New Clearfield Rice lines – Uruguay Rice Breeden Program

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Introduction

The Clearfield rice area in Uruguay has remained stable in the last three years by 25%. Almost half of the area was planted with the Rice Tec hybrid INOV CL and the other half was planted with Gurí INTA CL and two INIA lines, CL244 and CL212. The INIA Rice Breeding Program located in Treinta y Tres, Uruguay has been working for many years on Clearfield Rice. Recently we started the multiplication of three lines that were obtained using CFX 18 and Puitá INTA CL, as imidazoline source of resistance.

Objective

The objective of the rice breeding program has been to develop Clearfield cultivar that overcomes some of the limitations of CL244, CL 212 and Gurí INTA CL (Commercial Clearfield varieties) such as blast resistance, yield potential and rice quality, particularly chalk.

Material and Methods

- Pedigree selection of crosses made with donors lines in 2009/10.
- At least tow or tree backcrosse made in Paso de la Laguan, Terinta y Tres, with cultivars of excellent cooking quality.
- Best lines were evaluated in different experiment with replication.
  - Two year of evaluation: BCA with two replication and plots of 4.2 m²
  - Two year of evaluation: BCA with three replication and plots of 4.2 m²
  - One year of evaluation in big plots, commercial fields (ongoing)
- Seed increase for small commercial areas of CL1202, CL1294 and CL 1304 (ongoing)

Results

CL1202, is Indica type with a long cycle, like INIA Merin, resistant to blast and very good milling and cooking quality. CL1202 has smooth leaf with high capacity of tillering. Plants can reach 100 cm but they wont lodge. In 2019 on several yield tests, CL 1202 performs in term of yield very similar to INIA Merin (10.6 ton/ha).

Table 1: Yield and milling quality of CL1202 at commercial fields in Big Plots 2018/19

Cultivars	Yield. ton/ha	Milled rice %	Head rice %	Chalk %
El Paso 144	9.97	69.9	66.2	3.7
Merín	10.69	71.8	67.9	2.3
CL1202	10.74	69.7	64.8	2
CV(%)	11.8	1.1	2	29.8
Prob. Locaction	0.06	0.03	0	0.2
Prob. Cultivar	0.25	0	0	0
Prob. LxC	ns	ns	ns	0.15

Conclusions

CL1202, CL1294 and CL1304 are new Celarfield Indica lines with high yield, excellent agronomics trait manly resistant to blast and low chalk. According to our tests the cooking quality is a outstanding point on all lines

On the other hand, CL 1294 and CL1304 are also Indica type but with an intermedia to short cycle and shorter plants, compare to CL1202. These two lines have been on yield test for 3 year in Paso de la Laguna. Where CL 1294 yield 5% more that Gurí INTA CL, CL1304 yield 2 % less than the check, Gurí INTA CL but booth lines have resistant to blast and good milling quality. On average Gurí INTA CL has 5.3 % of chalk when CL 1294 and 1304 have 2.9 and 2.6 % of chalk respectively. All three liens have been tested for cooking quality and they are comparable to Gurí INTA CL without objection.

Table 2: Yield test, Paso de la Laguna (2016/17 – 2018/19)

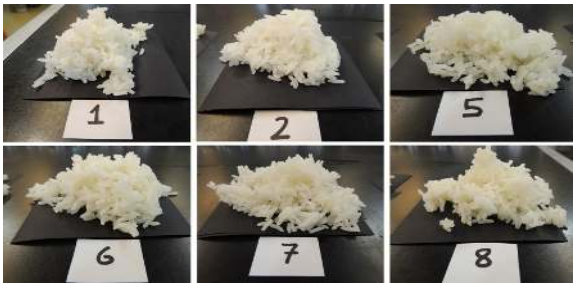
Cultivar	Yield kg/ha	Days to Heading	Height cm	Pyricularia leaf (1)	White rice %	Head rice %	Chalk %
CL 1294	10160	102	88	0	68.7	63.5	2.9
CL 1304	9404	100	90	0	68.4	60.3	2.6
Gurí CL	9615	104	87	4	69.5	62.3	5.3

Table 3: Cooking quality test of new lines

Cultivar	Looseness	Texture	% Amilose*	G.T *
El Paso 144	2.0	4.0	29.5	Low
INIA Olimar	3.0	4.0	31.0	Low
INIA Tacuarí	2.0	2.0	27.3	High
INIA Merín	1.5	3.0	29.8	Low
CL 1202	2.0	3.5	31.0	Low
CL 1294	3.0	4.0	29.6	Low
CL 1304	3.0	4.0	29.7	Low
Gurí INTA CL	2.5	3.0	29.8	Low

Loosenes socre (visual): 1 Completely added, 4 No aggregates.
Texture score on palate: 1 Sticky, 2 Soft and Wet, 3 Soft, 4 Consistent, 5 Hard.

Figure 1: Cooking quality test of new lines



Note: 1 El Paso 144, 2 INIA Olimar, 5 CL1202, 6 CL1294, 7 CL1304, 8 Gurí CL

References

MARTINEZ, C., 1989. Evaluación de la calidad culinaria y molinera del arroz. CIAT.