Evaluation of Agronomic Traits and Inorganic Nutritional Composition of Rice Seed from IRSSTN Genotypes in Iraq

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Abstract

The study aimed to determine the agronomic traits of two rice modules (IRSSTN 1 for a coastal salinity-wet season, and IRSSTN 2 for an inland salinity-coastal salinity-dry season) to select promising genotypes that have highest grain yields, early maturity, and stable under Al-mishkhab, Iraq environmental conditions by using inorganic and organic nutrition. The results showed that genotype IR72049-B-R-22-3-1-1 performed the best agronomic traits

Materials and Methods

18	IR73055-8-1-1-3-1	1.95 ± 0.138	222.53 ± 224.8	27 ± 6.1	1032 ± 106.5	422.4 ± 47.65	82.48 ± 8.4	4.654 ± 4.9	31.81 ± 6.6	50.13 ± 5.4	34.97 ± 3.8
19	IR71907-3R-2-1-1	1.45 ± 0.102	191.49 ± 193.4	17 ± 1.9	759.3 ± 80.14	500.3 ± 55.47	106.9 ± 14.2	4.078 ± 0.5	14.56 ± 1.7	76.98 ± 7.9	10.86 ± 1.6
20	IR68652-3B-20-3	1.63 ± 0.115	184.83 ± 186.7	18 ± 2.1	803.6 ± 86.48	417.2 ± 48.69	199.4 ± 24.1	3.408 ± 0.4	15.63 ± 1.9	96.27 ± 10.1	16.62 ± 1.9
21	IR77664-B-25-1-2-1-3-12-4-AJY1	1.32 ± 0.54	238.41 ± 241.1	34.2 ± 0.5	1904 ± 221.1	460.61 ± 54.1	210.4 ± 312.4	4.2 ± 0.53	16.4 ± 1.9	50.78 ± 6.4	15.4 ± 2.4
22	IR51499-2B-29-2B-1-1	1.61 ± 0.7	156.27 ± 201.3	17 ± 1.9	771 ± 81.2	173.6 ± 18.2	214.8 ± 25.1	5.136 ± 0.7	16.72 ± 1.9	25.26 ± 3.2	13.03 ± 1.7
23	IR71907-3R-2-1-2										

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gave the highest plant height (133 cm), while the lowest plant height was 63 cm [23]. T is diference may be attributed to good growth conditions in these countries that led to vigorous root growth in all directions compared with Iraq condition. T e result is identical to Negrão et al. [22].

