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GAMMA RAY INDUCED PEDIGREED MUTANT POPULATION OF TOSSA JUTE (CORCHORUS OLITORIUS L.): A KEY RESOURCE FOR FORWARD AND REVERSE GENETICS

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Low natural genetic diversity is a serious limiting factor for academic progress and agronomic improvement of crops like tossa jute (Corchorus olitorius L.), an economically important bast fibre crop. Mutation breeding with proven ability to improve both qualitative as well as quantitative yield attributes can be employed to augment germplasm diversity. In the present study, we used gamma rays to produce a total of 33,000 mutants of Corchorus olitorius L. cv. JRO 204. The mutant population was screened for agro-morphological traits (M2), abiotic stress (drought and water logging) tolerance (M5) under long day condition and flowering resistance (M2) under short day condition. A range of morphological variations of agronomic as well as scientific importance were identified at vegetative and reproductive stages. These traits include growth habit, pigmentation, plant architecture, root architecture and flowering behaviour. Conditional mutants such as drought and waterlogging stress tolerance were also identified in a pilot experiment by using a sub-set of the population. Selected mutants (588) have been advanced to M6 generation by following single seed descent method to constitute pedigreed mutant population. These mutants were subjected to morphological, histological, genomic analysis to understand their genetic regulation using qRT-PCR analysis of key phenyl propanoid pathway genes in lignin deficiency. The study of lignin deficient mutants demonstrated that transcriptional regulation of CCoAMT 1 gene is associated with suppressed phloem fibre intrusive growth and fibre cell bundle formation and hypo-lignifications at early growth stage. In addition, comparative transcriptional analysis of flowering mutants compared to wild type underscored genes regulating flower timing in jute. Overall, the mutant population will be of paramount importance for genetic and functional genomic research in jute.

Country or International Organization

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