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FAMILIARITY: The Olive Oil Preferences of Trained and Untrained Tasters

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"This article was written for a popular audience. Its objective is to explain the discrepancy between trained tasters' evaluations and the opinions of "average" consumers. Since educating the American consumer about olive oil quality is probably the biggest marketing challenge facing this industry, this is definitely a topic for further research and discussion."

When *Cook's Illustrated* published an article comparing various extra virgin olive oils, word spread more or less like wildfire through the olive oil tasting community. Most people may not even be aware that there is such a thing, but a small coterie of trained olive oil tasters exists in the United States. An olive oil taste panel located in California was trained by the University of California to international olive oil tasting standards and has been instrumental in the development of a world-class domestic olive oil industry.

The Cook's Illustrated Results

The results of the *Cook's Illustrated* tasting (in May 2006) are illuminating. The Italian oils did not fare well: the highest ranking achieved was 5th. The only California oil in the tasting scored 10th. The primary complaint about the Italian oils was that they were too green, pungent and harsh, and that this overwhelmed the olive flavor. The California

oil, made from a blend of mostly Tuscan varieties, was cited as especially assertive.

The oils ranked highest by the *Cook's* staff were from Spain and Greece. These oils were variously described as having "bold olive flavor," being "nutty, fruity, good," "well-rounded" "complex, rich without being bitter," and being generally olive-fruity and well-balanced. The two top-ranked oils were blends from Spain that prominently featured the Picual variety (probably an important factor in their popularity; more about that later).

Trained olive oil tasters usually read such rankings with a combination of interest, suspicion and disbelief. Taste is taste, after all, and it is a very personal matter. But there is also the question of educating a palate and training yourself to make distinctions that the average person would not notice or appreciate. No one would argue with the assertion that wine tasting is a highly developed skill. And there are many among us who began our wine-drinking careers with stuff that we wouldn't use to make a marinade today. One can always argue that you like what you like, but you must also admit that there is some

(Cooks, cont. on p. 2)

In this Issue

Mass-trapping and Spray Materials for Control of Olive Fruit Fly

2006 was a weird year for olive fruit fly. Some places that were affected by the hot weather in February and subsequent freeze in April had little or no fruit. Therefore, we expected to see five flies for every fruit, but in some cases we saw very little damage even in untreated trees that had 100% of the fruit damaged the year before. The summer was hot and this likely contributed to the demise of some flies; breaks my heart. As in previous years, however, we saw about the same results in our research trials, which nicely reinforced our data and observations.

We have been conducting olive fruit fly (OLF) control trials in Sonoma County since 2003. Year one focused on the homemade OLIPE trap, comparing attractants (ammonium carbonate and bicarbonate, water, household ammonia and torula yeast, with and without spiroketal pheromone). Spinosad® bait (GF-120) was used as the standard treatment. That year we found that Torula yeast proved the best food attractant - by far, and have used it as our attractant in all of the liquid traps since then. In 2004, 2005, and 2006 we compared five to seven treatments at 16-30 different sites with three to four replications. We tested mass trapping using: an attract & kill (A&K) device (Magnet OL®); McPhail-type traps; OLIPE traps; and yellow sticky traps. We also compared two spray treatments: a kaolin clay barrier film (Surround®) and spinosad bait (Naturlyte®). Every year there were

(Mass-trapping, cont. on p. 4)

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(Cooks, cont. from p.1)

consensus among experts about what is a good wine and (especially) what is a defective one.

International Olive Oil Standards and Training

Olive oil is similar to wine in this respect. Yes, people like what they like, but there is also some consensus about what constitutes good oil and bad. The International Olive Council (IOC) standards for the use of the term "extra virgin" are very specific, and only a few of the criteria are assessed with laboratory tests. The most important qualifier for extra virgin classification is the *absence of sensory defects and the presence of some olive fruitiness*. In plain English, this means that the oil cannot be rancid, or taste of rotten fruit, dirty equipment, fermenting paste, wastewater, or anything other than fresh olives. The olives can be green or ripe, or any mixture thereof, and they can be of any combination of over a thousand varieties (each having its own distinctive characteristics).