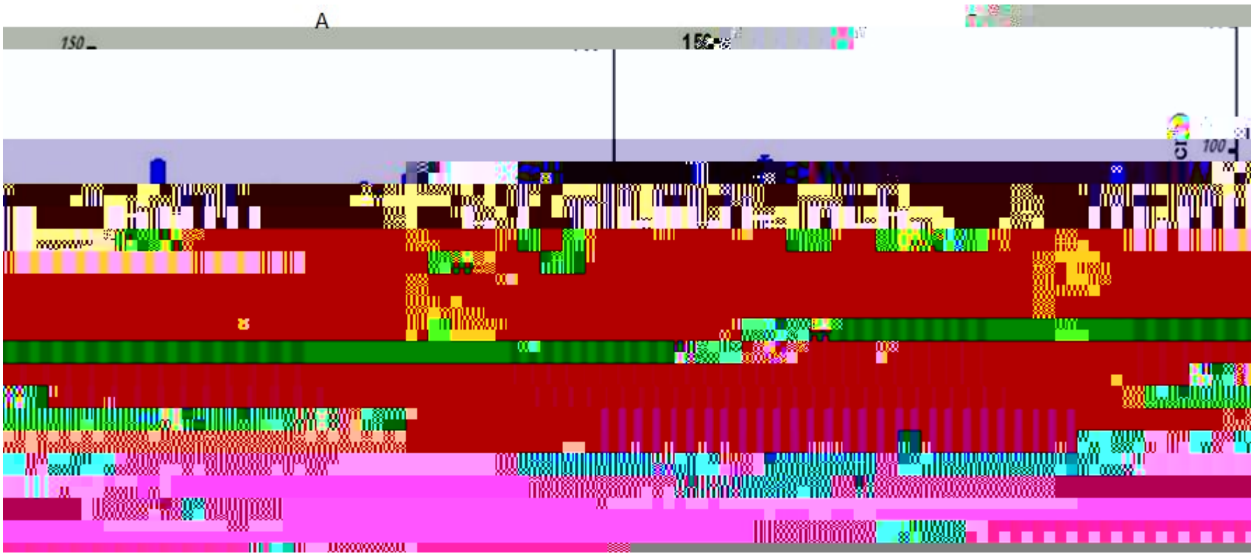

Figure 1: Plant height (A) IRSSTN-SS1; (B) IRSSTN-SS2

Days to 50% fowering

Considering this parameter afecting crop yield, the FDW average in IRSSTN-SS2 was lower (84 day) compared with the highest (122 day). T e frst IRRI locations gave highest in FDW was 133 days, while the lowest in FDW was 88 days (Figure 2). IRSSTN-SS1 plots, the highest FDW was 104 days as the average, while lowest FDW was 85 days, however, all locations at IRRI gave highest in plant height was 113 day, while the lowest highest in plant height was 88 days [24]. T is result may be attributed to more shading between plants and less nutrient uptake due to greater competition among IRRI plants which grow closer together. T e result agreed with Pandit et al. [1] and Gregorio et al. [25].

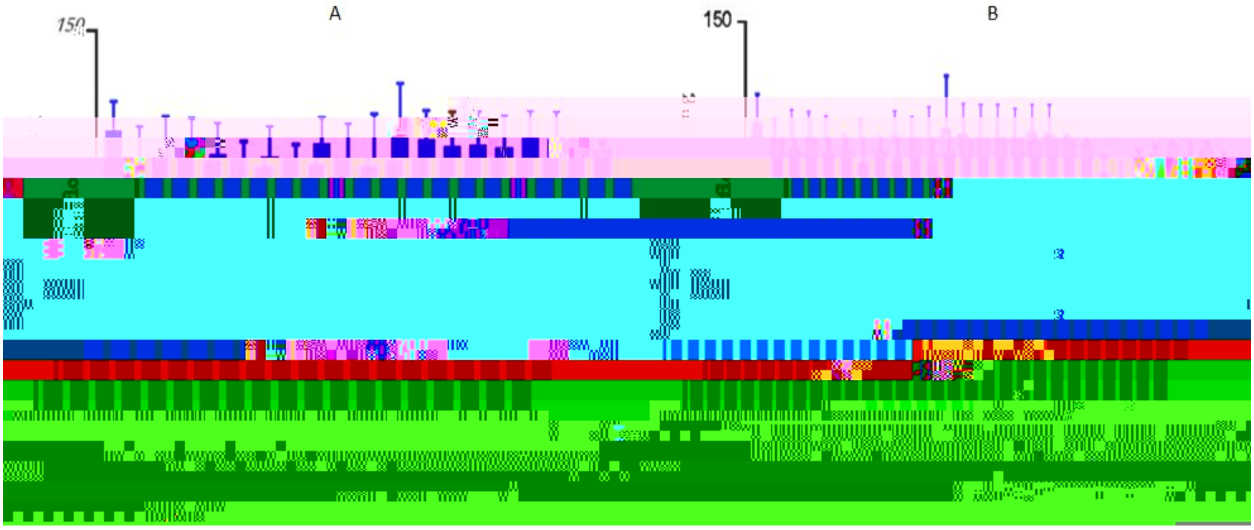

Figure 2: Days to 50% fowering (A) IRSSTN-SS1; (B) IRSSTN-SS2.

Days to maturity

IRSSTN Module 1 is late-maturity (>130 days). Days to maturity (DM) with AMMRS were greater, with132 day on average, while with IRRI methods. T ere was 121day, giving AMRRS more than 10 days. T e IRSSTN Module 2 is early to medium maturity (<125 days).

nutrient and light availability for plant management (Figure 3). T e result identical with Reza et al. [26] suggesting breeding for salinity tolerance using Bangladeshi rice landraces and understand genetic diversity has been limited by the complex and polygenic nature of salt tolerance in rice genotypes [27].

