

**Methylomics: DNA methylation modification –
a novel approach to breeding crops**

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DNA methylation provides a heritable mark that guides formation of transcriptionally silent heterochromatin. Methylated alleles are of potential value for applications in breeding. These are meiotically and mitotically heritable changes in gene expression that cannot be accounted-for by changes in DNA sequence. DNA methylation is essentially addition of a methyl (CH₃) group to cytosine or guanine nucleotides. In plants, cytosine can be methylated at CpG, CpHpG, and CpHpH sites, where, H represents any nucleotide but guanine. Differences in DNA methylation can be determined using methylation-sensitive amplified fragment length polymorphisms or MSAPs (Methylation-sensitive amplification polymorphisms) using restriction enzyme isoschizomers that are differentially sensitive to methylation, producing polymorphisms related to methylation differences (as opposed to sequence differences). We used papaya (*Carica papaya* L.) cv. Surya zygotic embryos for inducing variation through methylation modifying agents. Both hypo- and hyper- methylation modifiers were used. Methylation pattern in papaya plants regenerated from zygotic embryos was studied using MS-RAPD-PCR protocol where DNA-methylation-locus-specific restriction enzyme isoschizomers, *HpaII* and *MspI* were used. A total of 87 RAPD primers were used for analyzing banding pattern in the samples using PCR to resolve methylation status in the plants. The technique of MS-RAPD-PCR resolved global DNA methylation pattern in test samples and is an efficient, cost-effective and sensitive method for the purpose.

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Variability and genetic divergence in vegetable Cowpea germplasm of Goa

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Vegetable cowpea or Yard long bean [*Vigna unguiculata* var. *sesquipedalis* L.(Walp)] is a warm season leguminous crop grown especially for vegetable purpose along the west coast of India. In Goa, pole type varieties are preferred over bushy types as they offer multiple harvests with comparatively longer pods. There is wide variability found for different morphological and other traits in the local types cultivated in the state of Goa. Exploration of genetic variability in the available germplasm is a prerequisite for initiation of any successful breeding programme. Twenty nine genotypes of vegetable cowpea including three improved varieties collected from different parts of Goa state were evaluated for twelve quantitative characters including yield. High variability was observed for pod yield/plant, number of pods/plant and pod length. The high variability for pod yield per plant is apparent as the pod yield ranged from 315.25 to 2070.45 g /plant with an average of 827.48 g per plant. Pod yield depends on number of pods per plant, pod length and pod weight. Number of pods per plant ranged from 36.65 to 147.80. Pod weight depends on pod length, number of seeds per pod and hundred seeds weight. Wide variation was observed for all these characters in the present study. The GCV value was maximum for pod yield per plant (g) followed by pod weight (g) and number of pods per plant. Low values of GCV were observed for days to first flowering, days to first harvest and number of seeds per pod. In the present study, the twenty nine genotypes could be grouped into fourteen clusters based on genetic distance. High coefficient of variation was observed for pod yield per plant, pod weight, number of pods per plant and pod length indicating their significant contribution in determining the inter cluster distances.

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Heterosis for yield attributing traits in brinjal (*Solanum melongena* L.)

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Brinjal (*Solanum melongena* L.), also known as eggplant, is commercially important solanaceous vegetable crop of Indian subcontinent. Rich variability exists for both cultivated type and its wild species in the country. It is popular among people of all social strata and hence, it is rightly called as vegetable of masses. To obtain high yield per unit area, exploitation of hybrid vigour is one of the good way and particularly in crop like brinjal. This study was conducted with 21 F₁ hybrids and two standard checks at Horticultural Research Station, Pandirimamidi under High altitude and tribal zone of Andhra Pradesh to know the nature and magnitude of heterosis estimated as per cent increase or decrease of F₁ value over standard checks (standard heterosis). total Seventeen and four crosses noticed significant positive