It should be noted at this point that the IOC standards for "extra virgin" qualification are not enforced in this country. The label on an olive oil bottle can make claims to "extra virgin" status without ever having to prove the fact. The only enforcement is of the term "olive oil;" the oil must come from olives only and not be adulterated with other oils. This lack of oversight has led to tremendous consumer uncertainty in the olive oil section of the market.

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Learning to detect and identify the classic defects of olive oil is one of the first and most critical parts of a taster's training; panels that certify oils as "extra virgin" are concerned primarily with weeding out defective oils. One of the most common defects (rancidity) will occur in any oil given enough time, but can be present from the start if the oil was contaminated during processing or storage. Most defects result from poor fruit handling or processing problems prior to bottling. Olives fermenting in the absence of oxygen acquire a distinctive and common defect referred to as "fusty." This fermentation takes place when olives are allowed to sit for extended periods before milling. This is a common practice since speedy harvest, transport and processing are demanding and more costly for the producer. There are other classic defects, and also a wide range of non-specific "off" flavors.

Evaluating the positive aspects of olive oil is also part of the training, and quantifying the primary positive attributes is part of any certification tasting. The three primary positives are fruitiness, pungency and bitterness. Yes, pungency and bitterness. It is probably a little tough for most Americans to adjust to, but bitterness and pungency are regarded as *positive* characteristics of olive oil. Olives naturally contain various compounds that taste bitter or pungent, and these compounds are the antioxidants and other phytochemicals that make olive oil so good for you. Americans don't usually regard bitterness too highly; think "bitter pill," "bitter cold," or even "bitter old person." This disdain is not universal. Bitter flavors are part of many cuisines: think of the taste of Campari for example, or of bitter salad greens. And pungency (aka peppery or picante) is also prized by many cultures. Both are acquired tastes, however, and not very novice-friendly.

A Matter of Style

It should be noted that olive oil doesn't *have* to be bitter and pungent to qualify as extra virgin, and many olive oils are not. Bitterness and pungency decline as olives ripen, and oil made from ripe olives can have little or none of those qualities. Ripe oils are also less stable, since bitterness and pungency indicate the presence of antioxidants that preserve freshness. The shelf life of a properly stored high-polyphenol olive oil is a least two years; a ripe, low-polyphenol oil can become rancid in half that time. Degree of ripeness is a question of style, really, and regional or personal preference. In this regard, Italian olive oils tend to be painted rather broadly with a Tuscan brush; many Italian oils are ripe and fruity and not at all like the "green monster" (as they are called in the *Cook's* article) oils from Tuscany. And it is important to remember that there is a difference between olive oil tasted straight out of a glass and olive oil used on food. The bitterness and pungency of an oil are much less prominent when the oil is paired with the right food.

And what do the "experts" look for? When judging for competition or when doing an assessment of the overall quality of an olive

University of California Olive Oil Research Taste Panel tasting oil

oil, the two big items (this is assuming that we are looking at an oil with no defects) for most tasters are probably harmony and complexity. By "harmony," tasters mean the balance of flavors including bitterness, pungency and fruitiness; "complexity" refers to the variety of different flavors present in the fruit, including both green and ripe characteristics. The top-rated oils tend to be the ones that have pleasing proportions of bitterness and pungency to fruitiness (the fruitiness always being the strongest of the three) and a wide range of ripe and green flavors in the fruit. It might be argued that trained tasters, with their fondness for bitterness, pungency and complex fruit flavors, are not representative of the average consumer. That is probably true. But how many Americans first start drinking wine with Cabernet Sauvignon?

