



# Natular™ Stewardship Initiatives Over the Past Season

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Clarke - Environmental Sciences

for

NCMVCA

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# Our journey to Natular™

## 1982...at a Caribbean rum still

- A vacationing scientist collected soil samples from an abandoned rum still site.
- Back at the lab, the samples showed biological activity.
- Fermentation products of the samples further demonstrated insecticidal properties



# Our journey to Natular™

## 1986...A new organism was identified

- A new species of bacteria was found.
  - Named: *Saacharopolyspora spinosa* (“spiny sugar”)

## 1987...Metabolites identified

- Scientists identified the most active metabolites of *S. spinosa* - spinosyn A and spinosyn D
- Together, they comprise spinosad (spinosyn A + spinosyn D = spinosad) the active ingredient in Natular™

# Our journey to Natular™

## **1995...Spinosad classified as a Reduced Risk pesticide product**

- By the U.S. EPA, due to favorable environmental and toxicological profiles.

## **1997...First spinosad-based products registered**

## **1999...**

## **Presidential Green Chemistry Challenge Award**

- Category of “Designing Safer Chemicals” based on...  
“...its highly selective insecticidal activity and environmentally compatible characteristics.”



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# Stewardship Challenge

- Inert ingredient goals:
  - List 4 (Minimal / Reduced Risk)
  - NOP (National Organic Program – USDA)
- Reduced Risk review
- Section 3 registration
- Ultimately meet OMRI standards (Organic Material Review Institute)

# Complete Portfolio of Formulations

2 lb/gal EC

6.25% XRT

8.33% T30

7.48% DT

2.5% XRG




0.5% G



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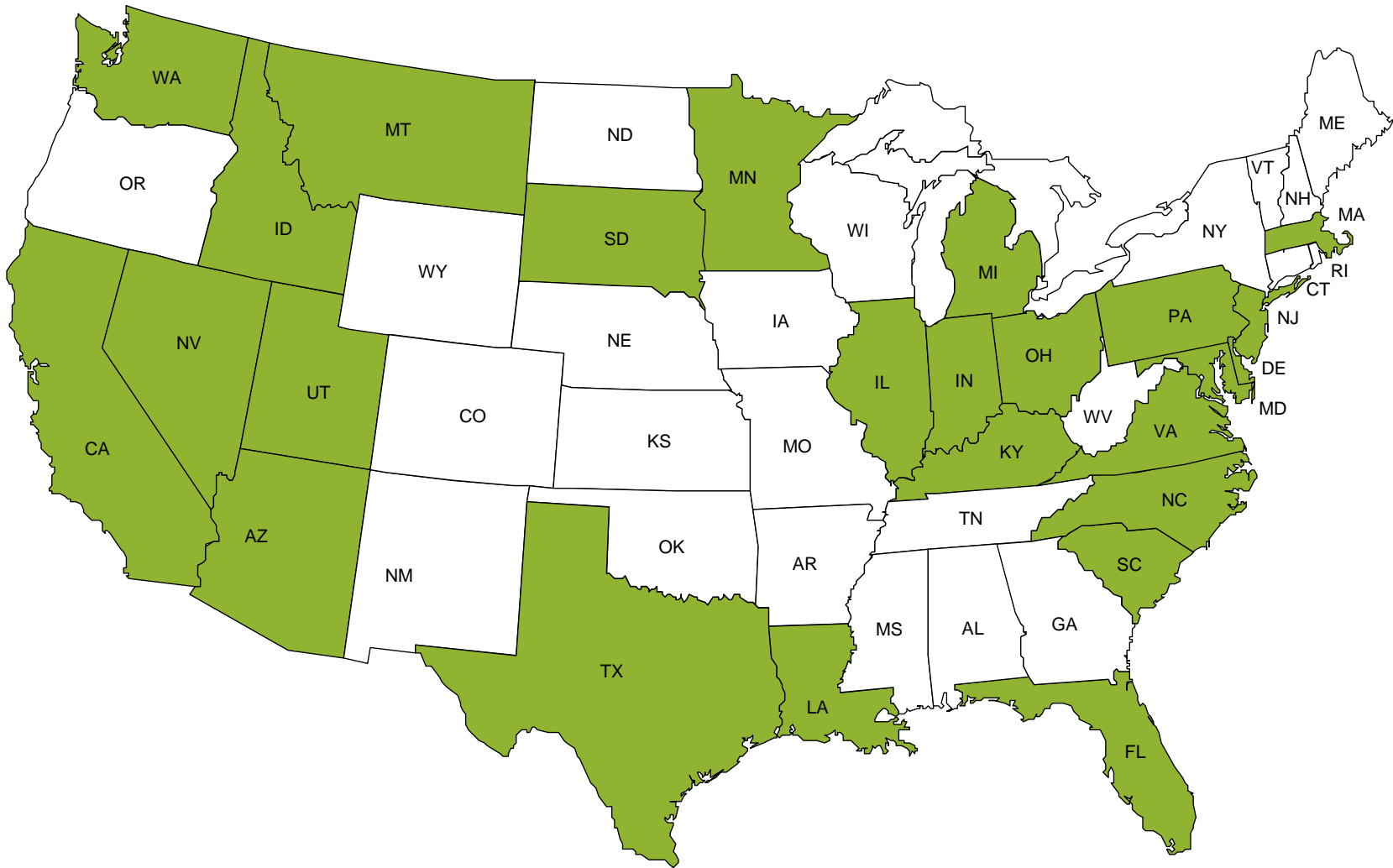
# From Inception - A Unique Opportunity

