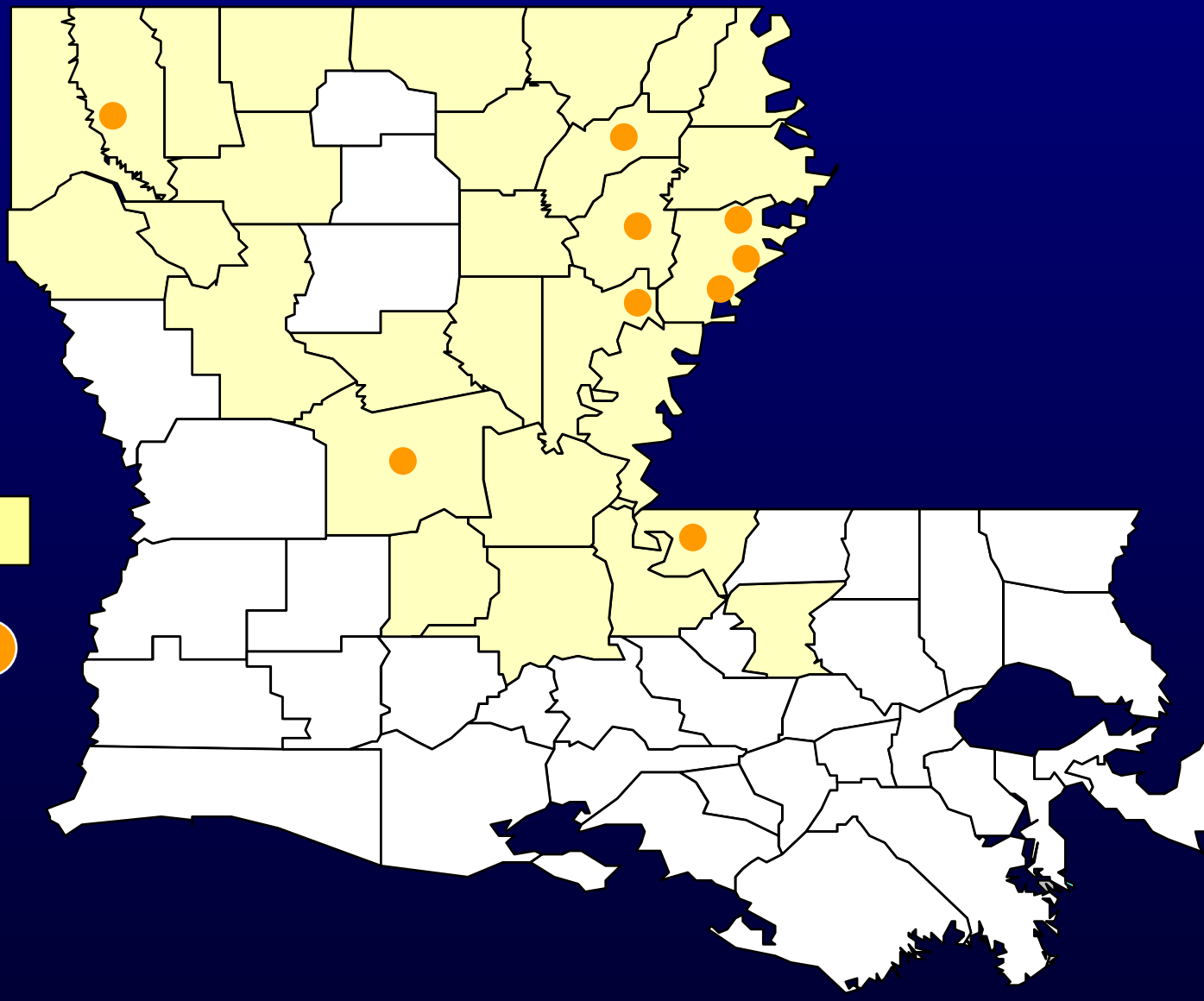
Susceptibility of field collections of bollworm from Louisiana to cypermethrin using AVT and topical bioassay procedures.

Adult Vial Test



5 & 10 µg/vial Cypermethrin

Collection Sites Across LA



otton Acreage

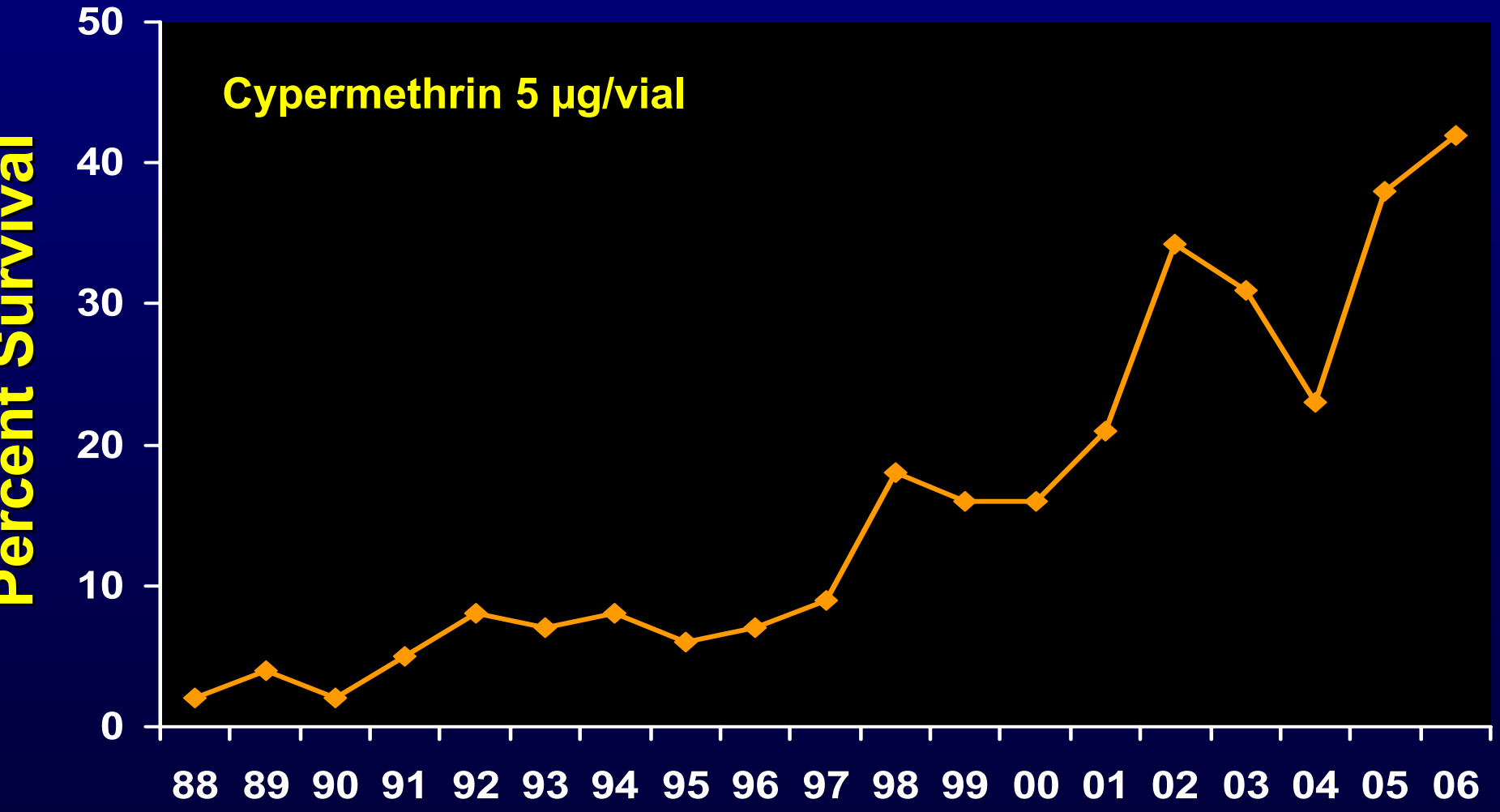
ampling Sites

Bollworm Moth Movement

David Y. Lanclos, Ph.D.

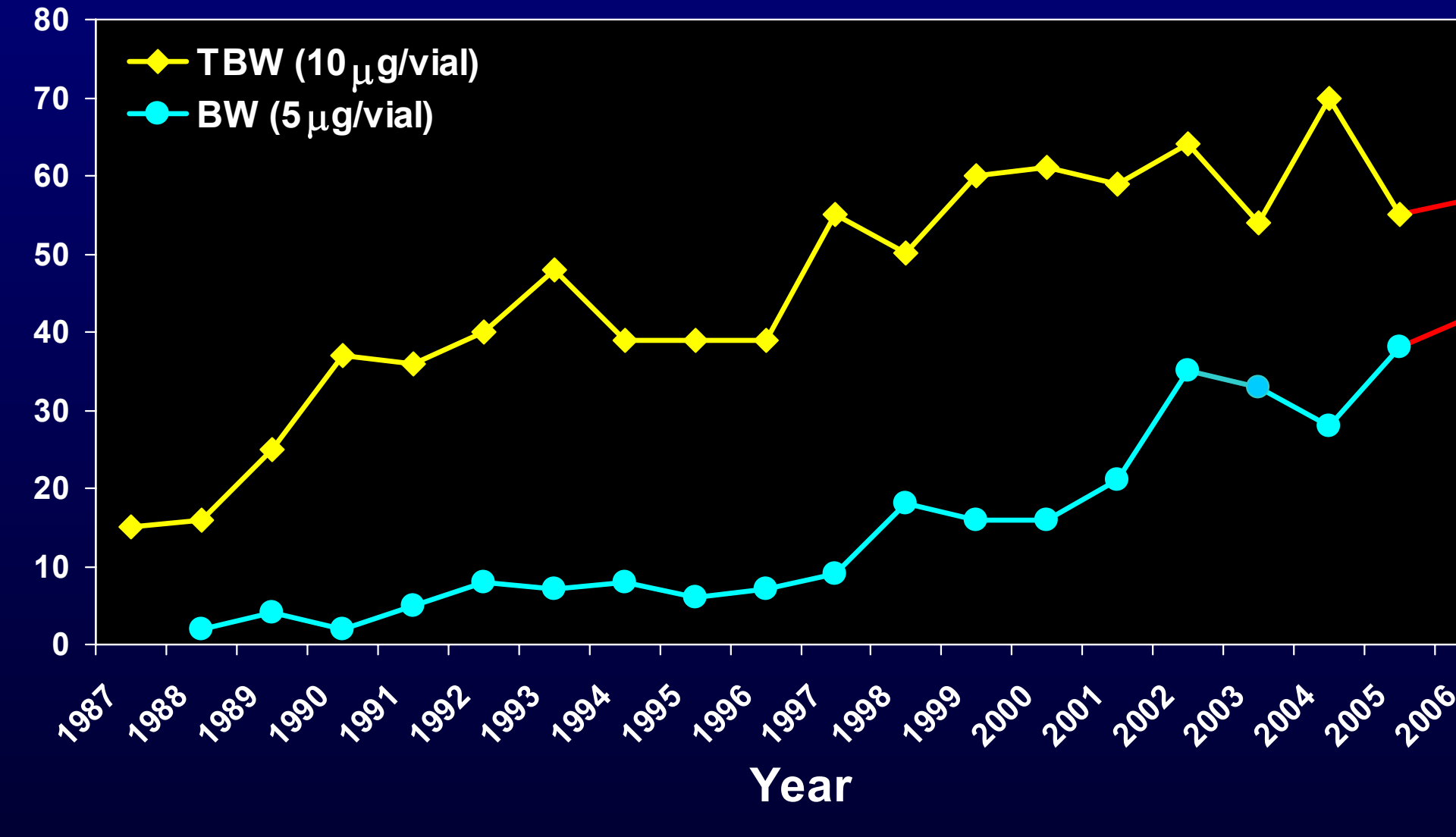
Louisiana State University AgCenter

Resistance Monitoring Survey
Cypermethrin (May-Sep Mean Survival)

