

Pesticide Review

An Information Source for Pest Control Operators

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Bifenthrin—2007

*Helping to improve
water quality in
California
through the
implementation of
Integrated Pest
Management
practices.*



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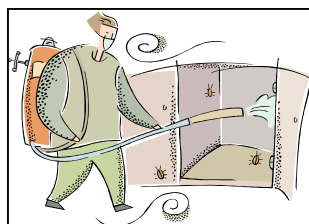


Bifenthrin—General Characteristics

Environmental Fate of Bifenthrin

Andrew Fecko, California Department of Pesticide Regulation

Bifenthrin is a member of the synthetic pyrethroid family of pesticides. Like most pyrethroid pesticides, bifenthrin affects the central and peripheral nervous system of insects causing paralysis. In addition to Red Imported Fire Ant (RIFA) control, bifenthrin is used as a miticide and acaricide in orchards, nurseries, and homes.



Bifenthrin is a third-generation synthetic pyrethroid chemical. This group is characterized by greater photostability and greater insecticidal activ-

ity than previous pyrethroids. Little research has been done specifically on bifenthrin's mode of action on invertebrates or vertebrates, however, most investigations have found that the pyrethroid family of pesticides demonstrate very similar effects on invertebrate nervous systems.

Pyrethroids utilize a number of different pathways to cause nervous system damage in invertebrates. Significant among these is interference with sodium channel gating in the nerve cell endings. By acting on the sodium channels to depolarize the pre-synaptic terminals, pyrethroid insecticides effectively paralyze organism by severely limiting neuro-transmission. This paralysis is often preceded by spastic activity of the organism due to the hyper-activity of nerve

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Bifenthrin – The Next Water Quality Problem Insecticide?

by Cheryl Wilen, Area IPM Advisor

When insecticides containing chlorpyrifos (Dursban) and Diazinon were no longer available for sale to home users after 2003 because of concerns about children's exposure to these products, people trying to improve water quality were optimistic that the aquatic problems caused by pesticide runoff would decrease. Water monitoring of streams and other water bodies has shown that that is what

happened in many cases. However, consumers were still looking for insecticides that could be used as replacement for these products. In response, pesticide companies began marketing a number of products, mainly in the chemical class of pyrethroids for similar uses.

Pyrethroids are the synthetic analogs of the naturally derived insecticide pyrethrin. Pyre-

thrins are effective insecticides but break down rapidly in sunlight and even when exposed to air. Pyrethroids, on the other hand, have been developed to be more stable and have less toxicity to mammals. On pesticide labels, the pyrethroids can usually be identified by the ending of -thrin. Examples include Bifenthrin, Cyfluthrin, Cypermethrin, Permethrin, Resmethrin, and

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Sample of Products Registered for Use in California containing Bifenthrin (07/07)

Baseline Pretreat Termiticide
by FMC Corporation

Bifen I/T Insecticide/Termiticide
by Control Solutions, Inc.

Bifen Maxx Insecticide/Termiticide
by Control Solutions, Inc.

Bifen XTS Insecticide/Termiticide
by Control Solutions, Inc.

Biflex SFR Termiticide/Insecticide
by FMC Corporation

Bisect L
by Loveland Products, Inc.

Bonide House Guard Perimeter & Foundation Insect Control
by Bonide Products, Inc.

Kgro Home Pest Insect Control
by Swiss Farms Products, Inc.

Lesco Allectus 0.18 G Plus Fertilizer
by Lesco, Inc.

Lesco Crosscheck Plus GC Insecticide/Miticide
by Lesco, Inc.

Lesco Crosscheck Plus Multi-Insecticide
by Lesco, Inc.

Maxxthor SC
by Ensystex II, Inc.

Menace 2.4% ME Insecticide
by Riverdale Chemical Company

Menace 7.9% Flowable
by Riverdale Chemical Company

Menace GC 7.9% Flowable
by Riverdale Chemical Company

Menace GC Granular
by Riverdale Chemical Company

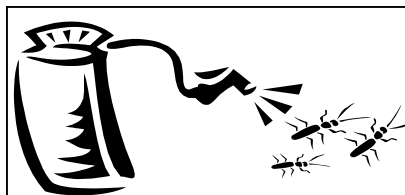
Menace PL Granular Insecticide
by Riverdale Chemical Company

Onyx Insecticide
by FMC Corporation

Onyxpro Insecticide
by FMC Corporation

Ortho Fire Ant Killer Mount Treatment
by The Ortho Group

Ortho Home Defense Max Insect Killer Granules
by The Ortho Group



Ortho Home Defense Max Perimeter & Indoor Insect Killer
by The Ortho Group

Ortho Home Defense Perimeter & Indoor Insect Killer Ready-To-Use
by The Ortho Group