## Now OMRI Listed

- 2 lb/gal emulsifiable concentrate (**EC**) In review
- 0.5% corn cob granule (**G**) In review
- 2.5% extended release sand granule (**XRG**) 
- 8.33% 30 day tablet (**T30**) 
- 6.25% 180 day extended release tablet (**XRT**) 
- 7.48% “effervescent” tablet (**DT**) international



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# 2009 Managed Rollout



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# 2009 Stewardship Participants



Utilized dynamic protocols, and facilitated the accumulation of operational, baseline information from coast to coast.

Our partners have helped to begin to define the interactions of a wide variety of mosquito species, in varied habitats, when challenged by a new active ingredient.



# 2009 Stewardship Participants

Natular Formulation	<i>Ae. albopictus</i>	<i>Ae. nigromaculis</i>	<i>Ae. taeniorhynchus</i>	<i>Ae. trivittatus</i>	<i>Ae. vexans</i>	<i>An. freeborni</i>	<i>An. quadrimaculatus</i>	<i>Cx. pipiens, Cx. restuans</i>	<i>Cx. tarsalis</i>	<i>Cs. inornata</i>	<i>Ae. japonicus</i>	<i>Ae. sollicitans</i>	<i>Ae. triseriatus</i>
EC (Min)				X			X				X	X	X
EC (Mid)							X						
EC (Max)		X		X		X	X		X	X	X	X	X
G (Min)	X			X			X				X		X
G (Mid)											X		X
G (Max)	X	X	X	X		X	X		X	X		X	
XRG (Min)	X			X			X				X		X
XRG (Mid)					X			X					
XRG (Max)	X			X			X				X		X
T30				X	X		X	X			X		X
XRT					X		X	X					