(Cooks, cont. on p. 3)

(Cooks, cont. from p. 2)

Tasting Results

Seven months after the original *Cook's* tasting, the University of California research taste panel blind-tasted the same oils as the *Cook's* staff, in the same way. The panel was asked to rank them in order of preference based on both plain tasting and how the oils fared with bread and fresh mozzarella cheese. The *Cook's* staff had ranked the oils in order of preference as follows:

1. Picual/Hojiblanca, about $29/liter (Spain)
2. Picual/Hojiblanca/Picudo, about $56/liter (Spain)
3. Koroneiki, about $20/liter (Greece)
4. Arbequina, about $29/liter (Spain)
5. Nocellara del Bellice, $21/liter (Italy)
6. Frantoio, Leccino, Pendolino, Moraiolo, $29.58/liter (Italy)
7. Blend, including Moraiolo, $22.98/liter (Italy)
8. Frantoio, Leccino, Pendolino, Moraiolo (Italy)
9. Arbequina, $42/liter (Spain)
10. Frantoio, Leccino, Pendolino, Maurino, Coratina (California)
11. Unstated varieties $12.99/liter (Various countries)

The results from the taste panel were very different. Four of the oils rated highest in the magazine tasting were found to be defective by the trained tasters. The most common defect was rancidity, followed by fustiness (the flavor of anaerobic fermentation). The oil ranked 5th by the magazine staff was the top choice of the taste panel. "Fresh, crisp, clean," "strong varietal character," "good, rich, intense flavor," "balanced" and "complex" were some of the comments. The oil got some strong positives from the magazine staff as well, but was down-rated for a "slightly bitter" profile that was "too much" for some. The number 10 oil from the magazine line-up was ranked number 2 by the taste panel, who called it "balanced," with "mellow bitterness and pungency just right," also "light," "floral, sweet." It was considered the most food-friendly of the oils by most of the tasters.

In general, the Italian oils fared very well in the taste panel rankings, as did the California oil; the Greek and Spanish oils did not do so well. This was a blind tasting for both groups, so national chauvinism couldn't have been a factor. Why the discrepancy between the two groups? The answer probably lies in style and familiarity. Oils from Spain (and Greece) are usually made from olives harvested later and therefore have lower levels of the polyphenol compounds that cause pungency and bitterness.

Familiarity and Preferences

Familiarity is also a critical factor; *we like what we know*. This issue looms large in olive oil preferences, because what we know (and therefore what we like) may not be good characteristics for an olive oil. One of the ironies of having a long-standing tradition of olive oil in your country is that it may have led to everyone developing a taste for defective olive oil. In days of yore, when a farmer had to rely on his family for harvest labor and on his donkey for transport to the communal mill, virtually all the olive oil was fusty because the olives sat around for days or even weeks before being processed. That was simply what olive oil tasted like, and everyone liked it. In a sense this has happened in the US as well. American consumers are most likely to purchase their oils in a supermarket from a large import company. Most of the oil in those containers is from the number one producer of olive oil in the world—Spain—and was made from the number one olive: Picual.

The Picual Controversy

This brings up one of the great debates of the olive oil world, the infamous Picual controversy. Picual oil tastes and smells fusty to trained olive oil tasters, or more specifically, like classic over-ripe, fusty Picual. For anyone used to American supermarket oil, the flavor of classic Picual is very familiar. This variety accounts for 80% of the six million acres of olives in Spain. It is a popular olive for good reason: it is very hardy, easy to pick, high in easily extracted oil and prolific. Why the bad rap? In a sense, Picual is a victim of its own popularity. Because there is so much of it planted, only a small fraction of it is harvested at its prime. Traditionally, Picual is picked slowly and steadily until it is all harvested. This can take months. And the same quality that makes it easy to harvest also makes it prone to falling off the trees if disturbed. Rotten olives are not left on the ground, they are picked up and tossed in with the rest of the fruit. The result of this is an oil with a very distinctive flavor described kindly as "eucalyptus." It is actually a combination of the defect "fusty" and the inherent over-ripe varietal character of the olive.

