

Category	: International Rice Research Conference
Select Theme	: Genetic improvement
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Keyword 1	: Pre-breeding
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Title of Entry	: Identification of Novel Sources for Strong Culm among Rice Genotypes
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Introduction of semi dwarf trait in the rice cultivars has improved fertilizer responsiveness, lodging resistance and increased grain yield. However, lodging due to low amounts of biomass is still a major concern when attempting to further increase the grain yield. Compared to bending type resistance, the plants with high breaking culm strength can produce more biomass/yield and yet are not prone to lodging. The present work aimed to evaluate 46 rice genotypes including tropical japonica accessions, indica land races and elite indica cultivars for identifying strong culm genotypes. Culm strength was measured in terms of bending moment at breaking stress (M) which ranged from 158 to 2655 gf. Sixteen genotypes (IRGC15147, IRGC39111, IRGC50448, IRGC33130, IRGC6309, IRGC14694, IRGC18021, IRGC10658, Azhoghi, IRGC7486, IRGC29772, Solumpiket, IRGC43741, SRAC34997, IRGC19144 and IRGC9147) possessed higher 'M' value in the range of 1005 to 2655gf and were significantly different from remaining genotypes. These sixteen genotypes were profiled with SCM2, a reported QTL for culm strength on chromosome 6, found in high-yielding indica variety 'Habataki' that enhances the culm diameter and grain number per panicle through pleiotropic effects. Five genotypes: IRGC50448, IRGC33130, IRGC14694, Azhoghi and IRGC29772 were found to possess an allele similar to Habataki, while remaining eleven genotypes viz., IRGC15147, IRGC39111, IRGC6309, IRGC18021, IRGC10658, IRGC7486, IRGC29772, Solumpiket, IRGC43741, SRAC34997, IRGC19144 and IRGC9147 had a different allele as that of 'Habataki'. Two novel sources of strong culm genotypes IRGC15147 (2655gf) and IRGC39111 (2243gf) with higher 'M' value than Habataki and possessing an allele different from SCM2 can serve as potential donors for breeding better adapted rice cultivars with high grain yield. Six component traits of

culm strength viz., days to 50% flowering, plant height, tiller number, culm outer diameter, culm inner diameter and culm thickness were analyzed to assess correlation with 'M' value. Significant positive correlation between 'M' and culm inner diameter and significant negative correlation between 'M' and days to 50% flowering was observed. Using novel sources of strong culm strength coupled with early duration and increased inner culm diameter would aid in the development of cultivars with improved tolerance to lodging with a significant yield improvement.

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