



# Science for Your Protection

## Biogents Sweetscent Lure Increases the Collection Rate of *Aedes aegypti* and *Aedes albopictus* in Commercially Available Mosquito Traps

Ingeborg Schleip, Daniel Kline, Joyce Urban, Scott Willis, Charles Abadam, Jay Kiser, Karen Akaratovic, Scott Gordon, Martin Geier



Joint International Tropical Medicine Meeting 2017

# The mosquito attractant “BG-Sweetscent”



## The BG-Sweetscent

- developed to enhance the catches of mosquito traps for Asian tiger mosquitoes (*Aedes albopictus*) and yellow fever or dengue mosquitoes (*Aedes aegypti*). Both species are important vectors of diseases such as dengue and chikungunya
- imitates human scent with three components found on the skin
- lasts up to 2 months
- EPA registration in the USA since 2016 (EPA Reg. No.: 87 472 – 1)



# The mosquito attractant “BG-Sweetscent”



The BG-Sweetscent works very well with Biogents mosquito traps.



## Question:

Will the BG-Sweetscent also increase the catch rates for *Aedes aegypti* and *Aedes albopictus* with other commercially available mosquito traps?



# Seven tested mosquito traps in the USA

Test of six commercially available traps for homeowner use and one researcher trap:

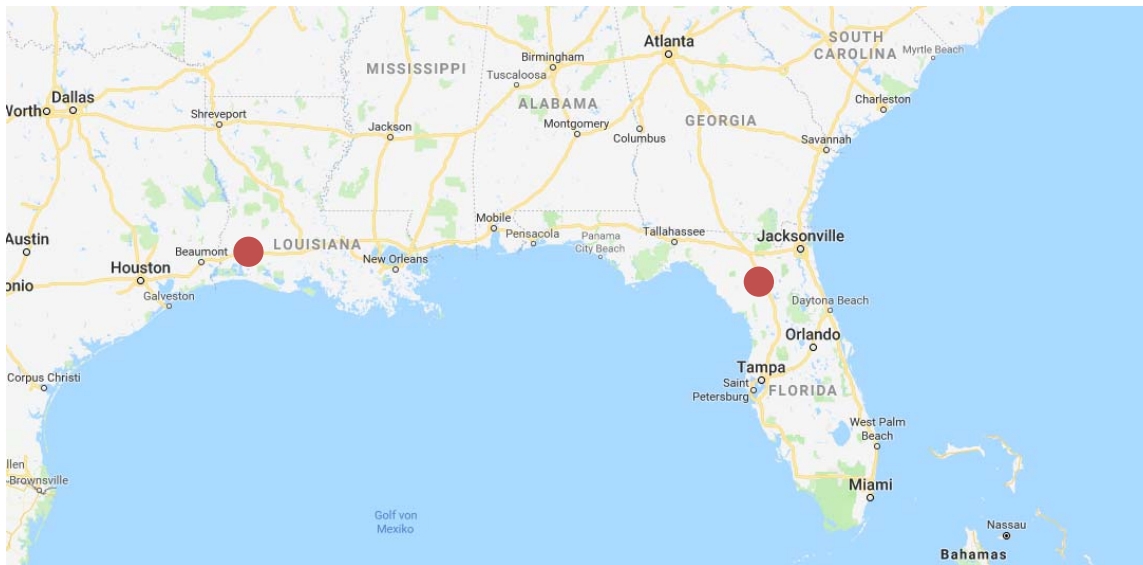
- Price ranging from USD 49-140
- Bought from
  - local home improvement stores
  - online merchants

						
Dynatrap DT2000XL / Dynatrap DT1000-12V	Bite Shield MK06 Protector	Blue Rhino Bite-Guard SVE6211	MosClean UV LED	Galaxie Flowtron PV75	Black Flag Zapper	CDC Miniature Light Trap
USD 136.45 / 99	USD 69.99	USD 59.97	USD 49.95	USD 66.55	USD 45.03	USD 106
Suction trap	Suction trap	Suction trap	Suction trap	Suction trap	Zapper trap Electrocutation	Suction trap



# Field studies with traps for homeowner use

Two studies from independent organisations tested different traps with similar study design:



Gainesville, Florida (USDA (United States Department of Agriculture)):  
*Aedes aegypti* and *Aedes albopictus*  
5 different traps, 20 trap nights

