Uneven emergence and stands prolific in Louisiana rice

Every year is different, and every year has its own unique set of challenges. This year is no different. In almost all southwest Louisiana rice fields there is one common problem that producers are facing, and that problem is delayed germination and uneven rice stands. This issue has caused the current crop to look visually unpleasant. It has also caused a few management questions associated with herbicide use, fertilization and flood establishment.

Before we discuss how to handle these uneven stands, lets take a look at what caused the poor stands in the first place. Most rice in southwest Louisiana was planted in a two-week window when the soil was dry beginning around March 15. Prior to then, the soils were too wet to plant with a grain drill. In fact, soils were wet throughout the winter and most were worked for the first time just

Figure 1. Soil temperature (3-inch depth) at the H.R.C. Rice Research Station in Crowley, LA in March and April of 2019.

![Soil temperature graph](image)
prior to planting. Cool, wet soils are not ideal for seed germination. Both oxygen and adequate soil temperatures are required for rice germination. The recommended soil temperature for satisfactory rice germination is 65°F or higher. Rice seed germination is negligible below 50°F. Poor rice germination is expected between 55 and 60°F. Improved, but still unsatisfactory, seed germination is expected between 60 and 65°F. Figure 1 displays the 2-inch soil temperatures at the Rice Station during the months of March and April. Looking at the most common planting window beginning on March 15, you can see that soil temperatures were high enough for some seed germination but there were unsatisfactory in general. In addition, many growers flushed the rice fields after planting due to inadequate soil moisture. Unfortunately, after flushing most of Louisiana was inundated with several inches of rain from multiple rainfall events. The standing water and anaerobic (no oxygen) soil conditions could have also delayed rice germination and emergence. Early field visits and discussions with growers focused on the possibility of poor germination. However, I observed this across multiple varieties and hybrids. In my opinion, the uneven germination and emergence was mostly due to environmental conditions.

Fertilize and flood now or wait until the next dry period?

The uneven stands at various stages of rice development, from just recently emerged to beginning tillering, have many worried about hurting or killing the younger rice when applying herbicides, fertilizing and establishing the permanent flood. Current soil conditions in the area are dry to nearly dry. These soil conditions are ideal to fertilize and establish the flood to maximize fertilizer
efficiency and rice yield. Furthermore, increased daily high temperatures will have rice growing faster this week than they have all season long. However, another wet period is expected to begin this Friday. Should growers fertilize and flood now or wait? This is a great question and it really depends on the current plant population of the rice and the age of the rice. I am a big believer in establishing the flood early to help with weed control, if the rice can take the flood. Rice is resilient and can withstand a shallow flood. Rice can also stretch when submerged slightly when the water is clear. So, when making this decision, I recommend evaluating the bulk of the rice stand instead of just focusing on the smaller percentage of rice that just recently emerged. Would you still have the optimum plant population to maximize yields if all the recently emerged rice did not survive? If not, it might be best to wait until the next dry spell. If so, then this is a great time to fertilize and establish the flood. Every field and situation will be different. Remember, optimum plant populations are 10 to 15 plants per square foot for varieties and 6 to 8 plants per square foot for hybrids.

Why is it important to have dry soil for preflood urea applications?

Pre-flood urea fertilizer applications should always be applied on dry ground and then flooded immediately to minimize nitrogen (N) losses and maximize fertilizer efficiency. When urea fertilizer breaks down, it has the potential to be converted into
ammonia gas, which subsequently can be lost to the atmosphere through a process called ammonia volatilization. Ammonia volatilization losses can be significant. Studies at the H. Rouse Caffey Rice Research Station have shown that 30% or more of the applied N fertilizer can be lost in a mere 10 days. Typically, volatilization does not start for the first couple of days after application when urea is applied onto dry ground. However, when urea is applied onto a moist soil or is applied into a standing flood, the urea is broken down quickly and volatilization can start immediately. This significantly increases the potential for larger N losses.

Treating urea with a urease inhibitor that contains the active ingredient NBPT, NPPT, or Duromide can temporarily protect N from volatility losses when urea is applied onto a dry or moist soil surface. However, the protection lasts only half the time (approximately five days) when the urea is applied on a moist soil as compared to when it is applied on a dry soil (approximately 10 days). A urease inhibitor will not provide any protection when the urea is applied into a standing flood. Applications of urea applied into a standing flood will also have N losses from other loss pathways in addition to ammonia volatilization. This further reduces
N fertilizer efficiency in this scenario. Applications of urea into a standing flood for early-season rice should always be avoided.

A trial was conducted in 2015 to illustrate the inefficiency of urea applications when applied onto a moist soil (when not treated with a urease inhibitor) or into a standing flood. Both urea and urea treated with a urease inhibitor (Agrotain Ultra in this trial) were evaluated. The permanent flood
was established 10 days after fertilizer application in this trial, with the exception of the application that was applied into the standing flood, which was maintained throughout the trial. The N fertilizer application rate was 120 pounds of N per acre or approximately 260 pounds of urea per acre. Figure 2 illustrates the fertilizer efficiency (percent of the applied N that actually made it into the plant) in each of the application scenarios. You will notice that the fertilizer applications onto dry ground were the most efficient. The application of urea onto a moist soil reduced fertilizer efficiency significantly as compared to applications onto a dry soil. However, treating the urea with the urease inhibitor (Agrotain Ultra) did provide protection in this scenario. Both urea and the urease-inhibitor-treated urea were very inefficient when applied into a standing flood, with less than 10% of the applied N actually making it into the plant. Figure 3 illustrates the yield losses associated with the reduced N efficiency when applications are made on moist soil and into a standing flood.

Sometimes visual observations are more convincing than actual data. Pictures of the research trial were taken that year and one is included on the previous page. The outside rows are border plots where N fertilizer was not applied. Notice how light-green and yellow these plots are. The yellow and light green color is a good visual indicator of N deficiency. In the first picture, where the fertilizers were applied onto moist soil (mud), you will notice that the urea (2nd plot from left of the first row) is darker green than the border plots, but not quite as green as the Agrotain Ultra (urease inhibitor, NBPT) treated urea next to it. This mirrors the fertilizer efficiency and yield data. In the second picture where the N fertilizer was applied into a standing flood, you will notice that the urea and Agrotain Ultra treated urea in the first row are not visually different from the border rows. Don’t forget, we applied 120 pounds of N per acre on these plots!

Applications of urea into a standing flood in early season rice should always be avoided.

Join the Louisiana Rice Text Group List

If you would like to join the Louisiana Rice Text Group, simply text @larice to 81010. To unsubscribe to the group, simply text back “unsubscribe@larice” to the group.
If you would like to get the text messages by email, send an email to larice@mail.remind.com. If you would like to unsubscribe to the email messages, simply email larice@mail.remind.com with “unsubscribe” in the subject line.

This information will also be posted to the LSU AgCenter website where additional rice information can be found. Please visit www.LSUAgCenter.com.

Additional Information

Louisiana Rice Notes is published periodically to provide timely information and recommendations for rice production in Louisiana. If you would like to be added to this email list, please send your request to dharrell@agcenter.lsu.edu.

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Upcoming

- May 28: Southwest Louisiana Rice Field Day, Iowa, LA
- May 30: Evangeline Parish Rice Field Day, Mamou, LA
- June 12: Acadia Parish/South Farm Field Day, Crowley, LA
- June 26: LSU AgCenter’s H. Rouse Caffey Rice Research Station Field Day, Crowley, LA
- July 18: Northeast Louisiana Rice Field Day, Rayville, LA