Field and Milling Quality Analysis of the MY1 Mapping Population in Arkansas


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Stuttgart, AR

Outline

- Introduction
- Materials and Methods
- Results and Discussion
- Significance of the Findings
MY1 (RT0034/CPRS) Mapping Population in AR

- A coordinated effort with LA and TX.
- Part of the RiceCAP breeding efforts.
- The objective was to evaluate the MY1 mapping population for agronomic characteristics and milling quality.

Materials and Methods

- 156 F$_{12}$ families + parents (RT0034, CPRS) and six controls (LaGrue, Madison, Spring, Maybelle, Trenasse, and Presidio) were examined for agronomic and milling quality during 2005 growing season.
- RBC design with two replications.
- Each line was planted in two row plots – 0.6 m long (25 cm row spacing), using a seeding rate of 2.6 g/m².
- Quilt® fungicide @ 1534 ml/ha + Quadris® @ 438 ml/ha were applied at early booting and again 10 days later to prevent disease.
Low and erratic stands were observed in certain plots.

Plants were transplanted into these plots to provide equivalent plant population throughout the trial.

Stand
1 – thin
2 – Intermediate
3 – Good or optimum – at least 1 plant/2 inches

Recorded date when panicle was emerged from boot of first plant in row.

Variability in maturity was not observed between parent.

Parents were different in days to heading by only three days.

A range of 39 days was observed in maturity among the progeny evaluated.
Heading Variability
1 – All plants in row on same day
2 – All plants in row head within 2-5 days
3 – All plants in row head within 6-10 days
4 – All plants in row head within 11-14 days
5 – All plants in row headed after 14 days

Heading Dates
Recorded date when panicle was emerged from boot of first plant in row.

Frequency Distribution – Brown Spot

Brown Spot Scale
Resistant: 0 – 3
Intermediate: 4 – 6
Susceptible: 7 – 9
(Rated at maturity)

Although fungicides were applied for disease control, a low level of Brown Spot disease was suspected in the test.
Blanked Panicles

Evaluated at maturity

Frequency Distribution – Blanking

% of Panicle Blanking

% of population

0-20 21-40 41-60 61-80 81-100

RT0034 Cypress

Comparison of parents and checks in MY1
Population grown in AR

Parents

Checks

<table>
<thead>
<tr>
<th></th>
<th>RT0034</th>
<th>Cypress</th>
<th>LaGrue</th>
<th>Madison</th>
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</thead>
<tbody>
<tr>
<td>Heading (d)</td>
<td>77</td>
<td>80</td>
<td>79</td>
<td>81</td>
</tr>
<tr>
<td>Tillers (m⁻¹)</td>
<td>124</td>
<td>124</td>
<td>96</td>
<td>85</td>
</tr>
<tr>
<td>% Whole Milling</td>
<td>47</td>
<td>57</td>
<td>59</td>
<td>61</td>
</tr>
<tr>
<td>% Total Milling</td>
<td>64</td>
<td>68</td>
<td>69</td>
<td>70</td>
</tr>
<tr>
<td>% Chalk</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Texas team
Comparison of MY1 Progeny and Parents

<table>
<thead>
<tr>
<th>Trait</th>
<th>Progeny</th>
<th>Parents</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Min</td>
</tr>
<tr>
<td>Heading (d)</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>Tillers (m⁻¹)</td>
<td>117</td>
<td>64</td>
</tr>
<tr>
<td>% Whole Milling</td>
<td>45</td>
<td>29</td>
</tr>
<tr>
<td>% Total Milling</td>
<td>65</td>
<td>57</td>
</tr>
<tr>
<td>% Chalk</td>
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</tr>
</tbody>
</table>

Source: Texas team

Correlations among MY1 Progeny Traits

<table>
<thead>
<tr>
<th>Trait</th>
<th>% Total Milling</th>
<th>Heading</th>
<th>Tillering</th>
<th>% Blanking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arkansas</td>
<td>0.68</td>
<td>0.46</td>
<td>-0.13</td>
<td>-0.10</td>
</tr>
</tbody>
</table>

Source: Texas team

- There were strong correlations between whole and total yield.
- However, moderate correlations were observed between heading and whole milling yield.
- In addition, whole milling was not related to tillering ability or blanking in AR.
MY2 Cypress/LaGrue Mapping Population

- In 2005, a preliminary marker evaluation of 311 progeny from leaf tissue of the F₅ generation.
- Five rice markers: RM224, RM3855, RM527, RM210, and RM304.
- Screening of the MY2 population with five markers indicates that only 1% of the progeny are outcrosses.

MY2 Cypress/LaGrue Mapping Population

- In 2006, a second set of MY2 population will be screened from seed samples before planting this season.
- The number of markers will be determined
Summary

- 156 F₁₂ families + parents (RT0034, CPRS) and six controls (LaGrue, Madison, Spring, Maybelle, Trenasse, and Presidio) were examined for agronomic and milling quality during 2005 at AR, LA, and TX.
- Plants were transplanted into plots with weak stand to provide a more equivalent population.
- Variability in maturity was no observed between the parents.
- The parents were different in days to heading by only three days.
- A range of 39 days was observed in maturity among the progeny evaluated, suggesting transgressive segregations for maturity.

Summary – Cont.

- Although fungicides were applied for disease control, a low level of brown spot disease was observed in the test.
- CPRS did not appear to be affected by BS disease; however, RT0034 had an intermediate reaction using a rating scale from 0 (no infection) to 9 (≥ 90% of leaf area affected).
- Milling yields were somewhat lower for parent RT0034 compared to the checks LaGrue and Madison; however, CPRS had similar yields.
- Mean of milling yields for progeny were very close to those of the parents.
- Overall, the AR test provided a good indication of the agronomic and milling quality of the MY1 population.
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