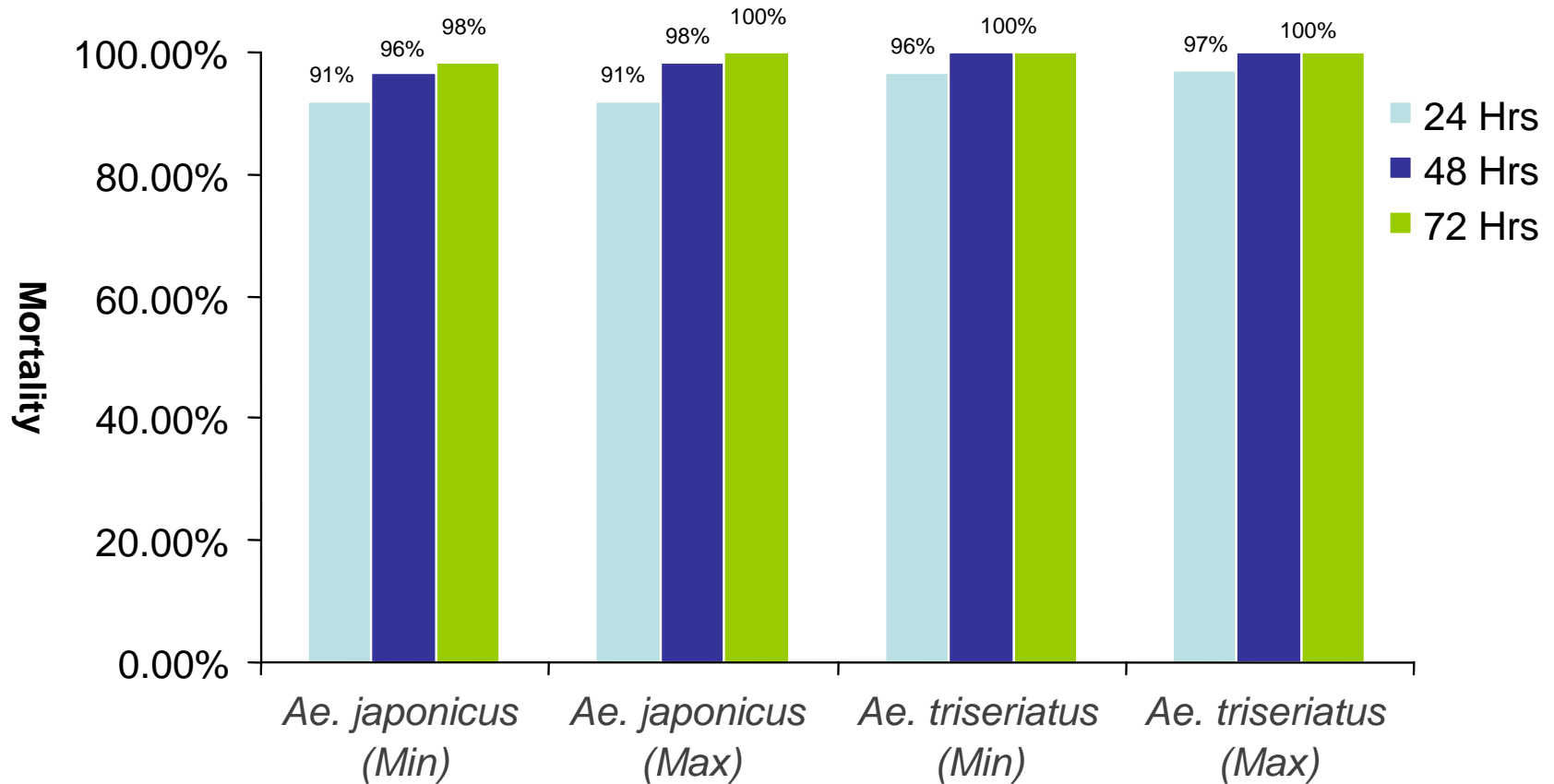


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# Natular EC

Rate: 1.1 fl oz/A (Min), 2.8 fl oz/A (Max)