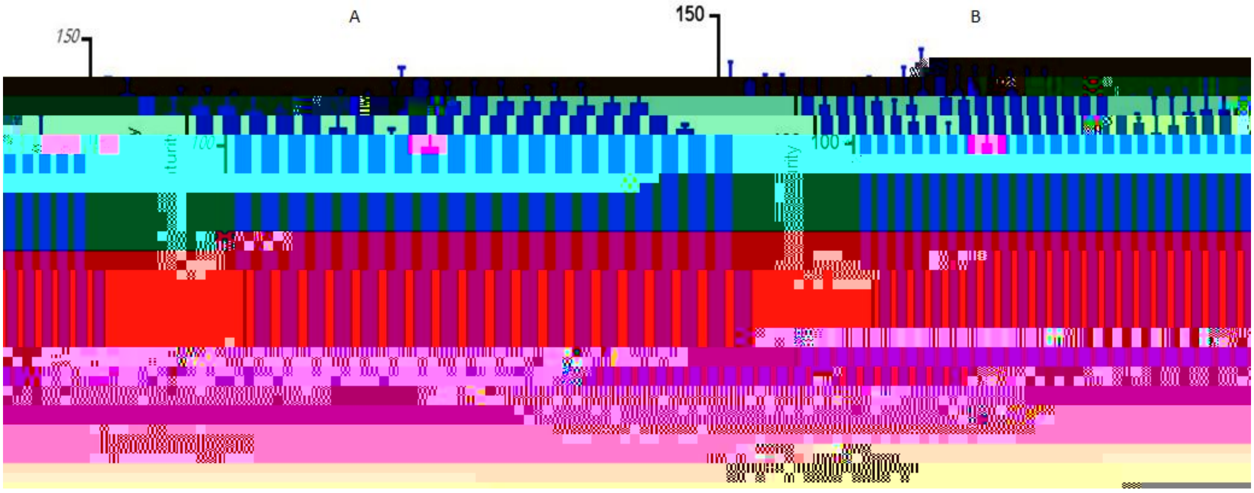

Figure 3: Days to maturity (A) IRSSTN Module 1; (B) IRSSTN Module 2.

Grain yield

Grain Yield According to this summary measure of crop performance, IRSSTN Module 1 was signi f cantly more successful than IRSSTN Module 2. IRSSTN-SS1 gave an average yield of 2.7 t ha^{-1} compared with 2.5 t ha^{-1} from IRSSTN-SS2 rice production in AMRRS station (Figure 4). T e IRRI location gave the highest in grain yield was 2.0 t ha^{-1} for IRSSTN-SS2, while the IRSSTN-SS2 rice production in represented the rice accessions of nutrient intake values (NIVs). Rice accessions, discoveries as far as fuctuation among conventional and recently enhanced rice assortments developed in Sri Lanka with a couple of special cases [28]. T is fuctuation was generally noticeable among the customary assortment containing rice increases than NIVs containing promotions. Further, display examine came about a one bunch for NIVs.