In Spain this is a familiar flavor and it is embraced as the flavor of Picual. In Italy, it is equally familiar, and scorned as the flavor of Picual (but Italians still buy lots of it and use it to make refined olive oil or to sell to Americans). The true flavor of Picual is actually fantastic; harvested at the right time and treated well, it produces a glorious, rich, fruity olive oil with a great balance of bitterness and pungency. There is no trace of the curse of the overripe Picual. But since that "classic Picual" flavor so familiar to the Spanish, they don't necessarily regard it as a defect. There are Spanish producers who have gotten wise about this and now produce superb Picual oils, but boatloads of "traditional" Picual are still produced as well. Because so much of the olive oil on American supermarket shelves is either this Picual or something else fusty, most Americans are accustomed to fustiness. One of the attendees at a sensory evaluation course (who had an extraordinarily acute sense of smell) embodied it perfectly when she smelled the defect "fusty" and confided that she thought that was just the smell of olive oil.

Starting Mild, But Fresh

The world of premium extra virgin olive oil is a fascinating one, and well worth exploring. Americans probably need to be introduced first to a mild olive oil from a variety with low inherent bitterness that was harvested fairly mature but then processed with immaculate care and attention to detail (a California Arbequina, for example). That might serve as an introduction to a more sophisticated appreciation of the qualities of excellent olive oil (the equivalent of the soft fruity Merlot for a wine education, to continue that analogy). There are so many wonderful olive oils in the world, and learning to appreciate them is a delightful (and healthy) pastime.

(Mass-trapping, cont. from p. 1)

Sound and rotten fruit; both infested with olive fly.

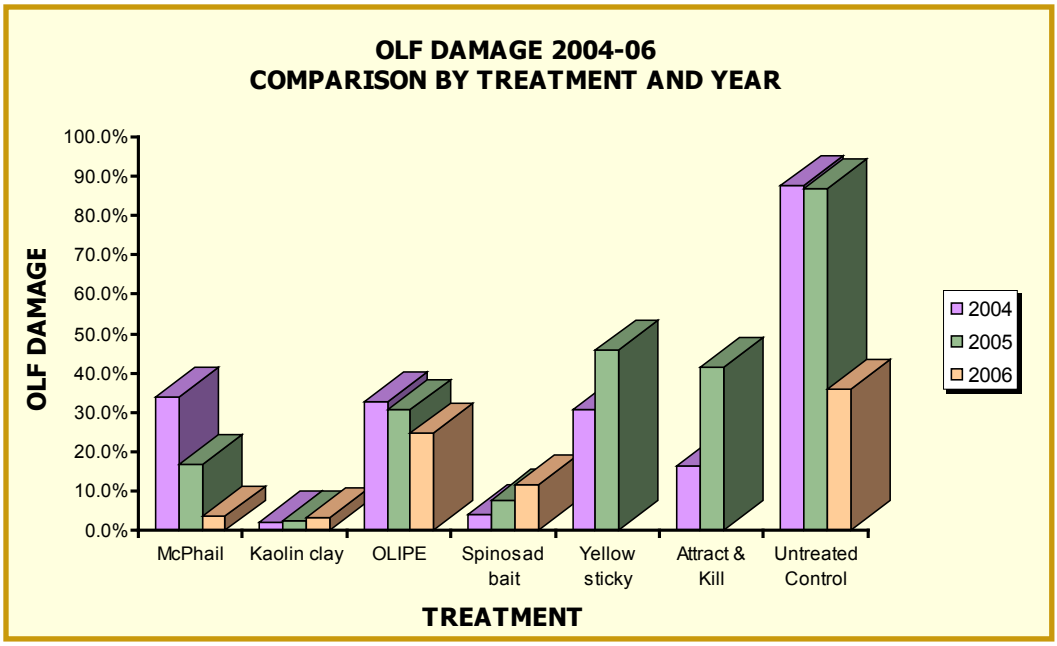
yellow sticky monitoring traps and untreated control trees at each site.

Here's a summary of what we found, which can be divided into two main areas (1) the number of flies caught in a particular trap type and (2) the amount of fly damage in the fruit at harvest time. It would be logical to think that if a certain trap type catches more flies that it would be better at protecting the surrounding fruit. The idea of mass trapping is to saturate the orchard with enough traps, usually one per tree, to catch most of the flies and prevent them from laying eggs in the fruit.