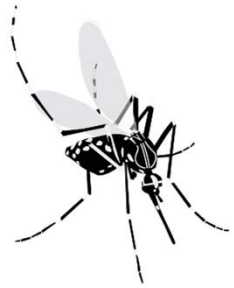
Lake Charles, Louisiana (Calcasieu Mosquito Control):  
*Aedes albopictus*  
3 different traps, 36 trap nights

- Each trap was tested with and without the BG-Sweetscent attractant
- Modified Latin square and a Latin square test
- Switching trap position/location
- No CO<sub>2</sub> was added to the traps

# Results: Gainesville, Florida



*Aedes aegypti*



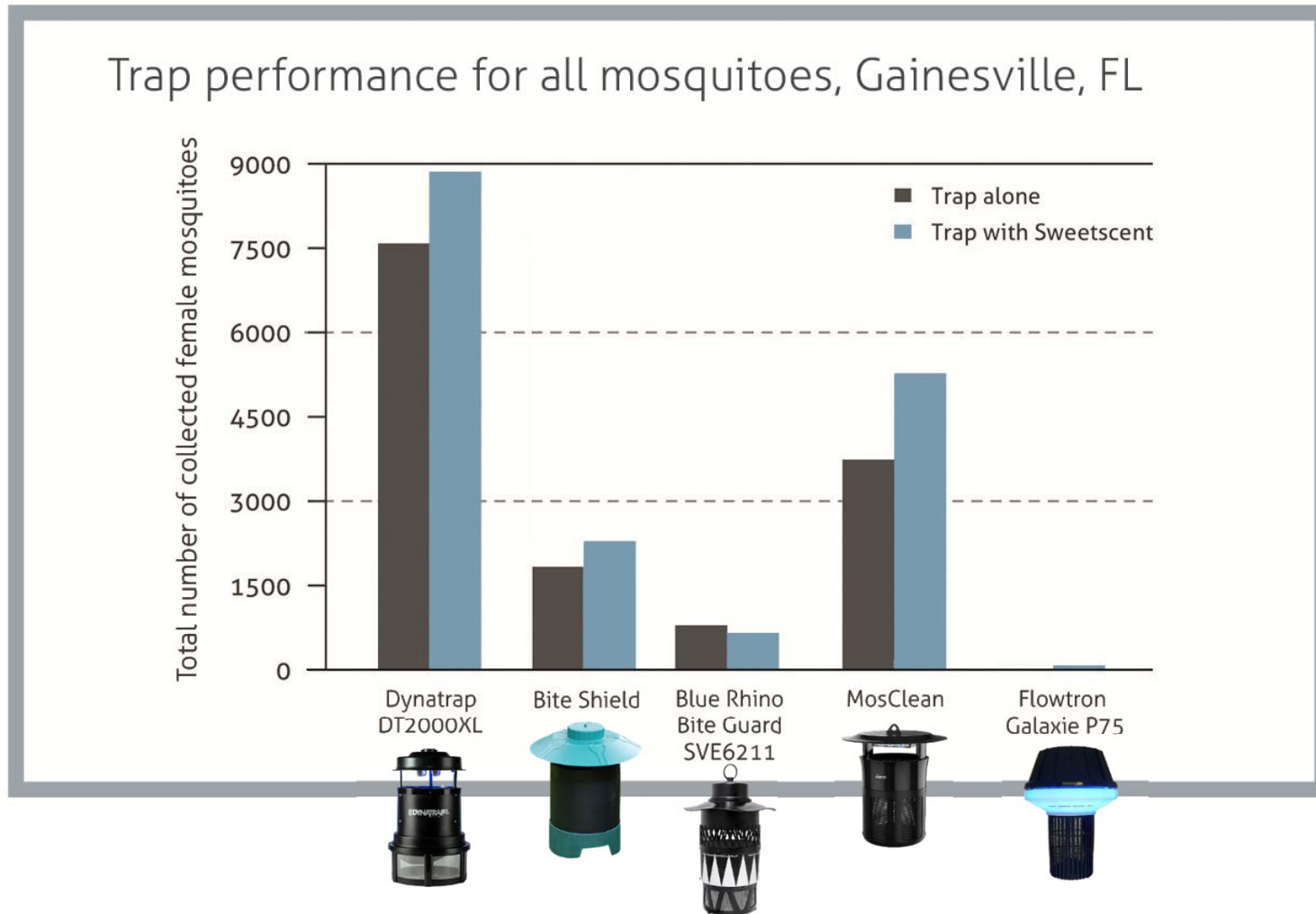
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Increase in catch rates with BG-Sweetscent	<b>6x</b>	<b>10x</b>	<b>1.2x</b>	<b>10x</b>																					
Total number collected ♀♀	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>3</td><td>18</td></tr> </table>	-	+	3	18	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>1</td><td>10</td></tr> </table>	-	+	1	10	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>5</td><td>6</td></tr> </table>	-	+	5	6	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>4</td><td>39</td></tr> </table>	-	+	4	39	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>0</td><td>0</td></tr> </table>	-	+	0	0
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*Aedes albopictus*



