

Rice Water Management: Its Impact on Pest Management and Harvest

LATMC

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Types of Rice Culture Based on Water Management

- Upland rice – planted dry, flooded by rainfall, usually on steep slopes or where water unreliable
- Lowland rice – also called paddy rice, fields surrounded by water retaining barriers or levees to maintain water in ponded situation

Primary Purpose of Growing Rice in Flooded Fields

Weed Control

Water Management Systems

- Water Seeded
 - Continuous flood
 - Delayed flood
 - Pinpoint flood
- Dry Seeded
 - Delayed flood

Continuous Flood

- Rice is water seeded
- Shallow flood maintained
- Rice must be above water by 4th leaf
- Water level raised as plants grow

Pinpoint Flood

- Rice is water seeded
- Field is drained briefly (3-5 days)
- Shallow flood established
- Rice must be above water by 4th leaf
- Water level raised as plants grow

Delayed Flood

- Also called prolonged drainage
- Rice water or dry seeded
- Field may be flushed
- Permanent flood not established until rice is 4 to 5 leaf

When should rice
be flooded?

As soon as possible

Why flood early?

- Better weed control
- Better nutrient utilization
- Earlier maturity

Flushing

The addition of water to a field to the point of saturation of the soil surface without maintaining or holding a flood on the field.

Essentially a rapid flood immediately followed by a rapid drain.

Water Management – Supply

- Must have adequate supply
- Must be able to flush in 2 to 4 days
- Must be able to flood in 3 to 5 days



Water Management - Timing

- Knowing when to flood and when to drain is critical
- Old “Rule of Thumb” often correct
 - If flooded and problems, drain
 - If drained and problems, flood

Effect of Water Management System on Rice Establishment

- Continuous flood Poor
- Pinpoint flood Fair
- Delayed flood Good

Effect of Water Management System on Red Rice Suppression

- Continuous flood Good
- Pinpoint flood Fair
- Delayed flood Poor

Water Management – Depth

- Water depth critical especially in seedling stages
- 2” difference in surface elevation can make or break stand establishment
- Uniformity of depth more important than average depth







Water Seeded Rice Seeds Germinating

Radicle
emerging





All Rice Herbicides
Work Better With
Water

Why?

Water Effects on Foliar Applied Herbicides

- Rapidly growing healthy rice plant more tolerant
- Rapidly growing healthy weed more susceptible

Contradiction?

