

Olea Varietal Identification by DNA Fingerprinting

Variety Identification

Varietal identification of olive plants by DNA fingerprinting is the verification of the specific variety of plant samples by comparing them against established "DNA fingerprinting" databases.

Olive is one of the oldest cultivated plants of great economic value. There are more than 1000 olive varieties in orchards around the world that growers have vegetatively propagated from selected clones over the centuries.

Because of the ancestral nature of *Olea* and the clonal propagation of olive trees, plant material has been transported across regions, creating utter confusion about its true cultivar identity.

Synonyms and Homonyms

Cultivar *synonyms* resulted when cultivars introduced from distant regions were renamed, or when cultivars were mislabeled and sold under a new name. Cultivar *homonyms* turned up when groupings of genetically and morphologically different cultivars grown in separate geographic regions (which could have originated by genetic drift) continued to be vaguely designated by a common ancestral name, as is the case of Manzanillo, Ogliarola, Chemlali and others.

Cultivars In North America

In California there are fewer than a dozen prevalent varieties originally from Italy and Spain, but there is an increased diversity of cultivars offered by plant nurseries. Mission, believed to be a quasi-indigenous, unique cultivar in the US, is actually *Picholine marrocaïne*. And sometimes a term such as "Tuscan" is vaguely used without a particular cultivar attribution.



Variety Matters

Olea cultivars differ in their horticultural traits such as disease resistance, cold hardiness, self compatibility, and in their oil: flavor-aroma attributes and yield. When horticultural or biochemical attributes do not correlate with morphology, there is a need for proper DNA cultivar identification. This applies to either current or newly released cultivars to be registered for intellectual property protection. Therefore, determining the true identity of mother plants used for propagation in the plant nursery is essential

Uses of DNA Fingerprinting

Olea germplasm banks set out to characterize their collections, acquired over time from different olive growing regions around the world. These efforts resulted in effective, standardized procedures for *Olea* cultivar identification that can be replicated.

First attempts in California at *Olea* cultivar identification were aimed at characterizing heritage groves and Mission trees. Another important objective has been to verify the identity of cultivars released by plant nurseries. Similarly, olive growers can verify the identity of plant cuttings used for propagation.

DNA Fingerprinting at Agbiolab

Our DNA fingerprinting is based on molecular plant breeding techniques that were expanded in forensic medicine. We have compiled an extensive *Olea* cultivar database that includes hundreds of varieties from Italy, Spain, France, Middle East, Northern Africa, Greece and Australia.

DNA fingerprinting is routinely used on several major field and horticultural crops: grapes, walnuts, plums, melons and others.

Contact us about your needs to verify cultivar identity of *Olea* or other nursery crops. We can also test for the presence of viruses in propagating material.