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SUMMARY

Two Field experiments were conducted at the experiment farm of the Faculty of Agricultural, Saba – Basha, Alexandria University during, 2009 and 2010 growing seasons.

The main objective of this investigation was studyed the effect of organic cultivation on the productivity and grain quality of some rice cultivars. (Sakha 101, Sakha 104 and Giza 178)During these successive seasons rice crop followed cultivated after wheat crop in the winter season and both rice and wheat were grown directly without tillage. In addition, the same experiment plot has been utilized at all seasons of study.

Split plot design with three replications was used whereas rice cultivars were assigned in the main plot, while, fertilization treatment were allocated in the sub plots.

The planting date was 13 and 9 May in 2009 and 2010 seasons, respectively for rice. The main studied characters were arranged as follow:

5.1. Growth characters:

5.1. 1. Number of days to heading (days):

Sakha 101 rice cultivar was the latest variety (101.00 and 101.67 days) in 2009 and 2010 seasons, respectively. While, Giza 178 rice cultivar was the earliest one in both season.

Difference among rice cultivars regarding No. of days to heading may be due to the genetic background for each cultivar. It is obvious that number of days to heading character was insignificantly affected by the rice residues fertilization in the two seasons of study.

5.1. 2. Plant height (cm).

Sakha 104 gave significantly the tallest plants followed by Sakha 101 in both seasons, while the shortest numerical plants were recorded for Giza 178. The recorded differences in plant height might be mainly due to the genetic background.

Organic fertilizer significantly decreased plant height. This might be due to the rate of mineral nitrogen alone (the control) is stimulating the meristemic activity and cell elongation of plants.

Mineral nitrogen combined with organic fertilization (rice residues) and its impact on plant height, the two tested fertilization treatments had significant effect on plant height in both seasons .

5.1.3.Clum length (cm).

The tested cultivars were differed significantly in culm length in the two seasons of study. Sakha104 surpassed the other cultivars in culm length in both seasons. The varietal differences in Culm length might be due to the differences in their genetic make up.

Significant increase in culm length was observed as a result of applying rice residues (husk) as a fertilizer in the two seasons of study followed by straw treatment in second season only. The tallest Culm was resulted under the husk treatment while the shortest culm was found in case of the control treatment in both seasons .

5.1.4. Panicle length (cm).

The panicle length was differed significantly between the three tested rice cultivars. Among these cultivars; Sakha 101 produced the longest panicles, on the other hand , Giza 178 had the shortest panicles in the two growing seasons. the differences in panicle length due to the rice residue fertilization were significant in the two seasons. The mineral treatment (the control) produced the longest panicles compared with the other rice residues treatments which might be due to the favorable effect of nitrogen which encouraged the growth of rice plant and subsequently the panicles length.

5.1.5- Number of tillers / m^2

The three tested rice cultivars differed significantly in their tillering capacity in 2009 season, only, While, no significant differences between cultivars were detected in 2010 season. Sakha101 cultivar recorded higher number of tillers/ m^2 at complete heading in both seasons followed by Saka104. These varietal differences are due to mainly to their genetic background

5.1.6. Leaf area index (LAI).

Leaf area index differed significantly among the three rice cultivars in both seasons at all sampling dates. This obtained results indicate that Sakha 101 had significantly the highest LAI compared with the other rice cultivars under study.Mineral nitrogen (control) has a significant effect in leaf area index in the first season. While, husk application surpassed the other treatments in the second season.

5.1.7 . Sterility (%).

The results indicated highly significant difference between different fertilization treatments on such trait. Application of 100% N (the control) gave the highest value of sterility percentage.

5.2. Yield and Yield components:

5.2.1. Number of panicles / m^2.

The tested cultivars differed significantly in respect of number of panicle/m^2 in the two seasons of study. Sakha104 surpassed the other cultivars in number of panicles/ m^2 in both seasons followed by Giza 178 in the two growing seasons, while Sakha101 gave the lowest number of panicles /m^2 in both seasons. significant increase of number of panicles / m^2 was determined as a result of applying rice residues (straw and husk) as fertilizers in the two seasons of study. The highest No. of panicles / m^2 resulted from the straw treatment while the lowest number was found in case of the control treatment in both seasons.