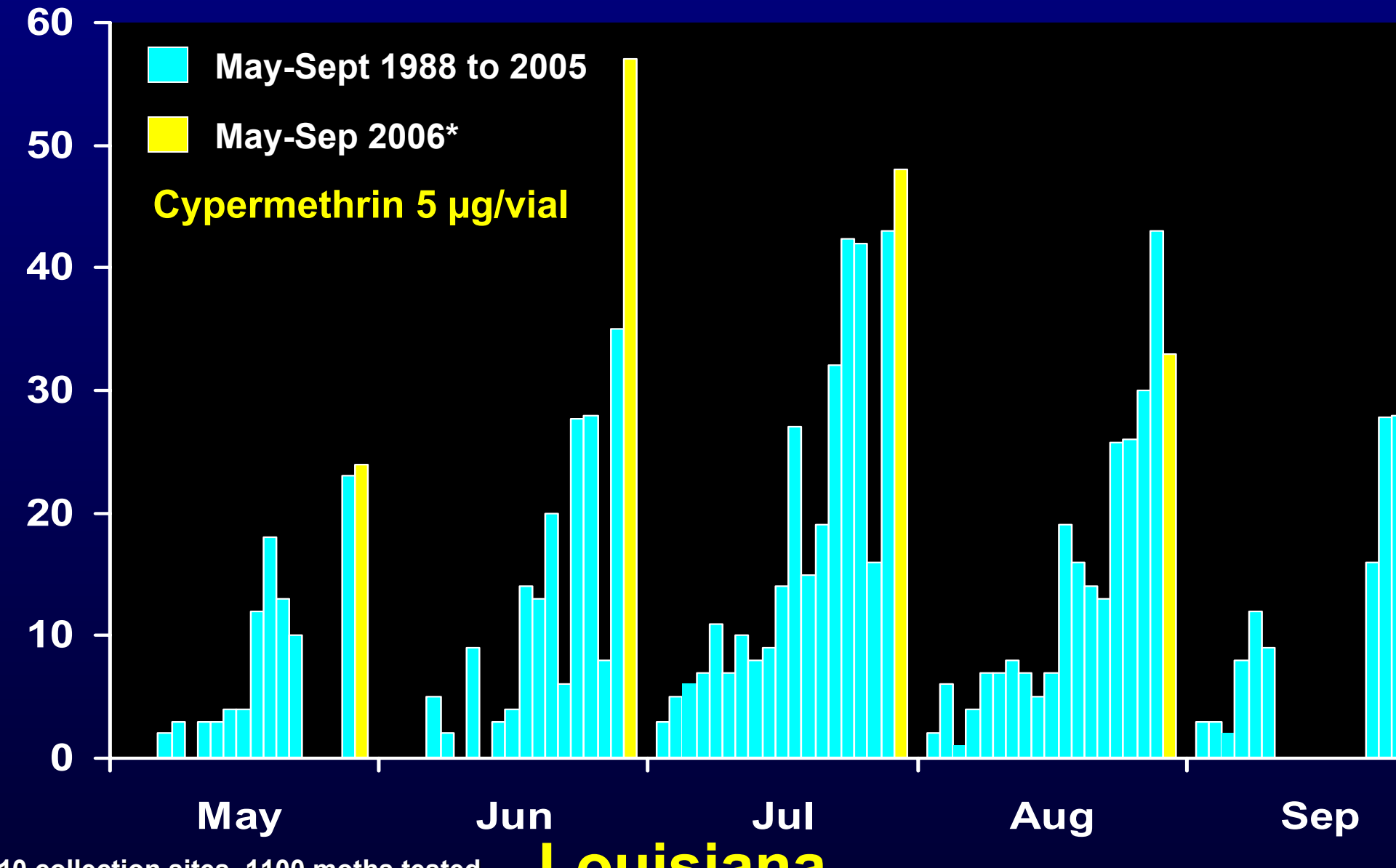


Resistance Monitoring Survey

Cypermethrin (May-Sep Mean Survival)



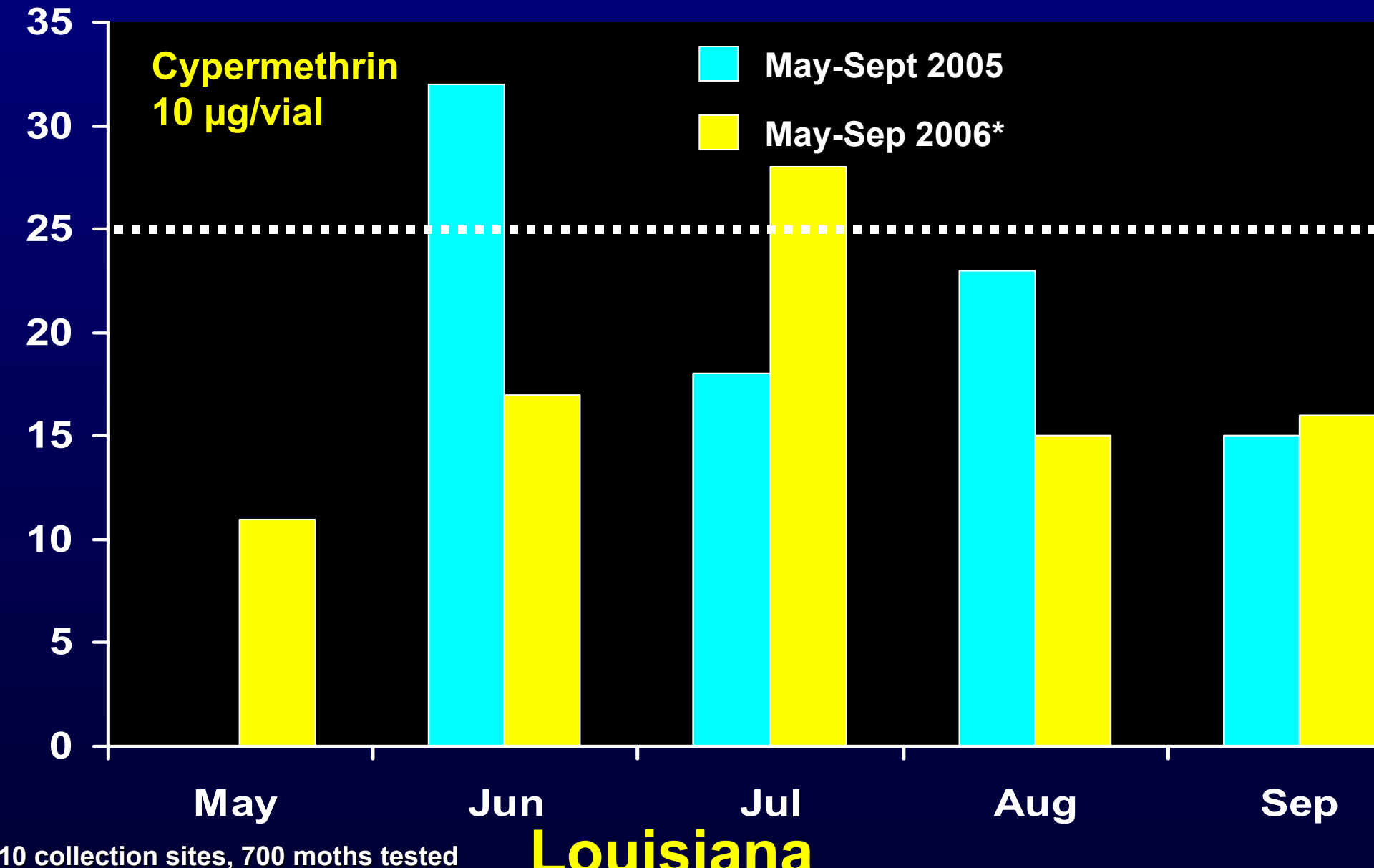
Historical Bollworm Survival (AVT)



10 collection sites, 1100 moths tested

Louisiana

Historical Bollworm Survival (AVT)