	Dynatrap DT2000XL	Bite Shield MK06 Protector	Blue Rhino Bite-Guard SVE6211	MosClean UV LED	Galaxie Flowtron PV75																				
	Suction trap	Suction trap	Suction trap	Suction trap	Suction trap																				
Increase in catch rates with BG-Sweetscent	<b>2x</b>	<b>9x</b>	<b>2x</b>	<b>4.5x</b>																					
Total number collected ♀♀	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>21</td><td>46</td></tr> </table>	-	+	21	46	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>3</td><td>28</td></tr> </table>	-	+	3	28	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>13</td><td>29</td></tr> </table>	-	+	13	29	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>6</td><td>27</td></tr> </table>	-	+	6	27	<table border="1"> <tr><td>-</td><td>+</td></tr> <tr><td>0</td><td>1</td></tr> </table>	-	+	0	1
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# Results: Gainesville, Florida

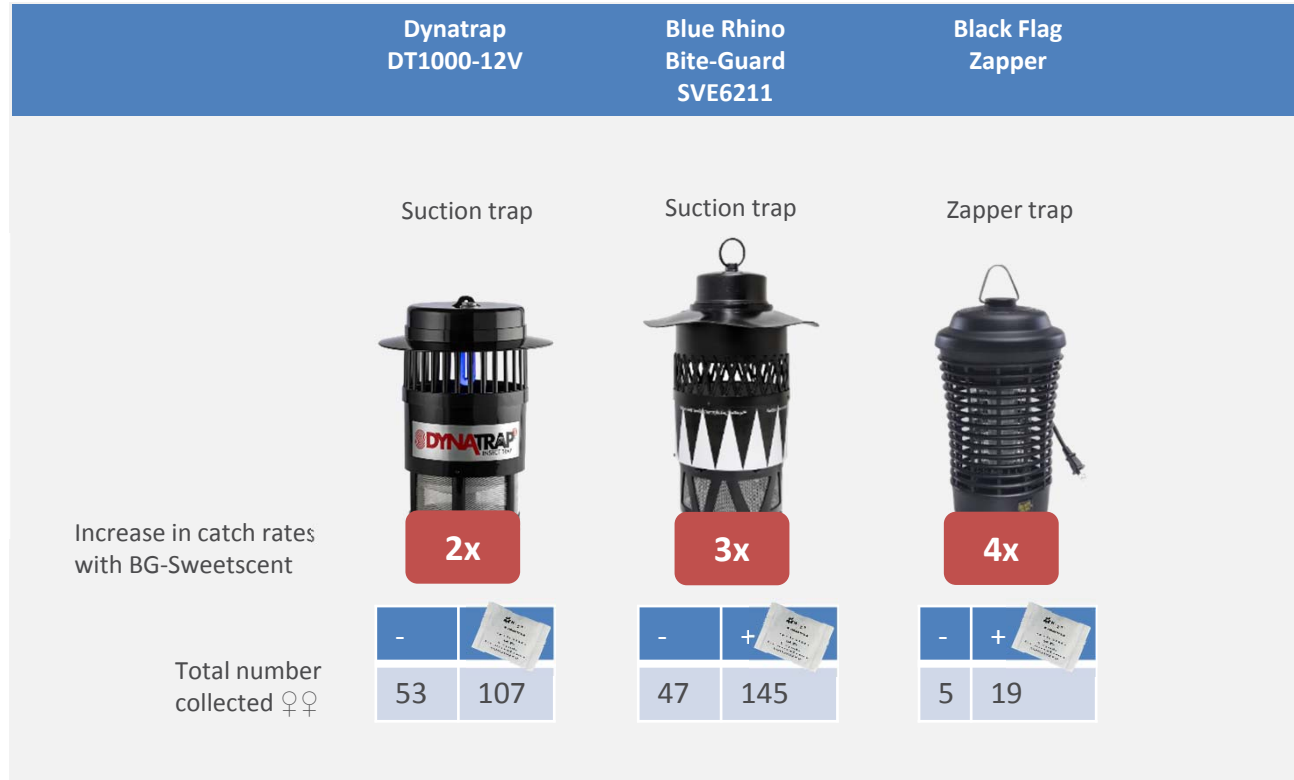


For all trap types except the Bite Guard, catch rates for all mosquitoes could be improved.

