Climate resilient rice variety – a climate change mitigation strategy for sustaining rice production in the changing environment

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OBJECTIVE

- Generation of superior lines harboring Sub1 + SalT + Drought QTLs
- Phenotyping of the multiple QTL pyramided lines for Drought, Submergence and salinity.

INTRODUCTION

- Agriculture is arguably one of the most sensitive sectors to climate changes since some input variables are directly related to climate and mankind has little control over it.
- In recent years there has been a significant rise in the frequency of occurrence of abiotic stress to crop plants which negatively affects crop production.
- Developing climate resilient varieties is of foremost importance in order to combat the effect of abiotic stress on crop plants to ensure food security.
- The present study involves in the pyramiding of QTLs responsible for major abiotic stresses viz., Submergence (Sub1), Salinity (salT) and Drought (DTY 2.2, DTY 3.1, DTY 6.i) in Improved White Ponni which is a mega rice variety in Tamil Nadu.

% OF ABIOTIC STRESS IN TAMILNADU
(in million hectares)

- Drought (Rainfed) - 1.5
- Salinity - 0.4
- Submergence - 0.5
- Intermittent Drought (Irrigated) - 0.2

OUTLINE OF WORK

- IWP X Apo
  - F1
  - F1 X IWP
  - BC1F1
  - BC2F4
  - Pseudo-backcross
  - BC1F2
  - BC2F4

- IWP X FL478
  - F1
  - Fl X IWP
  - Intermated F1
  - IWP
  - BC1F1

- IWP X FR13A
  - F1
  - F1 X IWP
  - BC1F1

- BC1F1 plant of IWP with Drought QTL (DTY2.2 + DTY3.1 + DTY6.i) identified
- Identification of heterozygote for five QTLs
- Phenotypic screening in target environments

CANDIDATE CLIMATE RESILIENT RICE VARIETY

Screening for Drought
Rain out shelter

Screening for salinity
Hydroponics

Screening for submergence
Submergence tank

Background genome recovery of pyramided lines from IWP

The superior lines harboring Sub1 + SalT + Drought QTLs performed well under challenging environment processing same quality as that of Improved white ponni rice variety that can be promoted as climate resilient rice variety.