PreVasive

08/05/2020

University of Florida Anastasia Mosquito Control District Research facility

1. Tick Efficacy update
2. Mosquito efficacy update
3. Cup assay and sugar bait attractive efficacy

BigShot/Pestfix performance significantly surpassed Pyrethrins for tick and mosquito efficacy.

2320 South DuPont Highway
Dover, Delaware 19901
agriculture.delaware.gov

DELAWARE DEPARTMENT OF
AGRICULTURE

Telephone: (302) 698-4500
Toll Free: (800) 282-8685
Fax: (302) 697-4483

Certificate of Registration

For Company:
PreVasive USA, Inc. - 6239
Jerry Bond
P.O. Box 1391
Dacula, GA 30019

This certifies that the applicant named herein is licensed to sell the following list of products in the State of Delaware for a period beginning with the actual date of registration and ending June 30, 2022 when sold, offered, or exposed for sale under the brand names and guarantees as described.

Approved By Christopher D Wade Date: 01/23/2020

LIST OF PRODUCTS

	Name	*EPA Number*	*25B?*	*Expiration Date*
1	BAC BOTANTICAL ANTIMICROBIAL CLEANER		☑	07/01/2022
2	BIGSHOT MAXIM		☑	07/01/2022

FIFRA 25b

BIGSHOT Maxim CONCENTRATE

Botanical Mosquito and Agricultural Pest Control

GROWN ORGANICALLY

Safe for animals, fish, humans, and plants
Biodegradable - Bee and Butterfly Friendly
when used as directed

Active Ingredients:	
Cedar Wood Oil	14%
Cinnamon Oil	0.23%
Thyme Oil	0.53%
Inert Ingredients:	
Water, Glycerin, Soap, Isopropyl alcohol	85.24%
Total	100.00%

NET CONTENTS:
128 FL. OZ.

KEEP OUT OF REACH OF CHILDREN

"EPA Exempted Product" "this 25(b) product is exempt from registration with the Federal Environmental Protection Agency under FIFRA regulation".

BIGSHOT Maxim is a mosquito Larvicide, Pupicide, and adulticide.

First Aid: Avoid contact with eyes. If in eyes, flush with clean water for 15 minutes. If on skin irritation occurs, rinse with water. If irritation persists, contact a physician. Have the product container or label with you when calling or visiting a doctor for treatment.

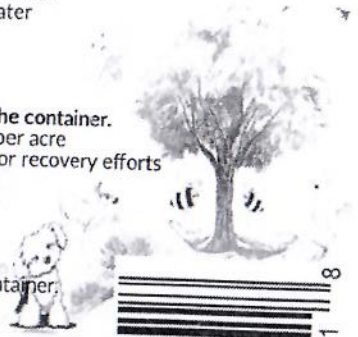
Directions of Use: Municipality. Mosquito crepuscular knockdown.
Concentration dilution recommendations for mosquito and tick control: knockdown crepuscular activity. This application is using directly from the container with no dilution for special apparatus application.
- 15 to 50 um particle – 2 to 4 ounces per minute or 2 to 4 ounces per acre
- 1-15 um ultra-fine particle 4 ounces per minute - smoke

Commercial/Residential application; backpack fog/misters/hand sprayer recommended dilutions:
- 25-45 days; dilution 12-19.5 ounces per 128 ounces clean water
- 21-30 days; dilution 12-19.5 ounces per 3 gallons clean water

Stationary Misters
- 1.5-3 ounces per gallon

Agriculture Pest Control Application: no Dilution direct from the container.
- 15-50 um particle – 2-4 ounces per minute or 2-4 ounces per acre
- Larger particles with water dilution 19.5 ounces per acre for recovery efforts pest and fungus
- Larger particles with water dilution 12-15 ounces per acre for pest maintenance

Storage and Disposal:
Store at room temperature. Do not freeze. Do not reuse the container. Dispose of in trash or offer for recycling.



SHAKE WELL BEFORE USE

PATENT PENDING

MADE IN USA

DISTRIBUTED BY PREVASIVE USA, LLC
3643 EXPLORER TRAIL. STE.D
OAKWOOD, GA 30566
18559666772

PreVasive

8 60002 15851 8

SAFETY DATA SHEET

FIFRA - 25B

BIGSHOT Maxim

CONCENTRATE

SECTION I: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: BIGSHOT Maxim

DISTRIBUTED by: PreVasive USA, LLC.

