CARBINETM (FLONICAMID): NOVEL INSECTICIDE CHEMISTRY FOR COTTON Kristine M. Treacy FMC Corporation Corpus Christi, TX

Abstract

CarbineTM is a new selective insecticide for the control of aphids and *Lygus* species in cotton. The active ingredient, flonicamid (Code names: F1785, IKI-220), belongs to a new chemical class named pyridinecarboxamides. Carbine is not cross-resistant with any existing chemistries and is a valuable tool for resistance management. Carbine is also soft on beneficial arthropods and fits extremely well in IPM programs. Carbine has a good environmental profile and has been classified by the US-EPA as an OP replacement. US-EPA is currently reviewing this product and registration is expected in time for the 2006 cotton season. Carbine was co-developed by Ishihara Sangyo Kaisha, Ltd. and FMC Corporation and will be marketed by FMC as Carbine in US cotton.

Introduction

Flonicamid is a novel and exciting new insecticide discovered by Ishihara Sangyo Kaisha, Ltd. (ISK). In 2001, FMC Corporation obtained exclusive rights to develop, market, and distribute this new product in North America and parts of Latin America. In North America, flonicamid will be sold in cotton under the trademark Carbine. This compound was granted an OP replacement status by the USEPA and registration in cotton is expected in 2005. First cotton sales are expected for the 2006 season.

Discussion

Results from extensive field and laboratory trials conducted since 2001 shows effective control of cotton aphids and of plant bugs at rates of 0.053 - 0.088 lb ai/A. Flonicamid is active on both immature and adult pest stages. Flonicamid, however, does not control mites, lepidopteran pests, coleopteran pests, or dipteran pests.

Activity is via both contact and ingestion. Once applied to the crop, there is both translaminar and systemic movement. Feeding by the insect pest ceases within one hour of exposure, however mortality may not occur until 2-5 days after treatment. Mortality is due to starvation and dehydration. Flonicamid provides excellent residual control up to 3 weeks following an application.

Flonicamid belongs to the class of chemistry, the pyridinecarboxamides (IRAC Classification 9C). Research has shown that flonicamid has a unique mode of action and does not affect the target sites associated with any of the other known insecticide classes. Flonicamid exhibits no cross-resistance with any existing chemistries thus making it an excellent choice for use in integrated pest management programs. Flonicamid has incorrectly been classified as a neonicotinoid compound based solely on structural similarities. Flonicamid differs chemically from the neonicotinoid and laboratory research has also shown that flonicamid does not affect the nicotinic receptor site; the key target for the neonicotinoid insecticides presently registered and used in several crops, including cotton.

Flonicamid will be formulated as a 50WG for use in cotton. This is a stable formulation that dissolves completely in the tank. Flonicamid 50WG is compatible with adjuvants and all mix partners tested to date. Flonicamid has a low environmental impact and has been classified as "practically non-toxic" to bees, birds, fish and aquatic organisms. Flonicamid also poses no risk to workers or the general public because of the low mammalian toxicity.

Extensive laboratory and field research has shown the tremendous potential for flonicamid as an ideal IPM tool. In laboratory and field studies, flonicamid has been shown to have little to no impact on beneficial arthropods at rates up to 0.088 lb ai/A. Among the beneficial arthropods evaluated were honey bee (*Apis mellifera*), Pirate bugs (*Orius spp.*), Big-eyed bugs (*Geocoris spp.*), nabids (*Nabis spp.*), lacewings (*Chrysoperla spp.*), mantids (*Tenodera spp.*), and predaceous mites.

Summary

Carbine[™] (flonicamid) is an excellent new tool to pest control in cotton. It possesses all the qualities desired in an insecticide, including:

- Effective control of aphids and plant bugs
- Selective
- Novel insect target site with no resistance issues
- Good formulation (50WG)
- Low ecological impact
- Good toxicology profile
- IPM friendly

[™] Carbine is a registered trademark of FMC Corporation