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Resequencing and Genomic Study of Wild Coffea Arabica Unveils Genetic Groups at Its Origin and Their Geographic Distribution

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Abstract : Coffea arabica (Arabica coffee), a cornerstone of the global beverage industry, necessitates rigorous genetic conservation due to its economic significance and genetic complexity. In this study, we performed whole-genome resequencing of wild species collected from its birthplace, Ethiopia. Advanced Illumina sequencing technology facilitated the mapping of a high percentage of clean reads to the C. arabica reference genome, revealing a substantial number of genetic variants, predominantly SNPs. Our comprehensive analysis not only uncovered a notable distribution of genomic variants across the coffee genome but also identified distinct genetic groups through phylogenetic and population structure analyses. This genomic study provides invaluable insights into the genetic diversity of C. arabica, highlighting the potential of identified SNPs and InDels in enhancing our understanding of key agronomic traits. The findings contribute significantly to genetic studies and support strategic breeding and conservation efforts essential for sustaining the global coffee industry.

Keywords : population genetics, wild species, evolutionary study, coffee plant
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