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PERFORMANCE OF IRRI RICE CULTURES UNDER COASTAL SALINE SOILS OF ANDHRA PRADESH

T. Anuradha[1], K. Nagendra Rao[2]
[1,2]**Agricultural Research Station, Machilipatnam – 521002, Andhara Pradesh.**

ABSTRACT

The trial conducted at Machilipatnam representing coastal saline eco system with p^H - 7.35, EC (dS m^{-1}) - 14.21 and ESP % - 17.57 with 30 rice cultures exclusively bred for salinity at IRRI, Philippines indicated the significant influence of soil salinity, however, only one test culture Pokkali registered significantly higher yield followed by FL 449(IR 66946-3R-149-1-1) with 4.21 t/ha, while the cultures IR 11 T 242 (3.56 t/ha) and IR 11 T 265 (3.28 t/ha) recorded yield at par with the check MTU 1001. The yield superiority of the culture Pokkali is due to the significance of spikelet fertility percent, effective tillers^{-1}, panicle length, and test weight while, FL 449 expressed the yield advantage by way of spikelet fertility percent and panicle length concluding that the test cultures Pokkali and FL 449 can tolerate moderate to high soil salinity(14.21 dSm) and give reasonably good yield.

KEY WORDS: Rice Cultures, Coastal Salinity.

I. INTRODUCTION

Soil salinity is a global phenomenon adversely affecting the productivity of millions of hectares of land, compromising the ability of a large number of countries to maintain the agricultural production and productivity targets. Salt tolerance of a plant varies with environmental and biological factors and response to salinity in terms of morphology, anatomical adoption and changes in various physiological and biochemical processes under salt stress facilitate the formulation of agro techniques and development of salt tolerant varieties through conventional as well as biotechnological approaches.

The ever increased pressure on land and water resources demand reclamation of areas affected by salinity for sustainable crop production. Of late Krishna Western delta of Andhra Pradesh the problematic areas of soil salinity spread over 0.25 million hectares where rice is grown suffer problems such as poor crop establishment reduced crop growth finally resulting the lower crop yields. Breeding of salt tolerant varieties is one of the crucial aspect of dealing the salinity problem and evaluation of their performance is the need base.

II. MATERIAL AND METHODS

The trial was conducted at Machilipatnam Agricultural Research Station, Krishna District of Andhra Pradesh representing coastal saline eco system with pH - 7.35, EC (dS m^{-1}) - 14.21 and ESP % - 17.57 with 30 rice cultures exclusively bred for salinity. The experiment was laid out in a Randomized Block Design with two replications and a good crop was raised as per the recommended agronomic practices. Data were recorded on 10 random and competitive plants on the parameters viz., plant height, days to 50% flowering, Effective Tillers/Sqm, Filled grains/panicle, Unfilled grains/panicle ,root length ,root dry weight, length of the panicle ,test weight and grain yield. The data was subjected to

statistical analysis as per Panse and Sukhatme (1969) for the comparison of varietal performance.

III. RESULTS AND DISCUSSION

Results on the varietal performance are furnished in table I. The traits Plant Height, Days to 50% Flowering, Tillers/Sqmt., Filled Grains/ Panicle, Un Filled Grains/Panicle, Root Length, Root Dry Weight, Test Weight, Length of the Panicle, Sodium content of the stem and Grain yield differed significantly. The cultures CSR 28 and Pokkali recorded significantly higher plant height while, 13 cultures viz., IR 11 T 261, IR 11 T 262, IR 11T 242, IR11 T 225, IR 11 T 193, IR 11 T 255, IR 11 T 179, IR 11 T 202, IR 11 T 206, IR 11 T 222, IR 11 T 227, IR 11 T 207 and IR 11 T 230 recorded significantly higher productive tillers. Whereas panicle length significance was observed in 10 cultures.

` Grain yield data indicated the significant influence of soil salinity however, only one test culture Pokkali registered significantly higher yield 4.21 t/ha followed by A 69-1 (3.81 t/ha) with, while the cultures FL 449 (3.58 t/ha) and IR 11 T 242 (3.56 t/ha) recorded yield at par with the check MTU 1001. (Subbarao *et al*., recommended Swarna and CSR 154 for the coastal saline soils of Andhra Pradesh

The yield superiority of Pokkali is due to the significance of spikelet fertility, effective tillers/sq.mtr, panicle length and test weight (Aswini Panwar *et al* 1997, Anbanandan *et al* 2009 and Nagendra Rao *et al* 2010) while, A 69-1 expressed the yield advantage by way of root dry weight and test weight (Sarvanan and Sabesan 2009) From the results it can be concluded that the test cultures Pokkali and A 69-1 can tolerate moderately high soil salinity and give reasonably good yield and may be considered as parents in salinity breeding of paddy.