The McPhail-type traps caught the most, or very close to the most flies in all cases every year. The biggest of the McPhail-type traps that held the most liquid (water and yeast attractant) were better than the smaller ones, because they did not dry out as fast. Unfortunately, they are still cumbersome, need to be refilled about every 2 weeks, and are expensive. The OLIPE trap (plastic bottle with holes melted in shoulder), which contained the same torula yeast mixture as the McPhail-type traps was certainly cheaper, easier to handle, and did not dry out. The OLIPE traps were not quite as effective in catching flies, but the numbers were close, and they were more convenient. We found that using spiroketal pheromone with any of the liquid traps did nothing to improve trap catches. The yellow sticky trap caught the least number of flies and was a sticky, gooey, messy, pain. Get some of that stickum on your hands and arms and pants and you'll know what I mean. They are expensive and need to be changed periodically or refreshed with new stickum. The yellow sticky trap can be used as a monitoring tool, by placing one trap in about every ten acres, but it really does not work very well, because we could never relate the number of flies caught to a damage level at fruit harvest. It can indicate the presence of flies, and possibly overall flight trends, but it was a poor predictor of damage. The attract and kill (Magnet OL®) devices do not catch flies, so we could not monitor numbers.

Trap catches don't mean much if it can not be translated to protecting the fruit. We found that all of the mass trapping devices controlled olive fruit fly down to between about 15 to 40% damage compared to 80 to 100% damage if nothing was done at all to control the olive fruit flies. A damage level of 15% along with an early harvest might be quite acceptable, but 40% probably is not. The positive is that with any of the mass trapping devices they all significantly reduced the fly population and damage. The negative was that sometimes it was not down to a level that most producers could tolerate. The worst scenario would be an expensive mass trapping program that takes a lot of effort, but does not work. The best scenarios in our investigations were with convenient traps and or inexpensive mass trapping devices that were used in isolated orchards where large numbers of flies were not moving in from infested trees or orchards nearby. Landscape and small-scale plantings in or near suburban areas are difficult sites for mass trapping because of the surrounding reservoir of flies; treatments that involve attracting the pest in some way are likely to be the most problematic. The attract and kill device offers a high degree of convenience and efficacy in the right setting. In isolated (or large-scale) plantings it was very effective. It is still a good choice for landscape olives because it is inconspicuous and easy to use, and could reduce the residential reservoir of flies.

Spinosad bait controlled olive fly very well in our trials the first three years, but it did not work as well last year and we are not sure why. Kaolin clay was very impressive in every situation we used it, even under very high fly pressure. Because it repels rather than attracts, it is probably the best treatment for high fly-pressure situations. Its main drawback is visual; on olives planted for aesthetics, a white coating might not be acceptable. Using a combination of tactics, such as mass-trapping to reduce the overall fly population, less frequent, carefully timed sprays, and early harvest might allow oil olive growers to adequately control OLF with minimum financial and environmental cost. For treatment protocols (timing, application



Olive Fruit Fly Damage Study 2004 - 2006

(Mass-trapping, cont. on p. 5)

(Mass-trapping, cont. from p.4)

rates, and other information go to: http://ucce.ucdavis.edu/files/filelibrary/2161/28458.pdf Sensory evaluation of fly-damaged oils showed that even high levels of fly damage were tolerable as long as there was no rot present within the fruit. One way of avoiding rot and loss of oil quality from fly-damaged fruit would be to harvest early and process promptly. The European standard of 10% damage tolerance really needs further investigation and documentation, because so much of it depends on the type and severity of the damage.

CONCLUSIONS

- Monitoring: trap numbers don't correlate to fruit damage
- Yellow Sticky trap is messy and doesn't work well
- OLIPE trap is easy, but doesn't work as well as McPhail Ball
- McPhail traps are difficult to manage, but work best
- Large yellow McPhail Ball trap better than red or smaller trap
- Torula yeast is the best attractant (+400%)
- Pheromone attractant does not improve liquid based traps
- Mass trapping can reduce damage by ~ 50% (not a stand alone control)
- A & K Device works, but not in landscapes with untreated trees nearby
- Spinosad bait (GF-120) works very well – attracts
- Kaolin clay (Surround) works very well – repels
- A combination of mass trapping and sprays could reduce cost
- Damage threshold for oil is high, but can change quickly
  - Depends on type of damage and fruit handling