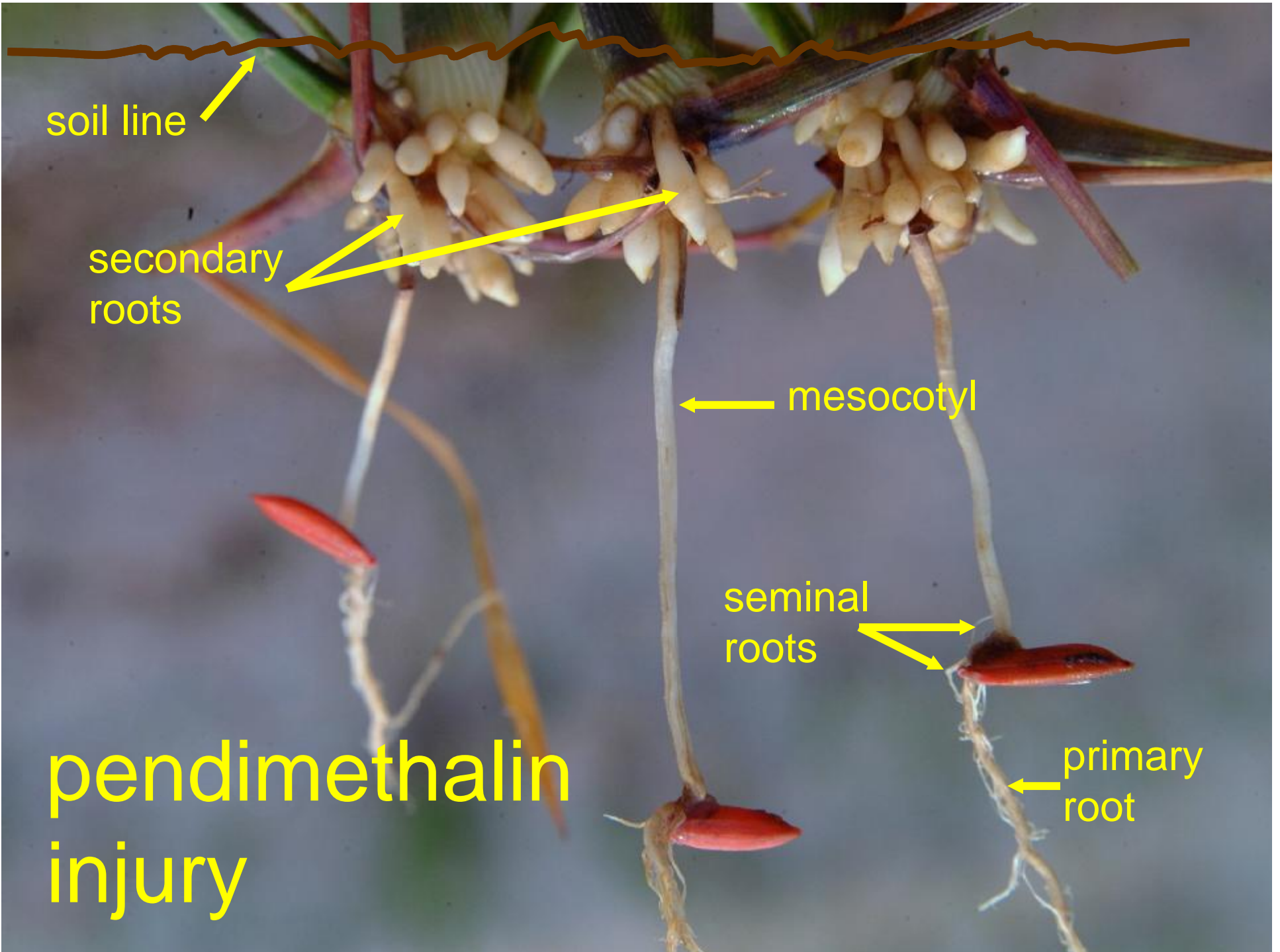
NO!

Physiological Response

- Healthy rice plants have ability to either metabolize or prevent the metabolism of herbicide
- Healthy weeds lack ability to do either and take it up rapidly for effective dose

Herbicide “Activation” of Soil Applied Herbicides

- Distribute herbicide evenly
- Gets herbicide into soil solution
- Moves herbicide below soil surface
 - Prevents UV breakdown
 - Reduces oxidation breakdown



