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CARBON ION BEAM IRRADIATION TECHNIQUE SHORTENS BREEDING CYCLE AND INDUCES NOVEL MUTANTS IN RICE

Rice cultivars Ashfal, NERICA-10 and Kasalath were submitted twice to 26.7 MeV/n carbon ions beam irradiation to induce stable mutants even in M1 generation. In the cultivar Ashfal, M1 fixed mutant was obtained with 200 Gy dose but in the other two cultivars NERICA-10 and Kasalath the dose range was 40-80 Gy. The irradiation was accomplished from Japan Atomic Energy Agency, Takasaki, Gunma, Japan through the FNCA forum as assistance to Bangladesh Atomic Energy Commission in 2009 and 2013, respectively. From the M1 fixed mutant of Ashfal, the rice variety, 'Binadhan-14' was released in 2013 by the National Seed Board of Bangladesh (NSB) that took four years and two months from irradiated seed sowing to release of the variety. On the other hand, from the M1 fixed mutant of NERICA-10, the rice variety, 'Binadhan-19' was released in 2017 that took four years and one month from irradiated seed sowing to release. The shortening of breeding cycle in these two varieties was attributed to the fixed M1 plants together with growing of two generations in a year. The fixed mutant of Kasalath has not yet been release due to the presence of some undesirable characters. 'Binadhan-14' is tolerant to high temperature (38-40°C), has a short duration cycle (105-125 days), saves 20% irrigation water and gives high yield (average yield is 6.9 t/ha). The late transplanting potential of this variety helps escaping seedling injury as well due to severe cool temperature. 'Binadhan-19' is a drought tolerant, short duration (95-105 days) and high yielding (average 4.0 t/ha in Aus and 5.16 t/ha in Aman) variety suitable for both Aus (April to July) and Aman (July to December) seasons. Proper and sincere application of this technique will enhance rice breeding worldwide.

Country or International Organization

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