

Development of doubled haploid rice plants adaptable to Zambia and evaluation of upland NERICA in Sapporo.

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1. Introduction

Anther culture is considered as a useful technique in plant breeding to quickly develop homozygous lines from two heterozygous parents and enhance selection efficiency. The aim of this study was to develop doubled haploid rice plants from inter-specific heterozygous plants. Regenerated plants and two parents were used to check segregation distortion and determine the cause of those distortions.

I also evaluated 18 upland NERICA varieties to determine their suitability for cultivation in Sapporo in four growing conditions.

2. Methods

Inter-specific varieties, Kitakaori (japonica) and Supa (indica) were crossed to come up with F_1 plants and later F_2 population was developed. Anthers from F_2 plants were cultured on N6 and SK-1 media for callus induction.

For checking segregation distortion, DNA from regenerated green and albino plants and parents was used. DNA markers were used to examine distortions on the 3 loci.

To compare growth of upland NERICA varieties, I raised plants in four growth conditions namely: greenhouse, greenhouse with short-day treatment, paddy field and upland field. Tiller number, plant height, heading date and seed fertility were compared.

3. Results and Discussion

Variations were observed in the response of the F_2 genotypes to callus induction. Callus induction ranged from 0% – 22.5%. A total of 176 green plants and 64 albino plants were developed.

Significant distortions were observed in chromosome 3, 4 and 11 with Supa alleles showing dominance in all the chromosomes. The cause of distortion is related to regeneration.

Variations were observed in the NERICA varieties in terms of tiller number, plant height, heading date and seed fertilities.

4. Conclusion

- Callus formation and plant regeneration are genotype dependent.
- Segregation distortion was observed on chromosome 3, 4 and 11. Distortions were in favour of Supa alleles which were dominant at these loci.
- The growing environment in Sapporo had an effect on NERICA varieties. Low temperature and long-day length affected the growth of the plants.