



**Vectra 3D™**  
contains 3 active  
ingredients:  
**Dinotefuran,**  
**Pyriproxyfen &**  
**Permethrin**

*“The combination of flea adulticides such as dinotefuran and IGRs such as pyriproxyfen will improve flea control and diminish the likelihood of insecticide resistance.”*

## Key Findings

- ✓ Year round treatment is the most effective method of eliminating ectoparasites from dogs and preventing reinfestations.
- ✓ Products that are safe and can be administered directly to dogs are most effective in controlling ectoparasites.
- ✓ Vectra 3D™ contains Pyriproxyfen, a key ingredient in breaking the life cycle of the fleas.

## Pyriproxyfen - A Powerful and Long Lasting Insect Growth Regulator

**Byron Blagburn, MS, PhD** Distinguished University Professor,  
Auburn University College of Veterinary Medicine

**Cathy Ann Ball, MS, VMD** Summit VetPharm, LLC

### INTRODUCTION

Controlling fleas and ticks on dogs is necessary in preventing primary diseases (FAD, irritation from bites) caused by these agents and also as an aid in the prevention of diseases that they transmit. This is one of the more important therapeutic challenges facing veterinarians today. The veterinarian is the key link in the control of these and other blood-feeding ectoparasites. An integrated method of controlling ectoparasites<sup>1</sup> together with the Companion Animal Parasite Council's (CAPC) recommendations of year round, lifelong prevention<sup>2</sup> are important tools in building successful ectoparasite control programs.

In the past, flea and tick control programs consisted of treating both the animal and its environment, either together or separately. Many products used to treat animals targeted adult fleas only. Environmental treatments targeted building and selected outdoor environments and consisted of total release fumigation formulations or targeted use of botanical, pyrethroids, carbamates or organophosphorus insecticides. Some of these agents (particularly carbamates and organophosphates) are potentially toxic to humans or animals. These early programs failed to eliminate many of the immature flea stages that represent the greater proportion of the flea life cycle.



## PYRIPROXYFEN

Insect Growth Regulators (IGRs) are unique insecticides that attack the insect's endocrine system. They specifically target insect juvenile hormone (JH). As long as JH is present, the insect cannot develop to the next life cycle stage (e.g. from the first to the second larval stage or from larvae to pupae). JH is broken down by JH esterase. When JH is no longer produced, the JH esterase eliminates all the JH circulating in the insect. This is the insect's cue to develop to the next stage. Pyriproxyfen is a very potent IGR. The structure of pyriproxyfen mimics the structure of JH that circulates in the insects' body; however, it cannot be broken down by JH esterase. When insects are exposed to an IGR such as pyriproxyfen, the insect never gets the signal to metamorphose because the IGR signals the insect to stay in its current stage. Pyriproxyfen and other IGRs also adversely affect egg, larvae and subsequently pupae development<sup>3</sup>. Adult cat fleas exposed to pyriproxyfen laid abnormal eggs in which no developing flea embryo was formed<sup>4</sup>. Because of its chemical structure, pyriproxyfen is photostable and does not breakdown when exposed to ultraviolet light. Pyriproxyfen is lipophilic therefore, binds to the pet's skin and hair, maintaining efficacy even when the dog gets wet.

Topical treatments containing an IGR such as pyriproxyfen give an added factor of protection in the event that there are fleas on the dog that have fed prior to treatment; these fleas will be unable to reproduce due to contact with the pyriproxyfen.

The IGR in Vectra 3D™ is pyriproxyfen.

### References:

1. Dryden MW. Integrated flea control for the 21st century. The North American Veterinary Conference, Small Animal and Exotics Orlando, Florida, A, 18-22 January, 2003.; 808-809.
2. <http://www.capcvet.org>
3. Ohio State University Extension Fact Sheet; Fleas HYG-2081-97
4. Abstract Palma, K.G.; Meola, S.M.; Meola, R.W. J. Med.Entomol. 1993, 30 (2)pp 421-426.

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Summit VetPharm  
400 Kelby Street, Fort Lee, NJ 07024  
[www.summitvetpharm.com](http://www.summitvetpharm.com)

800-999-0297  
Fax: 877-777-5138

