



Science For A Better Life

Permanone[®]

Aqua-Reslin[®]

Scourge[®]



Science For A Better Life

New active ingredient for ULV application to control adult mosquitoes

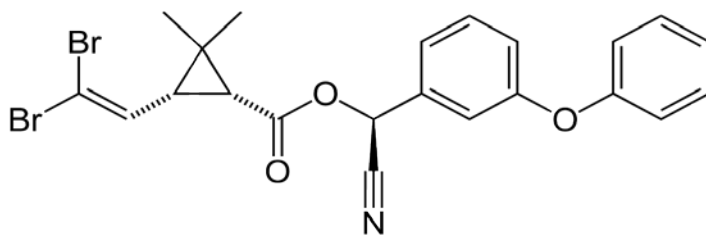
Gordon Morrison, Kurt Vandock, Britt Baker and Byron Reid

DeltaGard® Public Health Insecticide

A Game Changer!



Deltamethrin



- Type II pyrethroid that induces “long-lasting” inhibition of the sodium channel activation gate
- Unlike other pyrethroids, it’s one signal molecule (no isomers)
- Among the most popular and widely used insecticides in the world
 - Utilized for Vector control throughout the world for > 15 years
 - Full recommendation by WHOPES (World Health Organization Pesticide Evaluation Scheme)

DeltaGard[®] Public Health Insecticide



EPA

Reduced Risk Classification

for

Wide Area Mosquito Control

EPA's goal, "to quickly register commercially viable alternatives to riskier conventional pesticides"





Deltamethrin: Human Health Profile

EPA Human Health Risk Assessment (2009)

- Toxicology database is “essentially complete ... no particular concerns”;
- Not a developmental or reproductive toxicant;
- Not genotoxic or mutagenic
- Cancer Classification: Not likely to be carcinogenic to humans by all routes of exposure
- Low dermal absorption (~1%) & low toxicity by dermal route of exposure



Deltamethrin

Risk Reduction vs. Registered Alternatives

Acute Toxicity Category I: Naled

Carcinogenicity

- Likely human carcinogen: Permethrin & Resmethrin
- Possible human carcinogen: PBO
 - Used with Permethrin, Sumithrin, Pyrethrins & Resmethrin
- Suggestive Evidence of Carcinogenicity: Pyrethrins & Malathion

Mutagenicity: Positive findings with Malathion & Naled

Developmental Toxicity

- Spina Bifida (Phenothrin)

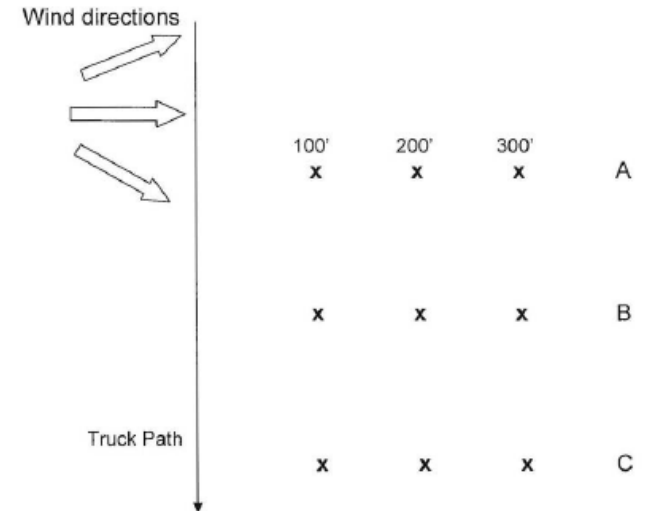
Organophosphorus Insecticides (AChE Inhibitors)

- Malathion
- Naled – Organophosphorus Induce a Delayed Polyneuropathy (OPIDP)
(DDVP is a metabolite)



Introduction and Methods

- To support EPA registration of DeltaGard® a comprehensive study plan was developed:
 - Locations:
 - Florida, April 2011; California, June 2011; Texas, July 2011; North Carolina, August 2011
 - Major Species:
 - *C. quinquefasciatus*, *An. quadrimaculatus*, *Ae. sollicitans*, *Ae. taeniorhynchus*, *Ae. melanimon*, *C. pipiens*, and *Ae. aegypti*
 - Application rates: 0.5, 1.0, and 1.5 g A.I./ha.
 - Truck-mounted ULV application (London Fog XKE sprayer) with cages set at 100, 200, and 300 ft intervals.