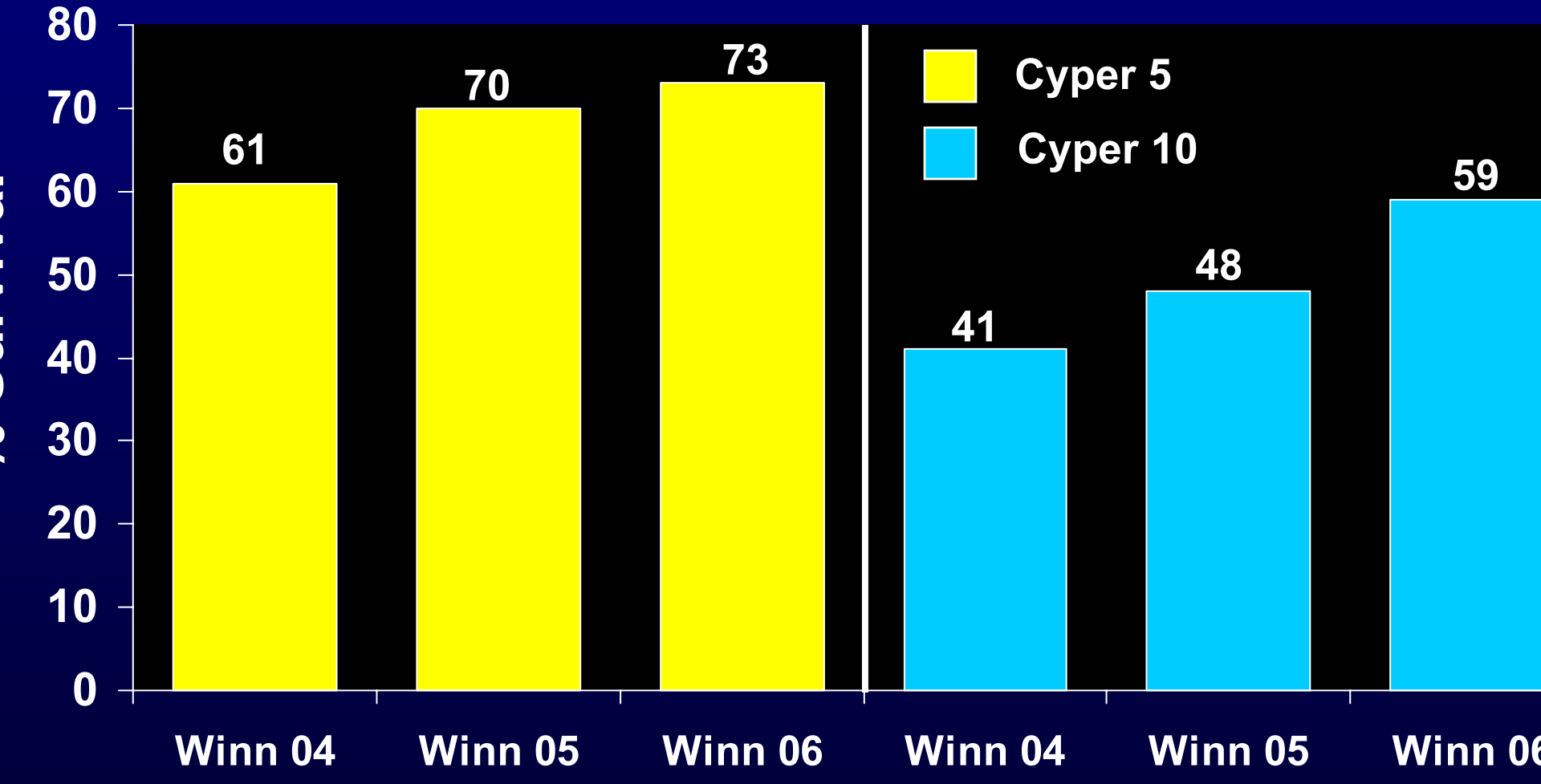


10 collection sites, 700 moths tested

Louisiana

Field Collection

Response of Late Season Field Colonies to Cypermethrin (5 & 10 µg/vial)



Bollworm $LC_{50's}$ to Cypermethrin

lony	n	LC_{50}	95%CL	Slope	X^2	R
Susceptible 88[1]	1081	0.05	0.01-0.09	0.84±0.23	0.41	
Susceptible 03[1]	308	0.28	0.21-0.83	n/a	1.40	
LSU LAB 06	300	0.41	0.11-0.87	1.03±0.14	13.28	
Winnsboro 04	60	9.80	6.90-16.38	2.71±0.86	2.07	35-
Winnsboro 05	104	8.20	6.12-11.80	2.15±0.46	3.39	29-
Winnsboro 06	190	9.76	6.79-14.90	1.83±0.27	5.82	35-
orgia 05	170	11.20	9.18-14.88	2.73±0.47	2.37	40-

Resistance Ratio (RR) calculated from LC_{50} data (0.05 – 0.283 µg/vial) derived from TX 1988(Sno
2003(Hockley).

Heliothine Species Occurrence

Macon Ridge, 2003-06

Collection Dates

Adult trap captur

TOPICAL APPLICATION

Bollworm LD_{50}'s to Cypermethrin in LA

Colony	Host	N	LD_{50}[1]	95% CL	Slope	X2	
Joseph-04	Corn	150	1.28	0.6-2.08	1.15±0.22	4.93	
nsboro-04	Cotton	159	6.12	4.92-7.76	2.92±0.37	4.65	7
sier-04	Cotton	164	3.24	2.44-4.16	2.19±0.30	4.34	3
Francisville-05	Clover	248	2.20	1.4-3.08	1.56±0.19	7.68	
ly Island-05	Clover	313	2.04	1.4-2.68	1.404±0.16	3.22	
Joseph-05	Corn	184	2.04	1.48-2.68	1.96±0.27	2.81	
rgia-05	Cotton	247	3.64	2.96-4.44	2.29±0.25	5.45	4
nsboro-05	Cotton	115	3.48	2.36-4.8	1.99±0.33	3.82	4
Joseph-06	Corn	120	2.84	2.24-3.60	2.93±0.53	1.35	3
nsboro-06	Cotton	220	3.49	2.76-4.36	2.04±0.25	1.46	4

sistance Ratio (RR) calculated from LD_{50} data (0.28 – 0.88 µg/g) derived from LA Lab & Field 199

g/g

Bollworm Insecticide Trial/Grain Sorghum
Macon Ridge Station, July 2006

Chemical	Rate AI/A	% Control 3 DAT	% Control 7 DAT
ythroid 2 EC	0.025	52	53
Tracer 4SC	0.05	73	72
Non-treated	_____	0	0

Summary

LA bollworm susceptibility to pyrethroids is declining.

No field control failures reported in Louisiana to date.

Widespread problem (Midwest, TX, SC, GA, New England)

Alternative control strategies in Cotton:

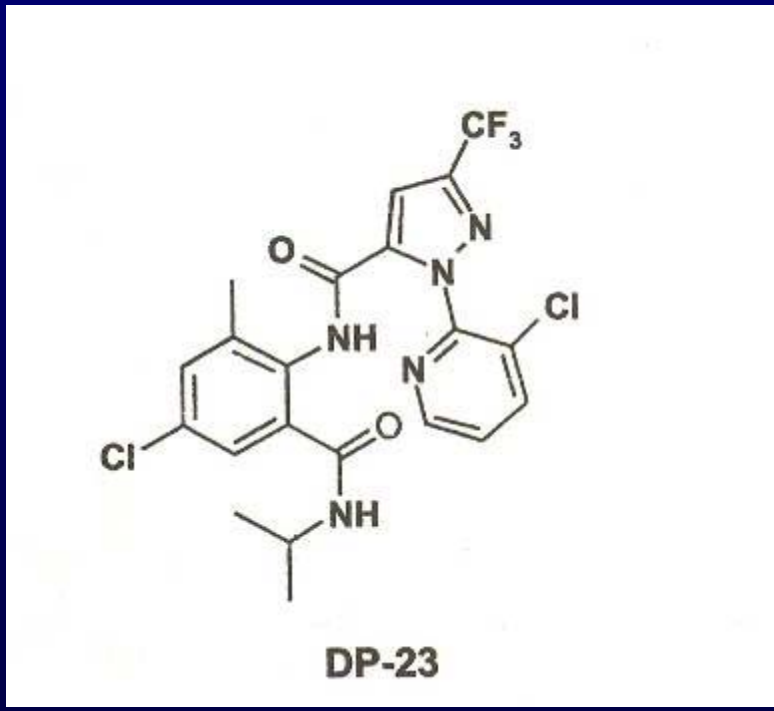
- Bollgard II and WideStrike
- Steward, Tracer, Denim, and Novel Chemistries

Rynaxypyr™ (DPX-E2Y45)

- Novel insecticide chemistry
  Class: Anthranilic diamides
- MOA: Muscle Functions
  Calcium Channels
- High toxicity to Lepidoptera at very low rates
- Low mammalian toxicity
- Feeding cessation, lethargy, paralysis, and death

valuate bioassay
ethods for Rynaxypyr:

- Diet Incorporation
- Topical Application
- Adult Vial Test



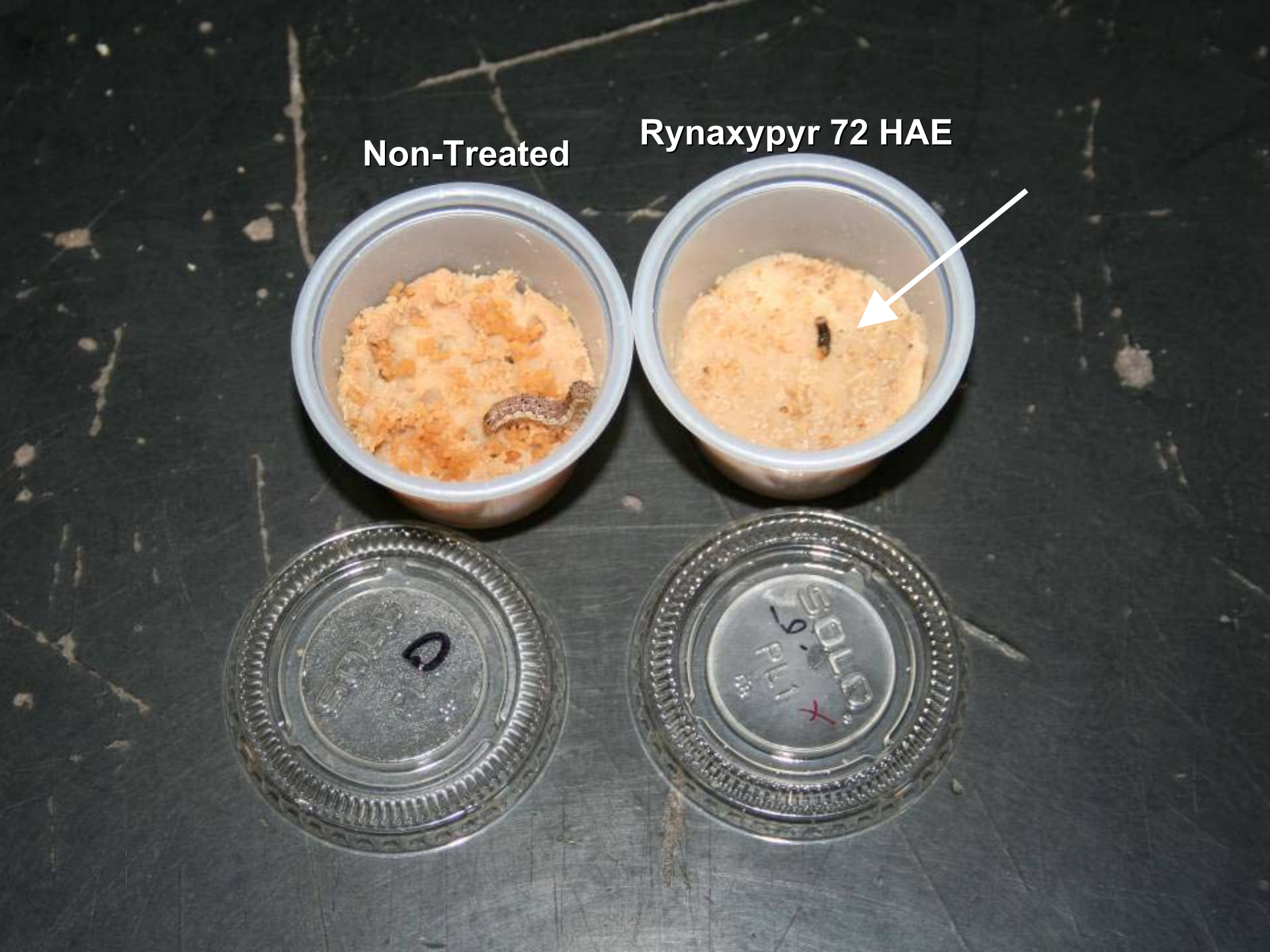
DP-23

Target Species

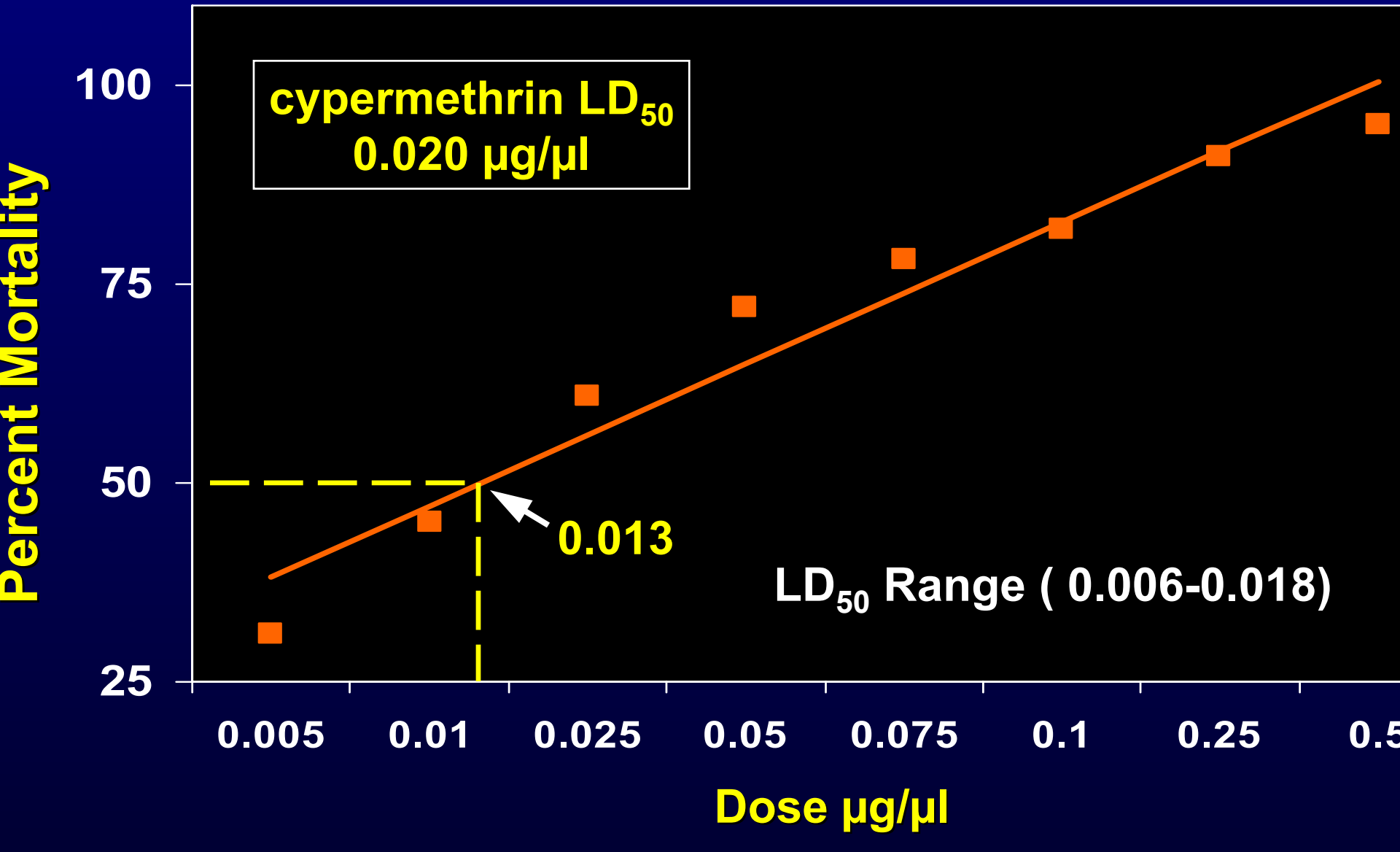
Tobacco Budworm
LSU TBW-Lab Colony
MRS TBW- Field LA 2006