# Results from Lake Charles, Louisiana

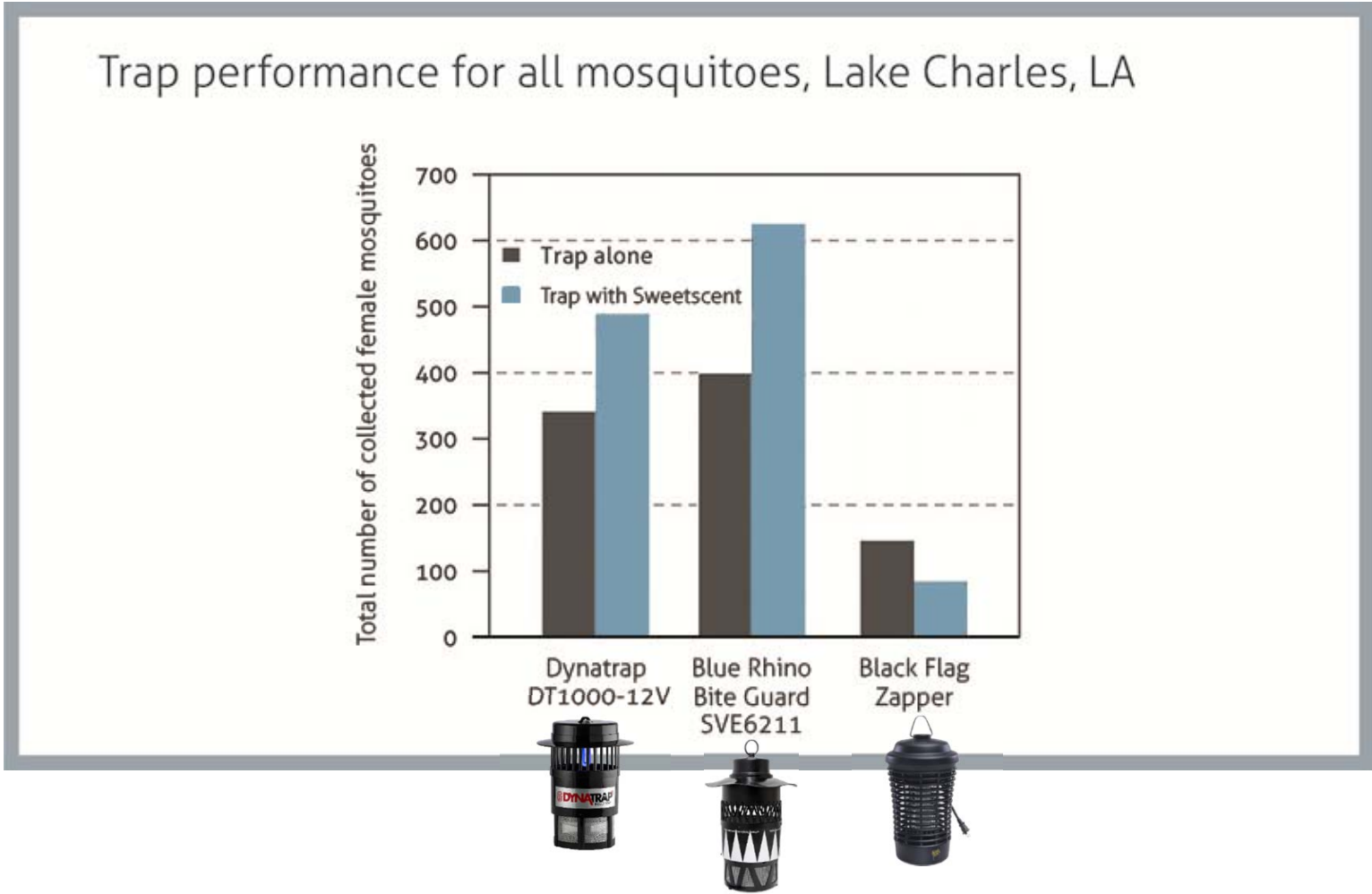


*Aedes albopictus*





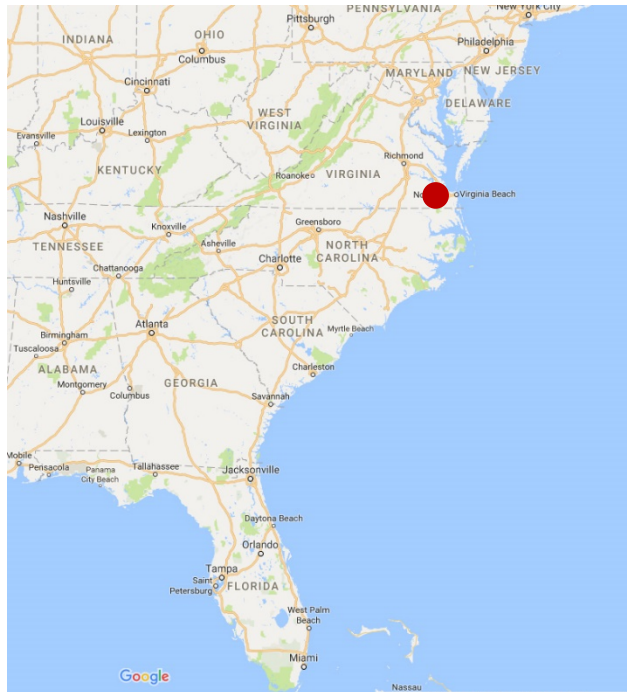
# Results from Lake Charles, Louisiana



For two trap types, catch rates for all mosquitoes could be improved, for the Black Flag (zapper trap) it decreased.

## Field study with a research trap: CDC light trap

A study from an independent organisation tested the widely used research trap „CDC miniature light trap“:

