Identifying panicle initiation in rice

June 2018, Primefact 1278, Third edition
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What is Panicle Initiation?
Panicle initiation (PI) is a growth stage that represents the start of the reproductive phase in rice development. It is when the actual panicle (terminal flowering head) begins to form in the base of the stem.

The formation of the panicle marks the end of the vegetative phase and the beginning of the reproductive phase. It is also valuable as it provides a definite marker in the crop development.

PI is defined as when 3 out of 10 main stems have a panicle 1 to 3 mm long.

Why is it important to identify PI?
Panicle initiation is the second best time to apply nitrogen to a rice crop with pre-permanent water being the most efficient. Nitrogen applications at PI are relatively efficient because the full crop canopy reduces fertiliser volatilisation and the extensive near surface root system takes up nitrogen soon after application.

It is important to identify PI correctly as it indicates:
1. The sampling time for the rice NIR Tissue Test
2. The ideal time for nitrogen topdressing
3. Time to start increasing water depth to a minimum of 25 cm before microspore begins.

When does PI 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 may be delayed until late January.
How to identify PI

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

A useful tool which will indicate when you should start checking your crop for PI and help guide your PI identification is the “PI Predictor” http://pipredictor.sunrice.com.au/

For practical purposes, PI is when the newly forming panicle (1 to 3 mm) can be seen with the naked eye, as a furry tip, located above the airspace or internode at the growing point (Figure 1). The furry tip of the panicle is actually the young florets forming.

The white bottle shaped section located immediately below the panicle is sometimes confused with the panicle. It is in fact unelongated stem tissue (Figure 1).

Steps in identifying PI

Step 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 don’t cut where the panicle is located.

Step 2 - SELECT MAIN STEM from the centre of the each plant. Do not use the smaller, less well developed tillers.

Step 3 - CUT OFF THE ROOTS just above the root ball.

Step 4 - SLICE THE STEM lengthwise with a sharp knife - be careful to cut down centre of the stem.

The airspace is a poor indicator of PI as it can vary in length from 10 to 60 mm at PI depending on temperature, variety, nitrogen fertility, plant population and water depth during tillering.
Step 5 - THE PANICLE itself is located above the airspace. At PI it appears as a “furry tip” 1 to 3 mm long (Figure 1). A magnifying glass will assist in identification.

PI has occurred when 3 out of 10 main stems have a panicle 1 to 3 mm long.

The topdressing window

PI indicates the beginning of the "topdressing window". This is the best period, after permanent water has been applied, to apply nitrogen to the rice crop should it be deficient.

The ideal topdressing period or "window" extends from PI until the panicle reaches 50 mm in length. It is ideal if PI nitrogen can be applied as close to PI as possible and within a week of PI occurring.

The rate of nitrogen fertiliser required for PI topdressing should be determined using the NIR Tissue Test.

Crops that are severely nitrogen deficient and are not expected to reach 80 kg N/ha by PI should be topdressed at mid to late tillering or grain yield potential may be reduced.

More information

NIR Tissue Test: Identifying panicle initiation

http://www.youtube.com/watch?v=6SreVbETiIlE&feature=youtu.be

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