ADDRESS: 3643 Explorer Trail
Suite D, Oakwood, GA
30566

EMERGENCY :

855.966.6772

SECTION II: INGREDIENT INFORMATION

Ingredients	CAS#	Wt%	OSHA-TWA	ACGIH-TWA	LD_{50}
Cedar Wood Oil	68990-83-0	14% - 16%	Not applicable	Not Applicable	980 g/kg (Oral/Rat)
Cinnamon Oil	8015-91-6	0.23% - 0.99%	Not applicable	Not Applicable	980 g/kg (Oral/Rat)
Thyme Oil	8007-46-3	0.25% - 0.54%	Not applicable	Not Applicable	980 g/kg (Oral/Rat)

Other Ingredients - Water, Glycerin, Soap, Isopropyl Alcohol.

Non WHMIS regulated product.

SECTION III: HAZARDOUS IDENTIFICATION

Classified as Category IV by the U.S. Environmental Protection Agency per Toxicity Profile Review for all routes of exposure: no Signal Word, Precautionary Statements or First Aid Statements required on product label.

Eye Contact:	EPA Category IV ("minimal effects")
Skin Contact:	EPA Category IV ("no irritation")
Inhalation:	EPA Category IV (>2 mg/L)
Ingestion:	EPA Category IV (>5,000 mg/kg)
Dermal Sensitizer	EPA Category IV ("not a sensitizer")
Dermal Toxicity	EPA Category IV (>5,000 mg/kg)
Chronic Effects Carcinogenicity:	No ingredients listed IARC or NTP or ACGIC. Non-hazardous by WHIMIS/OSHA criteria.
Teratogenicity, Mutagenicity, Reproductive Effects:	The ingredients in this product were found not to be mutagenic when tested by the Ames Assay, (OECD Guidelines for chemical testing, sec.471)

SECTION IV: FIRST AID MEASURES

If irritation occurs, rinse affected area thoroughly with cool water. If swallowed, drink plenty of water.

SECTION V: FIRE FIGHTING MEASURES

Flammability:	Non-flammable.
Flash Point deg (C,TCC) :	Not Applicable
Means of Extinction:	As for surrounding fire.
Special Fire Hazards:	As for surrounding fire.
Auto-ignition temperature:	Not applicable.
Flame propagation or burning rate of solid:	Not applicable.
Sensitivity to static discharge:	Not applicable
Unusual Fire and Explosion Hazards. Hazardous	None expected. As per surrounding fire. Oxides of carbon, oxides of nitrogen and sulphur.

decomposition products:

SECTION VI: ACCIDENTAL RELEASE MEASURES

Leak and Spill Procedures: Small spills may be absorbed with non-reactive absorbent and placed is suitable, covered container. For large quantities, dispose of in accordance with local, provincial/ state or federal regulations.

SECTION VII: HANDLING AND STORAGE

Storage Requirements: Keep out of reach of children. Store in a closed container away from incompatible materials.
Storage temperature (°C) Ambient to 30 °C (must be stored above 0 °C at all times)
Transport temperature (°C) Ambient to 30 °C (must be stored above 0 °C at all times.)
Keep container closed. Do not reuse empty containers.

SECTION VIII: EXPOSURE CONTROL/PERSONAL PROTECTION

Gloves: None required.
Eye Protection: None required.
Respiratory Protection: None required.
Other Protective Equipment: As required by employer code.
Engineering Controls: General ventilation adequate.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point (deg C)	100	**Specific Gravity (H_20 = 1):**	1.000 at 23 C	**Evaporation Rate (water=1):**	Similar
% Volatile (Wt%):	Not determined	**Solubility in water:** Complete	Complete	**pH:**	6.5
Physical State:	Liquid	**Viscosity:** Water like to 90-125cps	Water like	**VOC (Wt %)**	< 1%
Appearance / Odor:	Transparent clear amber liquid with thyme and spicy odor. No added colorant				

SECTION X: STABILITY AND REACTIVITY

Conditions for Chemical Instability: Stable
Incompatible Materials: Strong oxidizing agents, strong acids
Hazardous Decomposition Products: Oxides of carbon, Oxides of Nitrogen and suphur when heated

SECTION XI: TOXICOLOGICAL INFORMATION

Classified as Category IV by the U.S. Environmental Protection Agency per Toxicity Profile Review for all routes of exposure: no Signal Word, Precautionary Statements or First Aid Statements required on product label.

