

Spikelet Sterility of Lowland Rice related to Temperature at Booting Stage in Different Thermal Environment in Madagascar

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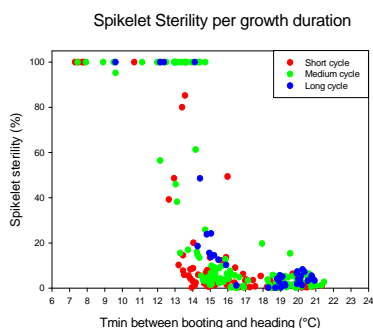
Introduction

Although rising global mean temperature will benefit high altitude rice systems, low minimum temperatures still pose a severe challenge. Cold induced spikelet sterility is dependent on the temperature rice experiences during booting stage. The introduction of cold tolerant varieties combined with crop models to simulate growth responses to environment conditions offers an opportunity to widen sowing windows. This study aims to determine the effective temperature affecting the viability of spikelets in high altitude rice systems.

Conclusions

- Spikelet sterility, coupled with growth duration, are adequate indicators for estimating cold tolerance in rice.
- Air temperature below 12°C between booting and heading stage induced 100% spikelet sterility at both locations for all varieties.
- Varieties which showed low spikelet sterility (> 20%) between 13°C and 18°C during booting and heading stage had short cycles.
- Short cycle varieties could be used for expanding cropping calendars in high altitude rice systems.

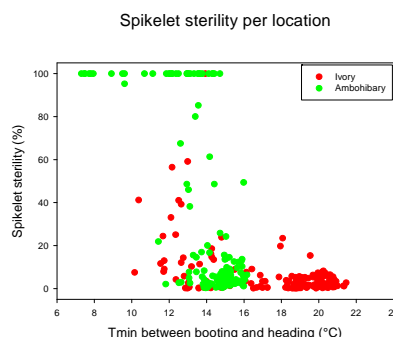
Results



Duration of plant development was affected by both location and planting date.

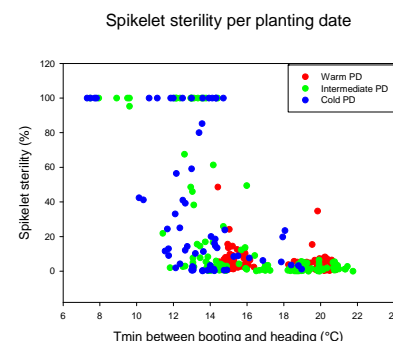
Spikelet sterility varied between groups of varieties:

- Short duration: 5.9 -38.31%
- Medium: 4.68-55.62%
- Long: 8.71-79.06%



Regardless of variety and planting date, spikelet sterility differs significantly for each location

- Ivory: 5.74%
- Ambohibary: 56.84%



Irrespective of location, varieties show different percentages of spikelet sterility for each planting date

- Warm : 4.5- 5.39 %
- Intermediate: 12.52- 9.81%
- Cold : 51.50- 59.96%

Material and Methods

- 20 varieties sown monthly in a non replicated garden trial
- 2 years field experiment at 2 different altitudes:
 - Ivory (800 m asl) and Ambohibary (1674 m asl)
- Weather station to collect daily weather data
- Tinytags data loggers to monitor plot microclimate
- Phenological stages were recorded during crop cycle
- Yield and yield components were determined at maturity

