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RICE
INFORMATION

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Rice Water Weevil Control Options [1]

A question asked every spring is "What control options will be available for rice water weevil this season?" Four insecticides will be available in 2002: ICON® (fipronil), Karate Z® (lambda cyhalothrin), Dimilin® (diflubenzuron), and available for the first time in rice Fury® (zeta cypermethrin). Each product will give effective control of rice water weevils if applied within the recommended rate range and, more importantly, at the proper time. For growers familiar with Furadan® (carbofuran), use of all these products represent changes and challenges in scouting and proper timing of applications.

Rice water weevil injury in dry-seeded rice only occasionally results in significant grain losses in Arkansas. However, each year a few fields or portions of fields incur yield losses from severe injury by RWW. Water-seeded rice fields are more susceptible to sustained RWW infestation, severe injury to small plants, and substantial yield losses. Appropriate scouting and control practices should be implemented in water-seeded rice to prevent excessive injury and yield losses.

ICON

ICON 6.2FS is labeled for use only as a seed treatment in Arkansas. ICON will be used to prevent rice water weevil (RWW) (*Lissorhoptrus oryzophilus*) larval injury rather than to treat a postflood critical level of larvae as Furadan was used. Therefore, use of ICON could be based on a field history of RWW problems or as insurance against RWW injury. Research data from many tests in drill- and water-seeded tests have indicated that ICON kills larvae, is highly effective in preventing RWW injury, but has no impact on adult RWW. The recommended rates range from 0.025 to 0.05 lb AI/acre. Table 1 can be used to adjust application rates to compensate for variable seeding rates. For drill-seeded rice, application rates of less than 0.025 lb AI/acre will substantially reduce residual activity and insect control. For water-seeded rice, application rates of less than 0.0375 lb AI/acre will substantially reduce residual activity and insect control. A single application of ICON will control grape colaspis (lespedza worm) (*Colaspis brunnea*), and suppress chinch bugs (*Blissus leucopterus leucopterus*), will reduce the number of

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whiteheads caused by rice stalk borers (*Chilo plejadellus*) and caused by the billbug (*Sphenophorus* sp.) on the levees by 40 to 60 percent. ICON will **not** control aphids, armyworms, or rice stink bug (*Oebalus pugnax*). ICON does not interact with commonly used herbicides to injure rice as was common with the Furadan - propanil interaction.

ICON is only available on rice seed which has been treated by registered seed dealers. Seed intended to be soaked (pre-germinated) for water seeding can **not** have ICON applied before soaking. ICON must be applied after seed is soaked and drained for at least 4 hours then applied by a seed dealer. If residual herbicides such as Bolero® (thiobencarb) or Ordram® (molinate) are applied prior to seeding, application of **dry** ICON treated seed into the flood is not recommended. In this situation, herbicide injury to rice seedlings may occur and result in seedling injury and stand loss.

Should the first planting of rice treated with ICON be lost due to unfavorable weather conditions or other reasons, there is no need to re-treat with ICON for a second planting. Enough ICON will carry-over from the first planting to control target pests.

The ICON label also restricts rotation of small grains other than rice for 12 months following planting of ICON treated seed. Root and leafy vegetable crops in rotation are restricted to five and one month, respectively. Production of fish, shellfish, and crustaceans in fields planted with ICON treated seed are also prohibited before rice harvest. Always check the most recent ICON label for use directions and restrictions since label recommendations and restrictions are often altered.

Karate Z

Karate Z 2.08CS is effective only on RWW adults and therefore must be applied before high numbers of eggs are placed in the leaf sheaths. Applications after eggs have been deposited will not prevent larval injury to roots. The need for Karate application can be based on field scouting for adults and/or leaf-scars. The leaf scar scouting methods consists of examining the Y-leaf (youngest leaf) for the presence or absence of RWW feeding scars. At each stop 40 individual Y-leaves are examined and those with at least one feeding scar are counted as positive. Continue to make stops, count scarred leaves, and maintain totals following the recommendations listed in Table 2. There is no set interval between scouting, but for timing a Karate Z application, the best results would occur if fields were scouted every other day starting at 5 and ending about 14 days after permanent flood in drill-seeded rice. In water-seeded rice begin scouting when plants emerge from the water and continue for at least 3 weeks. The leaf scar is a somewhat crude method but is useable because it indicates when adult RWW are actively feeding. When 60% of the leaves in drill-seeded rice and between 45 and 50% of leaves in water-seeded rice are scarred, then larval levels are predicted to exceed 10 per standard core sample. Treatment at the leaf scar threshold would reduce the risk of injury by larvae. If Karate Z were applied to water-seeded rice, scouting for RWW should resume 5 to 7 days later and continue periodically until plants reach the 4 to 5 leaf stage.

