

**O-35 (5)****DEVELOPMENT OF AN IDENTIFICATION KEY FOR DATE PALM (PHOENIX DACTYLIFERA L.) CULTIVARS BASED ON SINGLE NUCLEOTIDE POLYMORPHISM**

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Date palm has a long history of cultivation and a valuable germplasm in Pakistan with little knowledge about genetic makeup and variation among the most cultivated cultivars. Date palm is among the top three fruit crops of Pakistan which is grown throughout the country except the northern highlands. This study was conducted for characterization of local date palm cultivars and on the basis of morphological, chemical and molecular traits and development of an authentic key for their identification. Important morphological parameters of fruit, leaf and trunk of forty five locally adapted cultivars were studied for this purpose. Length, weight, volume of fruit, pulp weight, total soluble solids, % reducing sugars, % total sugar, % ash content, length and width of leaf, midrib length with pinnae, spine number, leaf base width and perianth height largely contributed to 81% variability among the cultivars. Simple sequence repeat markers when used to find genetic diversity in date palm cultivars under study showed greater similarity among the studied cultivars. Coefficient matrices were computed to form clusters on morphological, chemical and molecular basis to assess the relationship among the studied cultivars. Dendrogram based on morphological and proximate composition data divided the cultivars into four clusters while due to the less number of polymorphic SSR markers the studied cultivars were divided into two groups. Five gene fragments of more than 3.5kb of date palm chloroplast genome from seven commercially important date palm cultivars of Pakistan were sequenced. All these genomic fragments were almost identical among the selected cultivars. Twelve DNA fragments reported to have single nucleotide polymorphisms (SNPs) in date palm nuclear genome were also sequenced. Besides the reported ones, novel SNPs sites were also found in the sequenced fragments. A system was developed for varietal identification of date palm cultivars based on Single Nucleotide polymorphism typing. The system was able to distinguish studied cultivars from Pakistan. This strategy employed to study SNPs in date palm, could be used to identify closely related cultivars and germplasm found in Pakistan and can be extended to all the existing date palm cultivars thereby creating an authentic sequence based identification key for date palm germplasm in Pakistan.

**Keywords:** Date palm, morphological markers, simple sequence repeat markers, single nucleotide polymorphic markers