soil line

secondary roots

mesocotyl

seminal roots

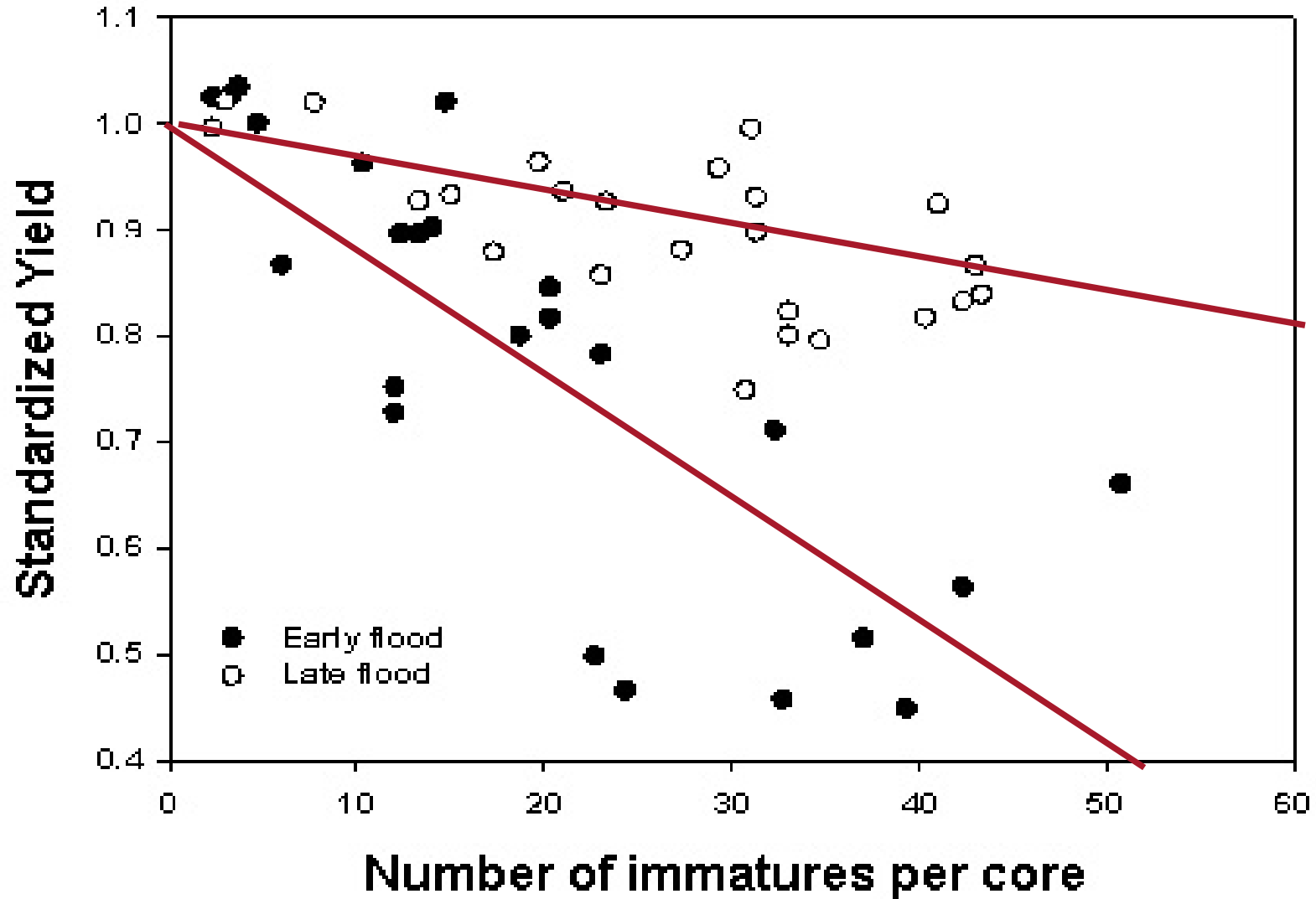
primary root

pendimethalin injury

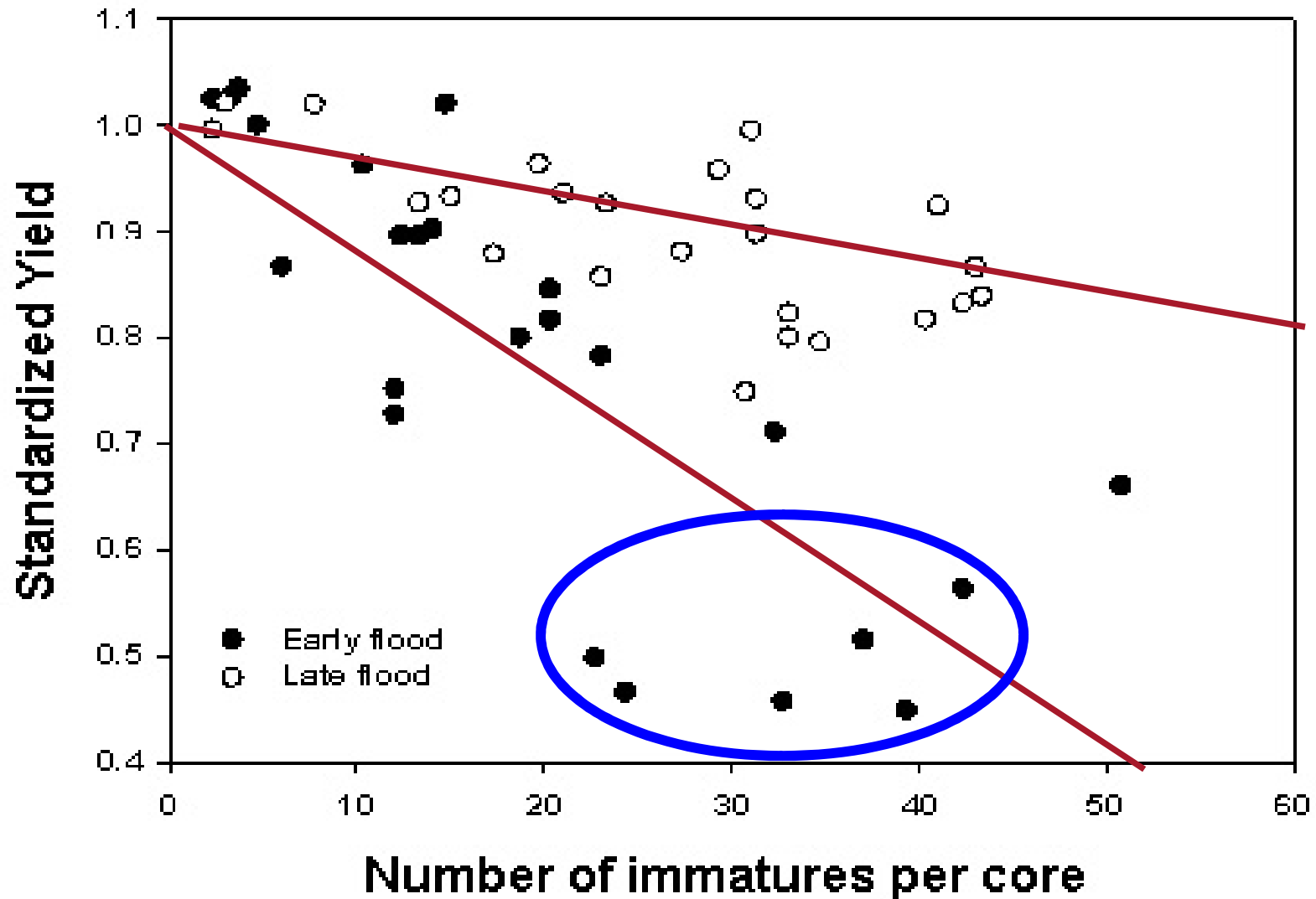
Timing - Water

- May depend upon management system
- Delaying flood
 - May help in rice water weevil suppression
 - Will reduce red rice suppression
 - May reduce weed control in general

Distribution of Rice Water Weevil Larvae Per Soil Core and Effect on Yield in Early vs Late Flooded Rice

