

SHORT COMMUNICATION

IDENTIFICATION OF RICE GENOTYPES ADAPTED TO ADVERSE SOILS IN MEKONG DELTA

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INTRODUCTION

Approximately one third of rice production area in Mekong delta are under adverse condition in which 700,000 ha (Boje-klein 1986) affected by salinity and acid sulphate soil. Farmers in salt effected area cultivated in rice-shrimp cropping system. The rice varieties growing in saline soil are mid duration genotypes with salt tolerance and high yielding such as IR42, THDB, OM723-7, and OM1348. However, they were very susceptible to insects, diseases, and poor grain quality. Some rice varieties grow well under acid sulphate soil condition such OM1633, AS996, and OM576 (called Ham Trau). OM576 covered 13.59% rice production area in Kien Giang province (KGAD, 2003) and being produced in large-scale areas in Soc Trang, Ca Mau and Bac Lieu provinces. Generally, these rice varieties also express their poor grain quality and their low potential to resist to major pests and diseases. This study aims at improving rice genotypes, which obtain high yield potential, tolerance to salt stress, high grain quality, tolerance to major pests and diseases in the target areas.

MATERIALS AND METHODS

Materials

Thirteen rice varieties with mid-duration, salt stress tolerance were used in the experiment. IR42 is considered as check.

Seven rice varieties adapted to acid sulphate soils were also used with AS996 as a check

Methods

Yield testing experiments were laid out in completely randomized block design with three replications. Statistical figures were analyzed with the models by Gomez and Gomez (1982). Agronomic characters, yield and yield components were sampled and scored according to SES (IRRI 1996). Evaluation of insect and disease reaction at seedling stage was conducted by CLRRRI's Plant Protection Department.

RESULT AND DISCUSSION

a. Identification of the promising rice for salt effected areas

Agronomic evaluation of 13 mid duration rice varieties in dry season 2003-2004, including growth duration, plant height, BPH and BL reaction were presented in table 1

Table 1: Some features of the treatments in 2004's Salt nursery.

| Designation | Origin | Duration (days) | Plant height (cm) | Reaction to | |
|--------------|----------------|-----------------|-------------------|-------------|-------|
| | | | | BPH | Blast |
| OM1351-2 | IR42/PUSA44-33 | 131 | 93.5 | 5 | 5 |
| OM1352-5 | IR42/OM80 | 131 | 100.2 | 3 | 5 |
| OM2494-3 | OM80/IR50404 | 132 | 97.6 | 3 | 1 |
| OM2487-15 | OM723-11/OM80 | 128 | 100.4 | 3 | 1 |
| OM3393 | B/OM1490 | 121 | 91.5 | 5 | 3 |
| OM3674 | KLOONG /OM1723 | 120 | 95.7 | 3 | 5 |
| OM2490-10 | OM723/IR50404 | 130 | 97.6 | 3 | 3 |
| OM2492-5 | OM850/IR64 | 130 | 98.5 | 3 | 3 |
| OM1350 | IR42/IR64 | 132 | 98.2 | 5 | 5 |
| OM2471 | TE TEP/IR62032 | 121 | 90.6 | 3 | 1 |
| OM2485 | VD20/IR64 | 120 | 92.4 | 5 | 7 |
| OM2486 | OM90/W7-1 | 125 | 101.2 | 5 | 3 |
| IR42 (Check) | IRRI | 130 | 100.1 | 7 | 9 |

Table 2: Yield and yield components of mid-duration genotypes adapted to rice-shrimp system in saline areas

| Designation | Panicle/m ² | Filled grains /panicle | Unfilled grains (%) | 1000-grain weight (g) | Yield (t/ha) |
|---------------|------------------------|------------------------|---------------------|-----------------------|--------------|
| OM1351-2 | 356.7 | 123.5 | 12.3 | 23.6 | 5.90* |
| OM1352-5 | 346.5 | 142.0 | 14.2 | 24.1 | 5.80* |
| OM2494-3 | 402.1 | 141.1 | 15.2 | 23.5 | 5.40* |
| OM2487-15 | 402.3 | 120.5 | 14.6 | 26.2 | 5.30 |
| OM3393 | 369.7 | 100.2 | 12.0 | 25.1 | 5.30 |
| OM3674 | 349.8 | 113.2 | 13.5 | 24.1 | 5.30 |
| OM2490-10 | 410.2 | 142.3 | 16.2 | 23.5 | 5.10 |
| OM2492-5 | 369.7 | 132.6 | 14.2 | 24.3 | 5.10 |
| OM1350 | 392.5 | 130.2 | 14.3 | 23.4 | 5.00 |
| OM2471 | 347.8 | 141.2 | 14.7 | 24.1 | 5.00 |
| OM2485 | 402.1 | 132.6 | 12.5 | 25.6 | 5.00 |
| OM2486 | 403.1 | 123.4 | 13.6 | 26.1 | 4.80 |
| IR42 (Check) | 397.8 | 100.5 | 14.2 | 23.5 | 4.70 |
| CV% | 16.5 | 12.1 | 10.3 | 8.6 | 12.3 |
| LSD0.05 | 25.6 | 10.2 | 5.6 | 1.3 | 0.7 |