Ortho Homedefense Indoor & Outdoor Insect Killer 5
by The Ortho Group

Ortho Max Pro
by FMC Corporation

Ortho Ortho-Klor Termite & Carpenter Ant Killer
by The Ortho Group

Ortho Termite & Carpenter Ant Killer Concentrate
by The Ortho Group

Pro-Mate Bifenthrin
by Helena Chemical Company

Scotts Professional Fertilizer 0-0-7 with Ortho Max Pro
by O.M. Scotts & Sons Company

Scotts Professional Fertilizer 24-0-08 with Ortho Max Pro
by O.M. Scotts & Sons Company

Speckoz Bifenthrin Termiticide/Insecticide
by Speckoz, Inc.

Surrender Brand Termite Killer 5
by Control Solutions, Inc.

Talstaf 10 PH Insecticide
by FMC Corporation

Talstaf 13% MUP Insecticide/Miticide
by FMC Corporation

Talstar 2.4% ME Insecticide/Miticide
by FMC Corporation

Talstar CA Granular Insecticide
by FMC Corporation

Talstar EZ Golf Granular Insecticide
by FMC Corporation

Talstar EZ Granular Insecticide

by FMC Corporation
Talstar GC Flowable Insecticide/Miticide
by FMC Corporation

Talstar GC Granular Insecticide
by FMC Corporation

Talstar HDRTU Insecticide/Miticide
by FMC Corporation

Talstar PL Granular Insecticide
by FMC Corporation

Talstar Professional Insecticide
by FMC Corporation

Talstar RTU Insecticide/Miticide
by FMC Corporation

Talstar SFR MUP Insecticide/Miticide
by FMC Corporation

Talstar Termiticide/Insecticide
by FMC Corporation

TalstarOne Multi-Insecticide
by FMC Corporation

The Andersons Professional Turf Products Fertilizer 21-0-7 with Allectus Insecticide
by The Andersons Lawn Fertilizer

Up-Star GC Granular Insecticide
by United Phosphorus Inc.

Up-Star Gold Granular Insecticide
by United Phosphorus Inc.

Up-Star Gold Insecticide
by United Phosphorus Inc.

Up-Star SC Lawn & Nursery Insecticide/Miticide
by United Phosphorus Inc.

Valueline Bifenthrin TC
by Univar USA Inc.

Verdicon Bisect CG
by Verdicon, Inc.

Wisdom EZ
by Amvac Chemical Corporation

Wisdom EZ Golf Course
by Amvac Chemical Corporation

Wisdom Flowable
by Amvac Chemical Corporation

Wisdom Lawn Granular Insecticide
by Amvac Chemical Corporation

Wisdom TC Flowable

Bifenthrin Overview *continued from page 1*

endings. This spastic activity is caused by sodium channels repeatedly polarizing and depolarizing, mimicking neuro-transmission where none is actually taking place.

Pyrethroids have also been shown to inhibit ATPase enzyme production. This is of primary importance in understanding why aquatic organisms are much more suscepti-

ble to pyrethroid insecticides than terrestrial organisms. Freshwater aquatic organisms must maintain ionic balances and osmoregulation in an extremely dilute environment. Active transport at cellular walls is needed to maintain critical cellular ion levels against a concentration gradient. ATPase enzymes provide the energy needed by cells to main-

tain this gradient. By inhibiting ATPase enzymes, pyrethroids breakdown the critical concentration gradient, eventually leading to death of the organism. Pyrethroids have the most serious effects on fish and gill breathing aquatic insects because of the large surface area available to de-ionized after ATPase inhibition.

Bifenthrin – The Next Water Quality Problem Insecticide? *continued from page 1*

Tralomethrin (note that are some pyrethroids that do not use the "thrin" suffix).

Bifenthrin is one of the most popular pyrethroids used for home gardens and landscapes. As of August 2007, there were 143 products that contain bifenthrin registered for use in California. These include insecticides and fertilizer-insecticide combinations. Although bifenthrin has been available to commercial users since 1998, it was not until 2000 that it was sold to residential users, about the same time that diazinon and chlorpyrifos were being phased out.