See Section II for LD_{50} for thymol.

Acute Oral Toxicity LD50: >5000 mg/Kg (EPA Category IV)
Acute Dermal Toxicity LD50: >5000 mg/Kg (EPA Category IV)
Acute Inhalation Toxicity LC50: >2.01 mg/L (EPA Category IV)
Acute Eye Irritation Minimal, all effects cleared in 24 hours (EPA Category IV)
Acute Dermal Irritation Slight, no erythema or edema at 72 hours (EPA Category IV)
Skin Sensitization Not a sensitizer (EPA Category IV)

SAFETY DATA SHEET
BIGSHOT Maxim
CONCENTRATE

SECTION XII: ECOLOGICAL INFORMATION

Biodegradability: Full formulation has been tested and is readily biodegradable under OECD 301 E
Possible hazardous short-term degradation products are unlikely and the products of degradation are less toxic than the original product.

Aquatic Toxicity: low aquatic toxicity.
Vibrio fischeri
CI 50-5 min 560 mg/L
IC 95 %-5 min 500-600 mg/L
CI 50-15 min 660 mg/L
IC 95 %-15 min 540-780 mg/L

SECTION XIII: DISPOSAL CONSIDERATIONS

Dispose of in accordance to all local, provincial/state and federal regulations

SECTION XIV: TRANSPORTATION

T.D.G. Classification: Not regulated
D.O.T. Classification: Not regulated

SECTION XV: REGULATORY INFORMATION

Occupational Health and Safety Regulations:
WHMIS Class: Not regulated.

OSHA & WHMIS: SDS prepared pursuant to the Hazard Communication Standard (CFR29.1920.1200) and Canadian WHMIS regulations

Toxic Substances Control Act (TSCA) All ingredients are registered on the Chemical Substances Inventory

SECTION XVI: OTHER INFORMATION

Date:	Sept 10, 2019	**Prepared By:**	PreVasive USA, LLC	**Telephone:**	1-855-966-6772

Disclaimer: Information for this safety data sheet was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond the control of supplier, it is assumed that users of this material; have been fully trained according to the mandatory requirements of WHMIS. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries for consequential damages, which may result from the use or reliance on any information contained in this form.

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BigShot/Pestfix performance significantly surpassed Pyrethrins for tick and mosquito efficacy.

Latest update from AMCD/University of Florida and the Anastacia Mosquito Control District

Anastasia Mosquito Control District of St. Johns County
120 EOC Drive
St. Augustine, FL 32092

Director: Dr. Rui-De Xue

The BigShot as active ingredient of the attractive toxic sugar baits against 3 species of adult mosquitoes showed effective from 24 hr. Attached is Dr. Qualls group data for your reference. We hired one intern student who will use BigShot as active ingredient of the ATSB against resistant *Aedes aegypti* and try to figure whether BigShot natural insecticide can overcome the resistant situation resulted by pyrithorid insecticides.

The data about testing in cups against adult mosquitoes showed that BigShot resulted in 100% mortality at 24h 48h, but the adulticide permethrin used by majority of mosquito control program for ULV did not result in 100% mortality. ULV for / BigShot to begin

Two Studies - Mosquito Control

- VIA CUP BIOASSAY
- THE EFFICACY OF BIGSHOT/PESTFIX AS A TSB (TOXIC SUGAR BAIT FOR MOSQUITOS)

