

INTREPID* 2F: A REGISTRATION, AVAILABILITY AND PERFORMANCE UPDATE

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Abstract

On June 1st 2001, Dow AgroSciences acquired the agricultural products of Rohm and Haas Company which included the new Lepidoptera active compound Intrepid*. Intrepid is a second generation MAC (molt accelerating compound). The MAC diacylhydrazine chemistry was discovered in 1983 and the mode of action was determined to mimic ecdysone and induce a lethal premature molt in some insects with Lepidoptera being by far the most sensitive. The MACs are the only insect growth regulators (IGRs) to mimic ecdysone. The MACs are not cross resistant with any other mode of action and are valuable tools for resistance management. They are faster acting than previous IGRs and halt feeding within hours. They have ovicidal activity on Lepidoptera eggs and are highly active on larvae. Larvae however must ingest the compound to be affected. They have broad-spectrum Lepidoptera activity with the best utility on armyworms and loopers. They are essentially non-active on insects other than Lepidoptera making them extremely valuable for IPM based programs and safety to pollinators. The MACs are classified as reduced risk by the EPA and were the 1998 winners of the Presidential Green Chemistry Award. In 2001 Intrepid received conditional registration on cotton. Currently, there are plant-back restrictions to crops other than cotton. Studies have been completed to remove the plant-back restrictions and review by the USEPA has been scheduled with action anticipated in May-June 2002. There are no anticipated supply problems and Dow AgroSciences will continue to support Confirm until all restrictions and supply issues are solved. A review of the recent performance with emphasis on armyworm and looper control will be provided. For the most recent labels and technical literature see www.dowagro.com.

Introduction

Dow AgroSciences was pleased to obtain the agricultural products and many of the experienced employees of the Rohm and Haas company during 2001. The additional products and employees will significantly strengthen Dow AgroSciences and allow us to better serve the cotton industry. One of the key cotton compounds in the Rohm and Haas pipeline was Intrepid* a second generation MAC (molt accelerating compound). It is anticipated that Intrepid will provide a significant improvement over Confirm a first generation MAC that has become the standard for armyworm control. Intrepid should also provide a nice compliment and rotation partner to Tracer* Naturalyte* insect control, Lorsban* and synthetic pyrethroids. It is Dow AgroSciences' goal to provide the best technical solution to meet cotton farmer insect control needs.

Technical Properties

Chemical Class: Diacylhydrazine
Chemical Name: methoxyfenozone
Code Names: RH-2485, RH-112,485
Trade Names: Intrepid, Runner, Prodigy, Falcon, Valient
Molecular formula: C₂₂H₂₈N₂O₃
Physical state: white powder
Melting point: 204-205 C
Log P: 3.7 at 25 C
Odor: faint
Stability: stable at 25 C
Acute rat oral LD50: >5000 mg/kg, practically non-toxic
Acute dermal rat LD50: >2000 mg/kg, practically non-toxic
Mutagenicity & Genotoxicity: Negative
Bluegill acute LC50 (96hrs): >4.3 mg/l
Daphnia magna 48-h EC50: 3.7 mg/l
Daphnia magna 21-day life cycle NOEL: 0.38 mg/l
Formulation: 2lb/gal (240 gm/l) aqueous suspension

Activity and Use

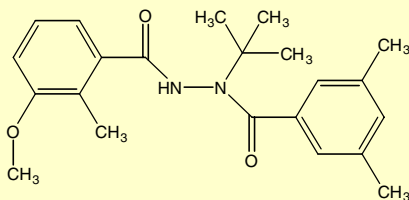
The MAC insecticides offer growers a safe and highly effective insecticide for control of lepidopterous pests without harming beneficial arthropods. On a cost performance basis, the MACs are very competitive with new and existing chemistries. In addition to providing broad spectrum control of Lepidoptera pests, MACs offer longer residual activity, application flexibility in addition to an excellent safety profile against humans, animals and the environment, including a short re-entry interval following application (4 hours). Their safety to beneficial arthropods and pollinators is second to none, making them an ideal fit in IPM programs around the world. Target pests include all foliar feeding Lepidoptera with exceptional performance on armyworms and loopers. Cryptic or fruit feeding lepidoptera such as Gary, Gary Lentz has a problem with cotton bollworm, He suggested to me that bollworm was more appropriate, Just a thought bollworm and tobacco budworm can also be controlled or suppressed but the applications need to be made prior to egg hatch and higher rates are necessary. The water based suspension concentrate formulation (flowable) is extremely robust and can be tank-mixed with all products. Competitive advantages of the Intrepid formulation are extended residual of 14 days or more and excellent rainfastness. Initial activity when measured by insect counts may appear slow the first few days after exposure. However, exposed larvae are unable to feed and crop protection occurs within a few hours after ingestion. The MACs trigger a premature lethal molt which results in more rapid activity than other IGRs in most cases.