Why is bifenthrin popular? It is stable in light, does not volatilize much, and has a long shelf life and has a residual effect. It is also an

effective in controlling ants, the number one problem insect for residential users. While this pesticide (as well as all other pyrethrins/-oids), is highly toxic to fish and other aquatic organisms, it was originally thought that it would not pose a water quality problem because it is very insoluble in water and strongly binds to soil organic matter. However, research conducted by scientists from UC Riverside and UC Berkeley has found that bifenthrin is carried into waterways on fine soil particles in surface runoff and is highly persistent in the water bodies. This results in levels toxic to aquatic organisms. Based on these findings, the California Department of Pesticide Regulation and Regional Water Boards are more

closely monitoring this insecticide. Increased levels of bifenthrin may result in additional regulations regarding its use.

This case study is a reminder that whenever anyone applies any pesticide, they should take strong precautions to limit its use to only the affected area, not apply it to impervious surfaces, like concrete, where it is easily washed into storm drains, and avoid excessive irrigation which would carry the insecticide or soil sediments. Using an integrated approach to pest management by using these pesticide properly will improve water quality and keep effective products available for use when needed.

Reducing Surface Water Quality Impacts from Structural Pest Control Applications

by Darren Haver, UC IPM Area Advisor

Applications of pesticides to residential, industrial, and institutional buildings may have unintended negative impacts on local water quality if the pesticides do not remain at the site of application. As a licensed structural pest control applicator it is important to take steps to lessen the risk of off-target pesticide movement. The greatest risk arises from spray or granular applications applied to the perimeter of structures in an attempt to control pests such as termites, ants, and cockroaches. Depending on the chemical properties of the pesticide, off-target movement may occur as a result of the pesticide being carried directly in water (i.e. diazinon) or adsorbing to soil, dust or other organic solids (i.e synthetic pyrethroids, such as bifenthrin and permethrin) that are subsequently mobilized in surface runoff resulting from rain or irrigation

events. Reducing the risk of surface water contamination requires the pesticide applicator to implement a few simple practices.

The following practices will help to reduce the potential for structural pest control pesticides from negatively impacting local water quality:

- Properly dispose of any leftover pesticide residues from spray equipment.

- Inform the client of the potential movement of pesticides as a result of irrigation runoff or washing down of sidewalk surfaces especially immediately following the application.

- Ensure mulch and soil around the perimeter of a structure is not easily washed into drains as synthetic pyrethroids readily adsorb to organic surfaces, such as soil particles, and there-

fore can be easily carried into storm drains.

- Avoid direct applications of pesticides (sprays or granular) to downspout drains and landscape drains located directly around the structure by covering them prior to the application.

- Coordinate pesticide applications with the client to ensure irrigation or rain events do not occur within 48 hours of the application.

- Be aware of noticeable surface runoff issues related to poor irrigation and notify the client of the need to address these issues prior to applying the pesticide.

- Sweep up any off-target granular applications of pesticides from hardscape surfaces as irrigation or rain events will quickly mobilize the pesticide into storm drains.

URBAN PESTICIDE RUNOFF MITIGATION AND OUTREACH PROJECT

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The Importance of Reading a Pesticide Label - It's the Law

Pesticides are [poisonous](#). Always read and carefully follow all precautions and safety recommendations given on the container label. Store all chemicals in the original labeled containers in a locked cabinet or shed, away from food or feeds, and out of the reach of children, unauthorized persons, pets, and livestock. Consult the [pesticide label](#) to determine active ingredients and signal words.

Pesticides applied in your home and landscape can move and [contaminate creeks, lakes, and rivers](#). Confine chemicals to the property being treated and never allow them to get into drains or creeks. Avoid drift onto neighboring properties, especially gardens containing fruits or vegetables ready to be picked.

Do not place containers containing pesticide in the trash or pour pesticides down sink, toilet, or outside drains. Either use the pesticide ac-

ording to the label until the container is empty, or take unwanted pesticides to a Household Hazardous Waste Collection site. Contact your county agricultural commissioner for additional information on safe container disposal and for the location of the Hazardous Waste Collection site nearest you. Dispose of empty containers by following label directions. Never reuse or burn the containers or dispose of them in such a manner that they may contaminate water supplies or natural waterways.

Important information regarding the pesticide can be found on the product's label. The label is a legal document required for every pesticide registered in the United States. The U.S. Environmental Protection Agency must approve the label. Always keep the product in the original package. Some of the information that is contained on the label includes:

- Trade name or brand name

- Active ingredients and their percentage by weight
- Types of plants or sites where pesticide may be used
- Pests targeted
- How much to use
- How and when to apply
- Required protective clothing and equipment
- Signal word defining short-term toxicity to people (DANGER, WARNING, or CAUTION)
- Precautionary statements defining hazards to people, domestic animals, or the environment
- Emergency and first aid measures to take if someone has been exposed
- How to properly store and dispose of the pesticide and empty containers