Rice Research: Open Access
ISSN: 2375-4338

Mini Review Open Access

Genetics Produce Superior Plants through Selective Breeding

Genga A*

Department of Agricultural Biology, CNR-IBBA, Italy

Introduction

Accumulation of water-soluble salts in the soil is high in arid and semi-arid regions. No part of the world however is safe from salinization. Soil that has an electrical conductivity is considered to be saline soil. The osmotic effect of saline water reduces the uptake of water by plants. The excess ions adversely affect plant cells by efflux of intracellular water [1]. Salinity is also known to increase the nutritional imbalance in plants. These mechanisms play a major role in inhibiting plant growth. Rice is the most sensitive cereal crop for salinity. The loss of rice yield in saline lands is estimated per annum. During evolution plants have developed mechanisms to sense changes in the environment and adapt to them. Rice has also developed mechanisms to withstand salinity. People have selected and cultivated such salt tolerant rice varieties from time immemorial. There are three common techniques that are used to produce rice plants that can tolerate salinity. They are conventional breeding; identification of quantitative trait loci and marker assisted selection or direct screening of rice plants in a saline environment and genetic modification by introducing Salt Tolerance Related Genes. The recently introduced technique of targeted gene editing promises great potential for the alteration of genes without affecting characteristics of elite genotypes. Genetic modification requires the identification of the relevant genes in stress tolerant pathways and genetic variants in those genes that confer functional advantage. Whole genome sequencing of plants on next generation genome sequencing platforms makes it possible to do this faster and more efficiently than before [2]. Godawee, a Sri Lankan traditional rice variety known for its salinity tolerance, was sequenced as the initial step of a whole genome-based polymorphism study to identify genes involved in salinity tolerance and genetic variants in those genes that confer functional advantage. In this paper we report the initial results of this work. Rice has been consumed in tropical and subtropical Asia from as far back as 8000 BC. Over the years the process of farming and selection for specific features has changed the wild rice, Oryza rufipogon, consumed by ancient people into the improved species, Oryza sativa, which is the major staple food of a third of the world population today. UNFPA estimates that the world population would reach 9.6 billion by the year 2050. To ensure food security for this increasing population food production has to increase by approximately 44 million metric tons annually from now on. Unpredictable climate change and abiotic stresses such as soil water scarcity and salinity hamper achieving this goal. Seed is the raw material of agriculture, which strongly influences the yield of any culture [3]. Whether it is for a peasant variety or selected. Employment of quality seeds increases production. A good seed must maintain the genetic purity of a variety, be healthy and well mature, have good germination ability, and be homogeneous in shape, seed size, and colour. Seed production is an important activity and appears to be the most important the first link in the agricultural sector, because it consists in setting up a production from seed stem to certified seed and provide quality seeds for producers. This requires care, more precision in procedures, more technical skills and strict production rules. One of the most important technical rules in production is the harvest date.

Discussion

The harvest date is the optimum harvesting time to obtain the best Seeds with high germination capacity. It remains poorly known or almost not known by the seed multipliers of rain fed rice which is still new and booming in Cameroon. Seed growers are based on the panicles or the cycle of the plant sometimes disturbed by unstable climatic conditions, causing early or late harvests that have a negative impact on the ability of seed germination, resulting in loss of production in fields and the use of very high seedling materials [4]. Germination is the first stage in the life cycle of plants to produce new generation, the ability of seeds to accomplish this biological process. The germination capacity is therefore an important characteristic for plant production. Rice is the staple food for more than half of the world's population. It ranks as the second cereal crop grown in the world after wheat. In Africa, rice has become a very strategic and priority production food security. Consumption is rising faster than for any other major product on the continent due to the large population growth, the rapid urbanization and changing eating habits [5]. Although the local production of rice rose rapidly after the 2008 food crisis, a problem of the rice sector in Africa in general is that local production never equalled the demand. The continent therefore continues to depend on imports in order to meet the growing demand for rice production and satisfied only of the national demand as much rice is of high importance for food security. In view of the existing potential and the weight of imports, the country must reverse the trend by the development of a strategy to promote rice cultivation in order to ensure competitiveness of this sector [6]. However, one of the major constraints of improving the cultivation of rice is the lack of agricultural inputs, especially lack of quality seeds. Seeds are an indispensable input for agricultural production. Moreover, neither productivity nor production can be improved without timely access to quality seeds. Quality rice seeds will boost the production of consumer in order to reduce imports. The chemical composition of rice determines its nutritional value and sensory properties such as taste and texture. Amylose content in the starch has been identified as one of the main composition components that affect its textural properties. Moisture, protein and fat content also have some effects on perceived taste and hardness of rice when being consumed. Parameters to assess the quality of starch have been largely discussed, proposed that texture could be considered as one of the key parameters. However, in many cases the perceived texture is associated to taste, thus it would be important to relate textural and taste properties of rice and to evaluate how they are affected by the composition. This is an objective of interest in areas such as the Heilongjiang region where the production of rice has a large economic impact that has been negatively affected by the variable quality of the rice produced in the region [7].