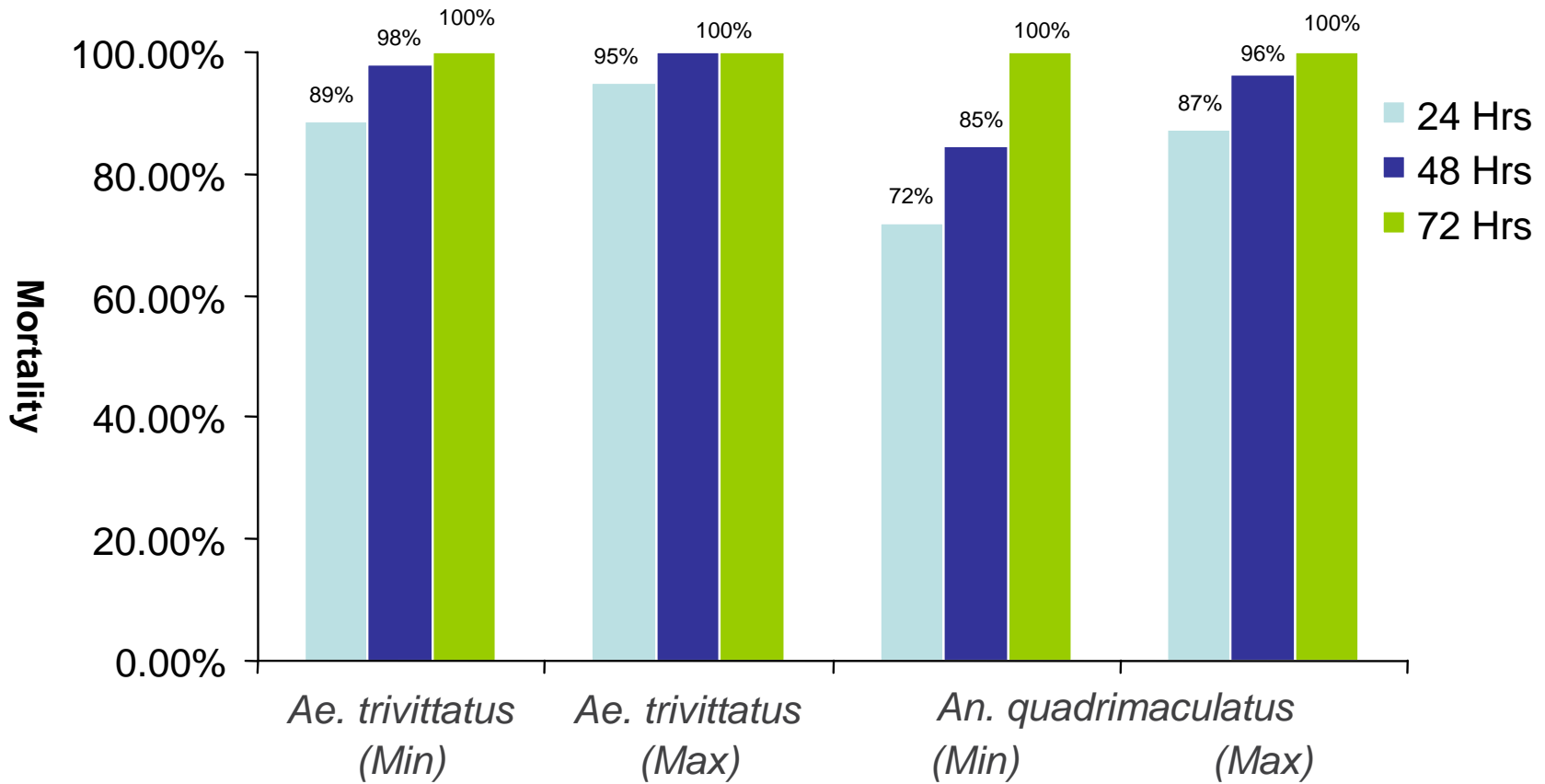
Location: Kentucky



# Natular EC

Rate: 1.1 fl oz/A (Min), 2.8 fl oz/A (Max)