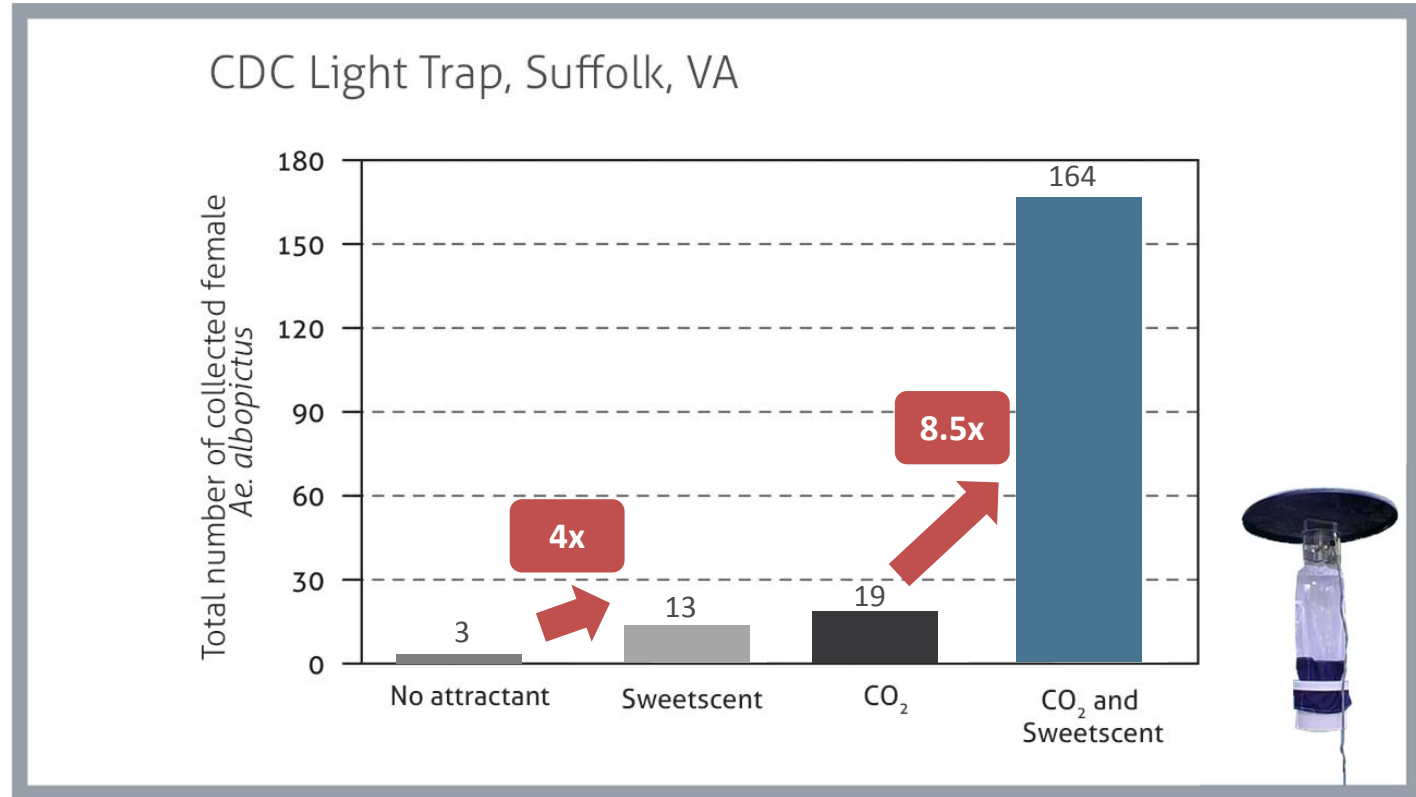


Suffolk, Virginia (Suffolk Mosquito Control):  
*Aedes albopictus*,  
4 CDC traps, 8 trap nights

- Traps were tested without attractant, with BG-Sweetscent, with CO<sub>2</sub>, and with BG-Sweetscent and CO<sub>2</sub>
- With incandescent light
- Latin square test
- Switching trap position/location

# Results from Suffolk, Virginia

*Aedes albopictus*



- 4 fold increase for CDC light traps without CO<sub>2</sub> when run additionally with BG-Sweetscent
- 8.5 fold increase for CDC light traps with CO<sub>2</sub> when run additionally with BG-Sweetscent
- Great example for the synergistic effect of CO<sub>2</sub> and BG-Sweetscent

# Summary

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## Homeowner traps

- Study in Florida:



- 2 - 4.5 times more captured *Aedes albopictus*
- 1.2 - 10 times more captured *Aedes aegypti*

- Study in Louisiana:



- 2 - 4 times more captured *Aedes albopictus*

## CDC miniature light trap

- Study in Virginia:



- BG-Sweetscent and CO<sub>2</sub> are synergists → 8.5 times more captured *Aedes albopictus* than just with CO<sub>2</sub>

## Summary

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- BG-Sweetscent can greatly increase the catching success for *Ae. aegypti* and *Ae. albopictus* when using mosquito traps for homeowner use
- For mosquito control programs using CO<sub>2</sub> baited CDC light traps, the addition of BG-Sweetscent can dramatically increase collections of *Ae. albopictus*
- Additionally, in most traps tested, adding BG-Sweetscent also increased overall mosquito collections
- **BG-Sweetscent is the first attractant for *Ae. aegypti* and *Ae. albopictus* that is scientifically proven to work**





# Acknowledgements



## Thank you to the authors of the studies:

- Daniel Kline and Joyce Urban from the CMAVE of the USDA (United States Department of Agriculture)
- Scott Willis from the Calcasieu Mosquito Control
- Charles Abadam, Jay Kiser, and Karen Akaratovic from the Suffolk Mosquito Control
- Scott Gordon and Martin Geier from Biogents AG