***Corresponding author:** Genga A, Department of Agricultural Biology, CNR-IBBA, Italy, Tel: +011390649931, E-mail: annamaria.genga@ibba.cnr.it

Received: 23-Aug-2022, Manuscript No. rroa-22-74653; **Editor assigned:** 25-Aug-2022, PreQC No.rroa-22-74653 (PQ); **Reviewed:** 08-Sep-2022, QC No rroa-22-74653; **Revised:** 14-Sep-2022, Manuscript No. rroa-22-74653 (R); **Published:** 21-Sep-2022, DOI: 10.4172/2375-4338.1000322

Citation: Genga A (2022) Genetics Produce Superior Plants through Selective Breeding. J Rice Res 10: 322.

Guoxingfeng and Muyundong determined the texture properties of rice after cooking from different regions using standard textural protocols and the research indicated that there existed significant difference between hardness and viscosity through variance analysis. Lufeng measured the hardness, viscosity, springiness and chewiness of rice by Texture Analyzer. Similar research, determined the influence of moisture content, particle size and level of cereal-pulse blend on the glass transition and melt temperatures of a ready to eat cereal-pulse formulation. Given the economic importance of rice production in the Heilongjiang region and the rising concerns regarding quality in terms of sensorial properties it is important to evaluate the effect of composition on these properties and that was the main objective of the present research orientation. For that the chemical composition of rice coming from this region was evaluated. The following properties of cooked rice were evaluated using Textural Profile Analysis and sensory evaluation. Correlations among the chemical composition of the rice types and their mechanical and sensory properties were evaluated at the same time. However rice is one of the most popular staple foods, and today half of the world population are living depend on it in Asia, Southern Europe, tropical America and some parts of Africa, and the total production is ranked 3rd among the world's total crop yields. The area of Heilongjiang is located in the centre of the north eastern Asia economic zone, which is one of the three world famous black soil zone and the rice produced from Heilongjiang is popular with acceptable quality. Although already in the market with good appearance in terms of surface, the rice fragrance and taste have some problems concerning sensory properties during consumption [8]. So it is important to evaluate the composition characteristics of the different rice cultivated in the Heilongjiang area in order to assess composition effects on sensorial and textural quality. There were many differences in chemical composition and texture characteristics, but few in taste of different regions rice. The correlation between rice chemical composition, and texture and sensory characteristics was that the fat, ash, amylase and protein content of different regions rice had significantly influence on its taste quality and structure characteristics [9]. The correlation analysis on texture characteristic and taste quality of rice shows that there was little difference between them so structure features could reflect people's overall evaluation of rice taste. Plant salinity tolerance occurs in two phases known as osmotic and ionic [10]. The osmotic phase starts with an increase in salt concentration around the roots and is characterised by reduced rate of shoot growth and reduction in number of tillers. Ionic phase starts with the accumulation of salts above the toxic levels in old leaves and is characterised by the death of leaves.

Conclusion

Mechanism of salinity tolerance in plants can be categorised as ion homeostasis and compartmentalization, ion transport and uptake, biosynthesis of protectants and compatible solutes, activation of antioxidant enzyme and synthesis of antioxidant compounds, synthesis of polyamines, generation of nitric oxide, and hormone modulation and involved several pathways.

Acknowledgement

None

Conflict of Interest

None

References

1. Zeven AC (1998) Landraces: a review of definitions and classifications. Euphytica EU 104: 127-139.
2. Villa TCC, Maxted N, Scholten M, Ford-Lloyd B (2007) Defining and identifying crop landraces. CUP UK 3: 373-384.
3. Mercer KL, Perales H R(2010) Evolutionary response of landraces to climate change in centers of crop diversity. Evol Appl US 3: 480-493.
4. Giandomenico Corrado,Rosa Rao (2017)Towards the genomic basis of local adaptation in landraces.
5. Gibson RW (2009) A review of perceptual distinctiveness in landraces including an analysis of how its roles have been overlooked in plant breeding for low-input farming systems. Econ Bot NY 63: 242-255.
6. Drechsel P, Dongus S (2009)Dynamics and sustainability of urban agriculture: Examples from sub-Saharan Africa. Sustain Sci UN 5: 69-78.
7. Smit J,Nasr J (1992) Urban agriculture for sustainable cities: using wastes and idle land and water bodies as resources.Environ Urban US 4: 141-152.
8. Mark SJ, Michael JL, Thoreau RT, Nicholas C (2015)Attenuation of urban agricultural production potential and crop water footprint due to shading from buildings and trees. Environ Res Lett UK 10: 1-12.
9. Karanja NN, Njenga M, Prain G, Kangâethe E, Kironchi G, et al. (2010) Assessment of environmental and public health hazards in wastewater used for urban agriculture in Nairobi, Kenya. Trop Subtrop Agroecosystems USA 12: 85-97.
10. Lado C (1990) Informal urban agriculture in Nairobi, Kenya: problem or resource in development and land use planning?.Land use policy EU 7: 257-266.