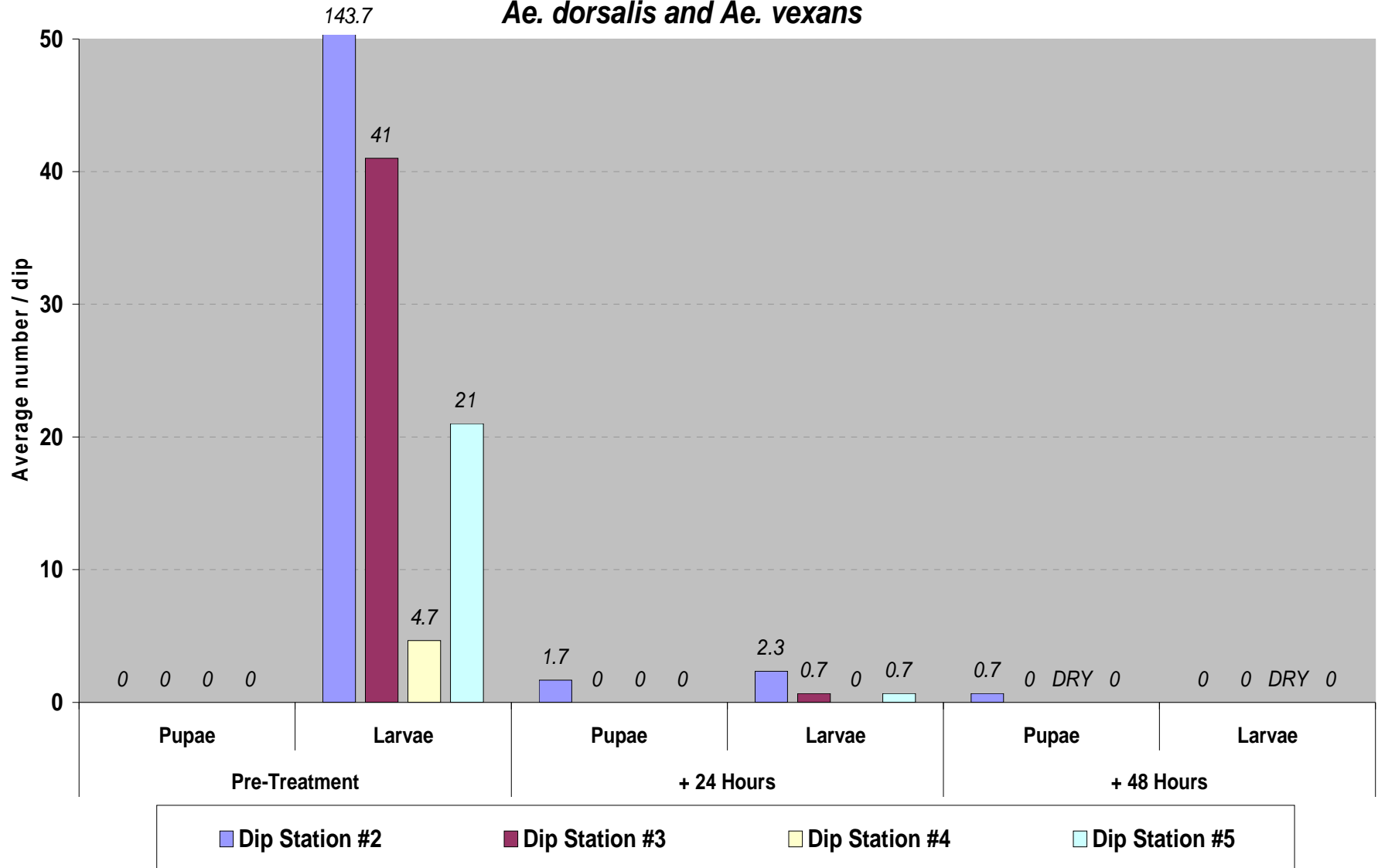
Location: Kentucky



# Results

Natular™ G  
 Montana Site 2  
 7 lbs / acre

*Ae. dorsalis* and *Ae. vexans*



# Monroe Co., FL



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# 0.5% Granule @ 9 lbs/A

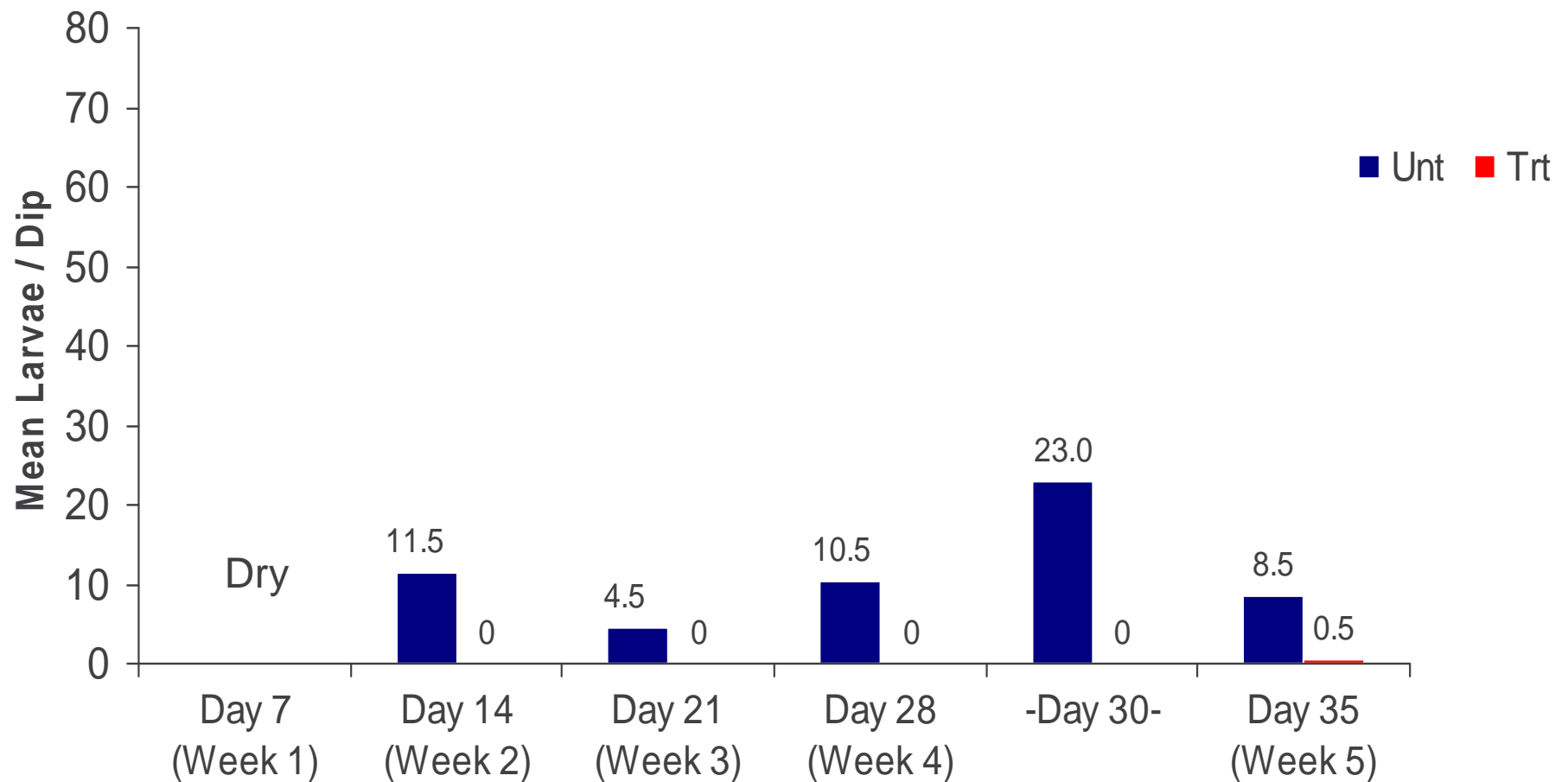
				<i>% control based on</i>		
				<u><i>pretreatment</i></u>		
<u><i>density</i></u>				<u><i>24h</i></u>	<u><i>48h</i></u>	
<u><i>72h</i></u>						
<i>Aedes nigromaculis</i>	pasture	82	97	93		
<i>untreated</i>	+40 +144 +593					
<i>Aedes taeniorhynchus</i>	rain pool	98	99			
	<i>untreated</i>	+23	+20			
<i>Culex tarsalis</i>	wetland	96	97	97		
	<i>untreated</i>	43	+10			