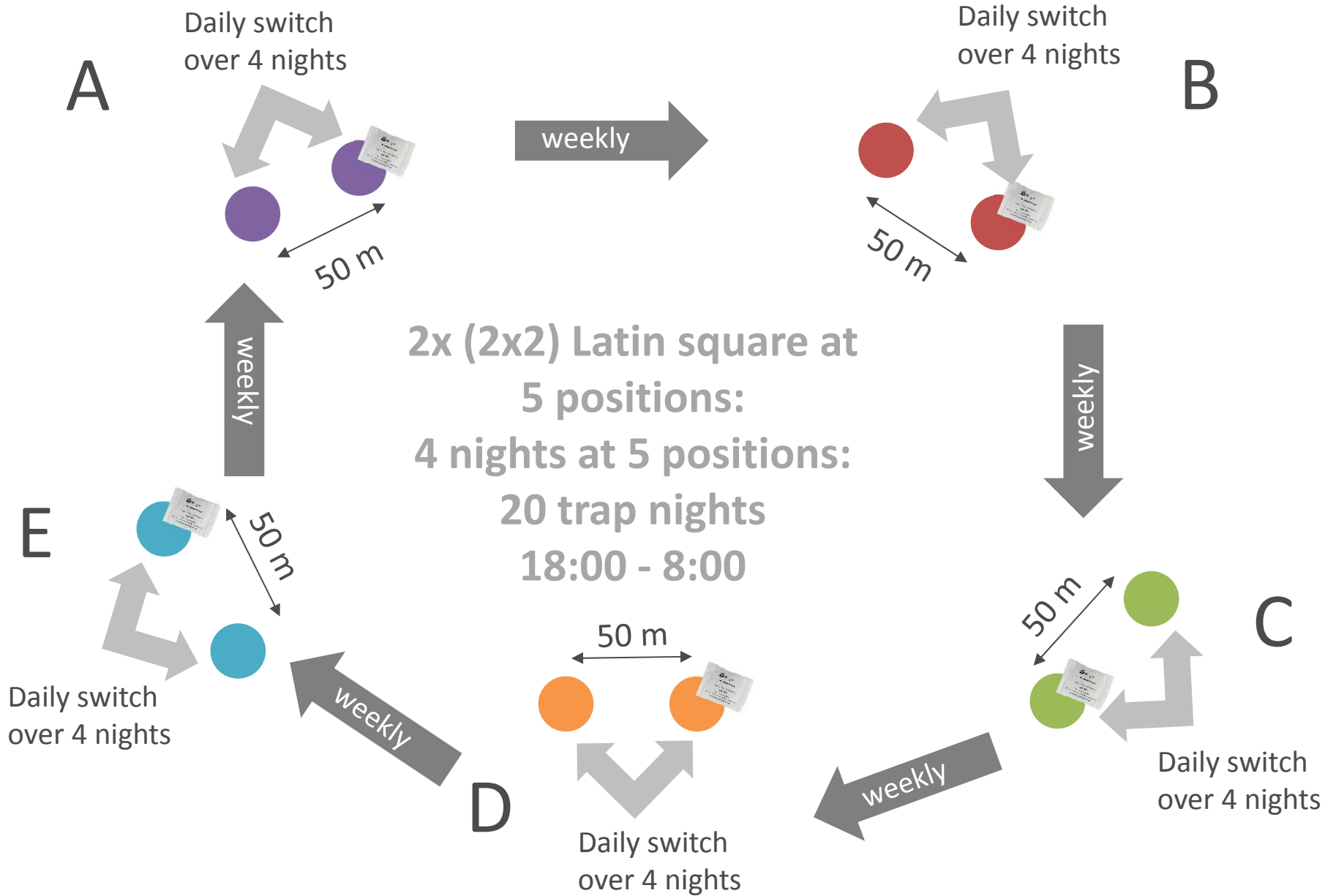
## Thank you for your attention!

The presentation is available at [www.biogents.com/pdf/ccs.pdf](http://www.biogents.com/pdf/ccs.pdf)

