Department of Primary Industries
primefact

Mid-season drainage of rice

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Mid-season drainage has been used by some rice growers particularly in the central and western Murray Valley for a number of years as a management tool to help avoid straighthead.

What is mid-season drainage?

Mid-season drainage involves the removal of all surface water from the rice crop at mid to late tillering for 10 – 14 days allowing the soil to dry, crack and re-aerate. Mid-season drainage in Australia has been used to reduce the occurrence or severity of the condition known as “straighthead”. Straighthead is a physiological disorder of rice that causes excessive sterility and reduced crop yields. Yield reductions are usually in the order of 10 to 20% but losses of up to 90% have been recorded. Other symptoms are not normally observed, but in some cases florets may be deformed or missing and panicles may fail to emerge. Mid-season draining has been shown to counteract the factors that lead to straighthead in rice.

A mid-season drain will be particularly beneficial in years where conditions favour the development of straighthead. These conditions occur when there has been hot weather during crop establishment, large quantities of organic matter have been incorporated prior to sowing, the field has a history of straighthead or a straighthead susceptible rice variety has been grown.

Further information can be found in the NSW DPI Primefact: “Straighthead in Australian rice crops”.

Timing and duration of mid-season drainage.

Mid-season drainage is conducted at mid to late tillering, at least five weeks prior to panicle initiation. This allows time for the water to be drained from the field allowing it to dry out sufficiently that the soil surface cracks allowing the soil to be re-aerated.

The water needs to be drained from the field, not just allowed to evaporate, so that the entire bay dries evenly. In layouts where drained water is not readily recycled, the entire crop does not need to be drained at the same time. Top bays may be drained first and lower bays drained later.

The crop needs to be re-watered at least 7 to 10 days prior to panicle initiation. The time from draining to rewatering is between 10 and 14 days but this will vary with different soil types and weather conditions. The recommended cumulative evapotranspiration for this period of stress is between 80 – 100 mm depending on crop vigour and soil type.

Figure 1: Rice that has been mid-season drained ready to reintroduce water.

Image: John Fowler

Reintroduction of water

Water should be reintroduced to the field as quickly as possible ensuring all areas are covered. Water depth can then be built up over time ensuring 25 cm depth is achieved to protect the emerging panicle at the critical young microspore growth stage.

The period just prior to the reintroduction of water may be used to topdress the crop with urea. The

application of the urea onto dry soil before reapplying the water will result in less nitrogen losses than would occur if nitrogen was aerially applied to a flooded paddock. It is suggested that nitrogen rates be reduced if applied to dry soil at this stage and if total nitrogen available to the crop is approaching the optimum.

Figure 2: Crop of rice that has been mid-season drained as water is being reapplied.

Image: John Hand

Figure 3: Same crop of rice as in Figure 2 three weeks after reintroduction of water.

Image: John Hand

Mid-season draining will delay the crops development. Sowing date is an important factor to take into account. This delay may push the critical young microspore stage into a period where cold damage is more likely to occur. The physiological maturity of the crop will also be later potentially creating harvest problems if it is a cold or wet finish to the season.

Mid-season drainage may also lead to an increased risk of armyworm infestation. The causes of this are not fully known but an increase in the numbers of armyworms in mid-season drained crops compared to conventional crops has been observed over a number of seasons. The monitoring of the crop after mid-season drainage for armyworms is essential.

This information can be found in the current NSW DPI Primefact: “Armyworms in rice”

There is a NSW DPI video “Guide to mid-season draining of rice” see details in ‘More information’ below.

Other water management options

Delayed Permanent Water

Delayed permanent water is another irrigation management option where the crop is sown and initially managed the same as a conventional drill sown crop, but permanent water is not applied until the late-tillering stage. This keeps the soil in an aerobic state for much of the crops vegetative period and much longer than for aerial or conventional sown rice. Permanent water should be re-applied at least 10 days before panicle initiation. This strategy will reduce the possibility of straighthead occurring in the crop but may not be suited to all soil types or farm setups.

See Primefact on “Delaying permanent water on drill sown rice” for more details

More information

Primefact 1346: Straighthead in Australian rice crops

Primefact 1316: Armyworms in rice

Primefact 1238: Delaying permanent water on drill sown rice

Video Guide to mid season draining of rice can be found at:

www.youtube.com/watch?v=wJ7vJqiXzVM

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