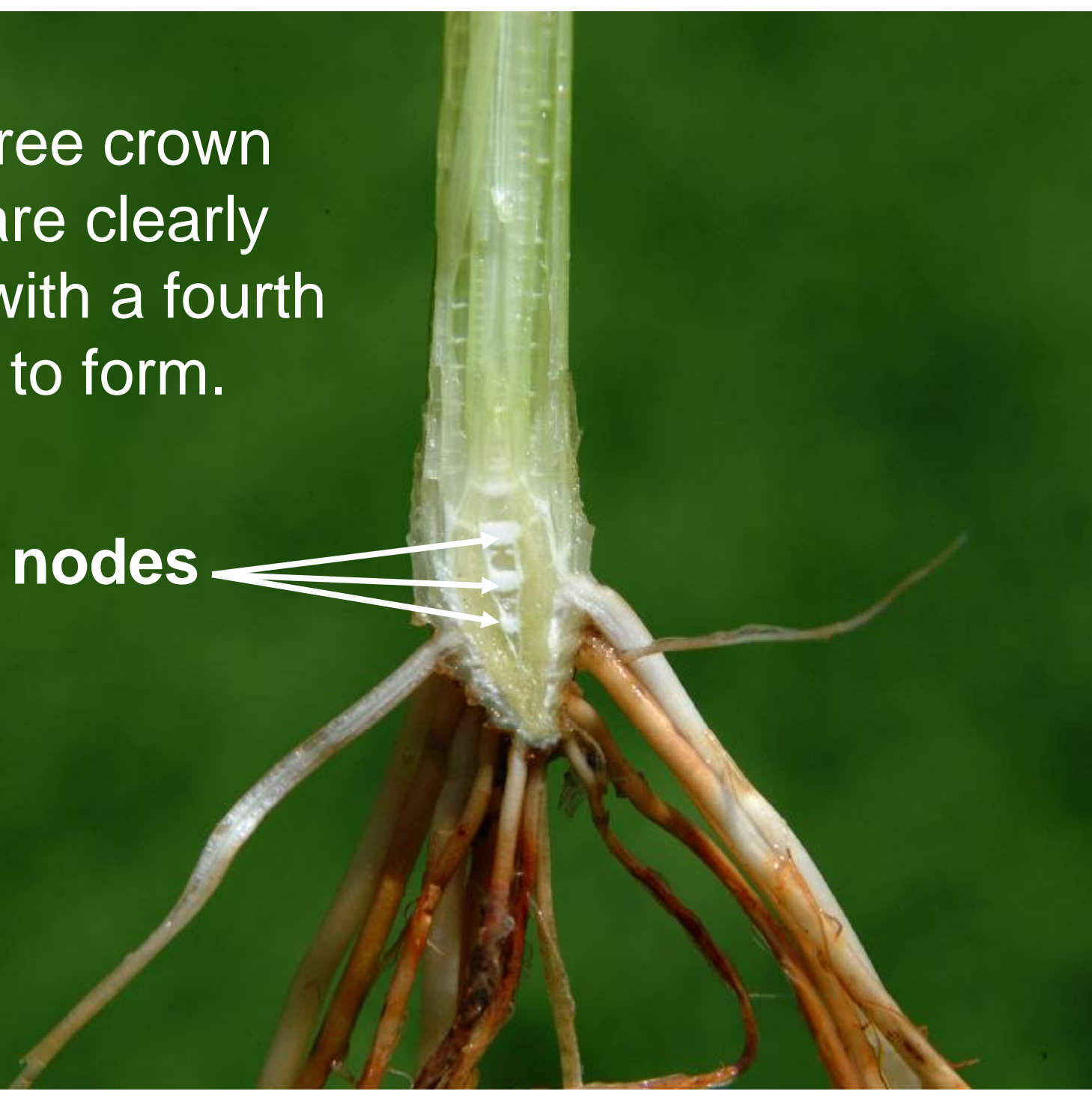


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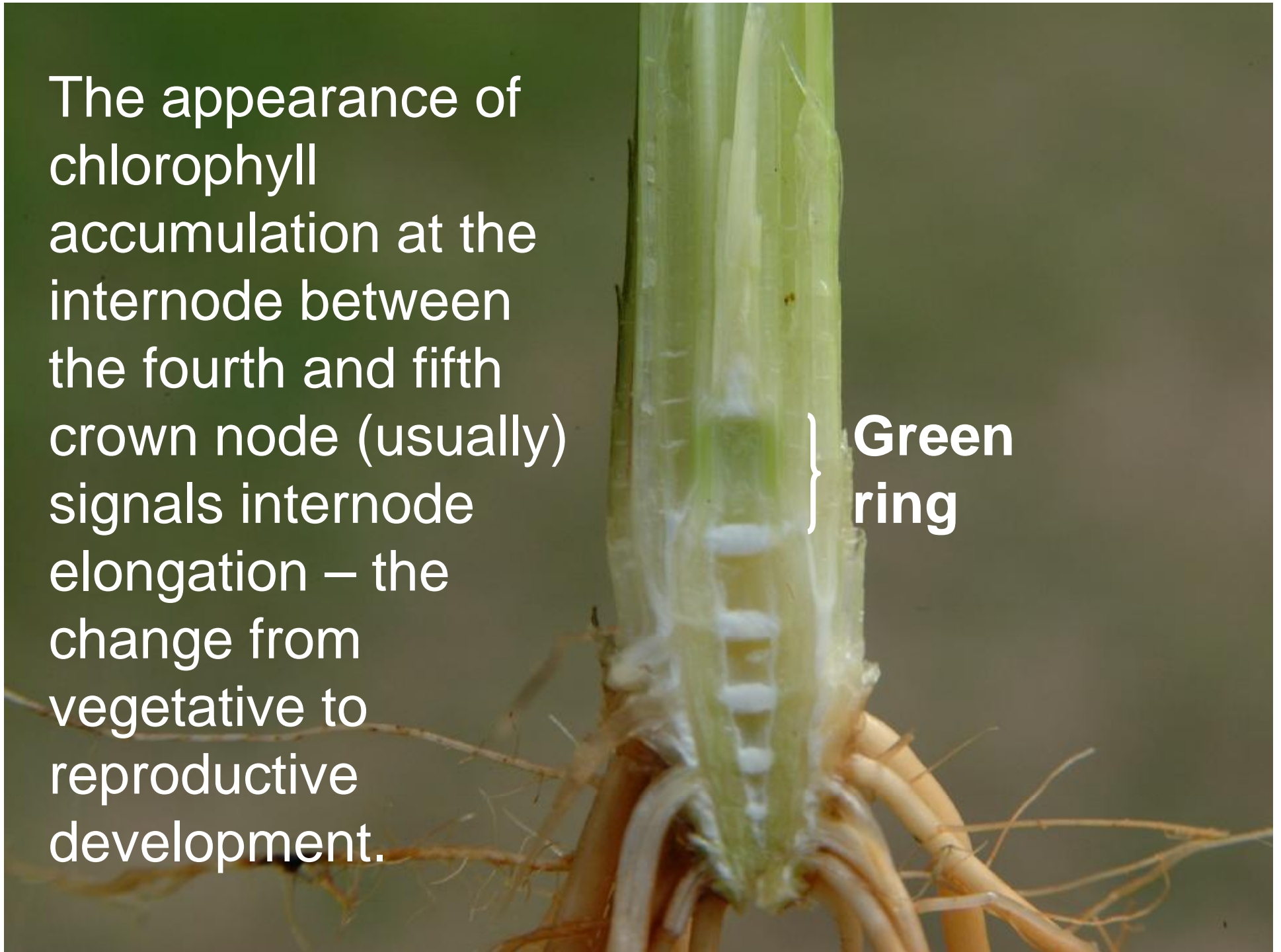


Here three crown nodes are clearly visible with a fourth starting to form.

Crown nodes



The appearance of chlorophyll accumulation at the internode between the fourth and fifth crown node (usually) signals internode elongation – the change from vegetative to reproductive development.



**Green
ring**

Drain Timing for Harvest

- Silt loam soils – when $\frac{2}{3}$ of panicle straw colored
- Clay soils – when $\frac{1}{2}$ of panicle straw colored
- Grain moisture between 30 & 33%
- In dry season may let plants use water – stop pumping

$2/3$
panicle
ripe

Silt loam

clay

$1/2$
panicle
ripe



