Tropentag, September 20-22, 2023, hybrid conference

"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Development of climate-smart dryland rice varieties with consumer-preferred qualities for Ghana

Felix Frimpong, Maxwell Darko Asante, Paul Kofi Ayirebi Dartey, Francis Amoako-Andoh, Kirpal Agyemang Ofosu, Benedicta Nsiah Frimpong, Charles Afriyie Debrah, Sylvia Kafui Artcher, Michael Akuamoah Boateng, Samuel Abebresse, Hillary Mireku Bortey, Priscilla Francisco Ribeiro, Aisha Karim, Phyllis Aculey, Daniel Gamenyah, Sober Ernest Boadu, William Lelabi Kota, Elizabeth Norkor Nartey, Huss Cole Yameen, Esther Nseasom

CSIR - Crops Research Institute of Ghana, Cereals, Ghana

Abstract

Ghana is a net rice importer due to a demand-supply imbalance, with a per capita consumption of >60 kg annually. Consumers in Ghana prefer long-grain aromatic rice that cooks fluffy but remains soft upon cooking. High-yielding varieties without these grain qualities do not appeal to farmers. About 90 % of rice cultivation in Ghana is done in rainfed lowland and upland ecologies, which are prone to drought stress. We report the development and plasticity of three new upland rice varieties that grow well under upland and rainfed lowland conditions and have excellent consumer-preferred cooking qualities. These varieties have average 4 and 6 $^{\mathrm{MT}}/_{\mathrm{ha}}$ yields under upland and rainfed lowland conditions, respectively. We found all three upland varieties tasted better and more aromatic as NERICA 1 check but more appealing than NERICA 1. Lower amylose content of 24 % or less was recorded for the three upland varieties compared to NERICA 1, which was 29 %. The three upland varieties had longer panicles similar to NERICA 1 but no anthocyanin colouration on the petiole base or seed, ranking them 1$^{\mathrm{st}}$ in terms of appeal. All three upland varieties differ in panicle colouration at maturity, with AG 4–18 appearing dry brown, AG 2–1 and AG 4–13 as a pale yellow. AG 2–1 differ with lots of pubescence on panicles, paddy or the seed coat, whereas pubescence was absent for AG 4–18 and AG 4–13. The development of consumer-preferred rice varieties that do well under upland and lowland conditions would facilitate the adoption of these varieties and result in the expansion of rice cultivation under drought-prone environments in Ghana.

Keywords: Ghana, morpho-physiological traits, smart-farming, sustainable rice, upland rice, yield

Contact Address: Felix Frimpong, CSIR - Crops Research Institute of Ghana, Cereals, Fumesua CSIR, P. O. Box 3785, Kumasi, Ghana, e-mail: felix.frimpong@yahoo.com