Another method to scout directly for adults is with the floating aquatic barrier trap. This trap is currently under development and field testing. The barrier trap catches swimming adults without the use of lures or pheromones. At the completion of testing, thresholds based on the

average number of adults caught per day per rice variety will be published. (See section on variety field tolerance to RWW in this publication)

The recommended rate using Karate Z for RWW control is 0.03 lb AI/acre (1.85 fl. oz./acre). The label gives a rate range from 0.025 to 0.04 lb AI/acre (1.6 – 2.56 fl. oz./acre). A total of 0.12 lb AI/acre of Karate Z may be applied to a field per season. Karate Z is also labeled for control of other rice pests - true armyworm (*Pseudaletia unipunta*), fall armyworm (*Spodoptera frugiperda*), rice stink bug (*Oebalus pugnax*), chinch bugs, short horned grasshoppers, and aphids (greenbug, *Schizaphis graminum* and bird cherry-oat aphid, *Rhopalosiphum padi*) (See MP144 - *Insecticide Recommendations for Arkansas* or FSA2068 - *Management of the Insect Pests of Rice* for more information). Karate Z does not interact with commonly used herbicides to injure rice as was common with the Furadan - propanil interaction. The preharvest interval for Karate Z is 21 days.

Fury

Fury 1.5EC was registered for use in rice early in 2002. Fury is a pyrethroid, similar to Karate Z, pyrethroid, and is also an adulticide of RWW. Scouting and time of application would be similar to that of Karate Z.

The label gives a rate range from 0.04 to 0.05 lb AI/acre (3.4 to 4.3 oz./acre). A total of 0.2 lb AI/acre (17.2 oz./acre) of Fury may be applied to a field per season. Fury is also labeled for control of other rice pests - true armyworm, fall armyworm, rice stink bug, chinch bugs, short horned grasshoppers, and aphids (greenbug and bird cherry-oat aphid) (See MP144 - *Insecticide Recommendations for Arkansas* or FSA2068 - *Management of the Insect Pests of Rice* for more information). Fury does not interact with commonly used herbicides to injure rice as was common with the Furadan - propanil interaction. The preharvest interval for Fury is 14 days.

Dimilin

Dimilin 2L is an insect growth regulator and has been shown to effectively control RWW. The main activity of Dimilin is against RWW eggs and, therefore, needs to be at a certain concentration in the water whenever adults are present and actively placing eggs in the plants. Dimilin will not kill RWW adults or established larvae in the soil. Just as with the other postflood insecticides, timing of Dimilin application(s) will be the key to controlling RWW effectively. A split application with 0.125 lb AI/acre (8 fl. oz./acre) (timed for 3 to 5 days after permanent flood followed in 5 to 7 days with another 0.125 lb AI/acre (8 fl. oz./acre) will give the best control. A single application at rates between 0.187 and 0.25 lb AI/acre (12 to 16 fl. oz./acre) applied 4 to 6 days after permanent flood will suffice as long as the flight of RWW adults is nearly completed. It is recommended that flood water not be added to the field for 7 days after Dimilin application. Treated water should be held at least 14 days to allow dissipation of Dimilin. Dimilin is not labeled for use on any other rice insect pest.

Alternative Control Measures

No insecticide is currently available to be used postflood to kill established RWW larvae. In addition, few effective cultural practices are available to kill established larvae. The practice of draining the initial flood and allowing the soil to dry until the soil cracks will reduce the number of RWW larvae and prevent excessive damage to the roots. Draining and drying should begin at 2

weeks after initial flood for best results. However, draining and drying may increase herbicide, labor, and irrigation costs.

Another cultural practice that once was thought to help plants recover from RWW damage is the addition of extra nitrogen at mid-season. However, research suggests that this practice is not effective. In the cultivars tested so far (Bengal, Cocodrie, Jefferson) yields were the same in untreated plots and in plots treated to prevent any RWW damage, even when 30 or 60 lbs of extra nitrogen were added to plots at mid-season and RWW larval densities exceeded 25 per core sample.

Cultivar Field Tolerance to RWW

Over the last 5 years 10 RWW field tests with treated and untreated plots have been conducted with selected rice cultivars. The following is a summary of results from the cultivars on RWW infestation density and yield response. In every test Bengal had the highest density of RWW larvae. Average density per core in untreated plots ranged from a high of 57.5 to a low of 18.2 and with an overall average of 39.3 larvae. In no test were grain yields in the untreated plots significantly lower than that in the treated plots. The average yield in the treated plots was 168.3 bushels and 166 bushels per acre in the untreated plots.

