Effect of flood timing on rice grain yield in a drill-seeded, delayed-flood rice production system

Manoch Kongchum, Dustin Harrell, and Nutifafa Adotey

Louisiana State University AgCenter, H. Rouse Caffey Rice Research Station

ABSTRACT

A field experiment was conducted at LSU AgCenter H. Rouse Caffey Rice Research Station in Crowley, Louisiana, to evaluate rice grain yield at 5 different flood timings for nine rice varieties and hybrids: CL111, CL151, XL753, CLXL745, Cheniere, LaKast, Roy J, Mermentau, and Jupiter. Permanent flood was established 7 days after CL111 reached the 2-3 leaf growth stage and every 7 days thereafter. Mean grain yield across varieties from highest to lowest was 14 days (10,959 kg ha^{-1}), 7 days (10,388 kg ha^{-1}), 21 days (9,829), 0 days (9,503), and 28 days (9,287) after CL111 reached 2-3 leaf stage. Rice yield was affected by the flood timing and by variety interaction. Five varieties (CL111, CL151, XL753, CLXL745, and LaKast) the highest yield was observed when permanent flooding began 14 days after CL111 reached 2-3 leaf stage of development. For the other 4 varieties (Cheniere, Roy J, Mermentau, and Jupiter) showed the highest yield when permanent was applied 7 days after CL111 reached 2-3 leaf stage of development. Preliminary data suggests that permanent flood establishment can be delayed up to 14 days after the 2-3 leaf stage development for some rice varieties and hybrids without sacrificing grain yield.

INTRODUCTION

Drill-seeded delayed-flood rice production normally performs well on a well-prepared seedbed and/or when red rice is not a severe problem (Saichuk (eds), 2014). In this system, the permanent flood is applied just before rice begins tillering. The effect of flooding later or earlier on grain yield is unknown. The objective of this study was to evaluate the effect of flooding time of dry seeded, delayed-flood system on rice grain yield performance.

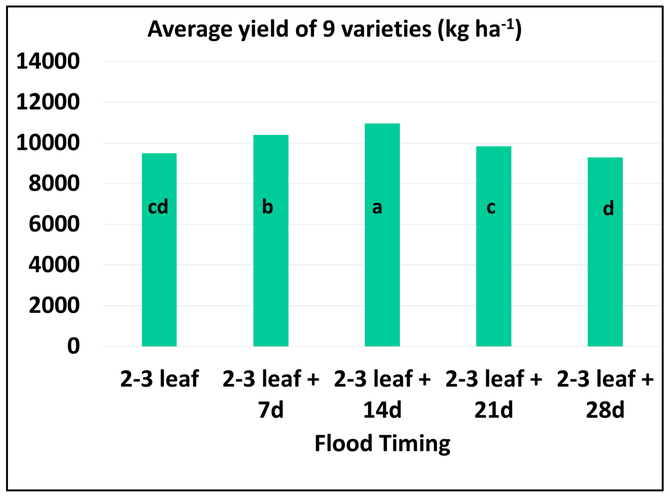
MATERIAL AND METHODS

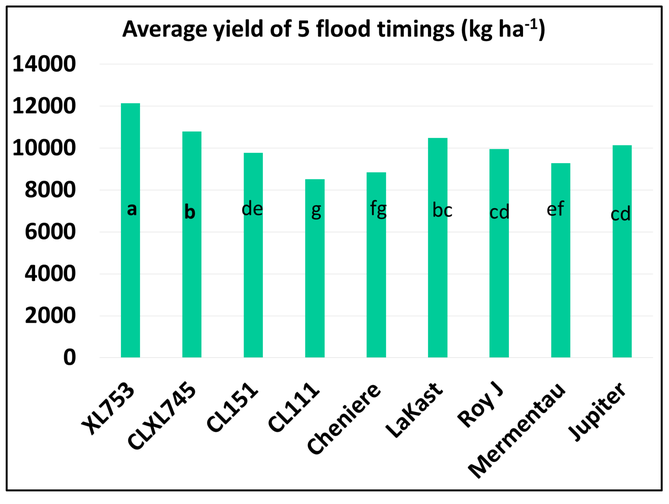
Drill-seeded cultivation
Tillage type: Fall Stale
Soil type: Crowley silt loam
Seeding rate:
- conventional varieties = 355 seeds m^{-2}
- hybrid varieties = 108 seeds m^{-2}

Fertilization:
- At planting 0-24-24-2.7(Zn) 270 kg ha^{-1}
- Nitrogen rates- 135 kg N ha^{-1} 1 day pre-flood

Pest managements:- as needed
Delayed-flood water management:
- First flood timing- at 2-3 leaf stage of CL 111, then every 7 days of 4 different timings

Data collection:
- Agronomic
  - 50% Heading
  - Height and Lodging
- Grain yield





RESULTS

- 2-3 leaf stage of CL111 was observed at 44 days after planting (DAP)
- The last flood timing was applied at 72 DAP
- Late permanent water and N application resulted in delayed maturity
- Greater lodging rate was observed in early flood timing (7 and 14 days after 2-3 leaf stage of CL111)
- Plant height was higher in the early flood as compared to later flood
- Yield was influenced by flood timing and rice variety interaction
- Highest mean yield (11.0 t ha^{-1}) was measured in the treatment when permanent flood was applied 14 days after 2-3 leaf stage of CL111 (57 DAP), followed by 7 days after 2-3 leaf stage of CL111 (50 DAP)

CONCLUSION

- Rice yield was affected by flood timing
- There were interaction between flood timing and rice variety

REFERENCES

Saichuk (Eds) 2014. Louisiana Rice Production Handbook. LSU AgCenter Pub.2321 (3M) 5/14 Rev.

ACKNOWLEDGEMENTS

This project was partially supported by Louisiana Rice Research Board and USDA-NIFA.