MOSQUIRON®

Solid Mosquito Larvicide Containing Novaluron Residual Activity

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ACTIVE INGREDIENT

Common Name: novaluron

Chemical Name: N-[[[3-chloro-4-[1, 1, 2-(trifluoro-2-trifluoromethoxy)ethoxy]phenyl] amino]carbonyl]-2,6-difluorobenzamide

ORIGINAL FORMULATION

Trade Name: Rimon 10EC

Common Name: novaluron

Chemical Name: N-[[[3-chloro-4-[1, 1, 2-(trifluoro-2-trifluoromethoxy)ethoxy]phenyl] amino]carbonyl]-2,6-difluorobenzamide

Family: Benzoyl Urea

Mode of Action: Chitin Synthesis Inhibitor

WHO RESEARCH REPORT 2004

Conclusions:

1. "Given its considerable activity against all developmental stages of mosquitoes, novaluron offers the flexibility of timing of application against asynchronous broods."
2. "Field studies in artificial and natural habitats showed that novaluron 10EC was effective against populations of *Ae. aegypti* (Mexico and Thailand), *Anopheles* species (Mexico and Sri Lanka) and *Culex* species (India, Mexico and USA) at application rates of 10-50 ppb."

WHO RESEARCH REPORT 2004

Recommendations (cont'd):

3. Although the 10% EC formulation of novaluron has been found to show a high level of activity against larvae of various groups of mosquitoes, there is a critical need for the development and evaluation of other formulations (e.g. granules and tablets) operationally suitable for use in specific larval habitats such as containers and other confined sources of larvae.
4. WHO should conduct an assessment of the safety of novaluron for use in drinking water as a mosquito larvicide.

WHO RECOMMENDATION 2007

- ✓ Novaluron is recommended for use in drinking water.

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NEW SOLID FORMULATION

LABORATORY STUDIES AT THE UNIVERSITY OF GUELPH 2005 TO 2009

- 200 litre drums with water, with and without organic matter, each treated with 1 CRD with various concentrations of novaluron
- At bi-weekly intervals 1 litre of water drawn out the drum into stainless steel trays; water drawn down to 10 cm from the bottom of the drum and refilled with fresh water
- *Aedes aegypti* eggs introduced into the steel trays and monitored daily for mortality until all the hatched larvae were dead or there was successful adult emergence


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NEW FORMULATION

- ✓ Increases solubility of novaluron in water from 3 ppb to 10-15 ppb vs WHO Report, "Field studies in artificial and natural habitats showed that novaluron 10EC was effective ….. at application rates of 10-50 ppb."
- ✓ Increases residual activity in excess of 6 months regardless of polluting organic matter vs WHO Report, "50 ppb a.i. dosages are needed for polluted and vegetated habitats."

These new properties are attributed to the formulations utilizing a novel carrier technology (involving food grade inerts) which has been patented in numerous countries.

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THE NEW SOLID FORMULATION

- ✓ Addresses "the critical need for the development and evaluation of other formulations (e.g. granules and tablets) operationally suitable for use in specific larval habitats such as containers and other confined sources of larvae."

EFFICACY OF NOVALURON AGAINST *AE. AEGYPTI* • NATHALIA GIGLIO FONTOURA

Control

After exposure to novaluron (mortality)

larva

pre-pupa

pupa

white

distended

visible adult inside

adult

partially emerged

tarsi deformed

NEW SOLID FORMULATION

2010 Field Trials

Trial Locations – Wn MB, BC, GA and FL

Experimental Design

- Formulation added to the tanks
- Eggs were introduced to treatment tanks approx . every 2 weeks
- *Culex* egg rafts were placed directly on water surface
- Once hatching occurred all treatments received a larval liquid food slurry
- Food slurry was a standard formula consisting of liver powder/brewer's yeast
- Food administered 3-4 times/wk. until water was cloudy in appearance

