TRANSITIONING TO ROW CROP IN SOUTHERN NSW

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Summary

Careful management is needed if row crops are to be established after rice crops. It will take about 18 months for the soil to be suitable for row crops after the conversion of rice layouts to a row crop layout. Growing a row crop in the season after a rice crop can result in poor crop growth because of several factors – especially due to rice stubble disorder.

Introduction

There has been considerable interest in the conversion of irrigation layouts to the new bankless beds in bay layouts. This has been driven by the ease of water management and the labour savings with the new layout compared to traditional siphon layouts.

Layouts have evolved over the past 15 years and there are now a few variations appearing to suit individual paddocks and the flow capacity of individual farms.

These new layouts have a big advantage in allowing better water management during crop establishment in soils that have lower subbing capacity. The layouts also allow greater flexibility in crop choice.

Careful management needs to occur if coming out of a rice based rotation. Research during the 1970s and 80s highlighted a problem known as Rice Stubble Disorder. Muirhead (1981) indicated that phosphorus was tied up as iron came into solution when rice fields were flooded. Banklines with better growth were clearly seen in crops such as maize after rice, where most of the iron in the soil was in a crystalline form which allowed phosphorus to remain available to the plant.

A number of cotton crops in southern NSW during the 2013/14 season have had poor growth when rice was grown as the previous crop. Leaf and soil tests have confirmed low phosphorus levels in both the soil and cotton plants. Assessments of pH undertaken in the top 10 cm soil were in the range of 4.4 to 4.7 CaCl2, and hence were not ideal for row crops. Compaction was also evident in some of these fields which is likely to restrict root growth in row crops, consequently these fields will need deep ripping to open up compaction layers.

To grow rice, fields are selected due to the heavy impermeable nature of their soil types and in many cases have lower pH values. This is in contrast to row crops such as cotton and maize that require good drainage and have pH requirements in the range of 5.5 to 7 CaCl2.

Other factors may also limit the growth of row crops in this situation. The alleopathic , effect of previous crop residues on the growing crop could be part of the cause and warrants further investigation. Also crops such as cotton have a high dependency on vesicular arbuscular mycorrhizal (VAM) fungi for good growth and initially coming out of the rice system VAM levels could be lower. At low levels of available phosphorus this dependence on VAM to access phosphorus is increased in cotton (Dowling 2010).. At a soil phosphorus level of 8 mg/kg, cotton depends upon VAM to meet 89 percent of its phosphorus requirements whereas when 18 mg/kg soil phosphorus, the dependency is 54 percent. Ongoing research is required to measure phosphorus, zinc and VAM levels in paddocks that are transitioning into row crops.

Conclusion

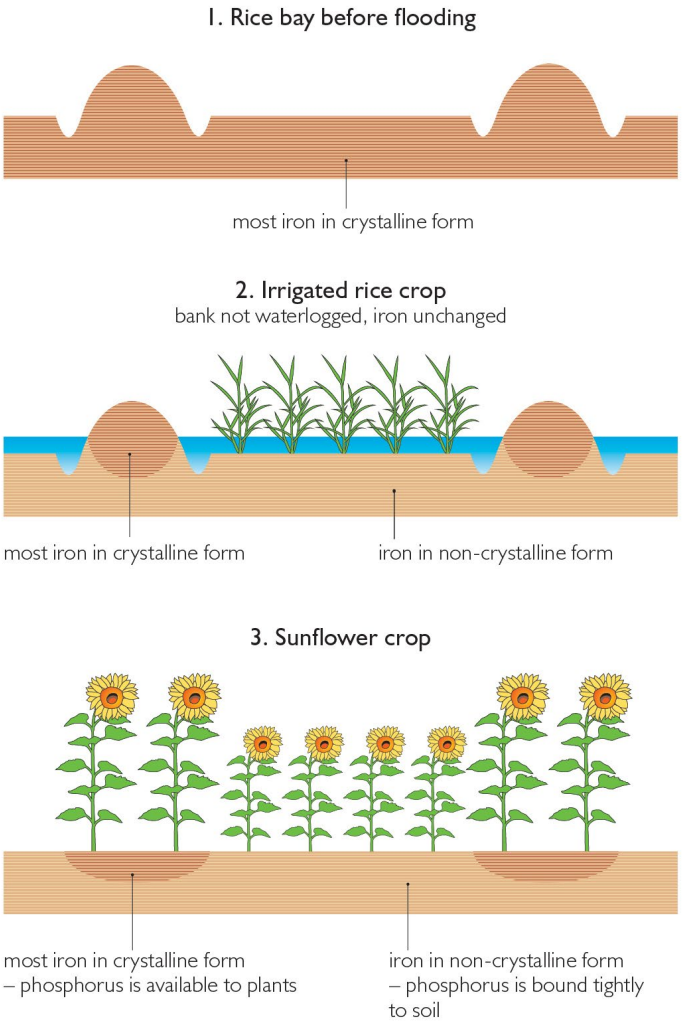
If row crops are to be successfully grown after a rice-based rotation careful management is needed. It will take about 18 months for the conversion of rice layouts to row crop layouts to be successful. The profile will need to be dried out and aerated

after rice. It is common practice to grow a cereal crop immediately after rice, and not water it fully in spring so the soil profile dries down.

After the cereal crop is harvested, landforming should be undertaken over the summer months. Soil tests will indicate if pH needs to be adjusted using the appropriate rate of lime. Common practice in past conversions is to apply high rates of poultry manure and in some cases up to double rates of phosphorus fertiliser to overcome short term Phosphorus tie up.

This timeframe allows residues to breakdown and soil biology to come back into balance.

Growers considering the conversion of fields to row cropping out of previous rice rotations should consult with a cotton crop advisor. The conversion will need to be a staged and well-managed process to get a good result with the first row crop.



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References

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