

Rice – A Great Grain

Muhammad Ashfaq^{*} and Iqra Saleem

Institute of Agricultural Sciences, University of the Punjab, Lahore, Pakistan

***Corresponding author:** Muhammad Ashfaq, Institute of Agricultural Sciences, University of the Punjab, Lahore, Pakistan, E-mail: ashfaq.iags@pu.edu.pk

Rec date: May 24, 2015; **Acc date:** May 27, 2015; **Pub date:** May 30, 2015

Copyright: © 2015 Ashfaq M, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Editorial

The story of rice is supposed to be about 7000 years old, starting as descendent of grass. It kept on spreading and migrating from its probable place of origin - the Himalayas. In some studies it is originated after the domestication of the cereals began and early cultivation occurred in Yangtze River [1]. Today it is feeding half the population on the planet [2,3]. It has been evolving and diversifying since the time it was first considered to be a food commodity. It has a splendid history and has been part of cultures and traditions. Along with many other antique writings we find it's mentioned in HEER RANJHA - an Epic Punjabi poem written by WARIS SHAH. It was written in 1750 [4]. There too its different types are mentioned and it is obvious that it was even then a prominent part of household life. The following verses are traced from the poem and translated in English to show how much impact it had.

Aromatic rice stores are occupied with Gold Leaf and ordinary rice are being threshed, Basmati, Musafari, Begumi, Harchand and Yellowish rice are being warehoused, Suthi, Karchaka, Sewala Ghard, Kanthal and Kekala rice are being replaced, Fine white Kashmir, Kabul rice dishes which are eaten by fairies and beautiful women..."

Above mentioned Mushkan rice (fragrant rice) is still in the precious collection of Rice Research Institute kala shah kaku Lahore Pakistan. The diversity of rice can be imagined by the fact that International rice research institute Philippines, has a repository of approximately 124,000 different lines till date [5]. This is the largest collection of all the collections worldwide. On the other hand, United States Department of Agriculture (USDA) Arkansas having thousands germplasm lines in Genetic Stock *Oryza* Collection (GSOR) [6]. From single or a few wild lines to above lac different types, this journey has humongous knowledge to share and spread. Thousands of varieties are being sown in more than hundred countries. Every line has its own history, story and traits. Every single variety is different from the other, in terms of both genotype and phenotype. Rice security means food security to half the world and to secure this food's resources IRRI has very well preserved wild lines, breeding lines, genetic stocks, land races, modern and obsolete varieties.

Rice has very small genome size, ploidy level diploid in nature, highly self-pollinated and model experimental plant among the other cereal crops for their genomics, genetics and molecular study. Rice grain is also called as global grain and significantly very important due its diversity [3,7,8].

Rice along with its husk is called paddy and with husk totally removed and polished is called milled rice. Brown rice is the rice which has its husked removed but rice bran is intact. Broken rice is formed during the milling process. It gets separated on the basis of size and is lower quality rice.

Size of the grain is an important parameter which is also a basis for studying morphological features. Length to width ration is also taken

into account. Short grain rice has average length of not more than 5.2 mm and length width ratio of less than 2 mm. They usually give a round appearance. Medium grained rice has average length ranging from 5.2-6 mm and a length width ratio of 2 mm. Long grain rice is one having average length above 6mm and length width ration of above 3 mm. They are slender in shape and remain separated after cooking. Such types of seed morphological traits are under genetic control. Some researcher reported that they are controlled by one, two, three or many genes [9-12]

There are two major domesticated rice varieties that are grown *Oryza sativa indica* and *Oryza sativa japonica*. Worldwide there are tens of thousands are different varieties of *Oryza sativa*, below some majorly classified groups are discussed. There is greatest variation among the cultivated species of rice i.e. *Oryza sativa* and *Oryza glaberrima* on various morphological traits and thousands (120000) of rice varieties have been created through selection, adaptation and human management [13].

