



TENCHU[®] 20SG

SUPERIOR RICE STINK BUG CONTROL

- Highly Systemic
- Quick Kill of Adults and Nymphs
- 10 - 14 Day Residual for Lethal Dose
- 14 - 21 Day Residual for Anti- Feeding
- Highly Effective Alternative Mode of Action

***Prevent Grain Quality Docking With Just
ONE Application of TENCHU[®] 20SG!***

Manufactured By:



MITSUI CHEMICALS CROP & LIFE SOLUTIONS, INC.



Belchim USA

GROWING TOGETHER



AN EFFECTIVE SOLUTION FOR SUPERIOR RICE STINK BUG CONTROL

WHAT IS TENCHU® 20SG?

TENCHU (dinotefuran) is a 3rd-generation neonicotinoid insecticide which is highly systemic and rapidly redistributed throughout the entire plant upon contact with the leaf surface. TENCHU has the very rapid knock-down you expect from a pyrethroid, with longer residual and anti-feeding action.

TENCHU CAN PREVENT SIGNIFICANT LOSSES!

Entomologist, consultants and growers agree, that adult and nymph stage Rice Stink Bug (RSB) feeding on grains, especially in the milk stage, is going to impact yield. Then, factor in the additional losses from continued feeding, allowing pathogens to get in causing discoloring and breakage when the rice is milled. High infestations can cause 30+ bushel yield loss, as well as docking fees for peck. One application of TENCHU can protect your crop and your investment, and give you *“peace of mind”!*



Photo credit J. Bernhardt of LSU Ag Center

HIGHLY SYSTEMIC REDISTRIBUTES THROUGHOUT PLANT CONTRIBUTES TO APPLICATION FORGIVENESS AND EFFICIENCY.

Because TENCHU is so highly systemic it allows for “application forgiveness & efficiency” Dennis Long (National Technical Service & Development Manager, Belchim Crop Protection USA) explains.

FORGIVENESS: IN THE ABSENCE OF PYRETHROID RESISTANCE

Data from small-plot university studies often show great performance for the pyrethroids. Treatments are often applied by ground at 10 GPA of water giving great coverage and subsequent great control. What happens when you apply contact insecticides such as pyrethroids by aerial application at only 2.5 GPA of water at 30 ft high, 125 mph, 90F; much fewer droplets actually hit the rice foliage. Coverage is sacrificed impacting efficiency of a contact product. Under these same conditions, TENCHU hits the leaf surface then quickly redistributes itself throughout the entire plant; even to the feeding points and within the canopy where RSB like to hide & feed during the day. I think this may possibly be the underlying reason for the high pyrethroid variability (as evidenced by the error bars) from the 3 years of research conducted by LSU in 11 aerial trials in 5 Parishes (Fig. 1). TENCHU was very steady and was the only product to keep RSB below treatment threshold offering growers *“peace of mind.”*

EFFICIENCY: Because of the importance of coverage, it is recommended to apply pyrethroids in a minimum of 5 PGA water by air. TENCHU has been commercially applied for years with success at only 2.5-3 GPA. This allows for 67% more acres to be treated to save time and money. Pilots can spend less time on the tarmac loading product and is especially important when RSB are in the field when a 2-day storm event is on the way.

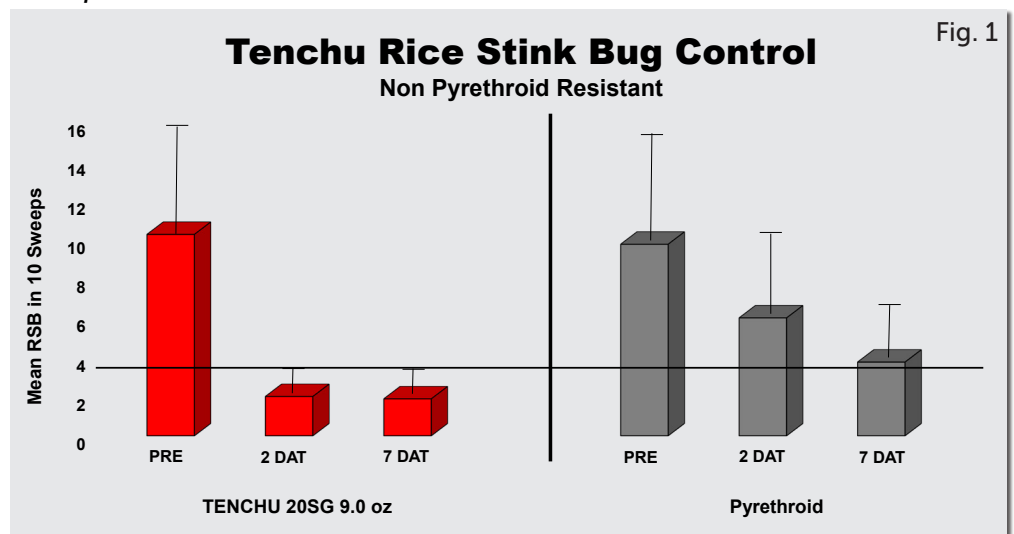


Fig. 1

Blackman, et. al, LSU – 2011-2013
Each plot size was 5 acres and treatments applied by air. Pyrethroids used were lambda-cyhalothrin & zeta-cypermethrin and were applied at commercial rates.

