



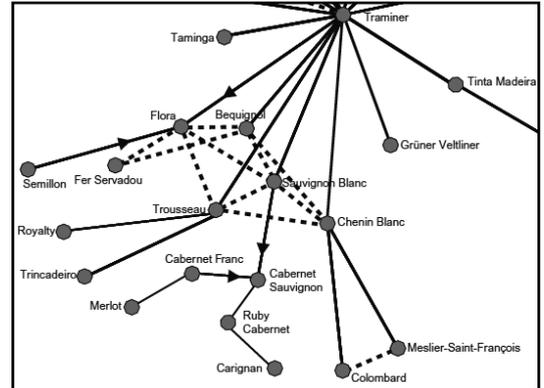
Winetech Scan

Wine Industry Network of Expertise and Technology
Netwerk van Kundigheid en Technologie vir die Wynbedryf

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Research News

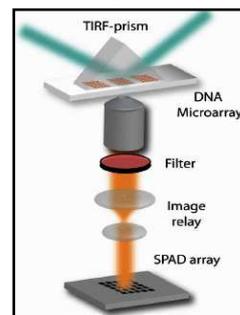
- A study has characterized genome-wide patterns of genetic variation in over 1 000 samples of the domesticated grape *Vitis vinifera* subsp. *vinifera* and its wild relative *V. vinifera* subsp. *sylvestris*. It has produced genomic maps of the samples, which link the presence of genetic markers to traits such as acidity, sugar content, or disease resistance. High levels of genetic diversity and rapid linkage disequilibrium decay have been maintained in *vinifera*, which is consistent with a weak domestication bottleneck followed by thousands of years of widespread vegetative propagation. The considerable genetic diversity within *vinifera*, however, is contained within a complex network of close pedigree relationships that has been generated by crosses among elite cultivars. A portion of the network of first-degree relationships is shown at right. First-degree relationships are rare between wine and table grapes and among grapes from geographically distant regions. This suggests that although substantial genetic diversity has been maintained in the grape subsequent to domestication, there has been a limited exploration of this diversity. The study proposes that the adoption of vegetative propagation has been a double-edged sword; although it provided a benefit by ensuring true breeding cultivars, it also discouraged the generation of unique cultivars through crosses. The grape currently faces severe pathogen pressures, and the long-term sustainability of the grape and wine industries will rely on the future exploitation of the grape's tremendous natural genetic diversity, and maps of the grape genome can help provide them. If the genetic markers associated with desirable traits are known, new cultivars can be planted out as seedlings, the DNA of the first leaf tissue can be examined and compared with genetic profiles associated with positive traits, and a decision whether to proceed can be made immediately, saving an enormous amount of time and money. www.pnas.org/cgi/doi/10.1073/pnas.1009363108
- The state grape of Missouri, the Norton, is resistant to powdery mildew despite the hot, humid environment. The fungal pathogen affects winemaking grapes around the world. Researchers are working to identify the genes responsible for this resistance for eventual transfer into other grapes so as to make them less susceptible to mildew, to decrease fungicide use and to increase world-wide grape production. The Norton grape builds more of a certain protein that is essential to fight fungal pathogens than do other grape varieties. The gene that contains the blueprint for this protein is present in both Norton grapes and other varieties that cannot resist the mildew. The researchers are investigating what in the genetic instructions is different in the Norton. The researchers say it will be technically difficult to make such transgenic grapes and to have consumers accept the idea of consuming GM grapes. 'Until then, there is no way to eliminate fungicide use, whether for economic reasons or to make organic wine'. www.physorg.com/news/2010-12-missouri-grapes-key-world-grape.html
- A study investigating flavonoid composition and C13-norisoprenoids (b-damascenone and b-ionone) in Shiraz grapes and wines, their relationships and links to wine sensory properties, created differences in the grape berry flavonoid profile by exposing bunches to varying levels of sunlight intensity through canopy manipulation. Norisoprenoids are products of carotenoid breakdown and have very low olfactory perception thresholds, thus having a high sensorial impact on wine aroma. Grapes produced under shaded canopy conditions had reduced anthocyanins and skin tannins, but little effect on seed tannins was observed. Pigmented polymers and tannins in wines were related to berry flavonoid composition (anthocyanins, skin and seed tannins, and their ratios). In grapes and wines, no significant effects were observed in response to canopy manipulation for two hydrolytically released C13-norisoprenoids, b-damascenone and b-ionone. Relationships were established for wine flavonoid composition, wine colour density, sensory perception of the astringency-related mouth-feel attributes and a quality scale. A positive relationship between wine quality score and hydrolytically released b-damascenone in both berries and wines was found, but not for free b-damascenone or any quantified forms of b-ionone. It was concluded that higher concentrations of anthocyanins and skin tannins in berries, coupled with a lower concentration of seed tannins were associated with higher wine quality. The ratio 'anthocyanins x skin tannins/seed tannins' is proposed as an indicator of wine flavonoid composition, wine colour and wine quality. Excessive canopy shade was detrimental to berry and wine composition and intensified sensory detection of 'straw' and 'herbaceous' characters in the wines, highlighting the importance of a canopy microclimate assessment. <http://dx.doi.org/10.1111/j.1755-0238.2010.00099.x>