Bollworm
SUSC BW-Lab Colony
MRS BW- Field LA 2006

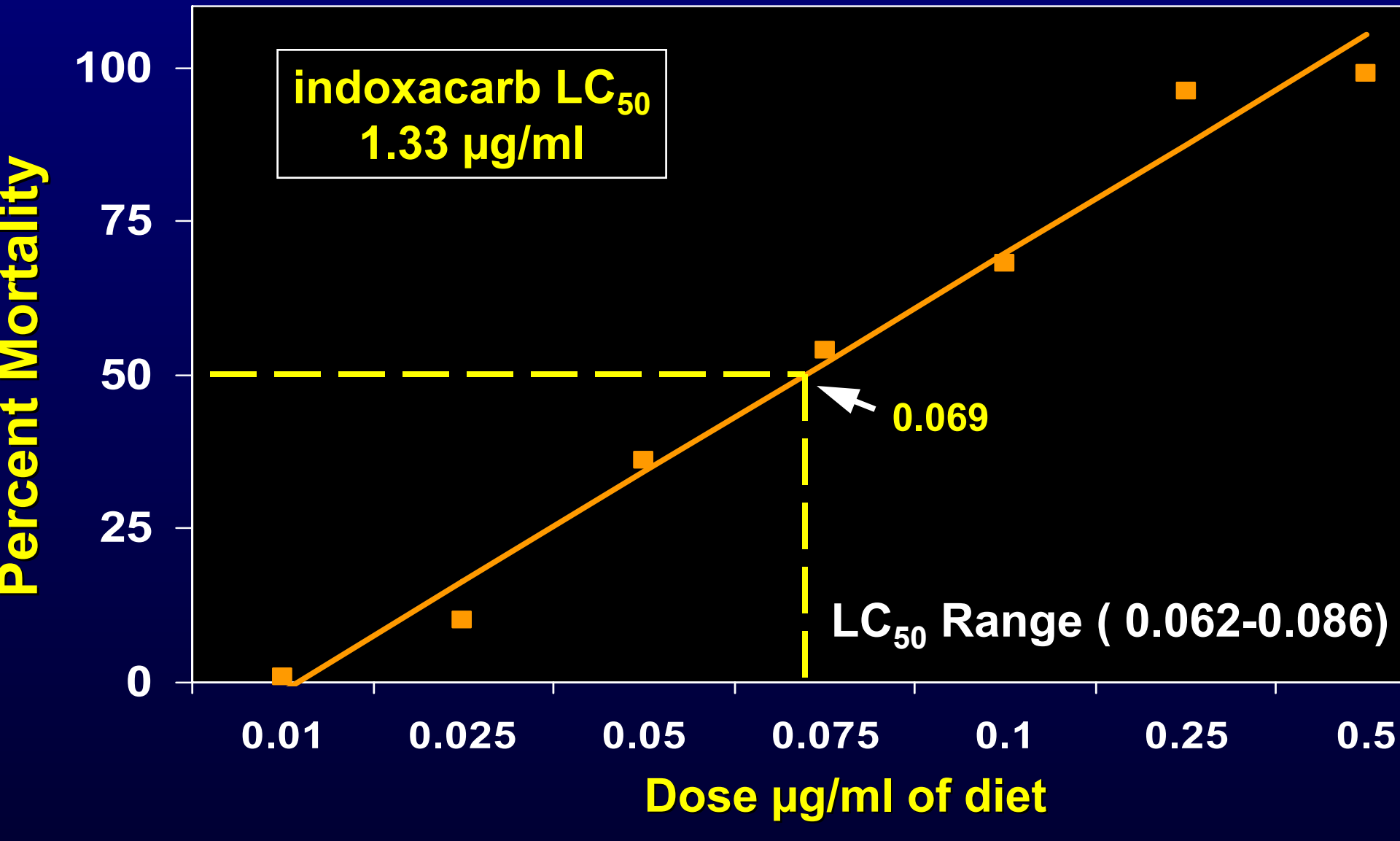
Fall Armyworm
MRS FAW- Field LA 2006


Non-Treated
Rynaxypyr 72 HAE

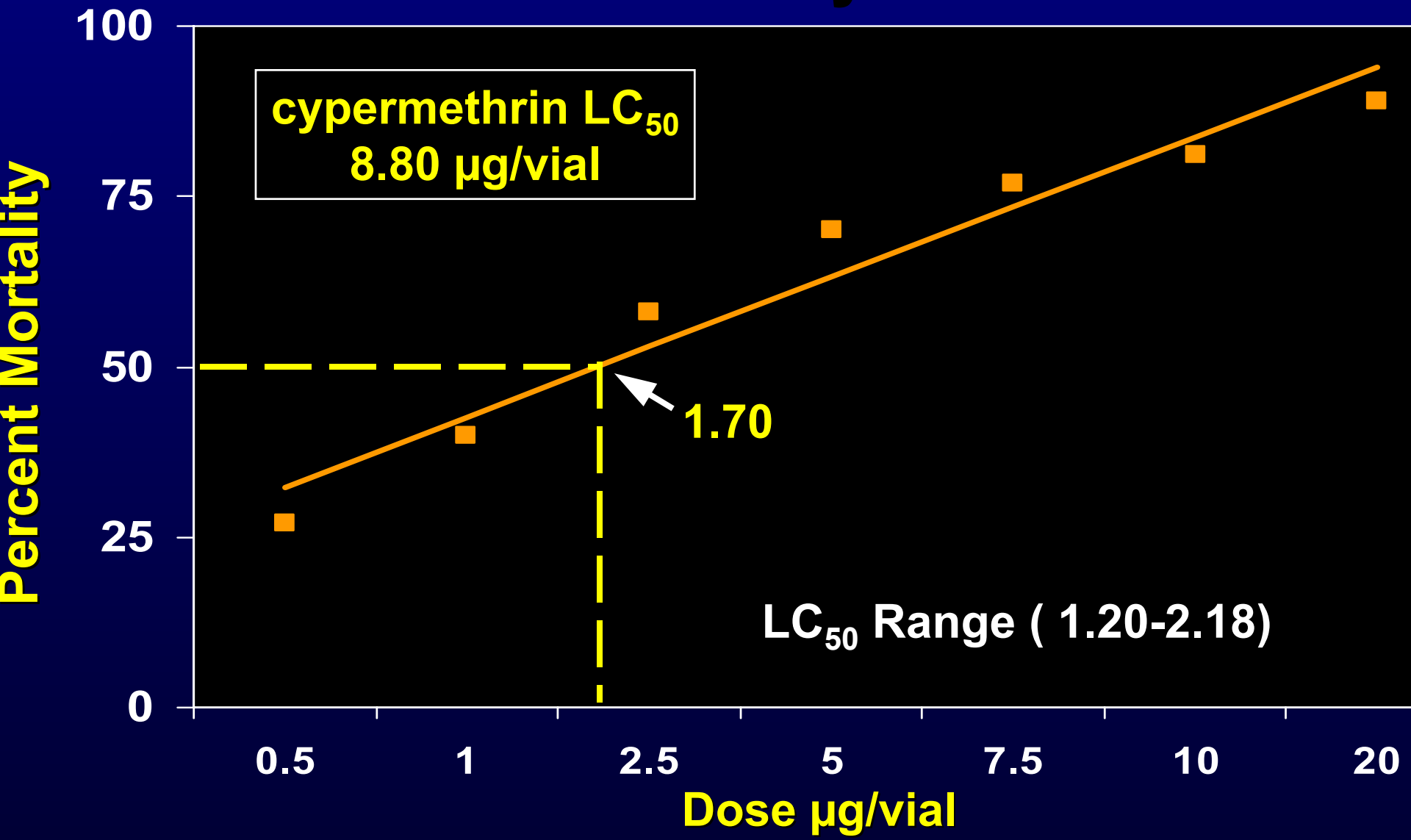
Topical Application of Rynaxypyr LSU Tobacco Budworm



