Changes In Rice Production Brought About By Reduced Tillage

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The introduction of reduced tillage techniques to rice production followed its use in row crop production. The unique culture of rice in flooded fields presented its own set of problems. The adoption of reduced tillage to row crops caused growers to re-think production practices and required many changes on the part of the growers. The combination of these changes and the cultural methodology of rice production proved challenging especially to the early adopters, the pioneers of reduced tillage rice production.

In an effort to control red rice, a weedy form of rice, in rice production seeding into water known as water planting became common in southwest Louisiana where about eighty percent of Louisiana's production is located. This method did not lend itself well to reduced tillage production. Early problems associated with poor seed to soil contact such as, seed desiccation during drain following seeding and the need to repeatedly flush fields were common complaints.

Vegetative cover present at planting both alive and dead caused problems as well. As dead plant material decomposed in flooded fields, oxygen levels were depleted affecting germination and emergence. Green vegetation interfered physically initially then as plants died added to the problems caused by decomposing vegetation.

Assessing stands was also difficult because small seedlings were difficult not only to count in determining plant populations, but were often hard to detect. Uniformity of stand was also problematic because only small areas could be seen at each point of examination in the field. It was virtually impossible to view the field as a whole so patterns of emergence were not clearly defined.

Without soil disturbance near planting incorporation of fertilizer especially phosphorus and potassium materials was impossible. Prevailing technology of the time questioned the ability of phosphorus to be carried into the soil where it was available to plant roots. The solubility of potassium brought about questions of nutrient removal in the process of flushing and/or flooding rice paddies.

Shifts in weed problems toward perennial species followed reduced tillage practices. An increase in Brook Paspalum (*Paspalum acuminatum*), Knotgrass (*P. distichum*), Water Paspalum (*P. hydrophilum*), Creeping Rivergrass (*Echinochloa polystachya*), Cutgrass (*Leersia* sp.), Alligatorweed (*Alternanthera philoxeroides*) and Burhead (*Echinodorus cordifolius*) among others have followed the increase in acreage devoted to reduced tillage practices.

Integral to this increase in adoption of reduced tillage is the culture of crawfish in rice fields. This popular practice usually follows a crop of rice grown in the summer with deep flooding of the same land and consequent harvesting of crawfish in the winter and spring. In the past these fields had to be drained and cultivated prior to planting another crop. Because of the lateness of the crawfish harvest many farmers either suffered reduced rice yields or planted soybeans if that option was available. Both seedbed quality and weeds often were impediments as well.

The problems of poor seed to soil contact were solved by preparing seedbeds in the fall then planting in the spring without further soil disturbance. While this is not true no-till it represents the most common form of reduced tillage practiced in Louisiana. Rapid vegetative growth of mostly Ryegrass (*Lolium sp*.), Annual Bluegrass (*Poa annua*), Carolina Foxtail (*Alopecurus carolinianus*) and assorted broadleaf species provided the benefits of soil and water conservation without the necessity of planting cover crops.

Initial attempts at burning down this vegetative cover did not solve the problems of poor seed to soil contact. Gradually growers learned to time herbicide applications so that vegetation did not produce as much biomass permitting seed to reach the soil surface resulting in acceptable rice stands. This required experimentation with materials, rates and timing to achieve satisfactory results. Glyphosate containing products and combinations with residual materials have become standard in the industry. Often two or more applications of burn-down materials are made with one in late fall or early winter and a second closer to planting.

Fertilization difficulties were overcome at the same time by applying phosphorus and potassium in the fall as part of seed bed preparation. Some soils with low cation exchange capacities (CEC's) do not allow the application of potassium because of leaching problems, but in these instances potassium may be applied at or just prior to planting.

Where red rice is not a problem and crawfish culture is not involved the simple technique of drilling was changed to permit seeding into undisturbed soil. Equipment developed for other crops was modified as necessary especially in the heavy clay soils of northeast Louisiana.

By far the single most influential change facilitating the adoption of reduced tillage was the development of Clearfield rice varieties. These varieties are tolerant of the herbicides Newpath (imazethapyr) and Beyond (imazamox) which will control red rice in conventional rice. This opened the door to drill seeding into red rice problem areas solving the problems associated with water seeding of rice increasing the acreage eligible for reduced tillage.

Trends In Texas Rice

Presented by Dr. Jim Stansel
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Dramatic changes in most phases of Texas rice production occurred in 2006. The 147,549 rice acres in Texas were the lowest since 1934. Average yields in 1934 were 2,241 lbs/ac (14 barrels), illustrating how far production has advanced. The 2006 acreage was a 26 percent reduction from 2005. Texas yields were the highest ever recorded and there were significant changes in the varieties grown.

Cocodrie remained the leading variety comprising 42 percent of the Texas acreage followed by Cheniere at 14 percent. Clearfield varieties made up 16 percent of the acreage with CL131 the most popular. The Rice Tec hybrids were grown on 14 percent of the acres with XL 723 having the largest acreage.

Main crop yields were over 8,000lbs/ac (50 barrels) dry weight, the highest average ever recorded in Texas. Over 40 percent of the hybrid fields yielded (main crop, dry wt.) over 10,000 lbs/ac (62 barrels). Hybrid milling yields averaged 60.7/72.8 number 2. Main crop yields across all varieties were above normal in the western regions with yields about normal in the east.

The first 50 percent of the crop was planted 2 weeks earlier than normal due to dry field conditions during the winter and early spring. The crop survived near record cold in late March and early April and was harvested a week earlier than normal. The second half of the crop in the east was later than normal due largely to a wet and cold April. Statewide, the reduced acreage, early planting and early harvest contributed to the record yields.

Rice Nutrition Studies For Mississippi River Alluvial Soils

Presented by Dr. Timothy W. Walker
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A large percentage of southern USA rice production is located in the Mississippi River Alluvial Valley. This area is known for its highly fertile soils and abundant water supply. Research is conducted so that information regarding nutrient recommendations keeps pace with an agricultural climate where change is rapid and certain. Much effort is placed in defining nitrogen (N) recommendations because it is applied in greater quantity and incidence compared to other plant nutrients. Furthermore, because there currently are no soil tests suitable for determining the amount of N that should be applied compared to the amount that is or will become available in the soil. In addition to N, grain yield responses to other nutrients such as P, K, S and Zn are evaluated so that general recommendations can be made based on where nutrients should be supplied, at what rate they should be applied, and the proper timing of the application so that optimum efficiency can be achieved. A summary of N-, P-, and K-nutrition studies conducted in Mississippi in 2006 are presented in this report.

In Mississippi, rice receives N-fertilizer typically three to five times throughout the grow-