| ARKANSAS COUNTY | | Flowering-Milk 3 DAT | Milk/Soft dough 7 DAT | 10% Hard dough 10 DAT |
|-----------------|------------------------|-------------------------|-----------------------------|-----------------------------|
| 2021 | L-Cy | 14.2 | 24.6 | 23 |
| | TENCHU ^{20SG} | 1.2 | 1.4 | 2.2 |
| 2022 | L-Cy | 9.2 | 30 | 17 |
| | TENCHU ^{20SG} | 0.6 | 1.6 | 2.8 |

| POINSETT COUNTY | | Flowering-Milk 3 DAT | Milk/Soft dough 7 DAT | 10% Hard dough 10 DAT |
|-----------------|------------------------|-------------------------|-----------------------------|-----------------------------|
| 2021 | L-Cy | 1.2 | 3.8 | 8.6 |
| | TENCHU ^{20SG} | 0.4 | 1 | 1.4 |
| 2022 | L-Cy | 7.6 | 5 | 10.8 |
| | TENCHU ^{20SG} | 0.6 | 1.2 | 3.4 |

FORGIVENESS: WITH PYRETHROID RESISTANCE

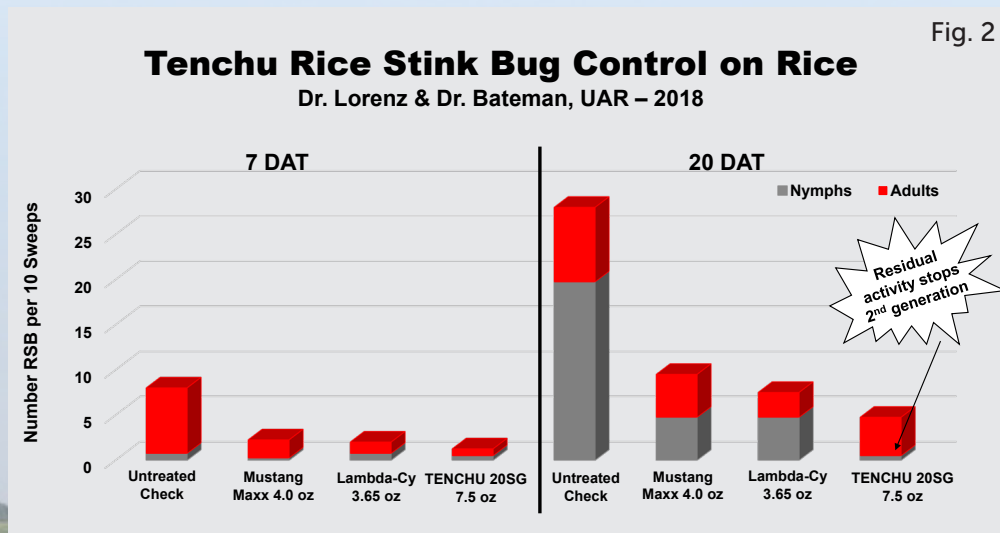
The tables on the left show the average number of RSB per 10 sweeps in two different Arkansas counties after rice fields were treated with lambya - cyhalothrin (L-Cy, 3.65oz) versus TENCHU (8.0oz). Numbers in green indicate a treatment threshold of less than 50%, yellow is equal to or greater than 50%, and red are above treatment threshold.

Trials in Arkansas County show that the full rate of L-Cy did not provide acceptable control in both 2021 and 2022. In Poinsett County, control decreased in 2021 at 10 days after treatment (DAT) with L-Cy and in 2022, control was slipping at just 3 DAT and above the threshold at 10 DAT. TENCHU provided steady and reliable control in both counties in both years. That's "peace of mind!"

QUICK KILL AND RESIDUAL PREVENTS NEXT POPULATION DEVELOPMENT

Commercial use and university field trials have proven that TENCHU gives much longer control than pyrethroids. TENCHU has shown a 10 - 14 day lethal dose residual, and a 14 - 21 day sub-lethal dose residual in which TENCHU causes 70-90% feeding inhibition. Even though the RSB are not dead, they are not active and don't do damage, probing the grains, potentially introducing them to microorganisms which cause breakage and yield loss.

