

Rice Allelopathic Potential of Recombinant Inbred Lines in Nongan/Sathi Cross

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Objective

This experiment was conducted to assess the allelopathic potential of Recombinant Inbred Lines (RILs) in Nongan/Sathi cross.

Materials and Methods

1. Rice: parents and 182 lines F6 RILs of Nongan/Sathi cross.
2. Barnyardgrass (*Echinochloa frumentacea* (Roxb.) Link.) was used as plant indicator of rice allelopathy
3. Assessments were carried out both in laboratory and field. Method in laboratory was Double Pots Allelopathic Bioassay (DPAB) Procedures. Method in field was Rice-Ratoon Interplanting Barnyardgrass Seedling (RRIBS) Procedures.
4. Barnyardgrass (Bg) height and shoot dry weight in DPAB were observed at 2 weeks after Bg seeding (WABS). Whereas in RRIBS, the same variables were observed at 4 and 6 weeks after Bg transplanting (WABT) for height and shoot dry weight, respectively.

Results and Discussion

1. Table 1 shows that among 181 RILs, 5, 35 and 20 lines, it is around 33% of RILs, show consistence (highly correlation) both in laboratory and field test as low, medium and high allelopathic potential, respectively. This indicates that better assessment should be developed both in laboratory and field sites.
2. Table 2 shows the allelopathic performance indicated by barnyardgrass height and shoot dry-weight of parental varieties, Nongan and Sathi, and some lines of RILs that show consistence both in laboratory and field test as high and low allelopathic potential. Among 20 lines with high allelopathic potential, 75% are tall type.
3. ALR007-B-B-B-10-1, ---25-1, ---63-1, ---79-1 and ---115-1 may have prospective lines as high allelopathic potential with desirable agronomic character.

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Table 1. Number of F6 RILs divided by allelopathic potential assessed in laboratory and field.

		Field			Total
		Low	Medium	High	
Laboratory	Low	5	17	12	34
	Medium	23	35	30	88
	High	9	30	20	59
Total		37	82	62	181

Note: Laboratory criteria: high is less than 60.0% to No Rice Check (NR) in Bg shoot dry weight, medium is between 60.0% to 76.0%, and low is upper than 76.0%. Field criteria: high is less than 12.5% to NR in Bg shoot dry weight, medium is between 12.5% to 27.5%, and low is upper than 27.5%.

Table 2. Allelopathic performance of cross parents, Sathi and Nongan, and RILs showing potentially high and low allelopathy

Rice accession	Rice height cm	Heading date*)	Lab.- Bg height cm*	Lab.- Bg shoot dry weight g/2 pots*	Field.- Bg height cm*	Field.- Bg shoot dry weight g/4 plants*
Sathi (HAP) variety	153.8	Aug. 6	20.68 (77.2)	0.087 (56.9)	102.4 (80.1)	8.8 (10.6)
Nongan (LAP) variety	108.4	Aug. 17	24.42 (91.2)	0.122 (79.7)	122.6 (95.9)	25.6 (30.7)
HAP RILs			High allelopathic potential		High allelopathic potential	
ALR007-B-B-B-3-1	151	Aug. 7	22.81 (85.2)	0.081 (53.1)	109.1 (85.4)	8.8 (10.6)
ALR007-B-B-B-9-1	140	Aug. 6	19.85 (74.1)	0.070 (45.4)	111.2 (87.0)	10.0 (12.1)
ALR007-B-B-B-10-1	137	Aug. 20	22.22 (83.0)	0.070 (45.4)	109.6 (85.7)	10.0 (12.1)
ALR007-B-B-B-18-1	147	Aug. 2	18.22 (68.1)	0.052 (34.0)	104.4 (81.7)	7.6 (9.1)
ALR007-B-B-B-25-1	98	Aug. 19	20.55 (76.8)	0.052 (34.0)	103.2 (80.7)	8.8 (10.6)
ALR007-B-B-B-35-1	148	Jul. 29	16.30 (60.9)	0.029 (18.7)	101.1 (79.1)	9.7 (11.6)
ALR007-B-B-B-36-1	170	Aug. 4	16.99 (63.5)	0.035 (22.6)	102.7 (80.4)	10.6 (12.8)
ALR007-B-B-B-37-1	168	Aug. 16	13.73 (51.3)	0.011 (7.3)	93.5 (73.2)	8.0 (9.7)
ALR007-B-B-B-62-1	156	Aug. 12	14.83 (55.4)	0.070 (45.4)	63.6 (49.8)	9.1 (10.9)
ALR007-B-B-B-63-1	129	Jul. 31	18.28 (68.3)	0.075 (49.2)	86.2 (67.5)	1.3 (1.6)
ALR007-B-B-B-70-1	143	Aug. 27	18.12 (67.7)	0.087 (56.9)	83.0 (65.0)	3.2 (3.8)
ALR007-B-B-B-79-1	109	Aug. 31	19.83 (74.1)	0.081 (53.1)	72.5 (56.7)	1.3 (1.6)
ALR007-B-B-B-81-1	170	Aug. 28	19.28 (72.0)	0.087 (56.9)	37.0 (28.9)	1.0 (1.2)
ALR007-B-B-B-91-1	165	Jul. 30	22.45 (83.9)	0.086 (56.3)	72.5 (56.7)	5.1 (6.1)
ALR007-B-B-B-112-1	170	Aug. 9	18.16 (67.9)	0.081 (53.1)	102.9 (80.5)	8.8 (10.6)
ALR007-B-B-B-115-1	111	Aug. 24	16.32 (61.0)	0.090 (58.8)	91.8 (71.9)	10.3 (12.3)
ALR007-B-B-B-116-1	175	Aug. 19	18.30 (68.4)	0.075 (49.2)	80.1 (62.7)	1.0 (1.2)
ALR007-B-B-B-118-1	167	Aug. 8	21.57 (80.6)	0.075 (49.2)	66.6 (52.1)	1.0 (1.2)
ALR007-B-B-B-121-1	172	Aug. 19	12.27 (45.9)	0.075 (49.2)	93.2 (72.9)	7.7 (9.2)
ALR007-B-B-B-123-1	178	Aug. 17	22.46 (83.9)	0.077 (50.0)	101.5 (79.4)	7.5 (9.0)
LAP RILs			Low allelopathic potential		Low allelopathic potential	
ALR007-B-B-B-48-1	110	Aug. 10	24.09 (90.0)	0.112 (72.9)	129.8 (101.5)	68.4 (82.1)
ALR007-B-B-B-96-1	168	Aug. 14	22.56 (84.3)	0.122 (79.7)	205.0 (160.4)	36.8 (44.2)
ALR007-B-B-B-116-1	150	Aug. 10	24.75 (92.5)	0.122 (79.7)	140.8 (110.2)	45.5 (54.6)
ALR007-B-B-B-154-1	121	Aug. 7	24.15 (90.2)	0.129 (84.3)	157.7 (123.4)	28.6 (34.3)
ALR007-B-B-B-179-1	134	Aug. 1	25.61 (95.7)	0.128 (83.6)	139.0 (108.8)	23.6 (28.4)

Note: *): rice seeding at April 30; *: figures in parentheses show the relative %to No Rice as Check-Plot

HAP: High Allelopathic Potential; LAP: Low Allelopathic Potential