2010 Field Trials in Canada and the United States

Panama City -FL Site

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2010 Field Trials

Marshall - WI site

Meansville - GA site

2010 Field Trials

Portage la Prairie - MB Site

2010 Field Trial Results

- Study results demonstrate Mosquiron formulations provided 100% Control for duration of study at all locations

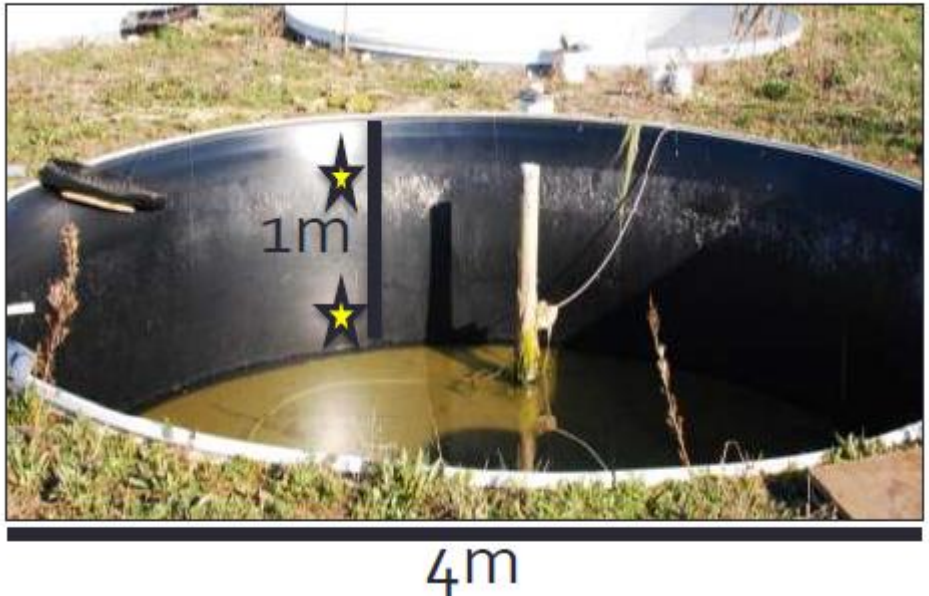
Product Research – 2011/12

Mesocosm Study

- Study completed spring 2012, University of Guelph
  (Reported at the AMCA 2013)

- 15 mesocosms were used
  - 5 treatments with 3 replicates:

0.12% Added Sediment	0.12% No Added Sediment	0.48% Added Sediment	0.48% No Added Sediment	Control (no active)



MESOCOSM STUDY RESULTS

The label rate of Mosquiron 0.12P, regardless of organic matter, provided at least 95% inhibition of adult emergence 318 days after application (winter months included).

MOSQUIRON LARVICIDE PRODUCTS

In 2013 Two MOSQUIRON Products

0.12CRD (briquet) & 0.12P (pellet)

Receive Canadian & U.S. Registrations and Class 6 Classification in Ontario

PEST ALTO

POTABLE WATER CONTAINERS









OTHER LARVAL HABITATS SUITABLE FOR TREATMENT WITH MOSQUIRON

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MOSQUIRON FIELD TRIALS 2013

United States

Catch Basins

Abandoned Tires

Tree Holes

Environmental Fate

Plastic Water Containers

Canada

Standing Water

Ecuador

Potable Water Containers

Malaysia

Small Water Containers

Brazil

Potable Water Containers

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Dr. Graham White, US Armed Forces Pest Management Board
Dr. Tom Wilmot, MCMC, Michigan
Dr. Ildefonso Fernandez-Salas, UANL, Mexico

MARKETING AND SALES

Mosquiron is sold by:

- Canadian Tire stores across Canada
- Atlantic Farm Services in Atlantic Canada
- Dealers Supply in Ontario
- Eddi's in British Columbia

Used by: Pestalto under permit in its West Nile virus abatement programs

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