Diet Incorporation of Rynaxypyr SUSC Bollworm

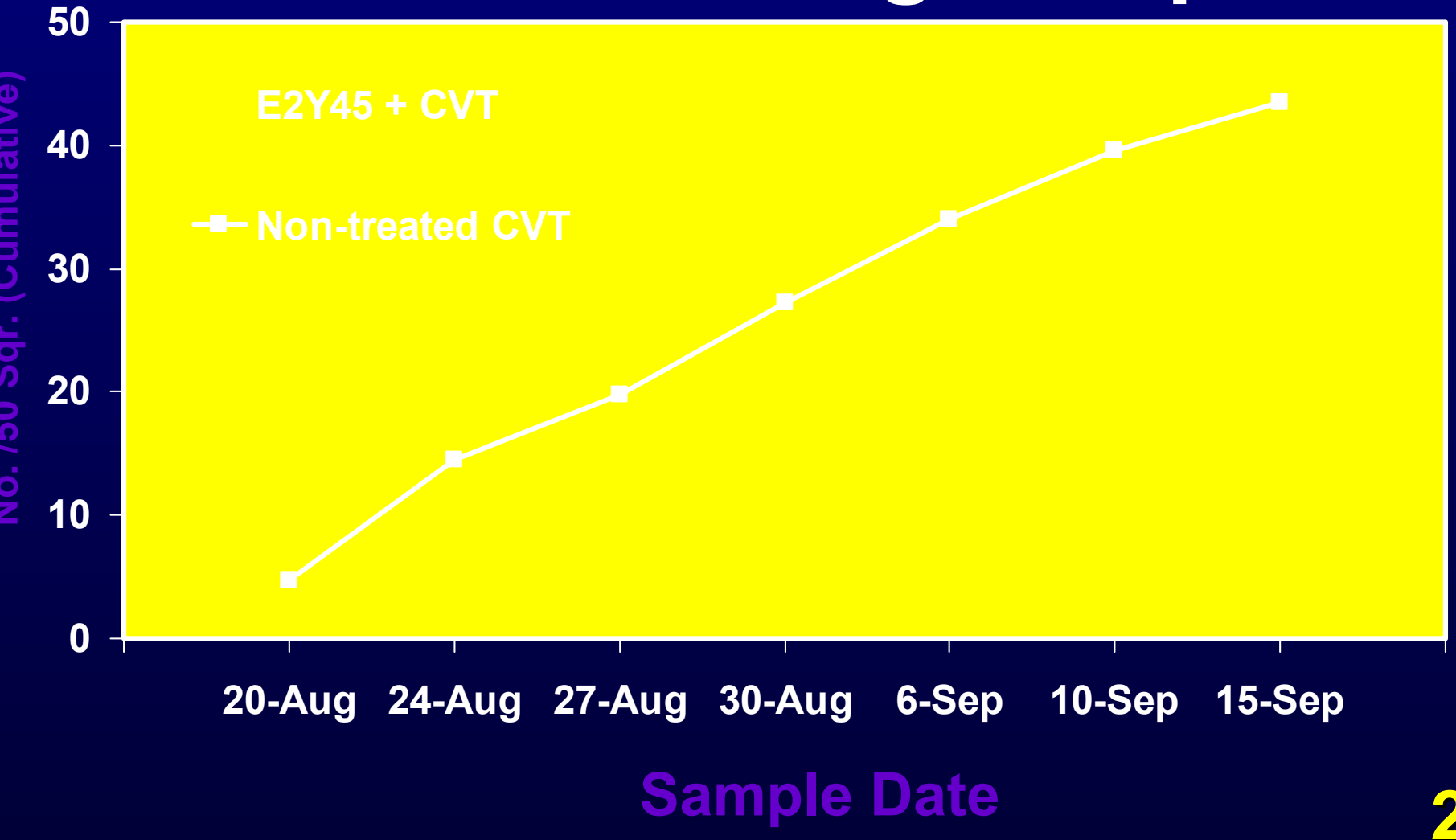


Adult Vial Test-Rynaxypyr
MRS Fall Armyworm

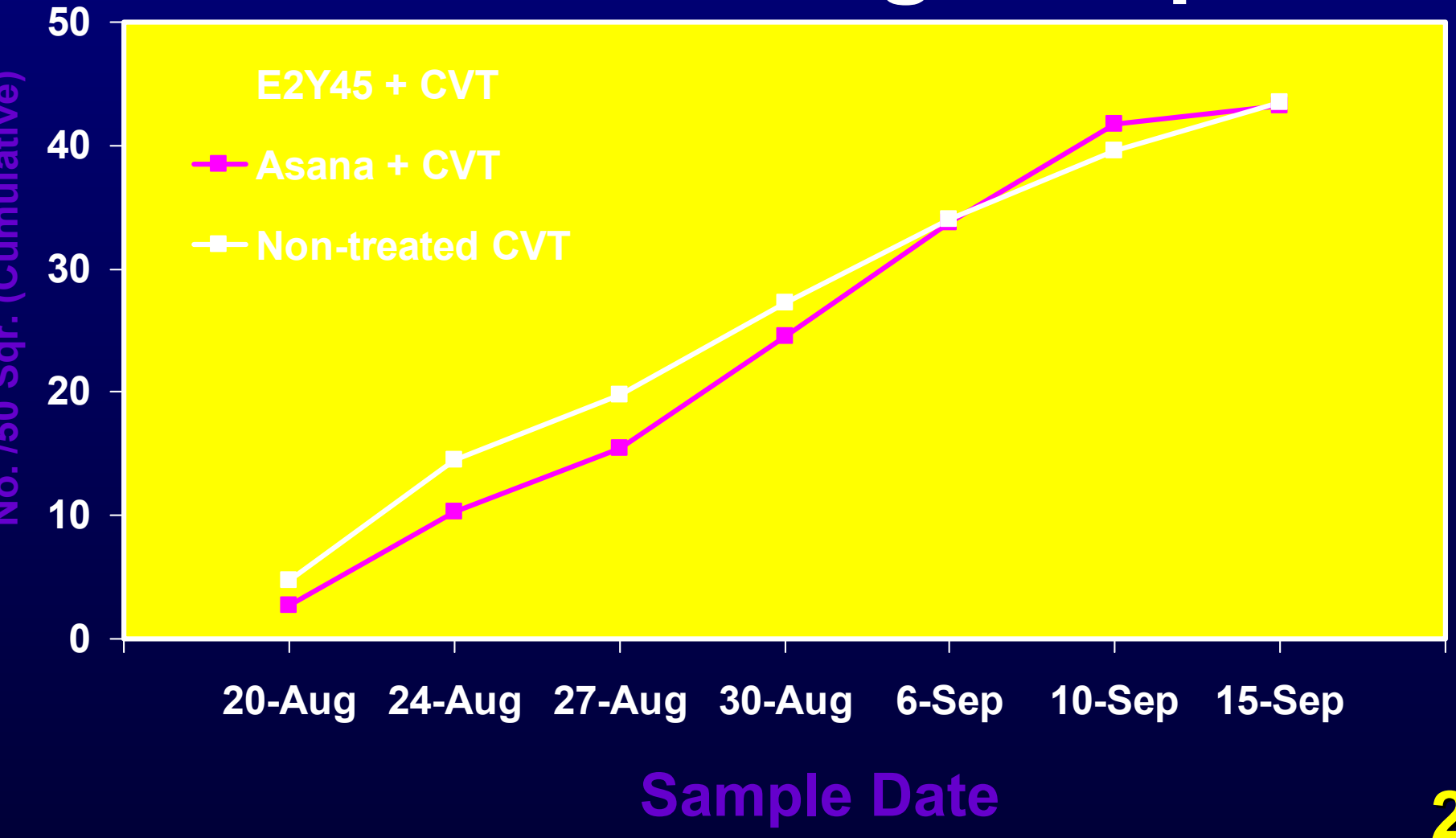


Field Trials

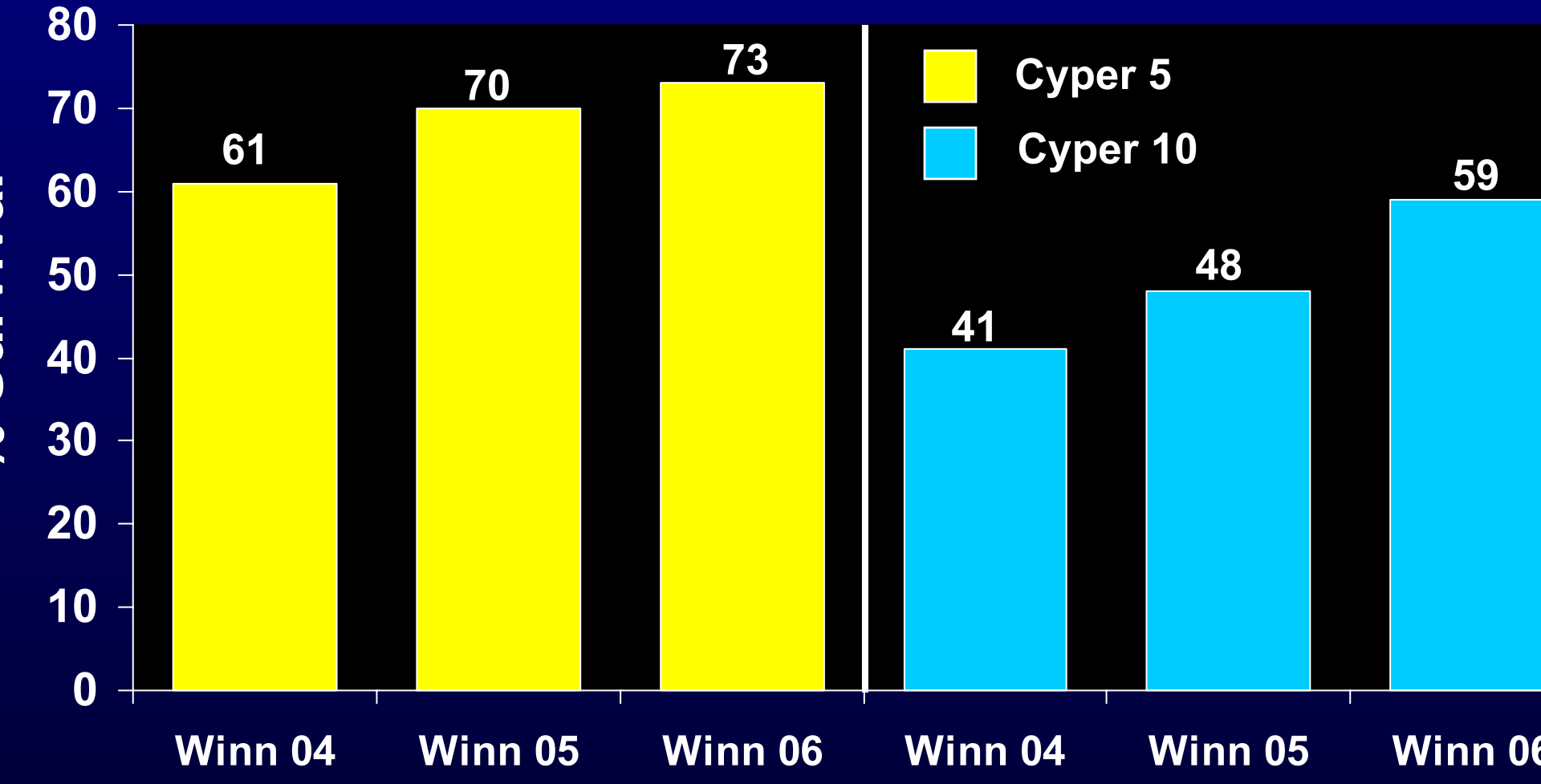
Rynaxypyr E2Y45
Heliothine Damaged Squares



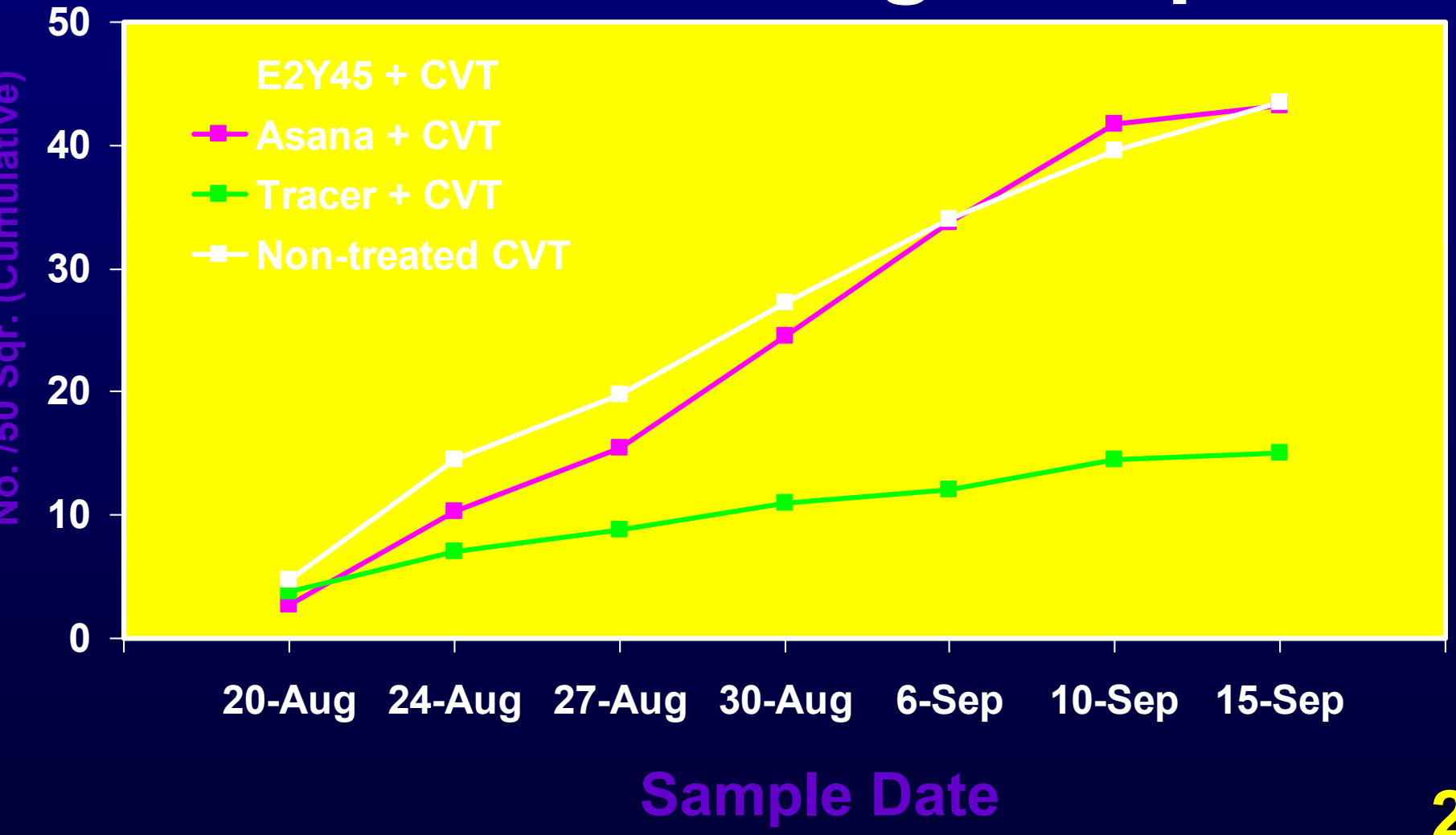
Rynaxypyr E2Y45
Heliothine Damaged Squares



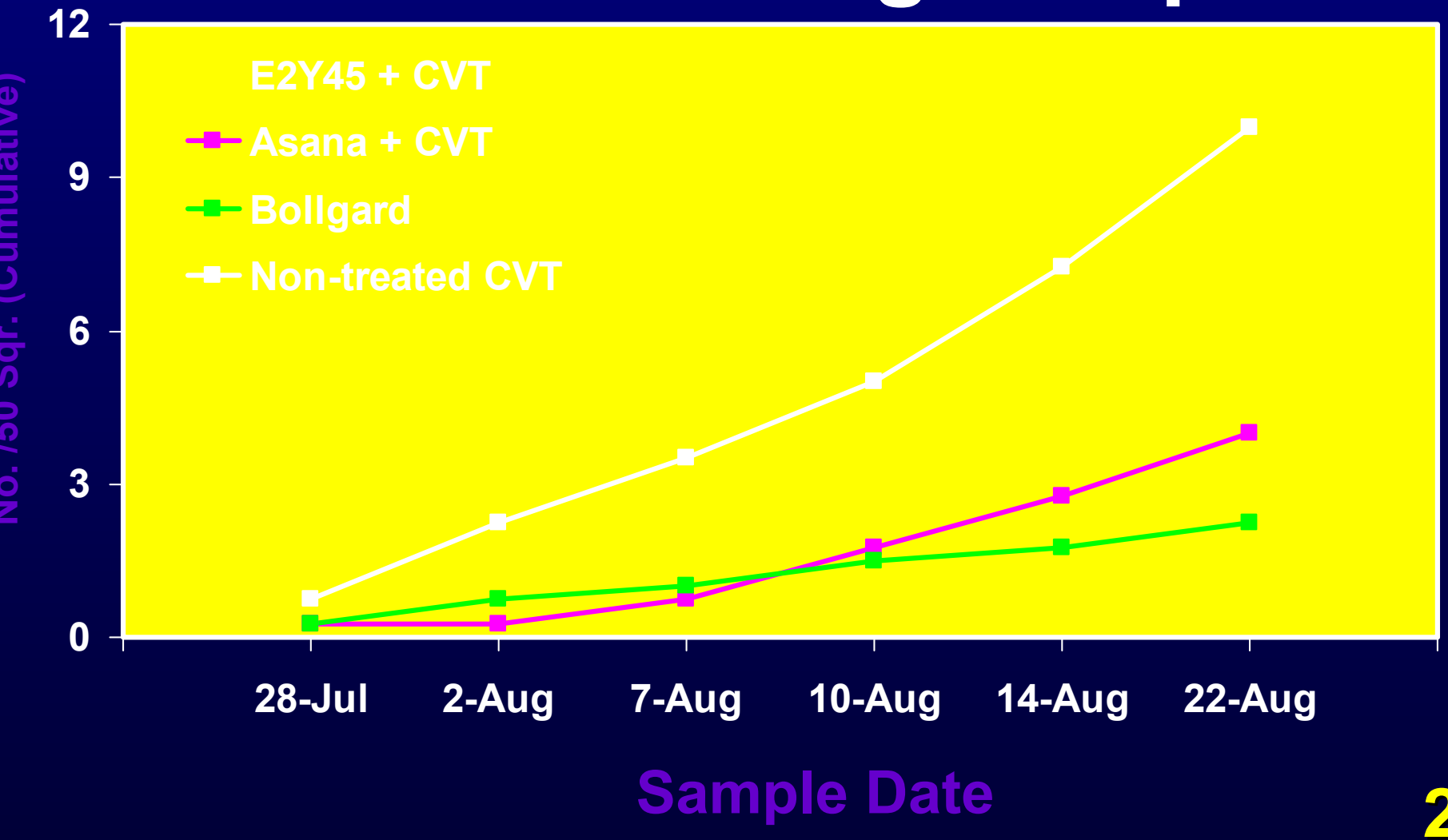
Response of Late Season Field Colonies to Cypermethrin (5 & 10 µg/vial)