# Natular™ XRG

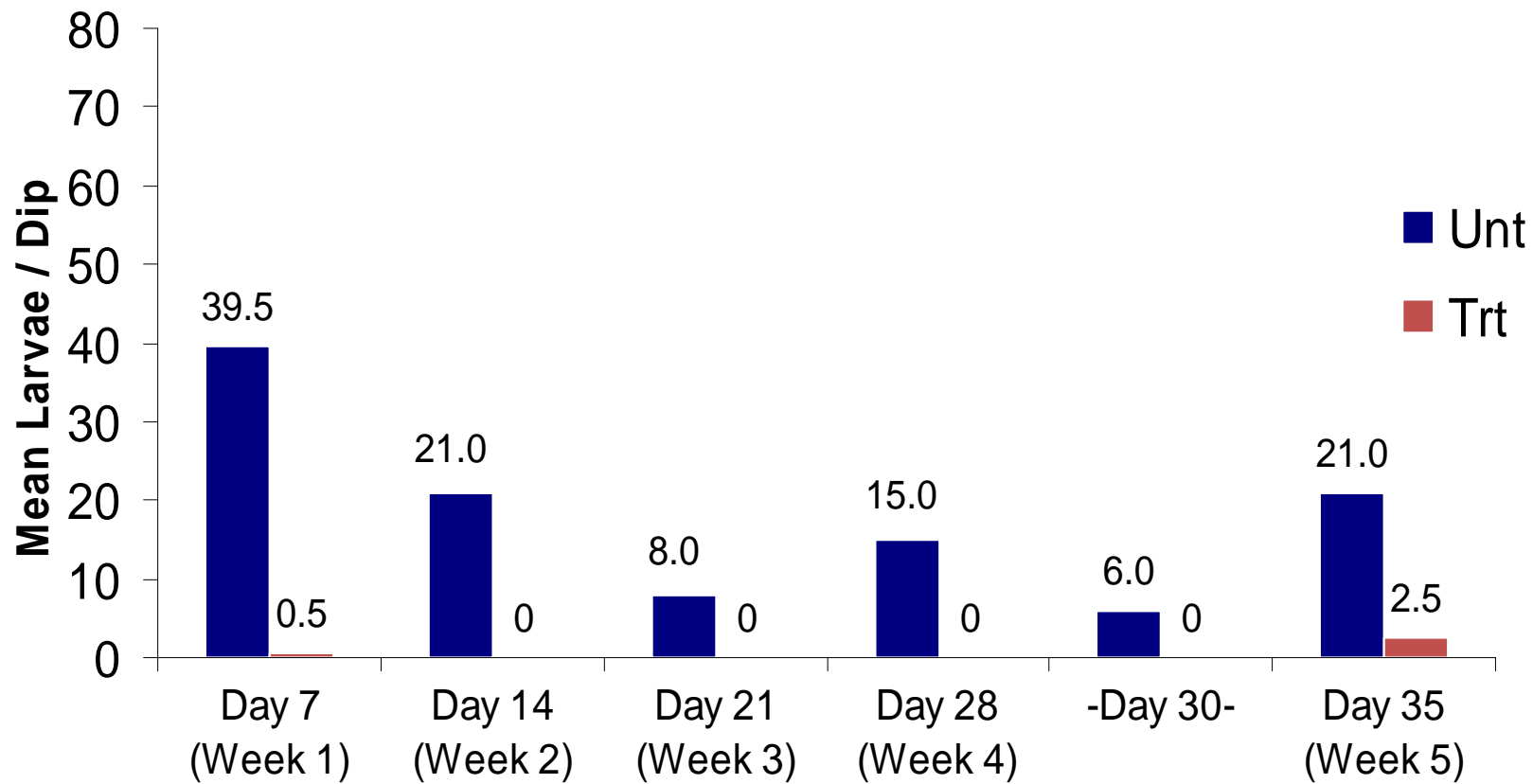
Retention Ponds / *Ae. vexans* – *Cx. pipiens*

Rate: 10 lb/A (<Mid)

Location: Illinois



Natular™ XRG  
Retention Ponds / *Cx. pipiens*  
Rate: 10 lb/A (<Mid)  
Location: Illinois



# Metropolitan MCD, MN

Natular XRG tests in small ground sites (10 lb/acre rate) against *Aedes vexans* in 2009

