

- Women must be empowered to ensure their effective role in sustainable livelihood programmes for biodiversity conservation.

- Recognizing the role of ocean biodiversity in carbon storage, promoting blue economy, and food security, sincere efforts are required to increase the marine protected area network in India.

- Effective monitoring of SST and coral ecosystem restoration should be given priority.

- Understanding the patterns and processes of change to draw a realistic action agenda for conservation and sus-

tainable use of Himalayan goods and services.

- Multidisciplinary research programmes must be accelerated for strengthening the mountain ecosystems, which might be promoted in academic and research institutions to work towards Aichi Biodiversity Targets and UN SDGs.

- Coupled with environmental education, biodiversity education should be made compulsory in formal and non-formal system, by involving extensive use of Information and Communication Technology and linkages with media.

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RESEARCH NEWS

A rare occurrence of $2n$ gametes functioning in interspecific crosses involving commercial cultivar of sugarcane (Co 89029) and *Saccharum spontaneum* L.

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Functioning of n and $2n$ gametes in sugarcane is a cytogenetic peculiarity with specific crosses involving different species and genera of the *Saccharum* complex. The $2n + n$ transmission is predominant in crosses of *S. officinarum* and *S. spontaneum*, and this had earlier led to the success of the first evolved variety 'Co 205' in 1918. Exceptions of $n + n$ gametes have also been reported later. However, transmission of $2n$ gametes in the crosses involving commercial varieties and *S. spontaneum* is a rare occurrence. Transmission of $n + n$ is the major limitation in prebreeding of sugarcane for introgression of *S. spontaneum* ($2n = 40-128$) genome into commercial varieties as donor for incorporating pest and disease resistance, wider adaptability, high tillering, etc. The F_1 progenies have to be backcrossed for several generations in varietal developmental programme^{1,2}. Hence selection of hybrids with female restitution in wide crosses is highly advantageous in nobilization programme.

Chromosome transmission pattern in 39 hybrids of three crosses involving a commercial variety of sugarcane, Co 89029 ($2n = 110$) (as female) and three different cytotypes of *S. spontaneum* ($2n = 64, 88$ and 112) (as male) was analysed along with their parents through mitotic preparation from root-tip squash.

Among the three cytotypes, $n + n$ contribution was strictly followed in $2n = 64$

derived progenies with few aneuploids, whereas the derivatives of $2n = 88$ and 112 exhibited both $n + n$ and $2n + n$ transmission. Among 18 clones of Co 89029 ($2n = 110$) \times *S. spontaneum* ($2n = 88$) analysed, the hybrid (04-2163) showed $2n = 153$ with $2n + n$ transmission, whereas the expected number was $2n = 99$ from $n + n$ segregation. Seventeen hybrids of this cross possessed chromosome number $2n = 85-99$. Two clones were stable with expected chromosome number $2n = 99$. Elimination of chromosomes from 2 to 15 was noticed in 15 clones with a frequency of 83.3%. In the cross of Co 89029 and *S. spontaneum* ($2n = 112$), the hybrid 04-244 possessed $2n + n$ transmission with $2n = 166$, while the expected number of $n + n$ transmission was $2n = 111$. Nine hybrids had elimination of 1-11 chromosomes and one hybrid (04-1879) exhibited the expected chromosome number of $2n = 111$. Kandasamy³ observed differential chromosome transmission pattern in the crosses involving POJ 2725 and *S. spontaneum* with the cytotypes $2n = 64$ and $2n = 112$ with $n + n$ and $2n + n$ transmission respectively. He noted $2n = 161$ in a hybrid with $2n + n$ transmission from the cross of POJ 2725 and *S. spontaneum* ($2n = 112$). The hybrid with $2n = 166$ (04-244) in the present study is the highest record for chromosome number of interspecific crosses involving a commercial variety and *S. spontaneum*.

Despite their high ploidy level and chromosome number, the hybrids exhibited normal meiosis. Meiotic studies in 04-244 (Co 89029 \times *S. spontaneum*, $2n = 112$) revealed 82 bivalents and two univalents at metaphase I. In 04-2163 (Co 89029 \times *S. spontaneum*, $2n = 88$), 65-74 bivalents and 1-4 univalents were observed. Laggards were few and tetrads were either normal, or with 1-4 micronuclei. Molecular marker analysis with 35 SSR primer pairs confirmed the hybridity with the presence of female- and male-specific fragments.

Success of prebreeding and development of potential genetic stocks depend on the type of chromosome transmission in wide hybrids of sugarcane. This study has clearly indicated the advantages of exploitation of higher cytotypes of *S. spontaneum* to harness female restitution. Hence, more crosses with higher cytotypes will facilitate the progenies with $2n$ female gametes.

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