5.2.2- Number of filled grains / panicle .

Number of filled grains /panicle was significantly higher in Sakha101 as compared with those of Sakha 104 and Giza 178 which produced the highest numerical number of filled grains/panicle in the two seasons, while Giza 178 gave the lowest one..

5.2.3 . 1000 grain weight.

Both Sakha 101 and Sakha 104 produced the heaviest grains followed by Giza 178 in the two seasons. Giza 178 ranked the lowest among all cultivars and gave the lightest grains in both season of study.The 1000-grain weight was significantly affected by the different types of fertilization in the two seasons. The treatment 100% N (control) gave the highest 1000-garin weight. On the other hand no significant differences were found between husk and straw treatments. These treatments produced the lowest 1000- grain weight in both seasons.

5.2.4 . Grain yield / fad.

Grain yield was significantly influenced by different fertilizers. Application of 100% N (control) followed by rice husk as organic fertilizer increased grain yield in both seasons, while using rice straw as a organic fertilizer resulted in the lowest grain yield under the present study. This could be due to the increase in number of panicle/ m^2 , number of grains/panicle and no of filled grains number /panicle reported earlier as effect of these treatments.

5.3. Grain Quality characters:

5.3.1. Grain shape characters:

5.3. 1.1. Grain length (mm).

It is clear that Sakha 101 produced the longest milled grain length in 2009 and 2010 seasons, while Giza 178 gave the shortest grain length. highly significant differences between fertilizers treatments were detected . Application of nitrogen alone (the control) gave the tallest grain length (4.99 and 5.02 m.m) in the two seasons, respectively. Meantime, the differences between the two other treatments (rice husk and rice straw) were not significant in the two season of study.

5.3. 1.2. Grain width (mm).

Sakha 101 gave the widest milled grain (2.76 and 2.74 mm) in 2009 and 2010 seasons, respectively. Whereas, Giza 178 rice cultivar produced the narrowest milled grains (2.32 and 2.34 mm) in both seasons. These differences may be due to that this character is mostly genetically controlled and the effect of the environments on its behavior is very low.

The control treatment (100% N) produced the widest grain (2,70 and 2.68 mm) in the 2009 and 2010 seasons .there were no significant differences between the effect of rice husk and rice straw on grain width in both seasons.

5.3. 1.3. Grain shape "L/W ratio.

There was significant difference in grain shape between rice cultivars in 2009 season, only. Sakha 101 rice cultivar recorded the maximum milled grain shape followed by Sakha 104 cultivate. While the minimum value was found for Giza 178 in 2009 and 2010 seasons.

The results of the effect of mineral (N) fertilizer, and rice residues as fertilizers, the results indicated that highly significant differences were estimated in the first season, only. it is clear that the highest grain shape estimate was recorded for the control (100% N) with insignificant differences from the husk treatment.

5.3.2. Milling characters:

5.3. 2.1. Hulling % (Brown rice %).

Rice cultivars showed a significant differences regarding hulling % in both seasons. Sakha 101 gave the highest values of hulling % (20.39 and 20.77 %) in 2009 and 2010 seasons, respectively. Meanwhile, the lowest values (18.66 and 18.41 %) were for Giza 178 cultivar, in the first and second seasons, respectively. These differences could mainly be attributed to the genetic variability among the three cultivars of rice under study.

5.3. 2.2. Milling % (total milled rice %).

Sakha 101 cultivar produce the highest value of milling percentage (72.44 and 72,82 %) , in both seasons respectively, while Giza 178 cultivar recorded the lowest values of milling percentage (70.60 and 70.14%), in the both seasons, respectively.