Indica group contains Long grain basmati and non-basmati rice, for which Pakistan and India are famous. Basmati or aromatic rice is fragrant due to 2-acetyl 1-pyrroline. The more the age greater will be aroma. Jasmine rice is fragrant rice of Thailand but its aroma is less than basmati rice of subcontinent. Americans have also developed aromatic rice. Kalijira rice is Bangladeshi aromatic rice with small grain [14].

Japonica rice is short to medium grained rice and is available in different colors. It is mainly grown in Japan and California Caribbean countries.

Glutinous rice is also a variety that becomes sticky and thick fluid like on cooking. Arborio rice is Italian rice with high starch content. Golden rice is genetically engineered rice that is fortified to fulfill the vitamin A requirements [15].

Wild rice includes *O. rufipogon*, *O. nivara*, *O. nipponbare* along with many other species. They are wild relatives of domesticated rice and often used for breeding purposes to induce desired traits. They are highly potent against diseases and environmental stresses.

Highest possible quality germplasm should be used to enhance crop characters like disease resistance, salt tolerance, drought tolerance etc. Genetic erosion has already led to loss of many varieties, mainly wild ones which are endangered because of human activities. We need to conserve rice germplasm on priority basis to make sure global rice conservation and making our national rice agriculture system more strong [16].

References

1. Vaughan DA, Bao-Rong L, Tomooka N (2008) Was Asian Rice (*Oryza sativa*) domesticated more than once? *Rice* 1: 16-24.
2. IRRI (2009) Rice Policy- World Rice Statistics (WRS).

3. Ashfaq M, Haider MS, Khan AS, Ali M, Ali A, et al. (2014) Breeding for micronutrient improvements in rice (*Oryza sativa* L.) for better human health. *Journal of Food Agriculture & Environment* 12: 365-369
4. Rangha H, A book name written by Waris Shah in 1750.
5. Jackson MT (1997) Conservation of rice genetic resources: the role of the International Rice Genebank at IRRI. *Plant Mol Biol* 35: 61-67
6. USDA (2008) Rebuilding Agriculture and Food Security in Afganistan. Foreign Agricultural Services.
7. Kurata N, Nagamura Y, Yamamoto K, Harushima Y, Sue N, et al. (1994) A 300 kilobase interval genetic map of rice including 883 expressed sequences. *Nat Genet* 8: 365-372
8. Aluko G, Martinez C, Tohme J, Castano C, Bergman C, et al. (2004) QTL mapping of grain quality traits from the interspecific cross *Oryza sativa* x *O. glaberrima*. *Theor Appl Genet* 109: 630-639
9. Ramiah K, Jobiraz S, Mudaliar SD (1931) Inheritance of Characteristics of Rice. Part iv. Mem. Dept. Agric. India. *Bot Ser* 18:229-250
10. Bollich CN (1957). The Origin and evolution of cultivated rice in China.
11. Ramiah K, Parthasarathy N (1933). Inheritance of grain length in Rice. *Indian Journal. Agric. Sci.* 3 PP 808-819
12. Somrith B, Chang TT, Jackson BR (1979) Genetic analysis of traits related to grain characteristics and quality in two crosses of rice. *IRRI Res Paper series* 35: 14
13. Khush GS (1997) Origin, dispersal, cultivation and variation of rice. *Plant Mol Biol* 35: 25-34.
14. Buttery RG, Ling LC, Juliano BO (1982) 2-Acetyl-1-pyrroline: an important aroma component of cooked rice. *Chem Ind* 1982: 958-959
15. Beyer P (2010) Golden Rice and 'Golden' crops for human nutrition. *N Biotechnol* 27: 478-481.
16. Nakagahra M, Okuno K, Vaughan D (1997) Rice genetic resources: history, conservation, investigative characterization and use in Japan. *Plant Mol Biol* 35: 69-77.

This article was originally published in a special issue, entitled: "**Recent Advances in Rice Nutrition and Chemistry**", Edited by Shuvasish Choudhury