Jerry Bond
Industrial Hygiene Director
PreVasive USA

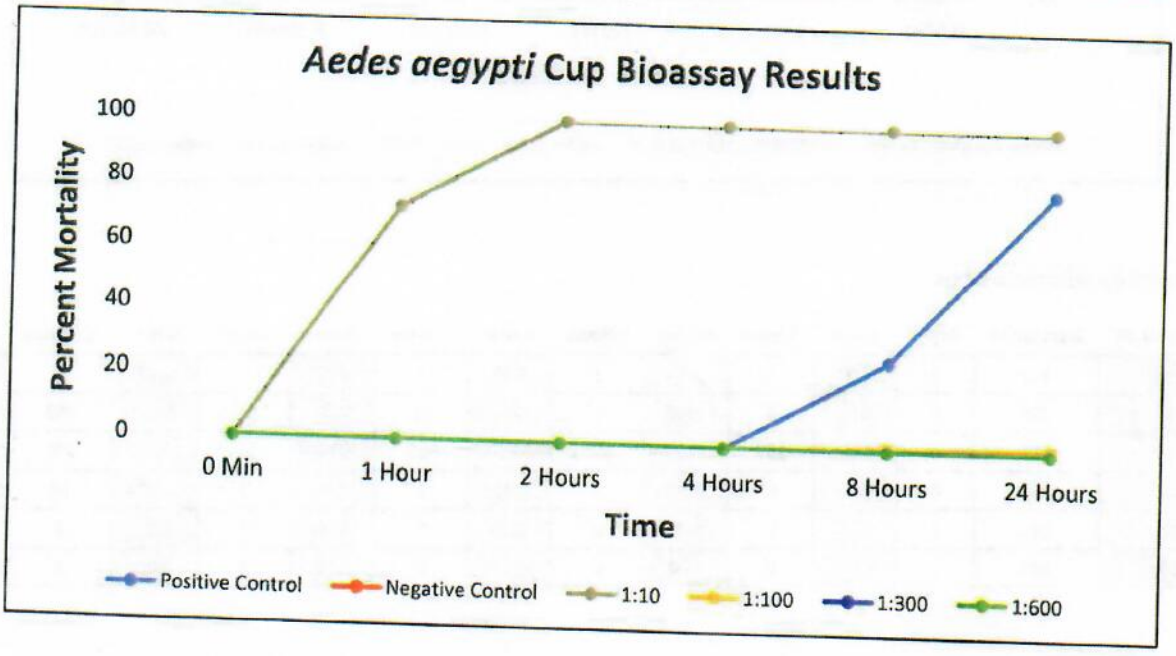
Summary of Bigshot Maxim Trials via Cup Bioassays

We conducted three trials with 5 replicates each of Bigshot Maxim at four dilutions (1:10, 1:100, 1:300, and 1:600). Dilutions were selected based on the micrograms of active ingredient. The dilution 1:100 (~14,000 micrograms) is representative of the suggested application rate. We then selected one at a higher concentration (1:10) and two more at lower concentrations (1:300 and 1:600). Each trial also had a negative (water) and positive (permethrin) control. Each replicate cup had 15 (plus or minus) adult female mosquitoes. Three trials were run for each of the following species: *Aedes aegypti, Culex quinquefasciatus,* and *Anopheles quadrimaculatus.*

For all three species, Bigshot Maxim at a dilution of 1:10 was more effective compared to the positive controls. This dilution was even effective for *Culex quinquefasciatus* when the positive control wasn't. No other dilution had an effect on any of the species.