This result proves that milling (%) character are expressed mainly by the genetic constitution with very limited effect for the environment.

5.3.2.3. Broken rice %.

Data showed that rice cultivars differed significantly in broken percentage in both seasons. Moreover, Giza 178 rice cultivar produced the highest broken percentage (6.50 and 6.40 %) in the first and second seasons, respectively. On the other hand, the lowest broken percentages i.e. 1.50 and 1.40 were found in case of the rice cultivar Sakha 101 in both seasons. The differences in broken percent between cultivars occurred mainly as a result of their differences in grain shape. As for the effect of different fertilizers treatments under the present study , the broken percentage was significantly increased in 2009 season. The broken percentage was highest at 100% N (check) accompanied with insignificant differences between rice husk and rice straw treatment. in both season.

5.3.3-Cooking and Eating Quality:

5.3.3.1 Gel consistency (mm):

Analysis of variance indicate clearly that, there was a significant difference among the rice cultivars under study regarding gel consistency (mm) in the two seasons of study. Sakha 101 rice cultivar produced the highest value followed by Sakha 104 cultivar of the

value of gel consistency in 2009 and 2010 seasons . Whereas Giza 178 cultivar gave the lowest value in both seasons,.

The control (100% N) gave the highest values of gel consistency as compared with the other treatment followed by rice husk treatment, however the rice straw treatment resulted the lowest estimates of gel consistency in the two seasons of study

5.3.3.2 . Gelatinization temperature.

Sakha 101 cultivar produced the highest value of GT (5.54 and 5.45) followed by Sakha 104 (4.82 and 4.86) in both seasons, respectively, while Giza 178 cultivar recorded the lowest values. Gelatinization temperature is the expression of time required for complete cooking of rice starch. It is clear that application of 100% N (control) gave the highest GT in both seasons, as compared with the rice residues treatments,

The interaction effect between rice cultivars and rice residues fertilizers on GT was not significant in the two seasons of study,

5.3.3.3.Amylose content (%).

Application of 100% N (the control) gave the highest values of amylose content (19.63 and 19.08 %))in 2009 and 2010 seasons, respectively as compared with the rice husk and/or rice straw. From another point of view, the differences between rice husk and rice straw in respect to amylose content (%) were significant in 2009 season only.

5.3.3.4. Protien content (%):

Sakha 101 cultivar produced the highest value of protein content (7.17 and 7.09 %) followed by Sakha 104 (6.82 and 6.86) in both seasons, while Giza 178 cultivar recorded the lowest values. This difference between cultivars regarding protien content was mainly because of their genetic back ground.Application of 100% N (control) gave the highest protein content (%) in both seasons, as compared with the rice residues treatments,

5.3.4.Mineral content :

5.3.4.1. Iron content:

Sakha 101 cultivar produced the highest value of Fe content (0.0130 and 0.0131 %), while Giza 178 cultivar recorded the. Lowest values. Application of 100% N (control) gave the highest Fe content in both seasons, as compared with the rice residues treatments,

5.3.4.2 . Zinc content.

the three cultivars did not varied significantly in their zinc content during the first and second seasons.Moreover there was no significant effect for fertilizers treatments on zinc content.

5.3.4.3 Nitrogen content:

Sakha 101 cultivar produced the highest value of nitrogen content (1.21 and 1.19) followed by Sakha 104 (1.15 and 1.15) in both seasons, respectively, while Giza 178

cultivar recorded the lowest values. the effect different fertilizers on nitrogen content. It is obvious to note that highly significant differences were recorded between treatments. Naturally application of 100% N (the control) followed by rice husk treatments gave the highest nitrogen content in both seasons.

Conclusion :

From the obtained data we can conclude that:

1- To avoid the environmental pollution as result of chemical fertilizers, using organic fertilizers is better in agriculture.

2- It's useful to use rice straw and rice husk as organic fertilizers in most field crops.

3- Generally for organic fertilizers utilization its useful to add it in the previous crop.