Group	6/10/2009			6/12/2009			% Control
	Pre-Treat Dip Count			48-hr Post Dip Count			
	Mean	SE	n	Mean	SE	n	
Control	19.7	8.51	8	32.7	12.99	8	
Natular XRG	25.4	8.34	3	0.0	0.00	3	100%



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# Metropolitan MCD, MN

Tests of Natular XRT in Culverts (10 lb/acre rate) to control WNV vectors (mainly *Culex restuans*) in 2009

Inspection Dates	Control				Natular XRG						
	(n)	cumulative data			1st trt	(n)	cumulative data			% Control	Weeks after treatment
		mean dipcount	SE dipcount	median dipcount			mean dipcount	SE dipcount	median dipcount		
6/24	6	5.90	1.42	5.20	6/17	6	0.00	0.00	0.00	100.0%	1
7/1	6	18.95	4.67	20.40		6	0.20	0.14	0.00	98.9%	2
7/8	6	35.60	9.69	34.90		6	1.58	0.96	0.15	95.6%	3
7/15	6	65.55	28.83	43.75		6	3.83	2.53	0.85	94.2%	4
7/22	6	71.62	32.04	45.10		6	5.80	3.35	1.05	91.9%	5



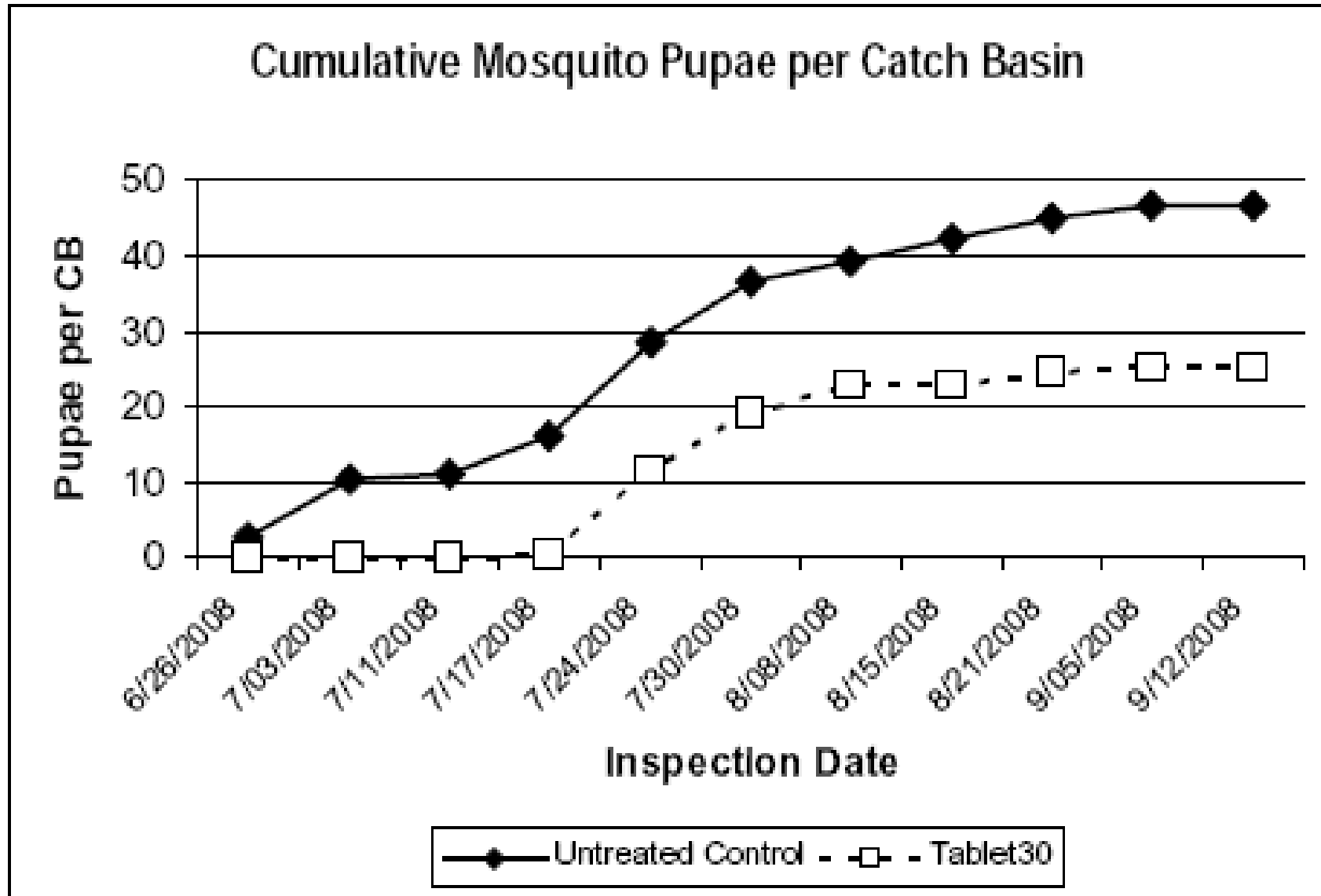
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# Brunswick Co., NC