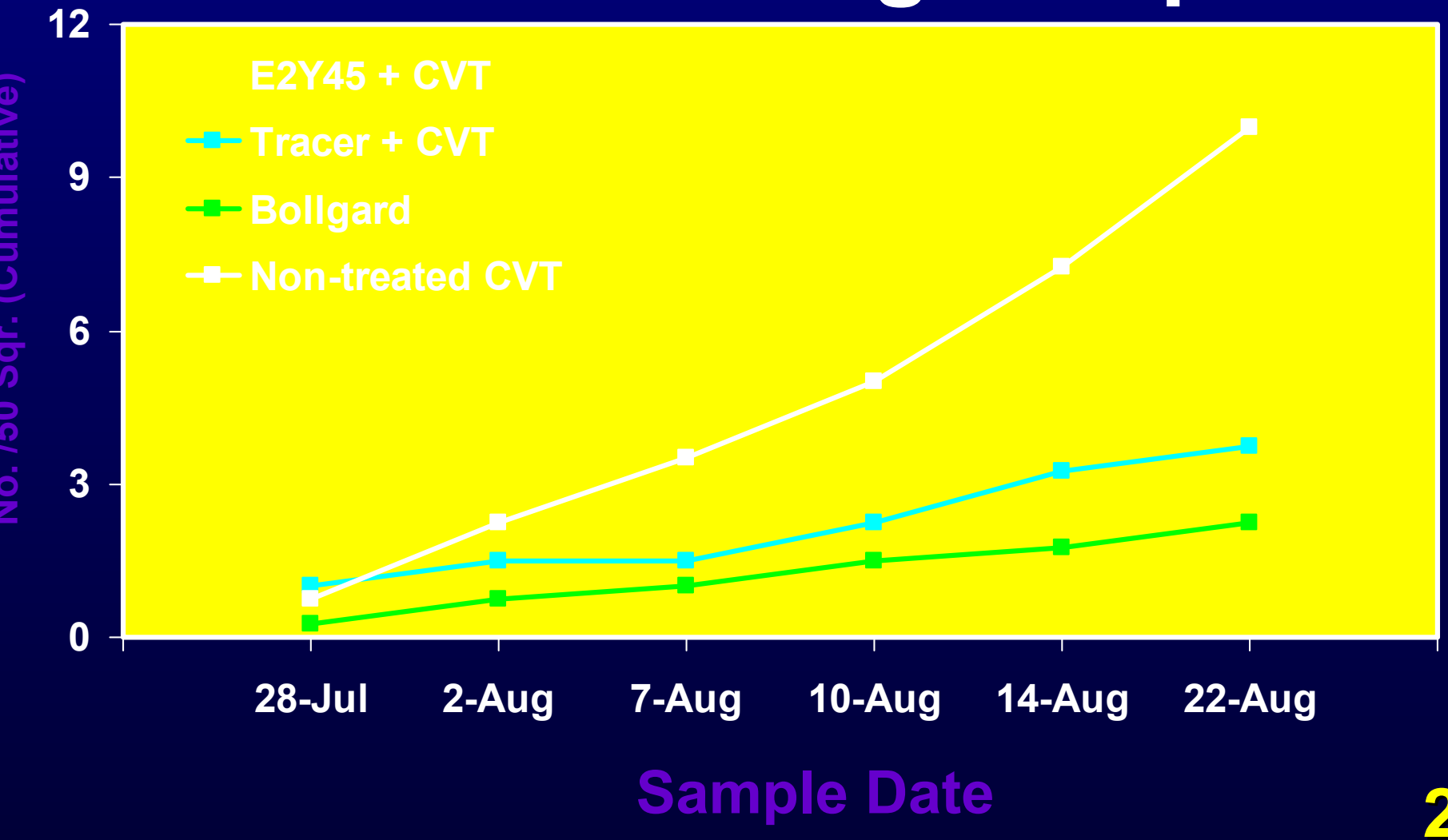
Rynaxypyr E2Y45
Heliothine Damaged Squares



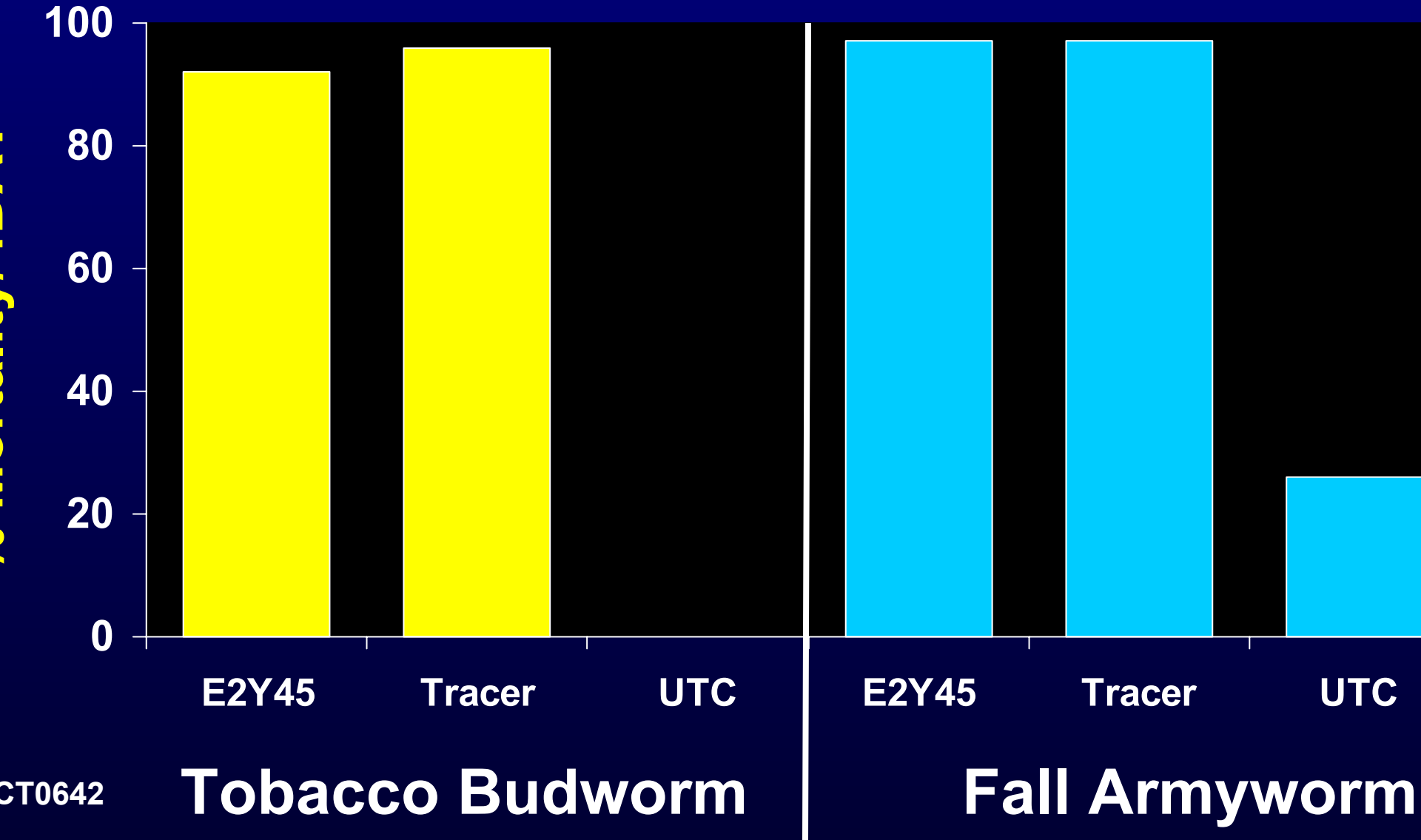
Rynaxypyr E2Y45
Heliothine Damaged Squares



