Rice Seed Production in a Changing Climate

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Introduction

Climate Change

Rainfall/Temperature
Drought
Flooding
Global Warming

Rice Seed Production

Low Seed Set
Seed Quality?
Seed Deterioration?

Adaptation in Rice Seed Production
Objective

Climate effect on
- seed yield
- yield components
- seed quality
Research Framework

Variety Screening  
(Green House)

Seed Yield  
(Field Trials)

Seed Storability

High Temperature  

Planting Dates & Locations
Methodology

12 locations field trails
Tropical climate

N1 Chiangrai
N2 Chiangmai
C1 Kamphaengphet
C2 Nakhonsawan
C3 Chainat
C4 Ratchaburi
E1 Nongkhai
E2 Sakonnakhon
E3 Roi-et
E4 Ubonratchathani
S1 Nakhonsi-thammarat
S2 Pattalung
Field Trials
Min and Max Temperature (°C) Compared to 30-year mean temperature

Chiangmai (North)

Nakhonsawan (Central)

12°C

41°C

-3.3°C

+3.1°C

30-Y Temp Mean Max

30-Y Temp Mean

30-Y Temp Mean Min
Seed Yield Reduction by Cold and Heat Stress

Crop 1 (Winter Crop)  
2.331 Ton ha\(^{-1}\)  
30% reduction

Crop 2 (Summer Crop)  
3.056 Ton ha\(^{-1}\)  
9% reduction

Crop 3 (Rainy Crop)  
3.343 Ton ha\(^{-1}\)
Cold Stress in Winter Crop

Results

- Seed yield: -30%
- Seed set: -20%
- Plant height: -27%
- Tillers/plant
- Panicles/plant
- Seeds/panicle
- Seed weight
Heat Stress in Summer Crop

Results

- Seed Yield: -9%
- Seed set: -6%
- Plant height: -5%
- Tillers/plant
- Panicles/plant
- Seeds/panicle
- 4% Seed weight
Seed Quality at harvest

Results

95% Germination Test

92% Accelerated Aging Test

Seed Viability
Winter Crop
Summer Crop
Rainy Crop

Seed Vigor
Winter Crop
Summer Crop
Rainy Crop
Seed Storability

Results

Seed germination (%) vs. Months of storage for Chiangmai and Nakhonsawan.
Conclusion

1. Temperature Stress Effect
   - Quantity: 30% ‘RD61’ Seed Yield Reduction
   - Quality: No effect on Seed Viability & Vigor

2. Adaptation Strategies
   - Develop Rice Variety
   - Production Management
My research team
Thank you