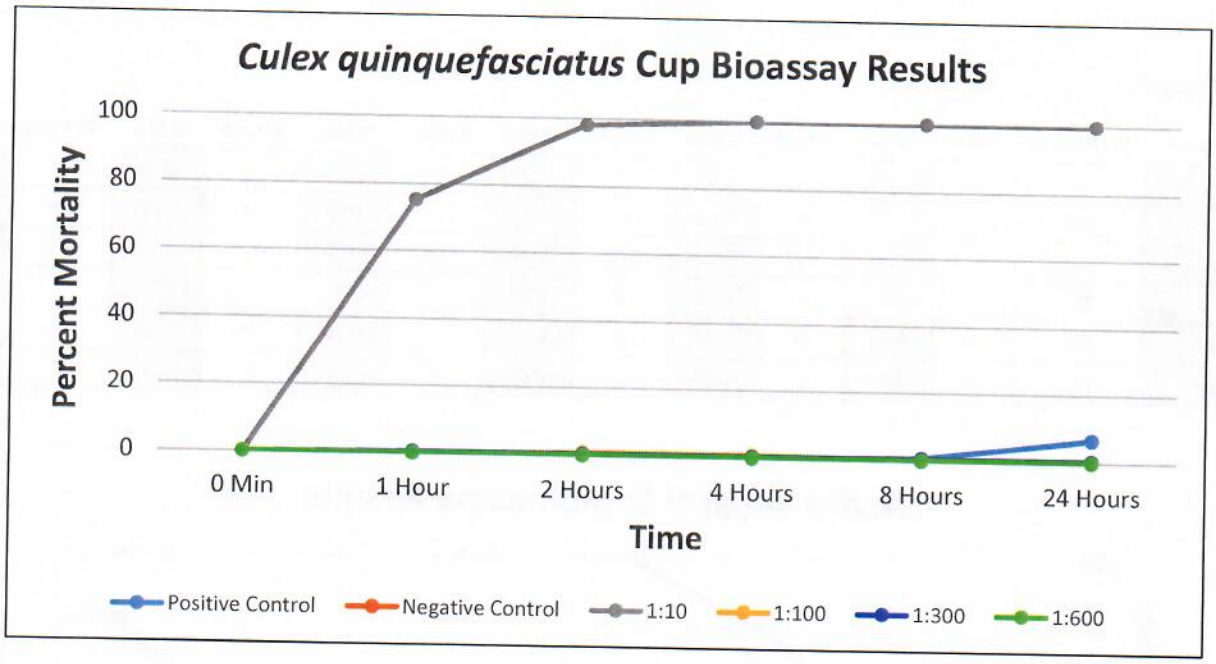
Aedes aegypti

Concentration	Start Count	0 Min	% Mor	1 Hour	% Mor	2 Hours	% Mor	4 Hours	% Mor	8 Hours	% Mor	24 Hours	% Mor
Neg	286	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Pos	291	0	0.00	0	0.00	0	0.00	0	0.00	79	27.15	234	80.41
1:10	266	0	0.00	192	72.18	266	100.00	266	100.00	266	100.00	266	100.00
1:100	259	0	0.00	0	0.00	0	0.00	0	0.00	2	0.77	3	1.16
1:300	277	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1:600	277	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00



Culex quinquefasciatus

Concentration	Start Count	0 Min	% Mor	1 Hour	% Mor	2 Hours	% Mor	4 Hours	% Mor	8 Hours	% Mor	24 Hours	% Mor
Neg	287	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Pos	300	0	0.00	0	0.00	0	0.00	0	0.00	2	0.67	20	6.67
1:10	276	0	0.00	208	75.36	271	98.19	276	100.00	276	100.00	276	100.00
1:100	259	0	0.00	0	0.00	2	0.77	2	0.77	0	0.00	0	0.00
1:300	254	0	0.00	1	0.39	1	0.39	1	0.39	1	0.39	1	0.39
1:600	263	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00



Anopheles quadrimaculatus

Concentration	Start Count	0 Min	% Mor	1 Hour	% Mor	2 Hours	% Mor	4 Hours	% Mor	8 Hours	% Mor	24 Hours	% Mor
Neg	268	0	0.00	1	0.37	1	0.37	1	0.37	1	0.37	1	0.37
Pos	255	0	0.00	0	0.00	1	0.39	27	10.59	124	48.63	252	98.82
1:10	265	0	0.00	198	74.72	259	97.74	265	100.00	265	100.00	265	100.00
1:100	250	0	0.00	0	0.00	1	0.40	1	0.40	3	1.20	26	10.40
1:300	241	0	0.00	0	0.00	0	0.00	0	0.00	2	0.83	2	0.83
1:600	266	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.75

The efficacy of Bigshot as a TSB (Toxic Sugar Bait) was evaluated against *Aedes aegypti*, *Culex quinquefasciatus*, and *Anopheles quadrimaculatus*.