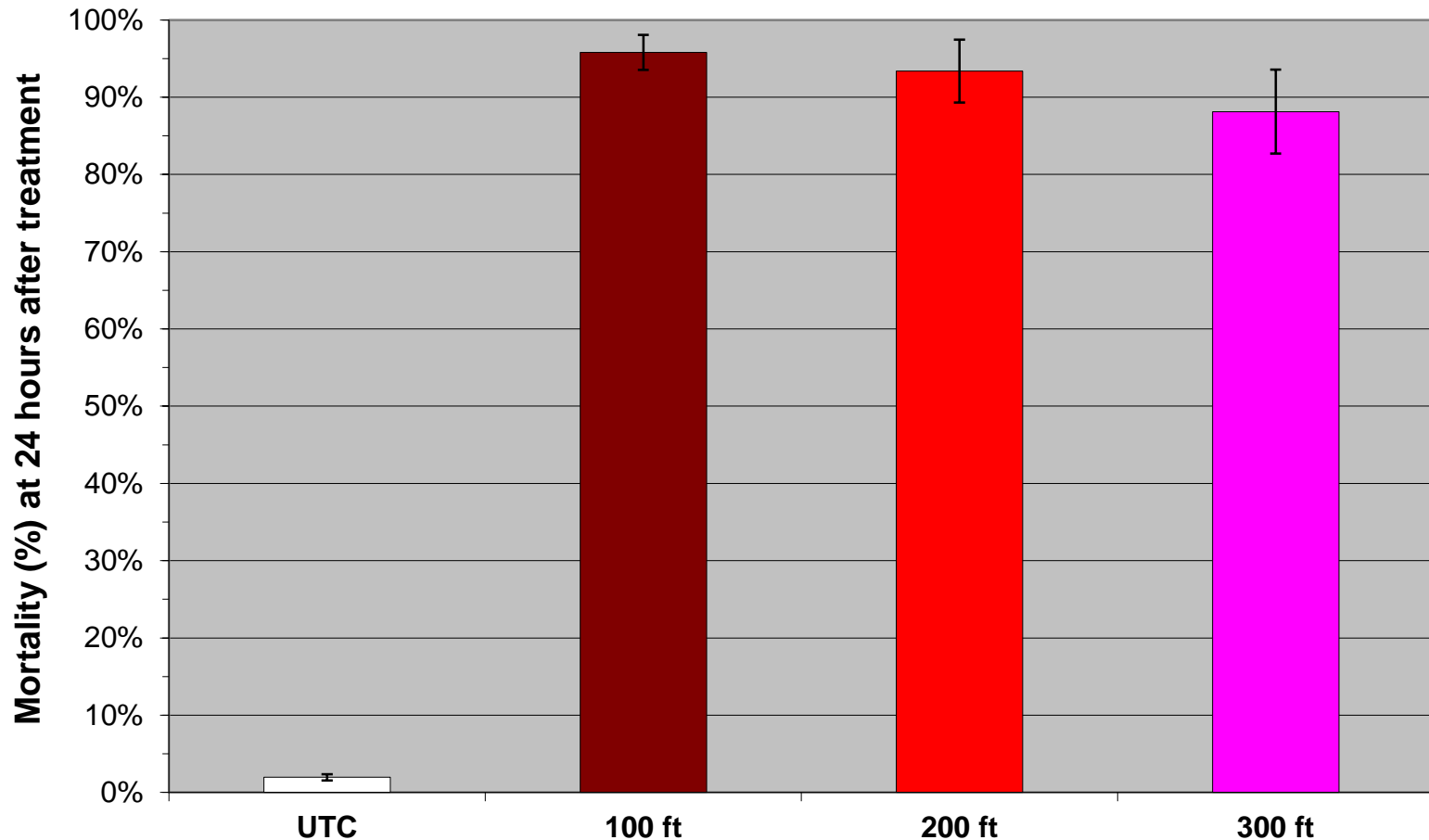


DeltaGard is a registered trademark of Bayer AG



DeltaGard Trial Summaries