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Table - I

Yield and Yield Attributes of Rice Cultures under Saline Soils

Means Table												
No	**Character**	**Plant Height cm**	**Days to 50% Flowering**	**Tillers/ mt²**	**Filled Grains/ Panicle**	**Unfilled Grains/ Panicle**	**Panicle length**	**Root length**	**Root dry weight**	**Test weight**	**Na content of the stem**	**Yield T/Ha**
1	FL449(IR 66946-3R-149-1-1	86.9250	75.0050	296.0050	92.6050	13.2050	22.9650	14.1650	6.4050	4.0050	2.0350	3.5825
2	IR 11 T 265	81.1950	79.9950	275.9950	62.7950	13.9950	22.8550	14.7350	3.8950	3.4950	1.1350	3.2815
3	IR 11 T 258	90.9850	79.0050	280.0050	117.2050	10.4050	25.1850	17.5050	6.7050	3.0050	2.4950	2.0365
4	IR 11 T 256	91.3150	75.9950	216.0000	88.5950	13.3950	21.9500	16.5350	6.3300	2.9950	2.3550	3.1615
5	IR 11 T 261	85.0450	75.0050	436.0050	116.8050	16.4050	25.6250	15.2250	5.7050	3.5050	3.4050	2.3525
6	IR 11 T 262	92.4150	69.9950	395.9950	92.5950	6.1950	23.8750	13.1950	5.3350	3.9950	3.6350	2.7415
7	IR 11 T 242	85.2450	80.0050	468.0050	91.0050	5.6050	25.0250	17.5650	5.5050	4.0050	3.6550	3.5675
8	IR 11 T 164	78.1550	69.9950	323.9950	67.1950	8.7950	22.7750	16.5550	9.7950	3.4950	1.8050	2.8195
9	IR 11 T 159	74.8850	76.0050	260.0050	55.8050	15.6050	20.2450	17.0050	5.9050	3.5050	2.5850	2.4575
10	IR 11 T 235	75.0750	83.9950	311.9950	74.1950	12.5950	22.4750	13.3950	5.5950	2.9950	1.7250	2.4235
11	IR 11 T 255	75.3250	75.0050	364.0050	51.8000	29.6050	25.9999	16.1850	6.8050	3.5050	2.3850	2.2825
12	IR 11 T 193	68.3550	69.9950	427.9950	73.1950	4.3950	21.8750	15.0350	3.0950	2.9950	2.6450	2.2825
13	IR 11 T 179	66.3050	75.0050	456.0050	76.6050	15.0050	20.5450	14.2250	6.5050	3.0050	2.8250	2.0525
14	IR 11 T 206	73.5150	69.9950	451.9950	67.7950	6.1950	20.6150	18.9750	3.5950	3.4950	5.6250	1.5835
15	IR 11 T 202	65.2250	70.0050	424.0050	64.0050	4.6050	19.1250	17.2450	6.6050	3.0050	0.7450	2.1455
16	IR 11 T 222	77.2550	74.9950	359.9950	67.5950	7.7950	20.4350	13.8950	5.2950	2.4950	1.7050	1.9555
17	IR 11 T 227	66.6250	75.0050	376.0050	48.8050	2.8050	18.8050	11.3050	3.6050	3.5050	0.3550	1.9115
18	IR 11 T 207	63.1950	79.9950	399.9950	59.1950	5.1950	20.2950	12.4350	5.3950	3.4950	0.3650	2.3575
19	IR 11 T 230	66.1450	80.0050	384.0050	78.2050	10.6050	20.7450	12.9850	6.0050	2.5050	0.5150	1.6475
20	IR 11 T 205	61.6750	79.9950	307.9950	45.1950	5.1950	17.8350	14.6150	2.5950	3.4950	4.1750	1.8145
21	POKKALI (ACC 108921)	93.7850	67.0050	455.9900	162.4000	16.6050	21.5450	12.6250	4.6050	4.0050	3.7250	4.2155
22	NONA BOKRA	80.8150	66.9950	239.9950	71.3950	17.1950	20.0350	11.1150	4.2950	3.4950	3.1150	1.0405
23	IR 29	66.4650	70.0050	336.0050	64.0050	4.6050	18.7850	11.7850	4.6050	3.0050	1.8850	2.3225
24	IR 28	63.5350	66.9950	351.9950	51.3950	7.5950	17.6350	10.0550	2.4950	2.9950	0.5650	1.8175
25	IR 66946-3R-178-1-1(FL 478)	57.7050	71.0050	260.0050	101.6050	13.6050	24.2650	14.7250	2.3050	3.5050	5.6550	1.1585
26	CSR 28	99.1550	86.9950	343.9950	158.3950	24.1950	29.3350	16.6950	9.6950	3.4950	3.9550	1.8295
27	IR 55179-3B-11-3	81.3450	89.0050	172.0050	105.6050	22.4050	23.2650	17.9450	5.6050	3.5050	2.0350	2.0915
28	AT 401	80.7150	76.9950	227.9950	106.3950	8.7950	23.8150	12.8950	2.4950	3.9950	1.1350	2.7295
29	IR 45427-2B-2-2B-1-1	71.7850	80.0050	156.0050	72.8050	25.2050	22.0050	18.1050	5.1050	3.5050	2.4950	2.4455
30	A 69-1	81.3350	81.9950	331.9950	93.1950	6.3950	21.3750	14.6150	6.9950	3.4950	2.3550	3.8175
31	MTU 1001	90.1250	105.0050	349.9600	82.1245	5.2312	21.6450	24.2050	4.0050	2.0050	0.7450	3.8000
Mean		**76.7167**	**75.7333**	**337.7333**	**82.6133**	**11.8067**	**22.0880**	**14.7780**	**5.6447**	**3.3833**	**2.6030**	**2.3975**
Range Lowest		57.7050	66.9950	156.0050	45.1950	2.8050	17.6350	10.0550	2.3050	2.4950	0.3550	1.0405
Range Highest		99.1550	89.0050	495.9950	162.8050	29.6050	29.3350	18.9750	12.7950	4.0050	4.1750	4.2155
C.V.		2.0628	1.3616	0.9909	1.9086	8.6342	4.6685	3.4432	5.4706	9.2545	11.9876	4.3011
C.D. 5%		3.2365	2.1090	6.8443	3.2249	2.0849	2.1090	1.0407	0.6316	0.6404	0.6382	0.2109