

Nestlé® and research partners map cocoa diversity to safeguard chocolate's future

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Nestlé® plant scientists, in collaboration with leading research institutions, have mapped the diversity of cocoa varieties in an effort to safeguard the future of chocolate. This work led to the establishment of a cocoa core collection consisting of 96 cocoa varieties.

Representing over 95 per cent of global cocoa genetic diversity, the collection will help researchers and breeders to more efficiently identify plants with desirable traits such as climate resilience, disease tolerance, higher yield, and sensory quality. As climate change, pests, and diseases impact cocoa yields and farmer livelihoods, this work lays a crucial foundation for building a more resilient supply chain.

This research, published in BMC Genomics, was a collaboration between The Pennsylvania State University (Penn State), the Tropical Agricultural Research and Higher Education Centre (CATIE), Fox Consultancy, and Nestlé® Research. The newly developed core collection includes several high-quality genome sequences generated by Penn State through its longstanding Molecular Biology of Cacao research program. CATIE, based in Costa Rica, also provided access to one of the world's largest living cacao collections, which includes several genotypes represented in this core collection.

The sequencing data are publicly available via the National Centre for Biotechnology Information (NCBI) database, and the corresponding trees are accessible at CATIE, Penn State, and other locations.

"Assembling the world's genetic diversity of cocoa into a well-curated collection, or a 'Noah's Ark' of cocoa diversity, not only makes sense from a conservation point of view," said Jeroen Dijkman, Head of the Nestlé® Institute of Agricultural Sciences. "It will also allow us to uncover key traits that can be used in traditional breeding programs to safeguard the future of cocoa."

A core collection is a carefully selected group of plant varieties that represents the full range of genetic diversity found in a species. It enables experts to study a smaller, representative sample of varieties without the need to maintain thousands of physical trees, as is typically required.

Patrick Descombes, Senior Expert in Genomics at the Nestlé® Institute of Food Safety and Analytical Sciences, explains: "Cocoa is a key ingredient in many of our products, especially chocolate. Yet, the fact that only a small percentage of global cocoa diversity is currently used in commercial production makes its supply chain more vulnerable to a fast-changing world. We leveraged cutting-edge genomic techniques, including deep sequencing of cocoa tree genomes, advanced data analysis, and bioinformatics, to explore genetic similarities and differences across over 300 cocoa varieties and establish this core collection."