

Factors to consider when draining rice

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Deciding when to drain the water from your rice crop for harvest is one of the most important and difficult decisions in rice growing. In draining you must meet two objectives:

1) You must ensure the field maintains adequate soil moisture until the crop reaches physiological maturity (26 to 28% grain moisture). The plants must not suffer moisture stress before this time or yield and grain quality will be reduced.

2) The field should dry out sufficiently for a timely and efficient harvest at high grain moisture (20 to 22%) with harvest machinery not damaging the soil surface. In trying to achieve objective 2 you must not compromise objective 1.

Weather conditions in autumn when grain ripening, draining and harvest occur are highly variable. This seasonal variation from year to year is what makes the draining decision so challenging.

Variety selection and time of sowing

Deciding on which variety to sow and when to sow it will impact on when the crop is maturing. The recommended sowing times for varieties are directly linked to when the variety will be at early pollen microspore. When sown on time the crop should reach early pollen microspore during the last two weeks of January when there is the highest probability of warm minimum temperatures. This timing will also allow the crop to reach maturity when temperatures are not too high which will improve rice grain quality and wholegrain mill out.

Sowing information can be found in the current NSW DPI Primefact: "Rice variety guide".

Water management after flowering

Once flowering is finished the deep water that was used to protect the crop during microspore and flowering can be used up by the crop and a

low water level established. Bring the water down to a very shallow level that still covers the top side of each bay and maintain it with the entire field covered until the crop is ready to be drained.

The practice of "Lockup" is not recommended as it often leads to uneven soil moisture across the field due to variability in soil surface levels and soil types across the field. This can lead to some areas of the field being dry before they are ready to drain, thus causing "haying off".

Figure 1. Maintain a minimum level of water over the entire field and then drain. Do not "lockup" as this can lead to uneven soil moisture and "haying" off.



Factors to consider when draining

There are a number of factors that need to be considered when deciding when to drain in order to maximise yield potential and wholegrain mill out while achieving a trafficable field.

These include:

Field layout

There are various layouts used in rice fields from contour bays through to lasered terraced bays with bankless channels. For each layout the speed that the water drains from the field needs

to be considered when deciding when to start draining.

For example; a terraced lasered field with clean bankless channels which is drill sown may allow all surface water to drain from the field in 2 days, whereas a field with a contour layout and flat slope, which is aerial sown, may take up to 2 weeks for the surface water to drain completely.

Figure 2. An aerial sown field with contour layout will take much longer to drain than a drill sown crop on a landformed field.



Sowing method

Sowing method can affect the speed of draining the rice field; aerial sown crops tend to be slower to drain due to a rougher soil surface and often increased presence of the weed *Chara* which slows water movement (Figure 3). Whereas in fields where the rice crop has been drill sown, draining is often rapid, as the soil surface is smooth and drill sowing requires a layout with the ability to supply and drain water quickly and *Chara* is also less prevalent.

Figure 3. The weed *Chara* slows water drainage.



Soil type

Soils can vary within a field let alone between fields so knowing the soil type and its ability to

dry down is very important and critical when the decision to drain is being made.

Crop nitrogen

High levels of nitrogen are required to produce high rice grain yields. High yielding crops are thick and bulky and require moisture for a longer time than crops with less biomass. It is important to consider variable rate nitrogen application prior to permanent water to create an even crop biomass across the field. When the crop is even it is much easier to decide when to drain than when the crop is highly variable. For a very variable field, draining should be timed so that almost all the crop will not experience moisture stress. This will mean some areas in the field may be well past the ideal harvest moisture before harvest is possible.

Time when crop is maturing

Rice crops that are sown earlier than recommended will mature when temperatures and evaporation are high. This is not desirable for good grain quality and also means water will need to be retained on the field until the crop is close to physiological maturity before draining can occur.

Time of drainage

When the crop is getting close to draining weather forecasts should be regularly checked. Your decision of when to drain a field may need to be modified if high temperatures and evaporation or rain are forecast in the near future. Short term (7 day) weather forecasts have become very accurate in recent years, particularly for temperature. This information is critical when making the correct draining decision and should be used in combination with the factors already discussed.

Remember that each field will be different so each should be assessed individually when deciding when to drain.

Grain development stages

It is very important to know the stage that your crop is at when looking at making a decision on when to drain. The current rice varieties are more synchronous in their maturity than they have been in the past, where varieties such as Amaroo were renowned for late tillers. Reiziq, Sherpa and Langi plants flower over a shorter period and are therefore easier to judge the level of crop maturity at drainage time.

There are three stages in grain development that are important when determining when to drain; these are late milky stage, late dough stage and physiological maturity. You need to squeeze the

florets between your thumbnail and forefinger to determine the stages (Figure 4).

Late milky stage is where the grain is full inside the glumes. When squeezed between thumbnail and forefinger a white liquid comes out.

Late dough stage is where the grain is full and firm but can still be cut in half by the thumbnail.

Physiological maturity is when most grains are hard and grain moisture is about 26-28%. When all the grain is at this stage moisture is no longer required by the plant.

Figure 4. It is important to select representative panicles and squeeze the glumes to determine their stage of development.



The grains at the bottom of the panicle are normally the last to develop, but it is important to squeeze florets across the whole length of several panicles.

Panicles should be checked in several locations which cover the variability in maturity that is present across the field.

It is important not to use colour as an indication of the stage of development of your crop as it varies considerably between varieties.

The following table gives a guide as to the suitable criteria for determining when to commence draining your rice crop (Table 1). It is important that forecast weather conditions are also taken into consideration with these criteria.

Table 1. These criteria should be used as a guide only. Source: Rice Production Guide.

Time of crop maturity	Quick drying field - Landformed layout - Drill sown	Slow drying field - Contour layout - Aerial sown
Late February to early March	Late dough stage	No milky grains
Early March to mid March	No milky grains	5% milky grains
Late March to early April	5% milky grains	10-15% milky grains

More information

Primefact 1112: Rice Variety guide

For updates go to www.dpi.nsw.gov.au/factsheets

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