Arthropod Pests Update

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Rice Invertebrate Pest Management

- Rice water weevil (Lissorhoptrus oryzophilus)
- □ Tadpole shrimp (*Triops longicaudatus*)
- \Box Rice seed midge
 - (Cricotopus sylvestris and others)
- □ Crayfish (Procambarus clarki)
- □ Armyworms (*Spodoptera* spp.)





Rice Invertebrate Pest Management



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RWW Flight - 2011 seasonal total = 415







Rice Water Weevil Management

New Products Examined for RWW

clothianidin (Belay[®]) - registration package submitted to EPA with a concurrent review at CA-DPR

□ rynaxypyr (Coragen[®], Dermacor[®]) – renewed interest

Declare – gamma cyhalothrin – registered for ~10 years originally by Dow, they 'shelved' the product, acquired by Cheminova

grubGONE! granular (and other formulations) -Bacillus thuringiensis galleriae from the Phyllom Corp., tested in the greenhouse

Rice Water Weevil Control with Registered Treatments



Rice Invertebrate Pest Management

Environmental issues Pyrethroids under re-registration by DPR due to off-site movement □ Volatile Organic Compounds – VOCs – EC formulations □ Presently Mustang Max and Warrior – both pyrethroids and ECs **Invasive pests**

Rice Water Weevil Control with Declare[®]



Rice Water Weevil New active ingredients

V10170 (clothianidin) Belay®

- Neonicotinoid class of chemistry
- 2.13 SC -- Preflood (3 rates), 2-3 leaf stage (3 rates), rescue treatment (1 rate)
- have discontinued seed treatment in CA

Rice Water Weevil Control with Belay[®] 2009 ■% control 100 80 60 40 20 0 Belay (5 fl. oz.) Belay (6 fl. oz.) Belay (5 fl. oz.) Belay (6 fl. oz.) preflood 3-leaf preflood 3-leaf

Rice Water Weevil Control with Belay® 2010-11



Rice Water Weevil Control with Belay® 2010-11



Rice Water Weevil New active ingredients

V10170 (clothianidin) Belay®

- Rescue application
 - 5 to 6 leaf stage
 - ~65% RWW control
- still need to examine efficacy under grower field conditions

Rice Water Weevil New active ingredients

Rynaxapyr - Dermacor[®], Coragen[®]

- anthranilic diamides class of chemistry
- Preflood (2 rates), 2-3 leaf stage (2 rates), rescue treatment (1 rate)
- replicated small plot study with 3 rates
- registered as seed treatment in southern U.S. rice
- have discontinued seed treatment in CA

Rice Water Weevil Control with Dermacor^{® -} 2010-11

■ % control - 2010 ■ % control - 2011 100 80 60 40 20 0 Dermacor Dermacor Dermacor Dermacor Dermacor (0.08 lbs. (0.10 lbs. (0.08 lbs. (0.10 lbs. (0.10 lbs. AI/A) AI/A) AI/A) AI/A) AI/A) Preflood 3-Leaf Seed trt.



<u>Rice Water Weevil Control - Coragen</u>



<u>Rice Water Weevil Control - Coragen</u>



<u>Rice Water Weevil Control - Coragen</u>



Large Plot Study - 2011

		RWW per core sample		
Treatment	Rate	12 July	26 July	Grain Yield (lbs./A) @ 14% Moisture
Belay – 3-leaf	4.5 fl. oz.	0.1	0.05	6750
Belay – preflood	4.5 fl. oz.	1.3	1.0	4078
Untreated		2.7	1.5	3985
Coragen - preflood	0.08 lbs. AI/A	1.7	1.7	4815
Coragen - preflood	0.10	2.5	1.8	6125
Coragen - preflood	0.12	1.25	2.6	6733
Untreated		2.7	1.5	3985

Rice Water Weevil New active ingredients

Rynaxapyr - Dermacor[®], Coragen[®]

- Rescue treatment
 - 5 to 6 leaf stage
 - ~60 control

Status

Belay

□registration package is at EPA and CA-DPR for a concurrent review

package is due out of the EPA 2nd quarter of 2012
CA registration - next season but when?
concern with honeybees

Coragen

□renewed interest □hopefully will continue research/development

Declare

registered and marketed

Bt product

□more testing

Bacillus thuringiensis galleriae Greenhouse Tests

- in late 1990's a biological product was tested in the greenhouse and field plots
- very effective Bacillus thuringiensis tenebrionis
- company was sold and later tested product and it was ineffective
- apparently organism (or strain) had been lost
- 2011-- rice planted in pot, flooded, covered with plastic cone
- RWW adults collected from grower fields and added at 3 adults per pot
- pots destructively sampled 3-4 weeks later
- granular product at increasing rates of 1.2, 1.6, 1.8 gr/sq ft preflood showed increasing level of activity but not as effective as the pyrethroid
- technical grade products were not as effective

Other Studies - 2011

Efficacy of insecticides against seedling pests (tadpole shrimp and seed midge)

• Why? replacement for copper sulfate and pyrethroids



Place shrimp in both smaller and larger rings
Count floating shrimp and seedlings
Count established seedlings

Product	<u>Formulation</u> (fl. oz.) per A	Timing
1. Untreated-no TPS		
2. Belay 2.13 SC	4.5	Preflood
3. Dermacor X-100 5FS	2.46	Preflood
4. Mustang Max EW	4.0	early post-flood
5. Copper sulfate	10 lb.	early post-flood
6. Belay 2.13 SC	4.5	early post-flood
7. Untreated with TPS		
8. Warrior II	1.92	early post-flood
9. Warrior II	1.92	Preflood

Other Studies - 2011

Efficacy of insecticides against seedling pests (tadpole shrimp and seed midge)

• Why? replacement for copper sulfate and pyrethroids



Percent established seedlings

Invasive Pests

Invasive Pests

PRM found on rice in UC-Davis greenhouses in January 2009 □Movement on seed likely method of transport New policies in place regarding handling of rice seed and presently "eradicated" □CDFA monitored grower fields (10% of acreage) in 2010 □ Found mite thought to be PRM US mite identification expert said it was related to PRM but not PRM; he could not ID it □What is it and what is it doing? PRM in US deregulated in 2011; no change in status in CA

Panicle Rice Mite



Invasive Pests

<u>Grain Quality – 2011</u> no evidence an insect pest is involved in this



Rice Arthropod Pest Management