Three evaluations were conducted per species using a 1% Bigshot TSB prepared in a 10% sucrose solution containing a 0.5% colored dye for observing if the mosquitoes fed on the TSB. Four cages per trial each with 100 male and 100 female mosquitoes, were evaluated. One cage was set up as the control containing two cotton feeding stations baited with a 10% sugar solution, and the three other cages contained two cotton feeding stations per cage baited with the 1% Bigshot TSB. Mortality was recorded at 24, 48, and 72 hours. For the males of all three species, 85% or more died withing the first 24 hours after exposure to the ATSB. For *Ae. aegypti* females, greater than 50% mortality was observed after 24 hours, while greater than 50% mortality of *Cx. quinquefasciatus* and *An. quadrimaculatus* females, was observed at 48 hours. At 72 hours, 100% mortality was observed for males of all three species. At 72 hours, 97%, 59%, and 67% mortality of *Ae. aegypti*, *Cx. quinquefasciatus.* and *An. quadrimaculatus* females were reported, respectively (Figures 1, 2 and 3). Of the *Ae. aegypti* that were recorded as dead in the TSB treatment 65.3% of the males and 85.8% of the female's abdomens were colored green compared to 25.3% and 96.3% of the controls recorded as alive at 72 h with green abdomens. For *Cx. quinquefasciatus*, 73.3% of the males and 72.4% of the females recorded as dead had green abdomens. For the controls found alive at 72 h, 19.3% of the males and 34.8% of the females were reported to have green abdomens. For *An. qaudrimaculatus* TSB treatment, 58.5% of the males and 71.3% of the females recorded as dead had green abdomens while in the controls 69.1% of males and 80.4% of females alive after 72h had green abdomens. This demonstrates that mosquito mortality was a result of feeding on the Bigshot TSB suggesting that the Bigshot active ingredients could be used to target the sugar-feeding behavior of these vector mosquitoes for control.

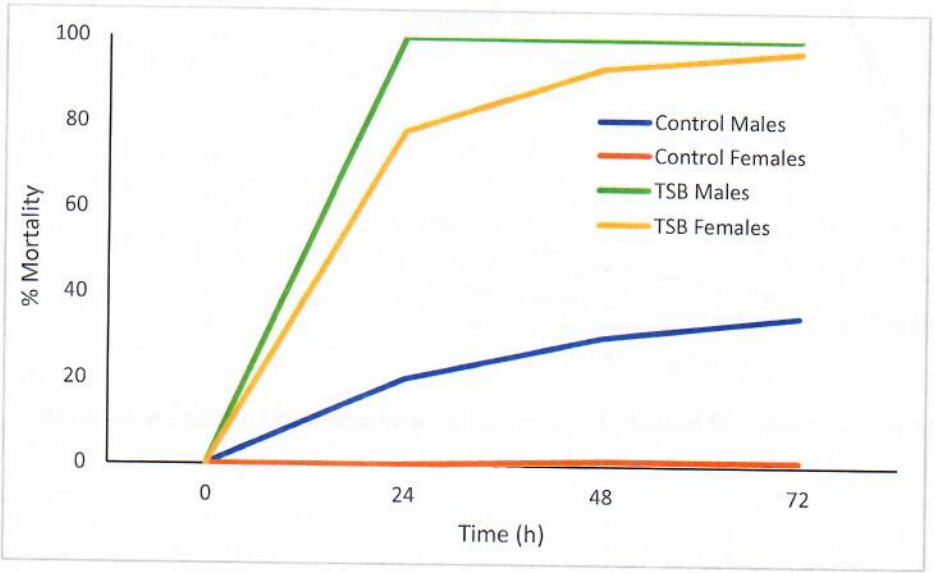


Figure 1 presents the average mortality (72 hours) of *Aedes* aegypti feeding on the ATSB compared to the control.

