

## **DNA Marker Analysis of Grape Cultivars at Foundation Plant Services and the National Clonal Germplasm Repository**

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Foundation Plant Services (FPS) and the National Clonal Germplasm Repository at Davis (NCGR-D) both maintain large collections of grape cultivars. Though the missions of the two collections are distinct, correct cultivar identification is essential for both.

DNA marker analysis, "DNA fingerprinting", has been used to study grape cultivars since the mid 1990s. Simple Sequence Repeats (SSRs) are the DNA marker of choice for characterization and identification of grape cultivars. Being co-dominant, SSR profiles can also be used for paternity analysis. Much of the technology was developed in the lab of Professor Carole Meredith before her retirement from the Viticulture and Enology Department at U.C. Davis. Meredith and graduate student John Bowers used this technology to determine the parentage of several major wine grape cultivars, including 'Cabernet Sauvignon' and 'Chardonnay', to verify the suspected Croatian origin of the cultivar known in California as 'Zinfandel', and to identify the cultivar known in California as 'Petit Syrah'. A lasting legacy of these efforts is an ever-growing database of DNA profiles of grape cultivars.

A DNA profile for a grape cultivar is useless unless it can be compared to a validated reference profile. There are several ways to validate a profile. For common varieties, taking samples from one or more established vineyards, additionally verified by ampelography, may be sufficient. For less common varieties, adequate voucher samples may be found in the country of origin, especially if there is a well documented cultivar collection. If the new profile comes from a controlled breeding program, and validated profiles for one or both parents are available, the new profile can be examined for consistency with its supposed pedigree.

The recent introduction of high through-put technologies at the NCGR-D has greatly increased the rate at which accessions from both collections can be tested. All 1200 *Vitis vinifera* accessions at the NCGR-D will be analyzed by the end of summer 2008. Fingerprints of many of these accessions have already been compared to voucher specimens, and while most have had identities confirmed, a number have been shown to be incorrectly labeled. SSR data have been exchanged with national collections of grapes in Spain and Portugal, which will permit further validation of accession identity in the next few months.