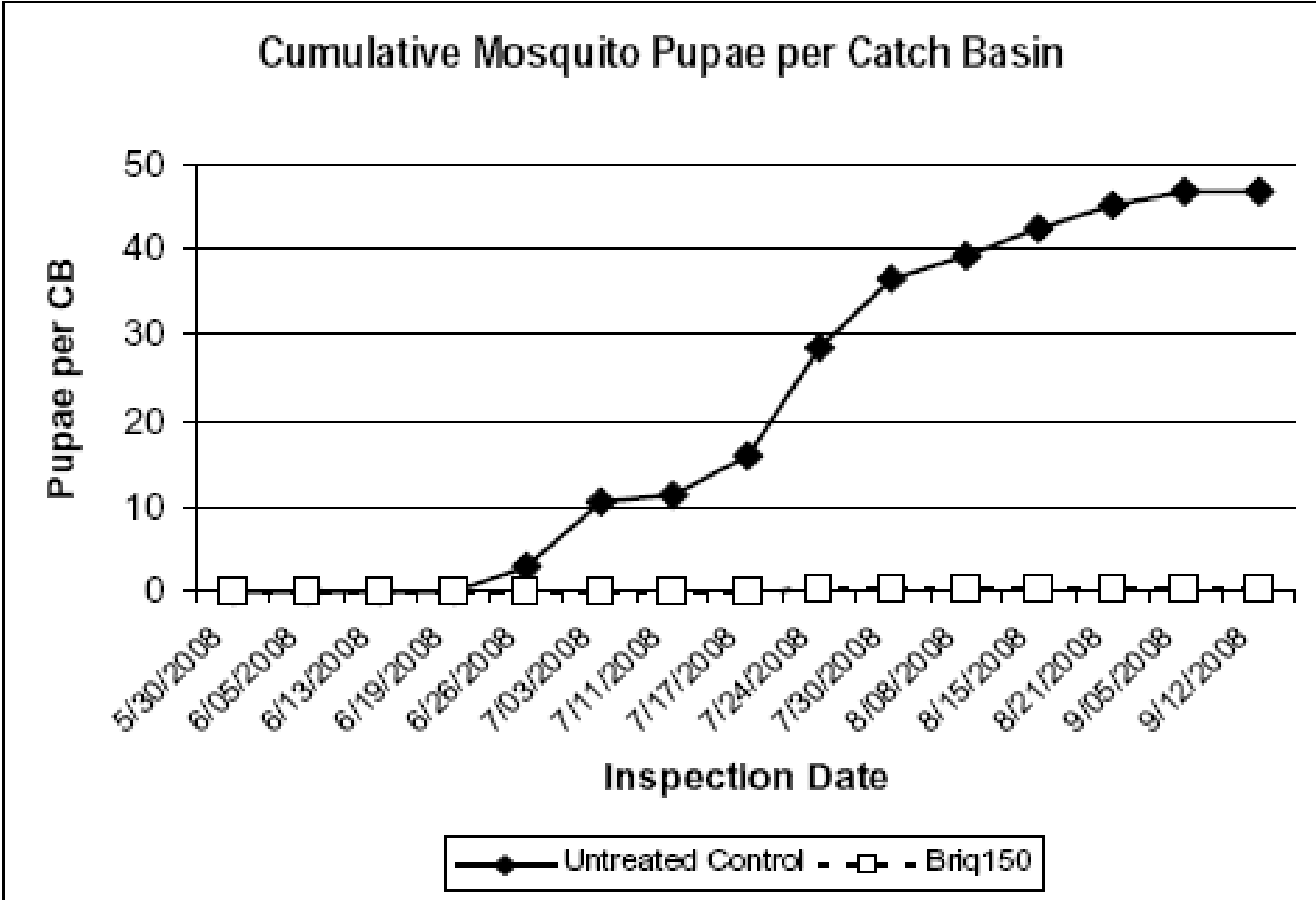
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# Results T30



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# Results - XRT



# General Summary

- All formulations achieved results validating labeled use patterns for proposed habitats, species, and rates.
- Post-treatment efficacy of Natular™ treated water should focus on late instar larvae / pupae, and ignore early instar larvae.
- These formulations (active ingredient – spinosad) are the only products in this MOA group, and should be used in a rotational larvicide regimen.





Thank you



# GO PHILS!



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