Entobac - A New Bti Pesticide for Larval and Adult Mosquito Control

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MEVLABS
Helping People Help Their World™

A Disabled Veteran Owned Small Business
Introduction

• Describe Entobac and Entobac D pesticides
• Delivery
• Laboratory and Field Trials
• Future Path
Entobac as Larvicide

- Kills Larval Mosquitoes
- Used as spray or pellet
- Used with the ProVector™
- Active ingredient is *Bti 10%*
- Uses micro-technology to disperse Bti
- Effective in water - high organic content
- Pellet treats 25 sq ft lasts up to 1 month
Outdoor

Mean Number of Larvae in Live Stock Water Tanks
(Control verses Entobac)
Current effect: $F\ (1,\ 18) = 10.909, \ p< 0.005$
Deposition of Bti by adult mosquitoes killed by Entobac will also kill mosquito larvae (*Aedes aegypti*).

Survival after an average of 3 adult mosquitoes killed by Entobac (contains Bti) were placed into 100 ml water containing 30 larvae (*p*<0.05).
Biological Integrated Detection System
Detected Re-Aerosolized Bti during the 72 hour study
Entobac Pellets can be delivered by hand, paint ball gun, and possibly artillery.
Entobac as Adulticide

• Kills Adult Mosquitoes
• Entobac™ Bait Pad used with ProVector and BFT Bug Fighter
• Used with the ProVector™
• Active ingredient is *Bti* 6.5%
• Mosquito Attractant Bait (MAB)
• Bait Pad lasts about 6 months
Laboratory Trials of ProVector Bti Adulticide Formulation conducted BDIDL-Georgia Southern University (top) and AFRIMS-Walter Reed Army Institute of Research

Figure 1. ProVector Bt - Mosquito Survival After One 24hr Period
Vertical bars denote 0.95 confidence intervals (P < 0.05)

Figure 2. ProVector Bt - Mosquito Survival after One Week

Figure 3. ProVector Bt - Anopheles dirus survival after 10 days
Blind Trials conducted by AFRIMS

Figure 4. ProVector Bt - Aedes aegypti survival after 10 days
Blind Trials conducted by AFRIMS
Simulated Village, Brooklet, Georgia

ProVector Bt - Simulated Village

Mean number of adult mosquitoes collected

- Control site
- Test site

Week 1  Week 2

0  20  40  60  80  100  120  140  160

Week 1

Week 2
Sierra Leone, Roll Back Malaria, WHO
Sierra Leone, collected survey data from heads of family for estimates of adult mosquito number
(based on Boolean logic of descriptors)
Reduction in Mosquito Populations in Ahero and Nyalenda, Kenya

Independent Data Collected by US Army Medical Research Unit, Walter Reed Army Institute of Research and Kenya Medical Research Institute
Ahero/Nyalenda Study

1) After one month,
   a. significant reduction of mosquitoes in the 9 homes with ProVector over the 7 control homes (Chi-square=9.35, p < 0.05).
   b. The mosquito population was reduced by >60% outside homes with ProVectors in them.

2) Mosquitoes returned to normal populations once the bait pads were used up within 5 months.
   a. significant difference between the mean percent growth of the ProVector homes vs. control homes (ANOVA: F(1,13)=10.9, p < 0.05).
   b. 135% lower number of mosquitoes around homes with the ProVector™ with Entobac™ than homes without
Feedback has been positive from NGO collaborators of ProVector Community Projects

Entebbe, Uganda

Photos by: Dr. Louis Mukwaya, Uganda Virus Institute
Reduction of Adult Mosquitoes on Hotel Property in Dominican Republic

Mosquito numbers were significantly reduced after one month of placing ProVector Flower with Entobac on balconies in a hotel complex.
1) Red indicates high and yellow indicates low numbers of mosquitoes in mosquito traps.
2) Hotel staff and management also reported lower numbers of mosquito bites.
Entobac D Adulticide

• Kills Adult Mosquitoes and Flies
• AI - *Bti* 6.5% & Deltamethrin 0.1%
• Entobac™ D Bait Pad - BFT Bug Fighter™
• Applied to Netty Bible Tract
• Super Netty
• Bait Pad lasts 2 to 3 months
Comparison between Control, Entobac and Entobac D on survival of adult flies (*Musca domestica*) and adult Mosquitoes (*Aedes aegypti*).

Chi Square = 27.8, $p \leq 0.05$
Outdoor Prototype of ProVector™ with Entobac D

Reduced mosquito populations within one month in southeast Georgia
The Netty Bible Tract uses colors to attract mosquitoes while providing an opportunity to tell the Wordless Gospel

Black and Red – *Anopheles*
Black and White – *Aedes*
Yellow – *Culex*
Blue - Various fly species

Black represents sin and separation from God
Red represents the blood of Jesus Christ shed for our sins
White represents repentance and the forgiveness of sins

“That if thou shalt confess with thy mouth the Lord Jesus, and shalt believe in thine heart that God hath raised him from the dead, thou shalt be saved. For with the heart man believeth unto righteousness; and with the mouth confession is made unto salvation.”

Romans 10: 9-10
Medical Missions

“If a brother or sister be naked, and destitute of daily food, And one of you say unto them, Depart in peace, be ye warmed and filled; notwithstanding ye give them not those things which are needful to the body; what doth it profit?” James 2: 15-16

200 to 300 Children come into the Freetown Childrens Hospital per Day

We were able to distribute 7,500 Netty Bible Tracts in Sierra Leone
Providing Netty Bible Tracts to Schools in Central America
The Future

- Expanding Vector Control Community Project (> 45 countries)
- Rebuilding after terminating exclusive licensee of the ProVector Flower
- EPA registration
- Add to current foreign registrations (Nigeria, Nicaragua)
- Assisting communities with microbusinesses
- Expanding medical missions support
- New Bed Bug trap/IGR formulation
- New Flea trap/formulation
- Outdoor ProVector
Thanks to:

- AFRIMS Thailand
- MOH, KEMRI and USAMRU-Kenya
- Virology Institute, Uganda
- Afro European Medical and Research Network
- Roll Back Malaria, Sierra Leone
- Children of the Nations
- Faith Multipliers International Ministries, Nicaragua
- And many other NGO’s serving around the world