Delta Rice Production – Planting and Fertility Practices

Rice production practices in the Delta are uniquely adapted to the local conditions, including cooler temperatures and soils with high organic matter. Variety selection, planting practices, and fertility management that are suitable for the region help ensure successful production.

Variety selection

UC Cooperative Extension evaluates varieties in the Delta for cold-tolerance and adaptability (Fig. 1). Very-early and early maturing varieties, like M-105, M-206, and CM-101 have performed well in trials. They have good agronomic characteristics and consistent quality across different harvest moistures. The most widely planted variety in the Delta and across the state is M-206. While CM-101 is a very good variety for the Delta, a contract is required, so it is not widely planted. Among the newer varieties, M-210 is early maturing, blast resistant, and may be a good option for the Delta. M-209 and M-211 are not suitable for the Delta because they are late to mature and susceptible to cold temperatures.

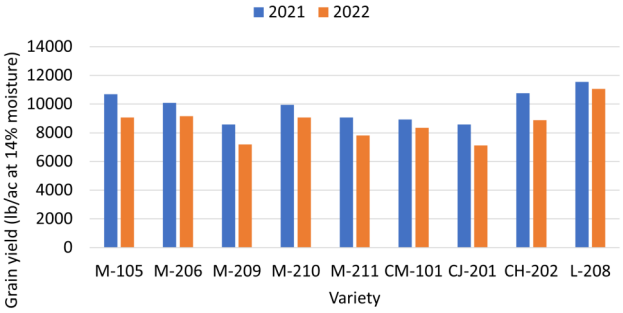

Figure 1. Yield from UCCE Delta variety trials.

Planting practices

Delta rice is planted in either April or May, depending on seasonal rainfall and when growers can start bringing equipment onto the fields. Rice is drill-seeded into moist soil, as growers would plant wheat, where row spacing is about 6 inches and seeding rate is around 150 pounds per acre. When employing drill-seeding, growers must be mindful of planting depth and soil moisture. Typical seeding depth is about 1.5-2 inches. Research has shown that rice seedlings do not emerge well and may come up twisted and bent when planted too deep. Rice emergence is most successful when growers "plant to moisture", which means that seed is planted at the interface of dry and moist soil. Some growers may drill-seed into dry soil and then irrigate with a brief flush of water to help germinate seed. This practice, however, can result in an uneven stand and may make weeds more problematic by giving them a head-start to grow before the rice has emerged. A better practice if a grower "misses the moisture" would be to flush the field ahead of planting, allow some time for the soil surface to dry, and then plant to moisture.

Fertility management

For rice grown on high organic matter soil, research indicates that there is no benefit to applying nitrogen (N), phosphorus (P), or potassium (K) fertilizer at planting. While some growers may apply starter fertilizer at planting through the grain drill, all fertilizer could be applied just be-

fore the permanent flood is established (roughly the 3-4 leaf stage, or about 3-5 weeks after planting).

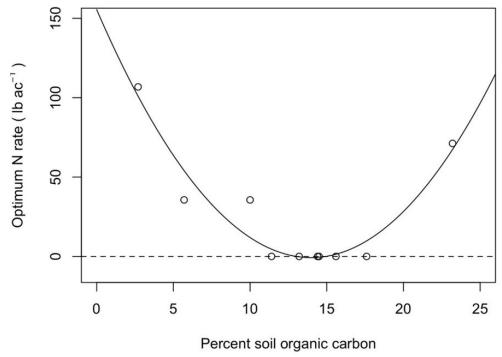

Figure 2. Relationship between soil organic carbon and optimum N fertility rate. (Data from Espe et al., 2015. Soil Science Society of America Journal).

Determining the correct N fertilizer rate is important. Applying too little N results in poor crop yields. Too much N results in delayed crop maturity, lodging (which lowers grain quality and slows harvest operations), and blanking. Research has indicated that soils with 12 to 18% carbon (roughly 24 to 36% organic matter) do not require N fertilizer; however, soils with lower or higher organic carbon contents do require N fertilizer (Fig. 2). Rice yields did not improve in trials where P fertilizer was applied, indicating that P fertilizer may not be necessary in the Delta (Fig. 3). In contrast, K fertilizer will be needed under some circumstances. Soils in the Delta may be low in K, and K is removed from the system in large quantities after harvest, especially in fields where the straw is baled. In trials, yields were reduced when no K was applied in one of two fields (Fig. 3). The data show that K could either be applied at planting or just before permanent flood with similar yield results. Trial results may not apply to all areas of the Delta, and growers should use soil and leaf sampling to guide their fertilizer decisions. Evaluate leaf samples at panicle initiation to determine if topdressing fertilizer is necessary.

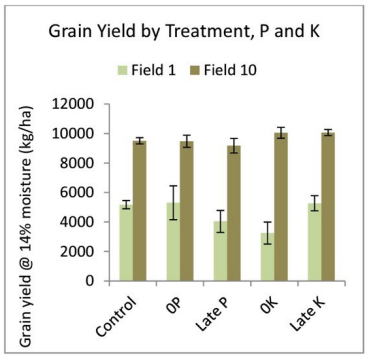

Figure 3. Yield response to P and K fertilizer. The control received both P and K fertilizer at planting. The late P and K received P and K fertilizer just before permanent flood.

For more on this topic:

- ✓ Espe et al. 2015. Indigenous Nitrogen Supply of Rice is Predicted by Soil Organic Carbon. Soil Science Society of America Journal. doi: 10.2136/sssaj2014.08.0328.
- ✓ Leinfelder-Miles, M. et al. 2022. Sample Costs to Produce Rice, Delta Region. UC Cooperative Extension and UC Davis Department of Agricultural and Resource Economics. https://coststudies.ucdavis.edu/en/current/commodity/rice/.
- ✓ UC Agronomy Fact Sheets. https://agric.ucdavis.edu/fact-sheets.

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2023