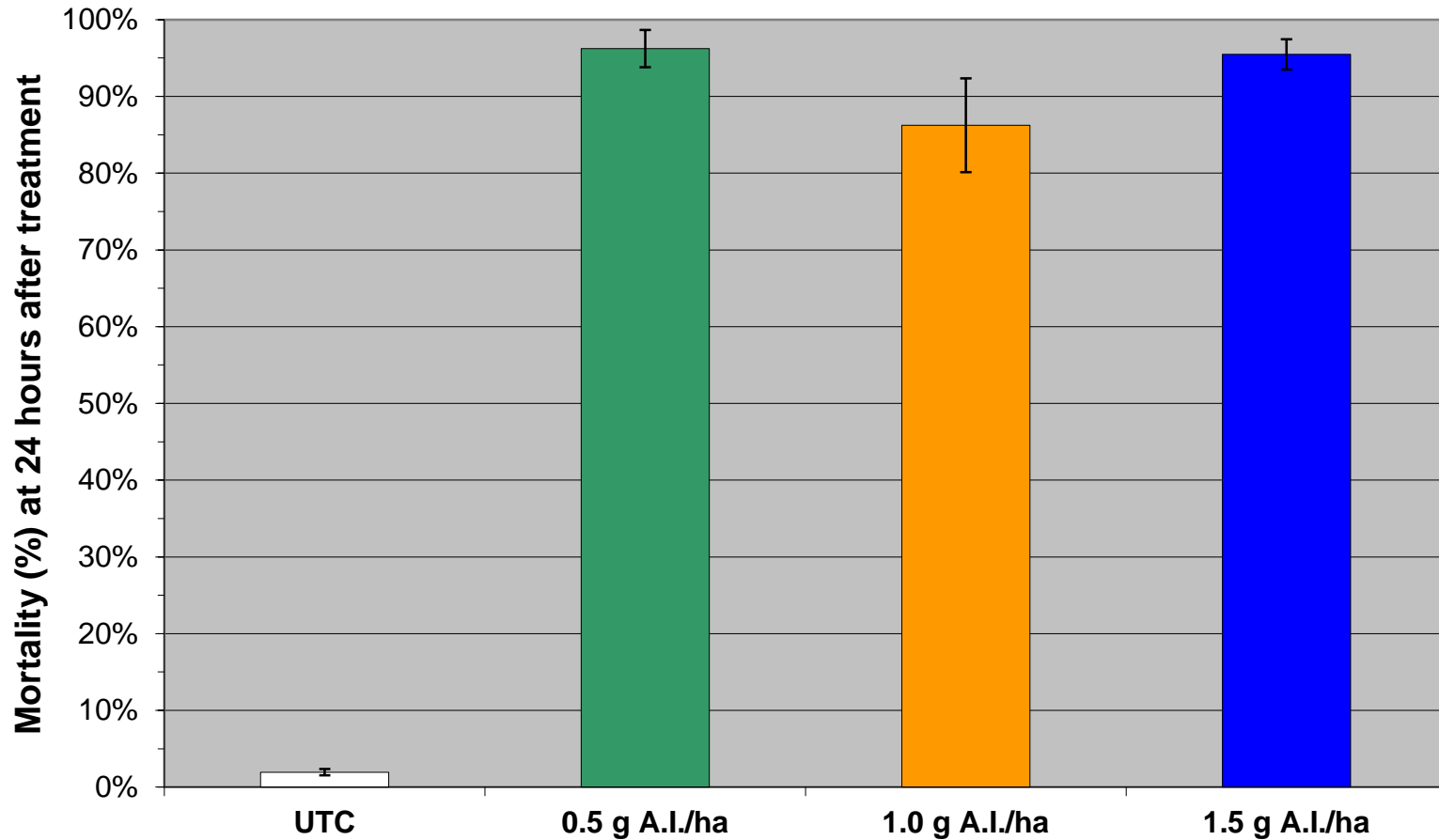
Overall efficacy, from 100 ft to 300 ft distance