Australian Olive Oil Association President Recommends Caution in New USDA Standards

Paul Miller, President of the Australian Olive Oil Association, just visited California on a world tour to inform olive oil producers about international standards for olive oil. He has been working closely with Richard Cantrill of the American Oil Chemists Society in the USA to make sure the USDA adopts oils standards that reflect what is being produced in California and anywhere else in the US. Their fear is that we might adopt new US standards based on only European levels of fatty acids, sterols, or other compounds. This may be a mistake if we find out later that some of our own domestically produced oils fall outside the norms, even though they are well made extra virgin olive oils. This has happened with some oils produced in Australia, Argentina, Spain, and North Africa where the oils have been extensively evaluated using sophisticated laboratory analysis techniques. Insufficient laboratory testing of oils made in the USA has been done to take into account annual and regional variations, so we need to be careful and if anything lean to the side of caution.

Olive oil laboratory

One of the tests for detecting adulteration is to measure the amounts of various sterol compounds that are not found above certain levels in olive oil. The question is what levels should be used? First of all we should support a research project to measure oils produced in the USA to develop background data over several years. They have done this in Australia and various other places. Next, Paul Miller strongly suggested that California producers support a standard for extra virgin olive oil that allows for 4.0% campesterol with an error of 1.4% of total sterols, this is because they have seen natural campesterol levels in Australian olive oils ranging from 1.88 to 4.98%. He also feels we should support a maximum linolenic level of 1.5% in the fatty acid composition of the oils. In Australia the natural linolenic levels in olive oil have ranged from 0.3 to 1.7%. Again, there should also be room within the standard for a certain amount of error, which may occur due to sampling, equipment calibration, and other commonly occurring variables.

Paul Miller also recommends that we support the development and use of new tests that are much more accurate in identifying adulteration in olive oils. In the international olive oil market – it could be quite convenient for oil buyers in certain places to reject, reduce prices, or avoid tariffs for olive oils that might not quite pass a standard. If those standards are set with a political motivation, then it behooves us to protect our own interests. If the USA begins rejecting imported olive oils for falling outside the standard, then our own oils better fit within that standard.

Upcoming Educational Events

- **Olive Oil Production, Processing and Evaluation (SusAg 118)**
  November 1, 8, 15, 17 & 29, 2007
  Santa Rosa Jr. College - Fall semester, 2007. For info or to register: www.santarosa.edu
- **Sensory Evaluation of Olive Oil - September 28-29, 2007 at UC Davis**
  For info or to register: www.extension.ucdavis.edu or call 800-752-0881

Alexandra Kicenik Devarenne

Best Wishes

Alexandra Kicenik Devarenne has moved on to bigger and better pastures filled with very productive olive orchards. We had worked together for six years on many different projects including the management of Master Gardener volunteers, development of the Pesticide Use Reduction Education (PURE) program, and various olive oil research and educational programs. She assisted with four years of research work in olive fruit fly control, which is summarized in this issue of First Press and in the evaluation of the sensory attributes of olive oil based on variety and growing region within California. She also helped in the collection, summary, and write-up of data on olive harvest method efficiencies, evaluation of milling equipment, and data base management for oil sensory categorization. Many of these programs she developed or played an integral part in their development. She is a member of the UC Olive Oil Research Taste Panel and is an excellent taster. She was a very valuable asset as a UC employee and public servant to the California olive oil industry and has now moved on to private industry and consulting work. We all will miss her very much, but wish her the best in her new endeavors.

Heavy Set Alert!

Take a look at your olive trees now right after fruit set. If you feel you have too much fruit – that might lead to no growth and a very poor crop next year, then remove some fruit. The easiest way to do this is to prune out one or two inside branches. Also, with a very heavy set, give the trees a bit more water and nitrogen fertilizer to get them to grow. This is delayed gratification, as next year you will have more fruit and less alternate bearing.