Registration Status and Availability

During 2001 Intrepid was first marketed under a conditional registration on cotton following one year of use under Section 18 or emergency registrations. The conditions were based on a need to conduct additional soil dissipation studies due to the persistence of Intrepid in the soil. Currently, there are plant-back restrictions to crops other than cotton. Studies have been completed to remove the plant-back restrictions and review by the USEPA has been scheduled with action anticipated in May-June 2002. The treatment to harvest interval restriction is 14 days and the worker re-entry interval is 4 hrs. No posting is required and the compound is not a restricted use product. Buffer areas from water are 25 ft for ground applications and 150 ft for aerial applications. There are no anticipated supply problems but Intrepid is produced in a shared facility and some lead-time is needed to shift between products. Dow AgroSciences will continue to supply and support Confirm until all restrictions and supply issues are solved.

MAC Insecticides

Molt Accelerating Insecticides



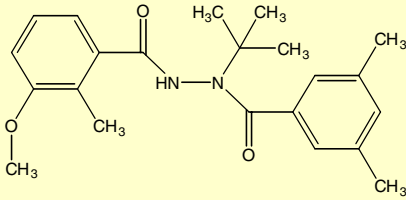
Methoxyfenozide, RH-2485
Tebufenozide, RH-5992
Halofenozide, RH-0345
INTREPID* **CONFIRM***
RUNNER* **MIMIC***
MACH 2*

History:

- **Discovered: 1983, Rohm & Haas**
- **Diacylhydrazine**
- **Mode of action discovered: 1984**
- **1st development candidate identified in 1986 (Confirm)**
- **Discovery of RH-2485: 1990**
- **Discovery of RH-0345 (MACH 2) 1991**
- **1st sales of CONFIRM, 1994**
- **1st sales of MACH 2, 1998**
- **1st sales of INTREPID 1999**
- **Cotton Registration 2001**

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MAC Insecticides



Features:

- Broad spectrum lepidoptericide
- Strong safety profile
- Selectivity: physiological, based on differences in morphology of ecdysone receptor among insects
- First Reduced Risk Insecticides registered on food crops
- Low use rates
- Lack of cross resistance with other products
- Ovicidal activity
- Intrepid more potent than Confirm

Methoxyfenozide, RH-2485
Tebufenozide, RH-5992

INTREPID * CONFIRM*
RUNNER* MIMIC*

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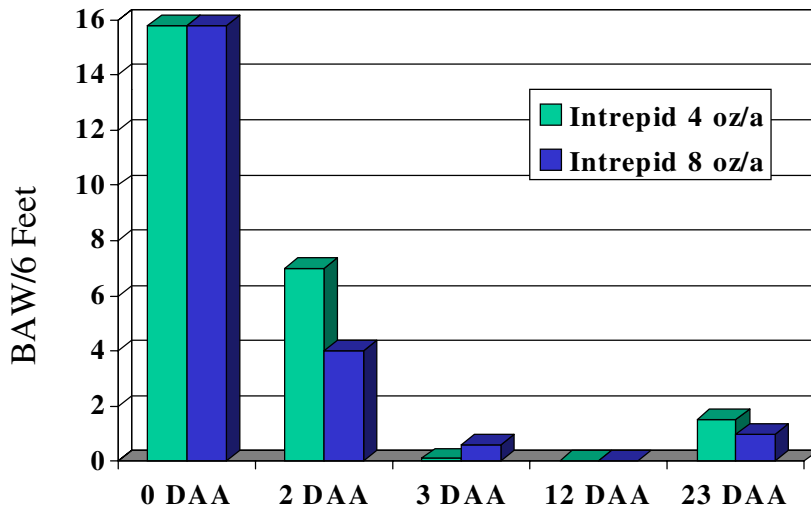


Figure 1. Control of Beet Armyworm on Cotton, Cultivar Stoneville 747 (non Bt), Midnight MS, Exp. 1700012.

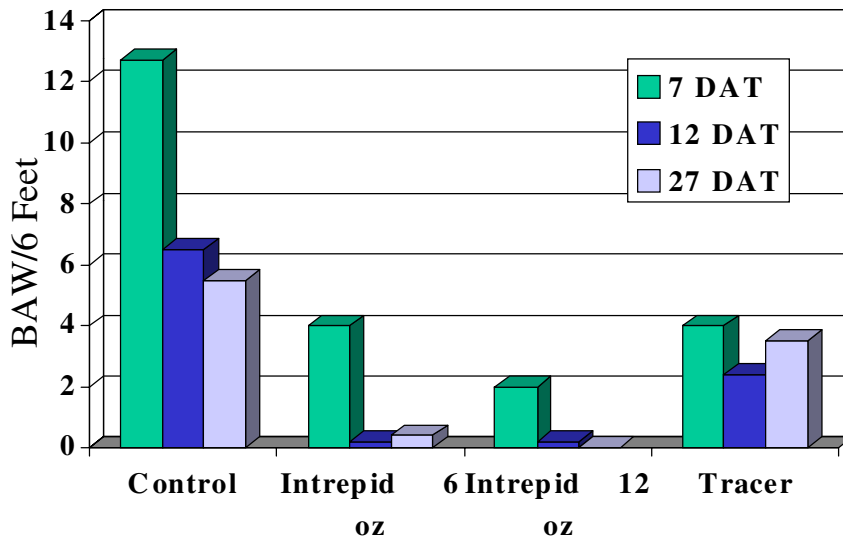


Figure 2. Control of Beet Army, Small Plot Edmondson, TX Exp. 14500018.