DeltaGard Trial Summaries

Overall efficacy, from 0.5 g A.I./ha to 1.5 g A.I./ha



DeltaGard® Features and Benefits



Product Features	Benefits for Mosquito abatement districts, Public Health Officials, DoD, IR4 & EPA
Proven effectiveness against resistant and hard-to-kill mosquito species	New effective tool to combat mosquitoes
Favorable toxicity profile	Reduces risk for applicators and the public
No Piperonyl Butoxide or other synergist	Reduces risk for applicators, the public, and the environment
Very Low absorption through skin (1%)	Reduces risk for applicator
Long history of safe use outside the United States (> 30 countries & more than 15 years)	Use with confidence

DeltaGard® Environmental Benefits



Product Features

Benefits for Mosquito abatement districts, Public Health Officials, DoD, IR4 & EPA

Lowest application rate
(0.00045 to 0.00134 lbs. per acre)
½ to 75 times lower vs. competitive products

Significantly reduces the amount of pesticide applied to the environment

FFAST water-based formulation
No oil or VOC's

No oil or VOC exposure to people and the environment

Highly absorptive / immobile in soil

Little potential to leach into groundwater

Low solubility in water

Little potential to leach into groundwater

Expect All Crop Tolerance

Freedom to Operate

DeltaGard® Public Health Insecticide



Science for a Better Life.®

Any Questions



DeltaGard Deposition Summary

Summary of average residues from drift deposition at three different application rates.

$\mu\text{g}/\text{cm}^2$		
Rate (g AI/ha)	Average Vertical Deposition	Average Horizontal Deposition
0.5	0.0092	0.0002
1.0	0.0179	0.0005
1.5	0.0287	0.0014

Very low environmental deposition attributable to very low use rates.



DeltaGard GLP Trial Summaries

		North Carolina Aug-11	North Carolina Aug-11	Texas* Jul-11	California* Jun-11	Florida Apr-11	
24 hour mortality							
Treatment	Distance	<i>C. quinquefasciatus</i> LAB COLONY	<i>An. quadrimaculatus</i> FIELD COLLECTED	<i>Ae. sollicitans</i> (86%) <i>Ae. taeniorhynchus</i> (12%)	<i>Ae. melanimon</i> (72%) <i>C. pipiens</i> (22%)	<i>Ae. aegypti</i> LAB COLONY	Average
UTC	- 50 ft	2.1%	2.3%	2.9%	1.2%	1.2%	1.9%
0.5 g A.I. per ha	100 ft	100%	92.2%	100%	100%	100%	98.4%
	200 ft	100%	85.3%	100%	100%	100%	97.1%
	300 ft	100%	65.9%	100%	100%	100%	93.2%
1.0 g A.I. per ha	100 ft	100%	90.5%	100%	100%	100%	98.1%
	200 ft	100%	86.3%	100%	100%	100%	97.3%
	300 ft	86.3%	66.3%	100%	100%	100%	90.5%
1.5 g A.I. per ha	100 ft	94.4%	93.0%	100%	100%	100%	97.5%
	200 ft	100%	95.5%	100%	100%	100%	99.1%
	300 ft	100%	85.2%	100%	100%	100%	97.0%

*Field collected, others:

P. columbiae (0.8%)

An. quadrimaculatus (0.1%)

C. salinarius (0.1%)

*Field collected, others:

C. tarsalis (2.8%)

C. erythrothorax (1.8%)

Ae. nigromaculis (0.9%)

An. franciscanus (0.1%)

DeltaGard® Public Health Insecticide **Science for a Better Life®**



Trial work in 2014 Available Jan 2015
Any Questions