Cypress had the next highest average number of larvae per core at 34.9 (21% less than Bengal) in the untreated plots with a range of 22.2 to 52.5 per core sample. Significant yield reductions that averaged 14.5 bushels per acre were found when the number of larvae per core sample was above 25.

Drew had the next highest average number of larvae per core at 25.2 (46% less than Bengal) in the untreated plots with a range of 14.2 to 42.5 per core sample. Average densities in the treated plots ranged from a high of 4.0 to a low of 0.2 per core. Significant yield reductions that averaged 12 bushels per acre were found when the number of larvae per core sample was above 25.

Wells had an average number of larvae per core at 22.4 (41% less than Bengal) in the untreated plots and with a range of 15.4 to 33.5 per core sample. Significant yield reductions that averaged 12 bushels per acre were found when the number of larvae per core sample was above 25.

Cocodrie has only been in 3 field tests but averaged 55% less larvae per core than Bengal. In only one test did a significant yield reduction occur and that was a 24 bushel per acre reduction when larvae per core sample averaged 30.6. More tests need to be conducted with Cocodrie to establish a density of larvae at which yields are consistently reduced.

LaGrue, Jefferson, and XL6 were included in only 2 field tests. These cultivars averaged about 50% less larvae per core than in Bengal. However, not enough data have been taken on these cultivars to draw conclusions on RWW infestations that would reduce yields.

ADDITIONAL INFORMATION SOURCES

Univ. of Arkansas Cooperative Extension Service Website www.uaex.edu
S Rice Information Sheet No. 148
University of Arkansas Agricultural Publications http://www.uark.edu/depts/agripub/Publications/
S B.R. Wells Rice Research Studies 1999 – 2001
Louisiana State University http://www.agctr.lsu.edu/Subjects/rice/RiceHome.htm

Table 1. Recommended rate of Icon seed treatment as a function of seeding rate. (areas shaded in black represent application rates above or below the recommended treatment rate per acre based on seed application rate).

ICON Application Rate	**Anticipated Seeding Rate, lbs rough rice seed/Acre**									
lb ai/cwt	**60**	**70**	**80**	**90**	**100**	**110**	**120**	**130**	**140**	**150**
	lb ICON ai/acre									
0.025	XX	XX	XX	XX	**0.025**	0.0275	0.030	0.0325	0.035	0.0375
0.03125	XX	XX	0.025	0.0213	**0.03125**	0.03438	0.0375	0.0406	0.0438	0.0469
0.0375	XX	0.0266	0.0304	0.0342	**0.038**	0.0418	0.0456	0.0494	XX	XX
0.04425	0.0266	0.031	0.0354	0.0398	**0.04425**	0.0487	XX	XX	XX	XX
0.05	0.03	0.035	0.04	0.045	**0.05**	XX	XX	XX	XX	XX

Table 2. Leaf-scar scouting recommendations.

Stop Number[2]	Total Number of Rice Plants with Adult Rice Water Weevil Feeding Scars[1]		
	Stop Scouting - No Treatment[3]	Keep Scouting - No Decision	Stop Scouting - Treatment Level[3]
1	ND[4]	Between	40
2	11	Between	56
3	29	Between	72
4	44	Between	89
5	61	Between	105
6	78	Between	122
7	94	Between	139
8	111	Between	156
9	128	Between	173
10	145	Between	189

1 Inspect the youngest mature leaf on 40 rice plants at each stop in the paddy area at least six feet away from levee and ditch.
2 Accumulated number of leaves having adult feeding scars on the Y-leaf from all stops.
3 If a treatment decision is not reached scout again in 4 to 5 days and compare to previous scouting results - consider treatment if scar frequency as increased towards the treatment threshold.
4 No decision can be made - continue scouting

Table 3. Average yield loss comparison between untreated and treated plots when untreated plots had uncontrolled rice water weevil larvae. Yield loss is expressed in bushels per acre per the number of tests, in parenthesis.

Cultivar	**Average Number of Rice Water Weevil Larvae per Standard Core Sample**					
	10 or less	**11 to 20**	**21 to 30**	**31 to 40**	**41 to 50**	**51 to 60**
Bengal		0 (1)	0 (2)	0 (2)	5 (2)	4 (3)
Cypress			12 (3)	12 (1)	6 (1)	22 (1)
Drew		4 (2)	7 (3)	8 (2)		
Wells		2 (1)	3 (3)	14 (1)		
Cocodrie		7 (2)		24 (1)		