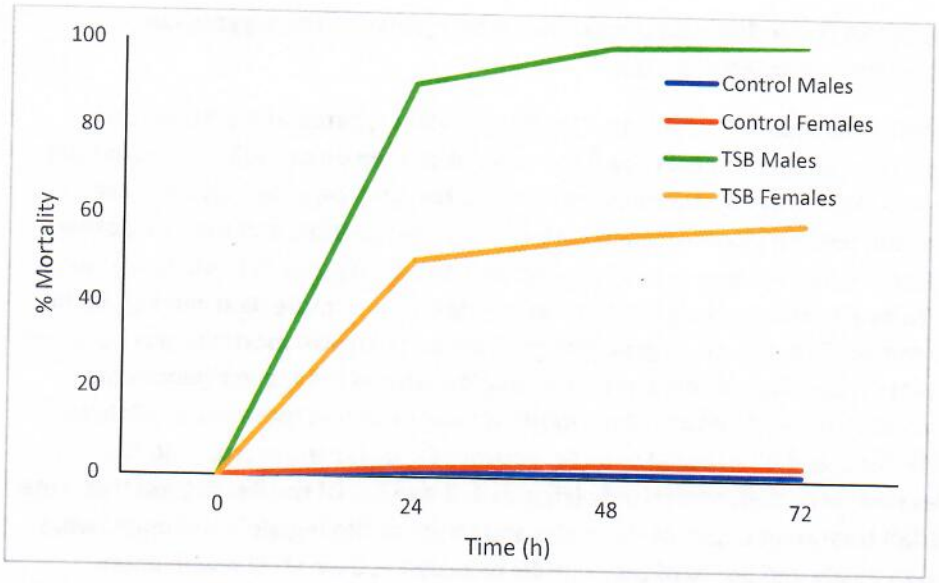


Figure 2 presents the average mortality (72 hours) of *Culex quinquefasciatus* feeding on the ATSB compared to the control.

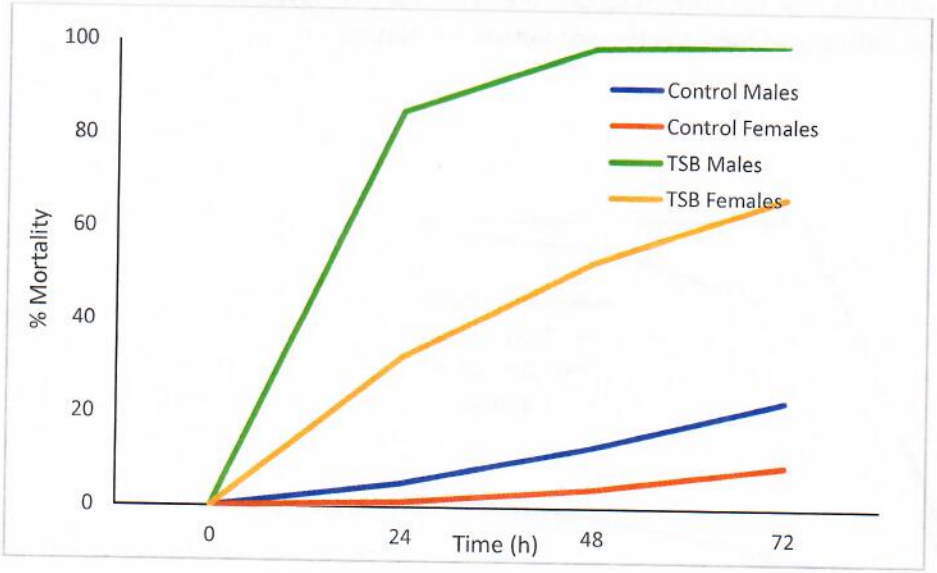


Figure 3 presents the average mortality (72 hours) of *Anopheles quadrimaculatus* feeding on the ATSB compared to the control.

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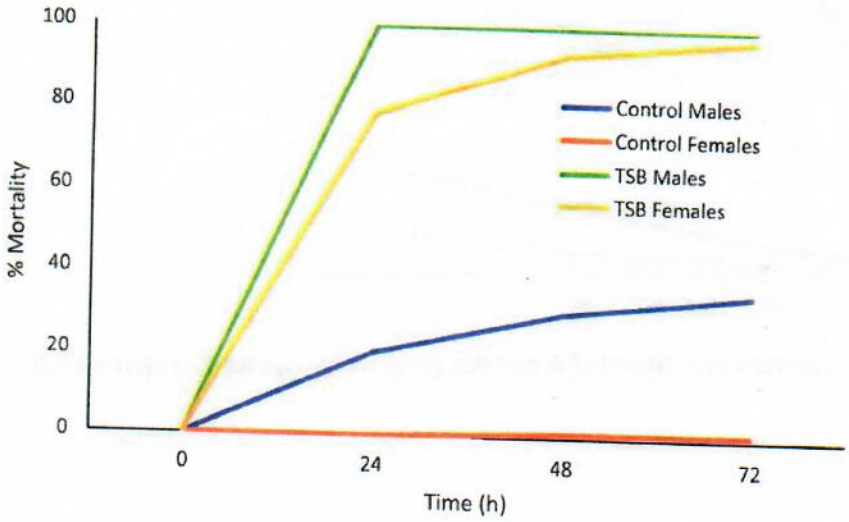

