

Bean in Turkey: Characterization, Inter Gene Pool Hybridization Events, Breeding, Utilizations

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Abstract : Turkey is considered a bridge between Europe, Asia, and Africa and possibly played an important role in the distribution of many crops including common bean. Hundreds of common bean landraces can be found in Turkey, particularly in farmers' fields, and they consistently contribute to the overall production. To investigate the existing genetic diversity and hybridization events between the Andean and Mesoamerican gene pools in the Turkish common bean, 188 common bean accessions (182 landraces and 6 modern cultivars as controls) were collected from 19 different Turkish geographic regions. These accessions were characterized using phenotypic data (growth habit and seed weight), geographic provenance, 12557 high-quality whole-genome DArTseq markers, and 3767 novel DArTseq loci were also identified. The clustering algorithms resolved the Turkish common bean landrace germplasm into the two recognized gene pools, the Mesoamerican and Andean gene pools. Hybridization events were observed in both gene pools (14.36% of the accessions) but mostly in the Mesoamerican (7.97% of the accessions), and was low relative to previous European studies. The lower level of hybridization witnessed the existence of Turkish common bean germplasm in its original form as compared to Europe. Mesoamerican gene pool reflected a higher level of diversity, while the Andean gene pool was predominant (56.91% of the accessions), but genetically less diverse and phenotypically more pure, reflecting farmers greater preference for the Andean gene pool. We also found some genetically distinct landraces and overall, a meaningful level of genetic variability which can be used by the scientific community in breeding efforts to develop superior common bean strains.

Keywords : bean germplasm, DArTseq markers, genotyping by sequencing, Turkey, whole genome diversity

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