Figure 2 shows the results from a 2018 trial conducted by Dr. Gus Lorenz & Dr. Nick Bateman, University of Arkansas. TENCHU's quick knock down is evident as well as the residual benefit preventing the development of nymphs and keeping RSB levels below the treatment threshold 3 weeks after application.

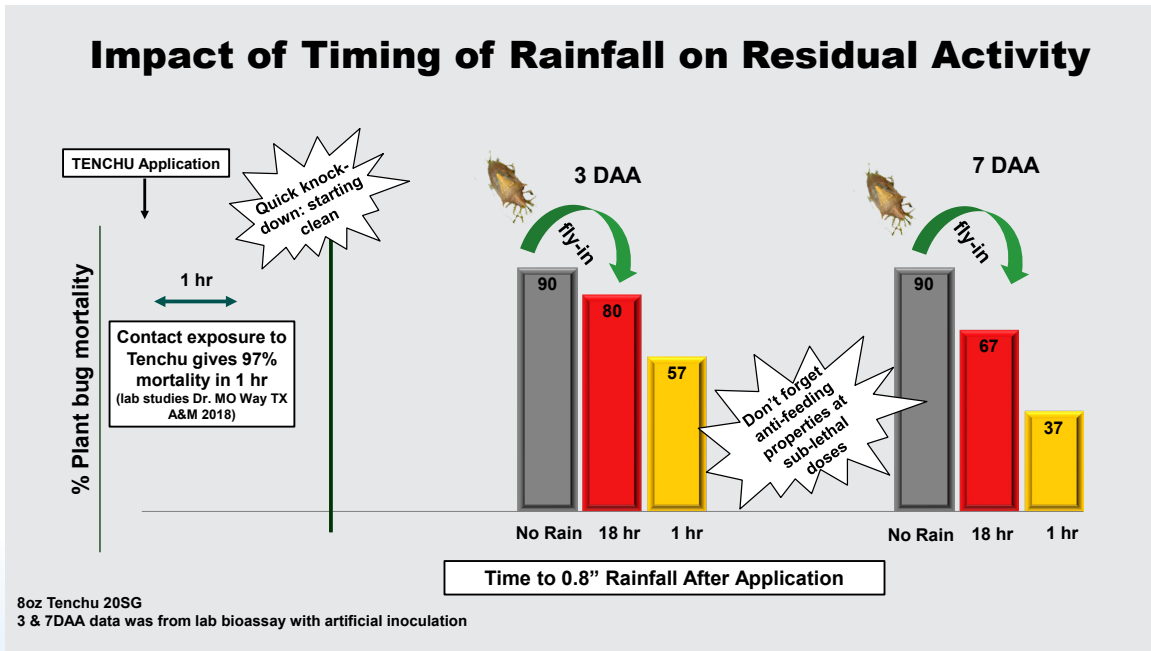


Rice Stink Bug infestations in pyrethroid treated fields will negatively impact yield and quality of rice.



IMPACT OF RAINFALL ON RESIDUAL ACTIVITY

Field reports have indicated great initial knock-down of RSB when TENCHU® was applied shortly before a significant rain event. However, the length of residual control was less than expected. In response to this feedback from the field, and to provide better recommendations for timing of application of TENCHU, a rice greenhouse study was conducted. Based upon these results and knowledge from Japanese commercial use, we have fine-tuned the recommendations for TENCHU around rain events.



RECOMMENDATIONS

- Wait until after the rain event and apply as soon as possible. It is okay to apply to wet leaves after the rain event (common practice in Japanese production).
- If not possible to wait, start application allowing for a window of at least an hour, but 3-4 hours are preferred. It is ok to apply to leaves with dew/moisture. Knock-down activity will quickly control adults and nymphs to below economic injury threshold. Residual control of subsequent reinfestations will be reduced by the time of the rain event, however, sub-lethal residue will still provide anti-feeding properties.

RSB that come into direct contact with TENCHU will die within an hour and get your counts below threshold. If you have at least an hour before rain, some of the active ingredient will have had time to translocate within the plant to provide a moderate level of residual control. TENCHU has anti-feeding properties with a sub-lethal dose; even though it may not kill them, it will still prevent them from feeding. During the 4-5 days it can take a tropical system to move out, TENCHU still provides a moderate level of RSB control and reduced feeding. After the system moves out, make another application of TENCHU and finish out the crop cycle

HIGHLY EFFECTIVE ALTERNATIVE MODE OF ACTION PROVIDES THE MOST PROFITABLE OPTION FOR RICE STINK BUG CONTROL

For several years; Pyrethroid resistant (Pyr-R) Rice Stink Bug (RSB) have been prevalent in Texas, making TENCHU® 20SG a dominant choice for RSB control. Pyr-R RSB have now rapidly become prevalent in Arkansas, Louisiana, and Mississippi as well. Entomologists have been documenting this rise in resistance, and a need to implement an alternative treatment program to control and prevent RSB damage.