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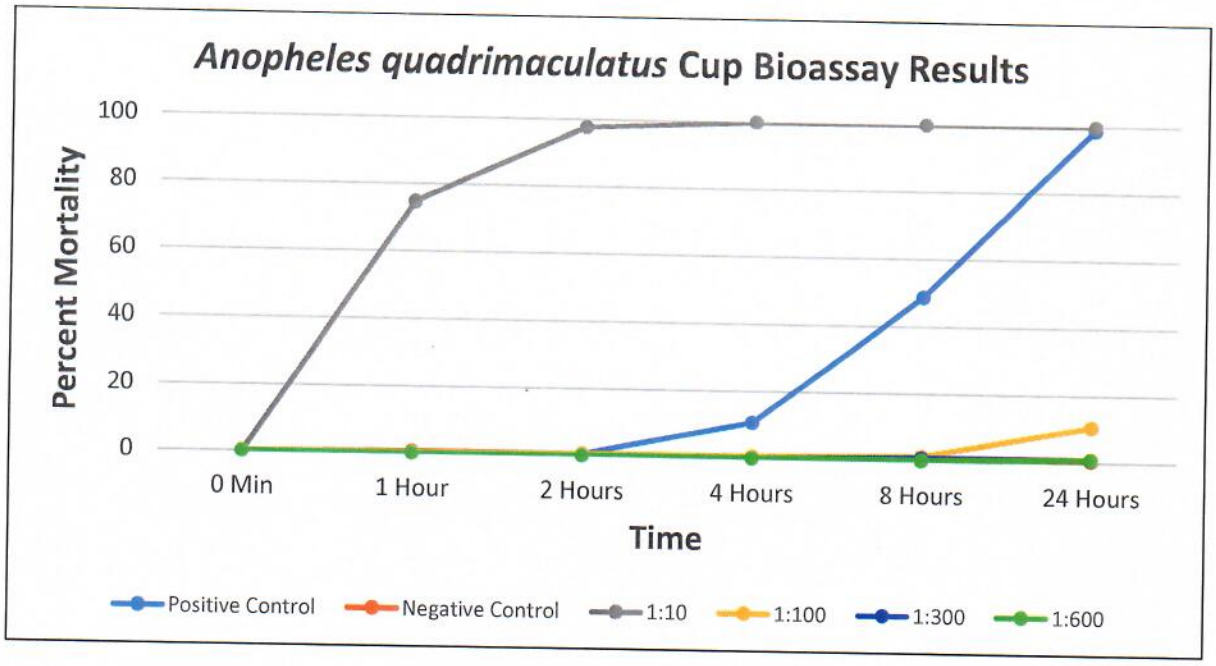
Anopheles quadrimaculatus Cup Bioassay Results
Percent Mortality
100
80
60
40
20
0
0 Min
1 Hour
2 Hours
4 Hours
8 Hours
24 Hours
Time
Positive Control
Negative Control
1:10
1:100
1:300
1:600

Update on Tick Testing

Inbox

Muhammad Farooq 7:23 AM (6 minutes ago)

to me, Rui-de, quallsamcd

Good Morning,

We have completed mortality tests for adults. The mortality decreased significantly on the third day. Mortality tests for nymphs still continue every week as we have significant mortality after 1 week. This week, we will test for week 2. Next week tests will be decided based on results for this week testing.

I am compiling data and will send you next week.

VR
Muhammad Farooq

Latest update from AMCD/University of Florida and the Anastacia Mosquito Control District