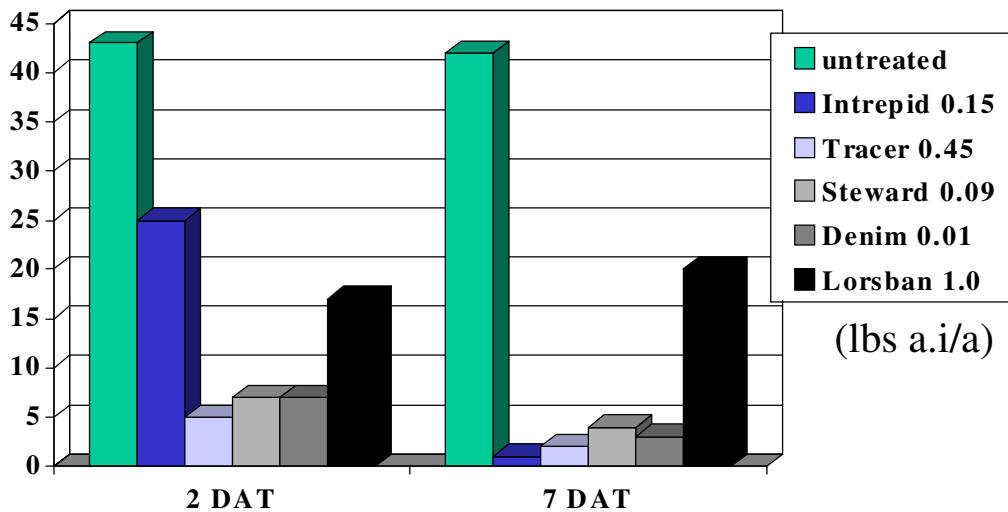


Figure 3. Small Plot Beet Armyworm – Winnsboro LA Adopted from Emginger, Leonard & Gore, LSU, Arthropod Management Tests, ESA 2001.

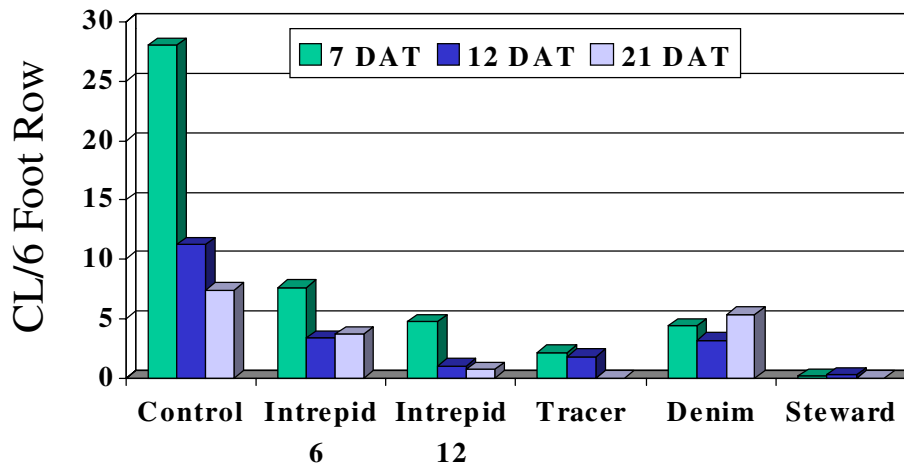


Figure 4. Control of Cabbage Loopers, Small Plot Trial Edmondson, TX. Exp. 14500018.

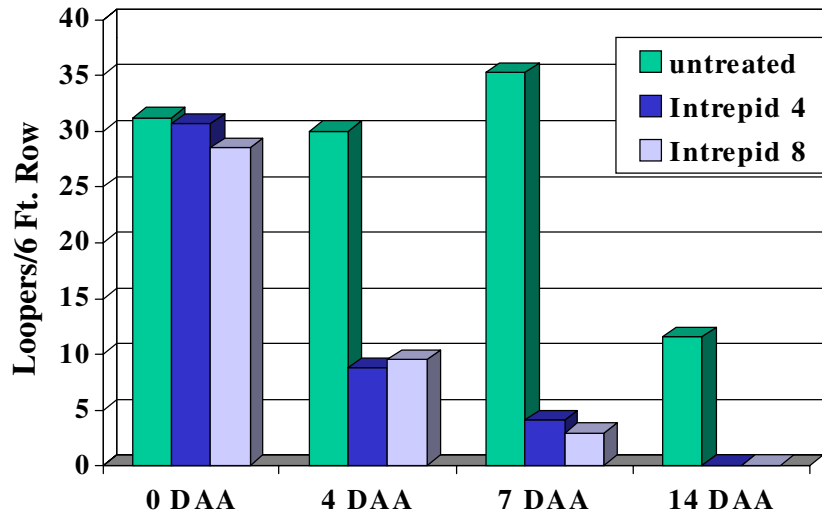


Figure 5. Control of Soybean Loopers of Bt Cotton. Large Plot trial Indianola, MS, Exp. 17400014.