The advantage of incorporating a different mode of action into the stink bug control program is invaluable. Prior to retirement, Dr. Gus Lorenz, entomologist from University of Arkansas offered his view, *"I think TENCHU is extremely important for resistance management. If we keep hammering with pyrethroids, we're going to start having problems. It's important for us to have another mode of action to get those stink bugs below threshold and not have them as a yield limiting or a quality issue for us in rice."* Lorenz went on to sum up his experience with TENCHU, *"I really like the knockdown and the residual control with this product. I think it's a safe compound to use. It is a top performer for stink bug control."*

University research and commercial use has consistently shown TENCHU to be a great option for RSB control. A frequent objection has been the cost of TENCHU compared to an economical pyrethroid based insecticide such as L-Cy or Mustang® Maxx.

Capturing quantitative scientific data on quality loss (pecky rice) has been a challenge for universities over the past seven years. To address this data-gap, Dr. Bateman (Univ. of Arkansas) brought on a Graduate Research Assistant to capture data to document the relevance of RSB control on pecky rice prevention with commercial insecticides. Rice was evaluated using the U.S. grading system in reference to percent peck. Docking amounts, based on USDA grade number, were assessed.

| | Rate Oz/Ac | Est. Cost per Treatment \$/Ac | Cost per Airplane (\$3 GPA) | Total Grower Cost for RSB/Ac | % Peck | U.S. Grade | Mill Dockage \$/Acre (200 Bu/Ac avg.) | Total Grower Cost \$ | ROI to the Grower \$/Ac |
|------------------------------|------------|-------------------------------|-----------------------------|------------------------------|--------|------------|---------------------------------------|----------------------|-------------------------|
| Untreated | -- | -- | -- | -- | 4.0 | No. 4 | \$60 | 60.00 | 0 |
| TENCHU^{20SG} | 8.0 | \$11.00 | \$8.00 | \$19.00 | 1.2 | No. 1 | \$0 | \$19.00 | \$41.00 |
| L-Cy | 3.65 | \$5.50 | \$8.00 | \$13.50 | 2.8 | No. 3 | \$30 | \$43.50* | \$16.50 |
| Mustang Maxx | 4.0 | \$6.15 | \$8.00 | \$14.15 | 3.1 | No. 3 | \$30 | \$44.15* | \$15.85 |
| Carbaryl | 32 | 16.75 | \$8.00 | \$24.75 | 1.9 | No. 2 | \$10 | \$34.75* | \$25.25 |
| Malathion | 32 | 11.25 | \$8.00 | \$19.25 | 2.6 | No. 3 | \$30 | \$49.25* | \$10.75 |

*NOTE: Data do not capture cost of:

- Second application for pyrethroid that failed
- Damage or kernel abortion early on that resulted from pyrethroid failure.

The table above summarizes statistically significant results from six trials conducted during 2021 and 2022. The data clearly shows, although the total cost of TENCHU is about \$5.00/ac more than a pyrethroid, the **actual ROI to growers applying TENCHU is about \$25.00/ac more!**

TENCHU's quick knock down, longer window of control and residual time for anti-feeding, all lead to increased yield, higher quality rating, greater ROI to the grower AND peace of mind for the consultant!



AQUATIC SAFETY

TENCHU has been used commercially for a number of years in Texas and southern Louisiana due to resistance issues as well as safety to adjacent aquatic habitats. The potential for disruption to an aquatic habit is far less (orders of magnitude) with TENCHU than pyrethroids. If you have a big rain event or a hurricane event coming, you can't apply a pyrethroid if you need to release flood water within 7 days of application due to fear of killing down stream aquatic organisms. TENCHU does not have a release period restriction.

TENCHU® 20SG Application Guidelines

- 7.5 - 10.5 oz/acre
- No more than 2 applications/season
- PHI 7 days
- Begin applications timed to economic thresholds
- Can be tank-mixed with fungicides and other insecticides

APPLICATION GUIDELINES

TENCHU is labeled for use in Texas, Louisiana, Mississippi, Arkansas and Missouri. Apply 7.5 - 10.5 ounces of TENCHU in 2.5 - 5 gallons of water per acre. TENCHU mixes well and is easy to apply. If a second treatment for rice stink bug is needed, re-apply TENCHU as the label allows for two applications per season.

See page 4 for application recommendations prior to, or after a rain event.



Belchim Crop Protection USA

225 Wilmington West Chester Pike | Suite 200 | Chadds Ford, PA 19317

Phone: 855-445-7990 | www.belchimusa.com

info.usa@belchim.com

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