

# DPI Primefact

## Identifying panicle initiation in rice

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### What is panicle initiation?

Panicle initiation (PI) is when the panicle (terminal flowering head) begins to form in the base of the tiller. The panicle formation marks the end of the vegetative phase and the beginning of the reproductive phase (Figure 1).

Panicle initiation is defined as when 3 out of 10 main tillers have a panicle 1–3 mm long (Figure 2). It is valuable as it provides a definite marker for crop development.



Figure 1. Panicle initiation is when the crop goes from the vegetative to the reproductive stage.

### Why is it important to identify panicle initiation?

The most efficient time to apply nitrogen (N) to a rice crop is pre-permanent water. Panicle initiation is the second most efficient time to apply N to a rice crop because the full crop canopy reduces fertiliser volatilisation, and the extensive near-surface root system takes up N soon after application.

It is important to identify PI correctly as it indicates the:

1. sampling time for the rice PI tissue test
2. ideal time for N top-dressing
3. time to start increasing water depth to a minimum of 250 mm before microspore begins.

### When does panicle initiation occur?

Ideally a crop should reach PI during the first and second week of January so that microspore occurs between late January and early February. This period has the highest probability of warm temperatures, thus reducing the risk of cold damage at microspore.

In a warm season, crops sown early in their recommended sowing window will generally reach PI during the first week of January. In cool seasons, and when crops are sown later than recommended, PI can be delayed until late January.

A useful tool to help indicate when to start checking the crop for PI is the [PI Predictor](https://riceextension.au/pi-predictor) (<https://riceextension.au/pi-predictor>).

### How to identify panicle initiation

The changes associated with the start of PI are microscopic and impossible to detect with the naked eye. The technique recommended is to identify the new panicle itself visually. This requires regular crop sampling from late December onwards.

For practical purposes, PI is when the newly forming panicle (1–3 mm long) can be seen with the naked eye as a furry tip, located above the airspace or internode at the growing point. This can be seen in the middle of the tiller after slicing it in half lengthwise (Figure 2).

The furry tip is the panicle with the young florets forming.

The airspace is a poor indicator of PI as it can vary in length from 10–60 mm at PI depending on temperature, variety, N fertility, plant population and water depth during tillering.

The white bottle-shaped section immediately below the panicle is non-elongated stem tissue, which can sometimes be confused with the panicle.

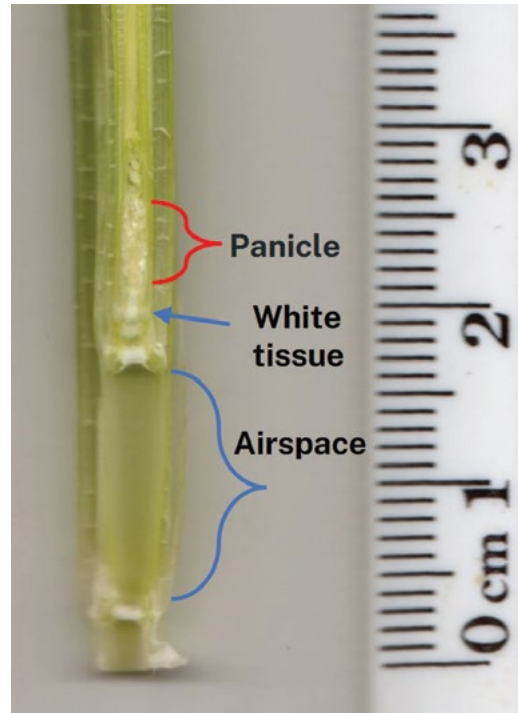


Figure 2. A rice tiller sliced lengthways showing the location of the small panicle.

### Steps in identifying panicle initiation

1. **Collect plant samples** from several locations representative of the crop. Avoid small areas where growth is different from the general crop. Keep some roots on the plants so you do not cut where the panicle is located.
2. **Select the main tiller** from the centre of each plant. Do not use the smaller, less developed tillers (Figure 3).



Figure 3. Select the main tiller from each plant.

3. **Cut off the roots** just above the root ball (Figure 4).



Figure 4. Cutting roots off.

4. **Slice the tiller** lengthwise with a sharp knife; be careful to cut down the centre of the stem (Figure 5).



Figure 5. Slicing the tiller lengthwise to find the panicle.

5. **The panicle** itself is located above the airspace. At PI it appears as a 'furry tip' 1–3 mm long (Figure 2). A magnifying glass will assist in identification.

Panicle initiation occurs when 3 out of 10 main tillers have a panicle that is 1–3 mm long.

### The top-dressing window

Panicle initiation indicates the beginning of the top-dressing window. This is the best period, after permanent water (PW) has been applied, to apply N to the rice crop should it be deficient.

The N fertiliser rate required for PI top-dressing should be determined using the PI tissue test.

Crops that are severely N deficient and not expected to reach 80 kg N/ha by PI should be top-dressed at mid to late tillering or grain yield potential might be reduced. The PI tissue test can be used at PI as long as 2 weeks have passed since N was applied. This will allow for a further top-up if required.

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