Yield testing in 2004 dry season indicated that OM1351-2, OM1352-5 and OM2494-3 significantly overyielded than IR42. OM1352-5 and OM1351-2 were approved as new varieties to be released as regional adaptation. Other promising genotypes such as OM2487-15, OM3393, OM3674 would be considered in next season (table 2)

b. Identification of acid sulphate soil tolerant rice

Agronomic characters of acid sulphate soil tolerant rice were presented in table 3. It is indicated that growth duration were less than 110 days. These varieties can be cultivated in early flooding area with acid sulfate soil effect in 3 rice cropping systems through the year. OM576 was being produced on acid sulphate soil large scale areas in Mekong delta and approved as new variety by Ministry of Agriculture and Rural Development. OM4498, OM2868 were BPH and BL tolerant reaction

Table 3: Some features of the treatments in 2004's ASS nursery

| Designation | Origin | Duration (Day) | Plant height (cm) | Reaction to | |
|---------------|----------------------------|----------------|-------------------|-------------|-------|
| | | | | BPH | Blast |
| OM576 | Hungary/IR48 | 107.0 | 93.8 | 3 | 5 |
| OM4498 | IR64/CS2000 | 100.0 | 95.4 | 3 | 3 |
| OM2869 | Nang Huong/ IR 28 | 98.6 | 99.1 | 5 | 3 |
| OM2868 | Nang Huong / OM1704 | 99.4 | 97.6 | 3 | 3 |
| OM2855 | Soc Nau / IR 28 | 93.2 | 96.5 | 5 | 5 |
| AS996 (Check) | IR64/ <i>O. rufipogone</i> | 93.8 | 94.7 | 3 | 3 |
| OM2490 | OM 723-11 / IR 50404 | 102.7 | 100.2 | 3 | 5 |

It was indicated that OM576 offered the highest yield, but not significantly different to AS996 (check). OM576 expressed its high potential on tillering and well adapted to acid

sulfate soils in Soc Trang, Kien Giang provinces. Many farmers and extension workers noticed the new genotype OM4498 to be promising.

Table 4: Yield and yield components of rice genotypes adapted to acid sulphate soils

| Designation | Panicles/ hill | Filled grains /panicle | Unfilled grains (%) | 1000-grain weight (g) | Yield (t/ha) |
|----------------|-------------------|---------------------------|------------------------|--------------------------|-----------------|
| OM576 | 10.3 | 100.6 | 10.3 | 25.4 | 6.20 |
| OM4498 | 11.1 | 108.7 | 12.1 | 24.6 | 6.20 |
| OM2869 | 12.2 | 105.2 | 9.8 | 25.7 | 6.10 |
| OM2868 | 9.6 | 109.8 | 10.5 | 26.1 | 6.10 |
| OM2855 | 9.7 | 100.1 | 9.4 | 24.6 | 6.10 |
| AS996 (Check) | 10.3 | 120.3 | 8.7 | 25.7 | 6.00 |
| OM2490 | 9.8 | 110.6 | 8.6 | 26.8 | 5.60 |
| CV% | 12.3 | 10.6 | 10.3 | - | 12.1 |
| LSD5% | 1.3 | 9.8 | 2.5 | - | 1.1 |

CONCLUSION

OM1352-5 and OM1351-2 were considered as the most promising rice genotypes to grow under saline condition. More attentions should be paid to two new promising genotypes as OM2494-3 and OM2487-15.

OM576 obtained the highest yield in acid sulfate soil nursery with high stability and wide adaptability. Other promising varieties such as OM4498, OM2869 should be considered next year, because of their acceptable traits by farmers and extension workers in Mekong delta.

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SUMMARY IN VIETNAMESE

Kết quả khảo nghiệm giống lúa chống chịu phèn mặn ở đồng bằng sông Cửu Long

Bộ giống chống chịu mặn được so sánh với IR42 cho thấy: OM1352-5 và OM1351-2 tỏ ra triển vọng. Hai giống này được Bộ cho phép khu vực hóa (công nhận tạm thời). Ngoài ra, OM2494-3 và OM2478-15 cũng tỏ ra rất có triển vọng, cần được lưu ý trong vụ tới.