- Archaeological excavations in the Areni-1 cave complex in south-eastern Armenia have revealed installations and artefacts dating to around 4000 BCE that are strongly indicative of wine production. It is the oldest complete wine production facility ever found, including grape seeds, withered grape vines, remains of pressed grapes, a rudimentary wine press, a clay vat apparently used for fermentation, wine-soaked potsherds, and even a cup and drinking bowl. To support the hypotheses that wine was present, a new method to detect the anthocyanin malvidin that gives grapes and pomegranates their red colour was developed. It uses solid phase extraction (SPE) and alkaline treatment of the samples, followed by combined liquid chromatography-tandem mass spectrometry (LC-MS/MS). The method was tested on authentic standards and four ancient potsherds from Armenia and Syria. The new method gave a positive result for two of the samples from the Areni-1 cave complex, adding evidence to the hypothesis that wine was produced in the cave complex, making it the oldest winery known, beating the record for the oldest known winery by 1000 years. <http://dx.doi.org/10.1016/j.jas.2010.11.012> and www.sciencedaily.com/releases/2011/01/110111133236.htm
- A study of 1 486 subjects from the Finnish Twin Cohort has examined the effects of midlife alcohol consumption and drinking patterns on cognitive impairment risks in late life. Alcohol consumption data was obtained in 1975 and 1981, and subjects were contacted between 1999 and 2007 to conduct a telephone interview evaluating cognitive function, with a mean follow-up period of 22.8 years. Both abstainers and heavy drinkers were found to have an increased risk of cognitive impairment in comparison to light drinkers. Also, binge drinking (defined as at least bottle of wine or the equivalent at a single occasion at least monthly) in 1975 and 1981, as well as more than two pass-outs due to excess drinking in 1981, were associated with a doubled risk of cognitive impairment. Subgroup analyses suggested that the increased risk of cognitive impairment associated with being an abstainer is limited to those without an $\epsilon 4$ allele gene. www.j-alz.com/issues/22/vol22-3.html (search for 'Virta').

Other News

- A European consortium is developing the Megaframe Imager, an ultrafast solid state camera chip capable of recording images at over one million frames per second. In the case of DNA microarray reading, time-correlated single-photon counting (TCSPC) based methods have some critical advantages over other techniques. These include single-photon sensitivity combined with unlimited dynamic range and high temporal resolution. Its drawback lies on its inherently low duty cycle and long data acquisition time, incompatible with real-time monitoring and high-throughput screening. Samples encountered in the context of biosciences are typically very 'dim', which reduces the advantage of lifetime estimation both in terms of speed and data compression. Biological samples also often show more complex decays which require photon arrival time histograms for more detailed analysis. The new device was used to show fast FLIM detection at low fluorophore concentrations. The arrival time of every detected photon was captured, allowing rapid FLIM based DNA microarray readout and the recording of arrival time histograms with a resolution of 54 picoseconds, which permitted the confirmation of multi-exponential decays. The microarrays were imaged by combining a total internal reflection fluorescence (TIRF) setup with the SPAD imager. www.opticsinfobase.org/boe/abstract.cfm?uri=boe-1-5-1302
- The Global Crop Diversity Trust has announced a major project to systematically find, gather, catalogue, use, and save the wild relatives of essential food crops. The object is to help protect global food supplies against the imminent threat of climate change, thus strengthening future food security. The project will target 23 global food crops: alfalfa, bambara groundnut, banana, barley, bean, fava bean, chickpea, cowpea, finger millet, grass pea, lentil, oat, pea, pearl millet, pigeon pea, potato, rye, rice, sorghum, sunflower, sweet potato, vetch and wheat. The work is scheduled to take 10 years, from determining where to collect, through to having material ready for crop breeding programs. The program will target critical traits in the wild relatives of crops that are essential, especially in the developing world, where climate change could cause production declines of between 10% and 30% or more. At present food crop wild relatives make up only a few percent of the world's genebank holdings. www.eurekalert.org/pub_releases/2010-12/bc-aat120610.php
- The Apple iPad is now in use as a full menu at upscale restaurants, hamburger eateries and quick-service chains across the US. The Chicago Cut steakhouse, a upmarket eatery on the northern bank of the Chicago River, has invested in 40 iPads at \$700 each for in-depth wine selection. The restaurant has created a custom application that looks like a virtual wine cellar. It lists the restaurant's more than 750 wines, includes photos of bottles on wooden shelves and allows for searches based on variety, price or region of origin. Diners can also access information about a wine's taste, composition and a Google map of the vineyard. To get a feel for what a diner may see and select, go to www.chicagocutsteakhouse.com/menu/# and click on 'Wine List'. Sorry, no South African wines available. www.physorg.com/news/2011-01-restaurants-uploading-menus-ipads-diners.html



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