Institute of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute) (490)

Transplanting as an option to mitigate abiotic stresses in lowland rice production in the Fogera plain, Ethiopia

Bayuh Belay Abera[1,2], Marc Cotter[1], Kalimuthu Senthilkumar[3], Arisoa Rajaona[3] and Folkard Asch[1]

[1]University of Hohenheim, Management of Crop Water Stress in the Tropics and Subtropics (490g), Stuttgart, Germany
[2]Ethiopian Institute of Agricultural Research (EIAR), Addis Ababa, Ethiopia
[3]Africa Rice Center (AfricaRice), Antananarivo, Madagascar

Introduction

The two major abiotic stresses for rainfed lowland rice in the Fogera plain, Ethiopia, are insufficient moisture in the early and low temperature in the late growing season. Rice is direct seeded after the first rains which vary in timing and intensity. Because of cold during the later growing season, any delay in sowing date threatens rice yields because of cold sterility. Transplanting could be an option to sow earlier in the season, since the water requirements of the seedling nursery are much lower.

Objective

To investigate the effect of transplanting on yield and yield components of contrasting rice genotypes in the Fogera plain, Ethiopia.

Conclusions

- Transplanting resulted in higher yields.
- Cold sterility was more severe under direct seeding.
- Transplanting allows taking advantage of medium and long duration varieties' higher yield potential.

Results and Discussion

- Yields were higher after transplanting (Fig 1).
- The effect was larger in long duration (>100% over direct seeded) followed by medium duration genotypes (>20%).
- Highest yields (7.5 tha^{-1} trans-planting; 6.8 tha^{-1} direct seeding) were recorded for Yun-Keng (medium duration).
- Long and medium duration geno-types were exposed to cold during reproductive stages (Fig. 2)
- Low temperature during reproductive stage led to low spikelet fertility in the long duration genotypes (Fig. 3).
- This effect was larger for direct seeded than for transplanted rice.

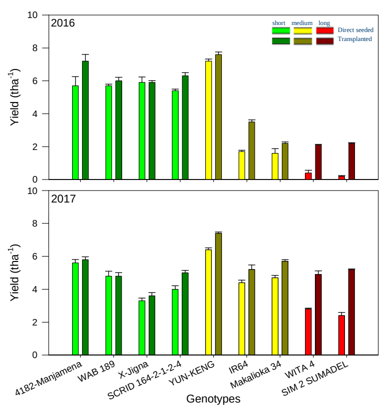


Figure 1

Mean yield of direct seeded and transplanted rice genotypes in 2016 and 2017

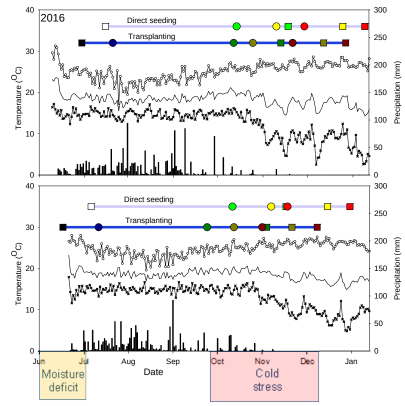


Figure 2

Daily weather during the growing seasons 2016 and 2017. Black and white squares: Sowing date; circles: Heading stage; squares: Maturity. Green: WAB 189, short; yellow: IR64, medium; red WITA 4, long duration.

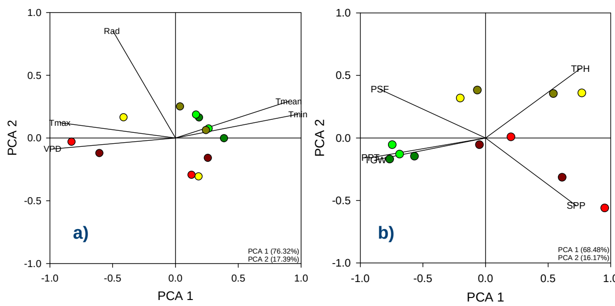
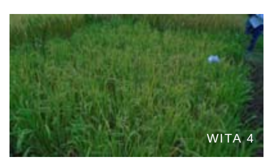


Figure 3

Biplots of a) weather experienced by geno-types during mid repro-ductive stage. b) Yield components of genotypes

Materials and Methods

Nine contrasting rice genotypes (WAB 189, X-Jigna, 4142 Manjamena, SCRID 164-2-1-2-4 as short duration; IR64, Yun-Keng, Makalioka 34 as medium duration and WITA 4 and SIM 2 SUMADEL as long duration) were direct seeded and transplanted in 2016 and 2017 in a randomized complete block design with three replications in the Fogera plain. Weather data were recorded during the experiment with a meteo-station installed at the trial site.



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