# Appendix



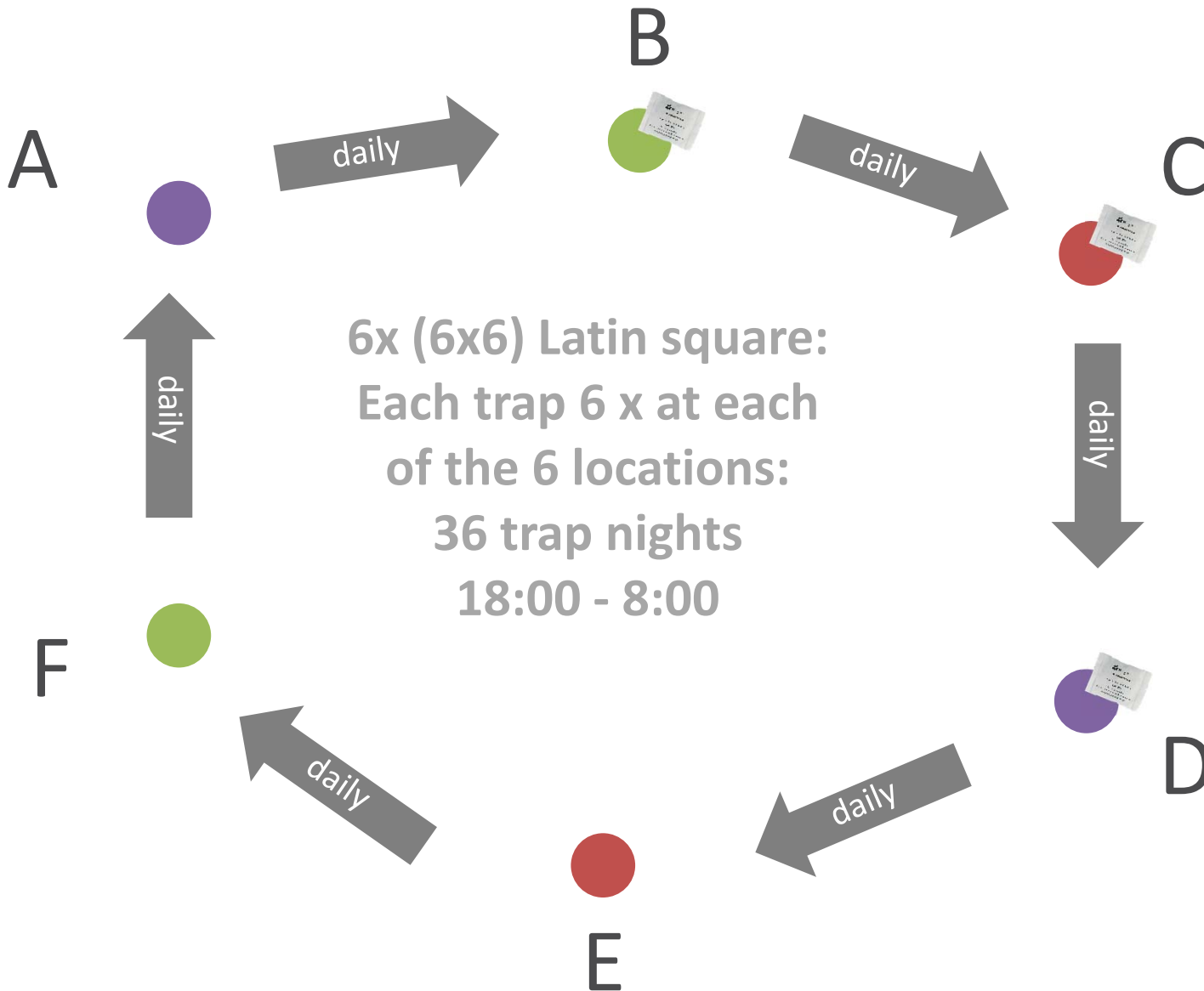
# Study design in Gainesville, Florida





# Study design in Lake Charles, Louisiana: Latin square Biogen

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# Study design in Suffolk, Virginia



A



B



2x (4x4) Latin square:  
Each trap 2 x at each  
location:  
8 trap nights  
18:00 - 8:00



D



C



# Tested mosquito traps



<p>Dynatrap DT2000XL / Dynatrap DT1000-12V</p>	<p>Bite Shield MK06 Protector</p>	<p>Blue Rhino Bite-Guard SVE6211</p>	<p>MosClean UV LED</p>	<p>Galaxie Flowtron PV75</p>	<p>Black Flag Zapper</p>	<p>CDC Miniature Light Trap</p>
<p>UV bulbs + TiO<sub>2</sub>, fan, warmth</p>	<p>UV bulbs + TiO<sub>2</sub>, fan, warmth</p>	<p>UV bulbs + TiO<sub>2</sub>, fan, warmth</p>	<p>UV LEDs + TiO<sub>2</sub>, fan</p>	<p>UV bulbs + fan, warmth</p>	<p>UV bulbs + warmth</p>	<p>Incandescent light, fan</p>

## Collected mosquito species

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Study in Louisiana:

*Psorophora ferox*

*Ps. ciliata*

*Ps. columbiae*

*Mansonia titillans*

*Culex quinquefasciatus*

*Cx. salinarius*

*Cx. nigripalpus*

*Cx. erraticus*

*Cx. coronator*

*Aedes albopictus*

*Ae. aegypti*

*Ae. atlanticus*

*Ae. fulvus pallens*

*Ae. sollicitans*

*Ae. taeniorhynchus*

*Ae. vexans*

*Anopheles quadrimaculatus*

*An. crucians*

*Coquillettidia perturbans*

Study in Florida:

*Aedes albopictus*

*Ae. aegypti*

*Ae. atlanticus*

*Ae. infirmatus*

*Mansonia perturbans*

*Culex erraticus*

*Uranotaenia spp*

*Anopheles crucians*

## US EPA Approval



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**We received US EPA approval for our BG-Sweetscent.  
The EPA allowed us to use following claims:**

- Mosquito attractant
- Developed for hard-to-catch species of mosquitoes and other biting insects, including those which may transmit Zika virus, Chikungunya or Dengue
- Effective in attracting a broad range of mosquitoes species, including those which may transmit diseases such as West Nile virus, Encephalitis, Zika virus, Chikungunya or Dengue
- Designed for use with any mosquito trap
- Attracts *Aedes albopictus*, Asian Tiger Mosquito
- Increase your catch rates
- Mimics naturally occurring human skin scents which attract mosquitoes