Rynaxypyr E2Y45
Heliothine Damaged Squares



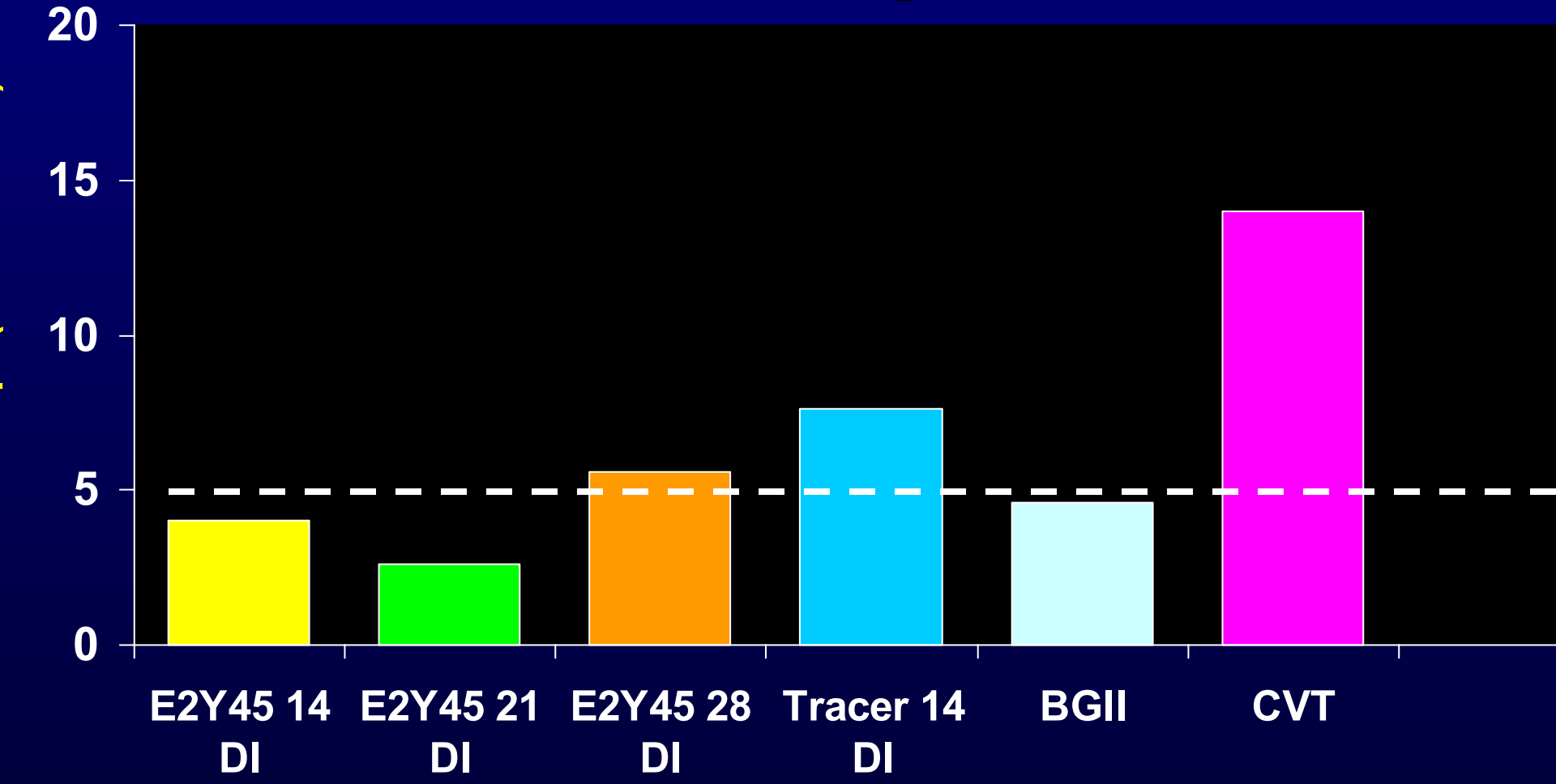
2006 Leaf Assay 2-d old Larvae



CT0642

E2Y45 Residual Test

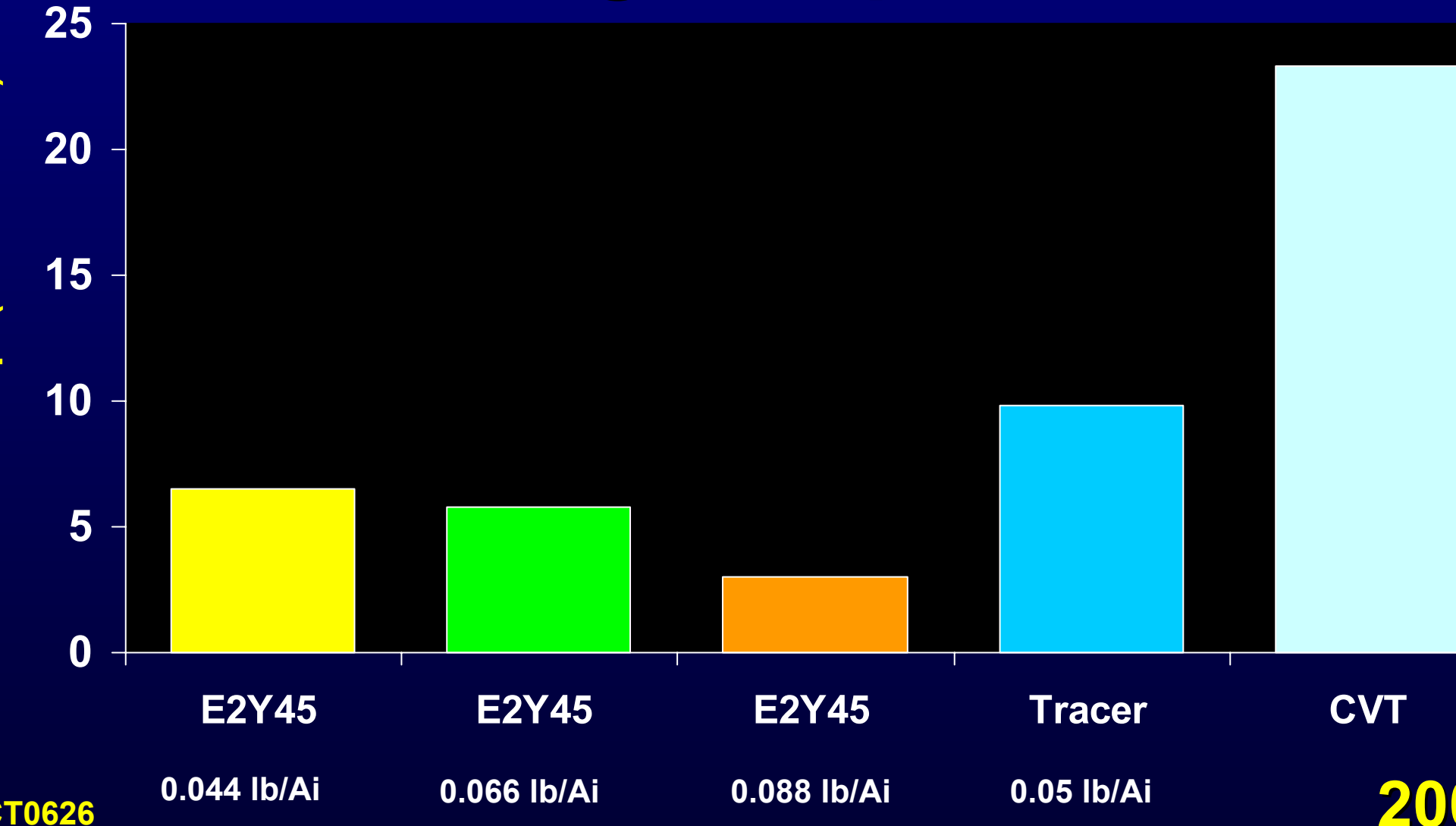
Heliothine Damaged Squares



IRCT0624

Control of Heliothines

Damaged Squares



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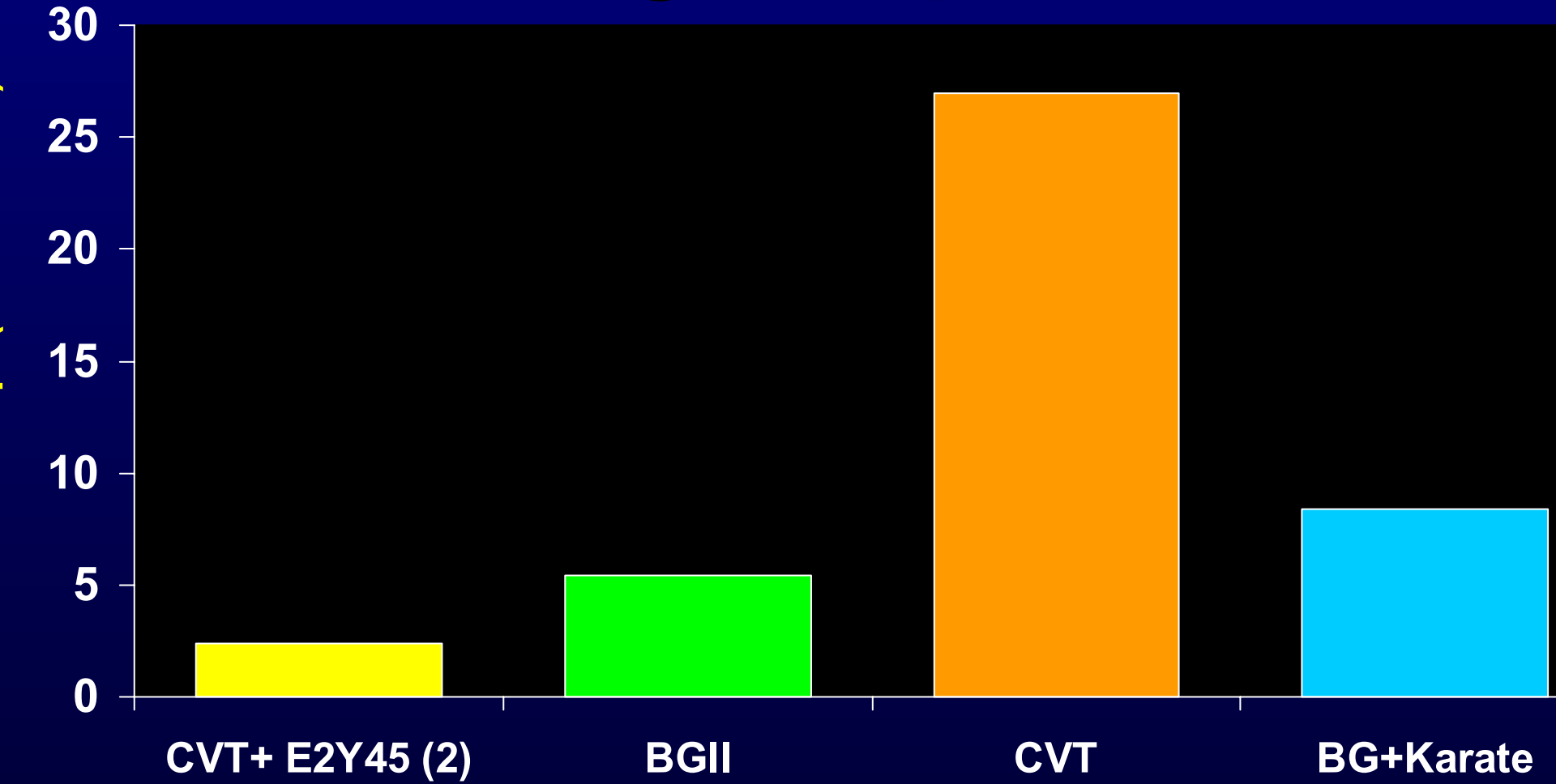
Control of Heliothines

Damaged Squares



2007 Recommendations

- Continue to use Pyrethroids
- Recognize probability for failures under heavy pressure – All Crops
- Suspected failures - switch chemistries
  Crop specific choices:
  - Tracer
  - Steward
  - Larvin
  - Lannate

Acknowledgments

Karla Emfinger, Trey Price, Ralph Sheppard, Stephen Lewis, Sara Lowe, Nick Cannady, John Lee, Josh Russell and numerous other student workers at the Macon Ridge Research Station.

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cotton