

# Secret to better coffee? Expert says it's in the genes

By EDWARD ORTIZ  
eortiz@sacbee.com

**T**he brave new world of coffee? Think genetics. That is the contention of UC Davis geneticist Juan Medrano.

Known for his study on the genetics of milk and its effect on humans, Medrano recently has been turning his research efforts toward coffee.

"I've started a research project to examine gene-expression differences between coffees grown at different altitudes," he said. "Coffee is a unique commodity that affects the lives of millions of people around the world ... so it's compelling to contribute to something with such human importance."

The key is to identify the gene regulators (involved in controlling the expression of other genes) that are related to flavor and other qualities, such as how coffee feels in the mouth, he said.

To do that, he has been spending time in places such as Boquete, Panama, home to the famed Kotowa coffee farm. That farm grows a varietal known as Geisha, prized for its bergamot and jasmine flavor tones. In some ways, Boquete is to coffee what Napa is to cabernet. Geisha was first introduced to the coffee market in 2004. Two years later, that variety set a record by selling for more than \$170 a pound at auction.

What Medrano has been learning in Boquete will assist other coffee scientists and growers in better understanding what makes a certain varietal more aromatic and flavorful than others.



Courtesy Juan Medrano

**UC Davis geneticist Juan Medrano** studies coffee. He and others hope to find the key to improving such things as flavor and mouthfeel. Improving disease-resistance of bean is also a goal.

The Guatemalan-born Medrano started looking into the many aspects of coffee growing and coffee flavor two years ago while visiting friends in Panama. Along the way he has met with expert coffee agronomist Jose Kawashima of Japan's Mi Cafeto coffee company. Kawashima is highly regarded for his maverick sensibilities when it comes to coffee production, and known for inventing a method of hermetically sealing freshly roasted beans in wine bottles to preserve their freshness and full aroma.

That kind of evolution has put coffee on track to

becoming a high-end specialty beverage, similar to wine. And as with wine, science will play a key role in its future, Medrano said.

The goal is to understand the variability of coffee genes at the DNA level. This would allow Medrano and others to accurately identify genetic forces that contribute to certain flavors as well as the crucial factor of disease resistance.

"Disease resistance is the highest priority, as it threatens all of the industry," said J. Bruce German professor of food science and technology at UC Davis.

German is the director of the recently founded Coffee

Center at the campus's Food and Health Institute – an ad hoc group of eight UC Davis scientists. That group recently meet with industry stakeholders and coffee growers and retailers in its first official coffee conference at UC Davis. The goal is to establish a dedicated major in coffee science at the university.

And when that happens, crop disease as it relates to coffee will be a major focus.

The issue is no small matter, especially recently, with the appearance of near-epidemic levels of "coffee rust" disease that is ravaging coffee growing in regions such as Central and South America. The fungus first appeared in 1970.

Climate change, including changing rainfall patterns, is viewed as a reason why the fungus has been cropping up at high elevations where it once was rare.

Altitude is crucial in coffee growing. Coffee flavor and aromas change significantly with changes in altitude, as temperature and microclimates vary greatly. The higher-altitude coffees are generally of better cupping quality, Medrano said.

"We'd like to identify what metabolic pathways are differentially expressed from coffees grown at different altitudes," Medrano said.

The uniqueness of coffee is often overshadowed by its status as a worldwide commodity. Coffee is widely viewed as the second most traded commodity, after oil.

Nevertheless, Medrano is excited about what will one day be gleaned from the sequencing of the coffee genome. That sequencing has not officially been announced or published, Medrano said.

However, the international coffee science community may have already sequenced the two varieties of coffee bean, arabica and robusta. Arabica is the most highly regarded and accounts for 70 percent of the consumed coffee worldwide, according to industry figures.

"Arabica is the most interesting species of coffee,"

Medrano said. "And we'd like to contribute to that sequencing effort. At UC Davis we're not doing whole genome sequencing yet – but we hope to get funding to support this effort, perhaps from some industry partners."

*Call The Bee's Edward Ortiz, (916) 321-1071. Follow him on Twitter @edwardortiz.*

## EASTER

### brunch buffet

Sunday, April 20th – 9:30 am to 2:30 pm

scrambled eggs, eggs benedict with canadian bacon, applewood smoked bacon, chicken & apple sausage, honey-baked ham, rosemary-crusted prime rib, carnitas with salsa, peel & eat shrimp, grilled salmon with lemon caper aioli, casserole with penne pasta, italian sausage, chicken, tomatoes, pancetta, mozzarella, ricotta cheese and garlic bread crumbs, roasted potatoes with green peppers & onions, french toast with powdered sugar & toasted almonds, assorted wood oven pizzas, caesar salad, mixed green salad, orzo pasta with bay shrimp, fresh mozzarella and cherry tomatoes, fresh fruits, assorted breakfast muffins & desserts.

*Brunch includes choice of an orange juice, champagne or mimosa.*

adults \$31.95 – children 12 & under \$12.95  
2 & under free

dinner served from 4 to 9 pm

Reservations  
**916.485.7100**  
www.zinfandelgrille.com

**ZINFANDEL GRILLE**  
SACRAMENTO

2384 Fair Oaks Boulevard