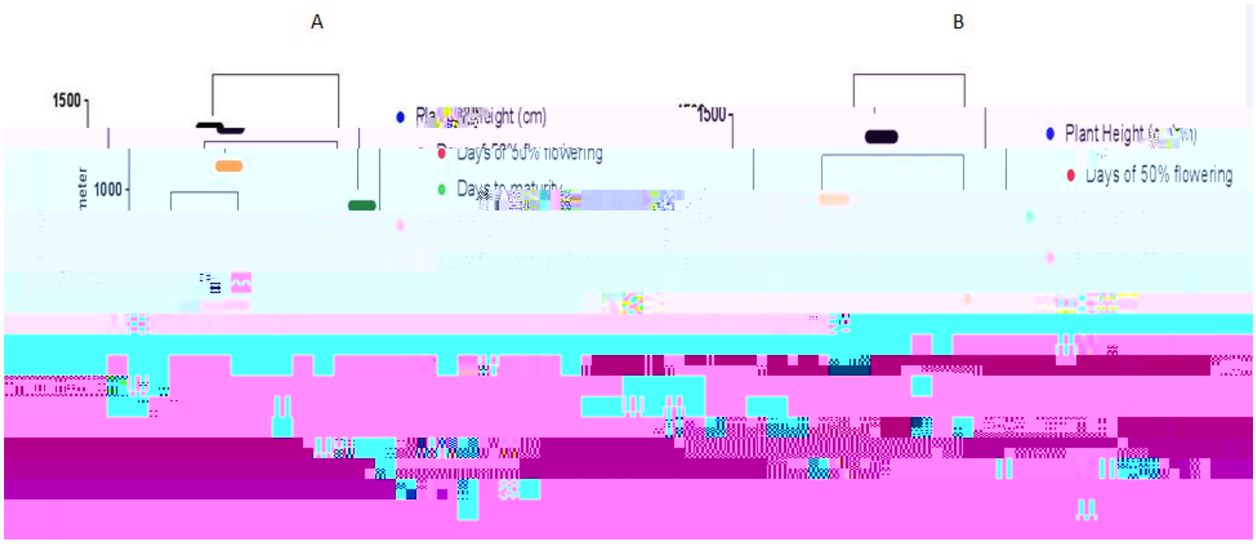

Figure 5: (A) IRSSTN Module 1; (B) IRSSTN Module 2.

Inorganic composition

Macronutrient: Rice genetic di ferences and Iraqi condition in seed mineral concentrations have been detected and the results showed in Tables 1 and 2. Na, Mg and Ca in the rice seed is lower than that in other parts of the plant, because the mobility of the elements. However, N and P concentrations have been reverse behavior. But K is distributed more uniformly throughout mature plants than N, P, Ca, Mg, and Na [29]. In our study, the content of N, P, K, Ca, Mg and Na varied slightly among IRSSTN Module 1 genotypes. T at is, the N content ranged from 1.08 to 1.85 mg kg^{-1} and only one genotype (IR77664-B-25-1-2-1-3-12-4-AJY1) presented 1.85 mg kg^{-1} and the rest of the genotypes were closer to 1.5 mg kg^{-1}. P content in IRSSTN Module 1 genotypes ranged from 1.28 to 2.75 g kg^{-1} however, more than 75% from IRSSTN Module 1 genotypes were closer to 1.5 g kg^{-1}. Potassium content varied between 14 to 42 mg kg^{-1} was IR50184-3B-18-2B-1 and IR07T114 genotypes respectively, Ca content were between 336.9 to 701.4 mg kg^{-1} and Mg content were between 613.1 and 1223 mg kg^{-1}. Na content varied between 65.6 to 345.8 mg kg^{-1} (Table 1). Table 2 showed that IRSSTN Module 2 genotype indicated that the mean of N content was 1.68 mg kg^{-1} with a range from 1.42 to 1.92 mg kg^{-1}, the P and Ca content varied from 37.06 to 2300 mg kg^{-1} of P and from 17 to 97 mg kg elements. T e Na content was negatively correlated with the Mn. T e Ca content was positively correlated with Zn content. Cu content positively correlated with the Fe and Zn (Table 3 and Figure 6).

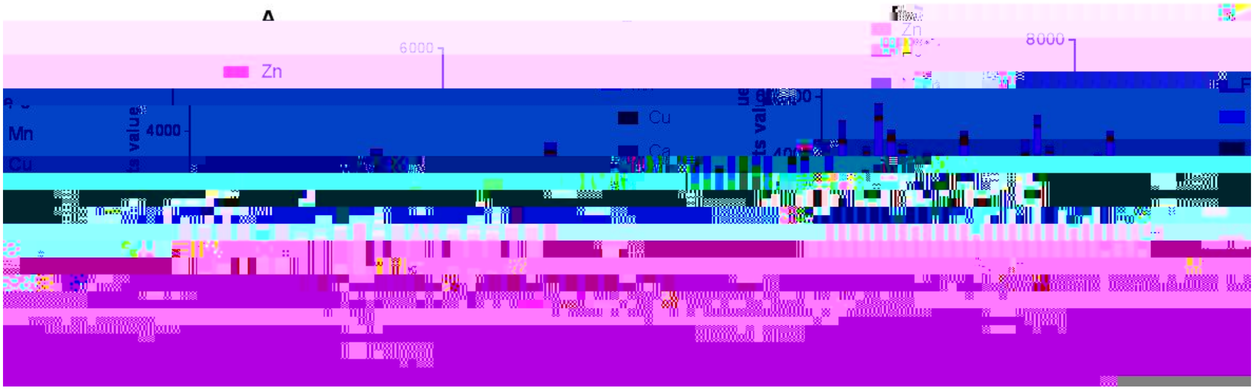

Figure 6: T e Pearson correlation analysis of the macro and micronutrient contents (A) IRSSTN Module 1; (B) IRSSTN Module 2.

Zn	-0.031	0.095	-0.108	0.172

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