

Does Oak Grain Still Matter?

A discussion of tree rings as a factor in making barrel buying decisions

Jim Gordon

Jim Gordon, editor at large for *Wine Business Monthly*, writes and edits articles on grape growing, winemaking and wine marketing. He has been covering wine and the wine business for more than 35 years, notably as the editor of *Wines & Vines* from 2006 through 2018. A role as contributing editor for *Wine Enthusiast* magazine began in 2014, in which he reviews California wines and reports on various California wine regions. He was executive director of the annual Symposium for Professional Wine Writers at Meadowood Napa Valley, from 2008-2015. Dorling Kindersley (DK Books) of London published his first book as editor in chief, *Opus Vino*, in 2010, which was chosen as a finalist in the James Beard Awards. In 2002 he was co-creator and managing editor of the long-running *Wine Country Living* TV series for NBC station KNTV in San Jose/San Francisco.



WHEN WAS THE LAST time you heard a cooperage sales rep touting a barrel made with “carefully selected open-grain oak?” While barrel staves potentially come in open-grain, medium-grain and tight-grain variations, the tight-grain or fine-grain option is the one that has become almost synonymous with high quality.

Tonnellerie Quintessence touts its Essence de Chantilly barrel as featuring “extra fine grain” from trees grown in limestone soil in France. **Tonnellerie Radoux’s** website states, “Only the highest quality, tightest-grain oak is selected and produced into Radoux’s Extra Tight Reserve Blend barrels.” **Canton Cooperage** in Kentucky uses “extra fine grain” American stave wood seasoned 48 months for its Grand Cru Limited Edition line of barrels.

These and other companies’ emphasis on grain in their marketing materials syncs up nicely with the criteria that winemakers say they use when shopping for barrels. In *Wine Business Monthly’s* recent Barrel & Oak Survey (December 2018 issue), a majority of the winemakers surveyed ranked grain as the second most important factor in their barrel-buying decisions, after type (French, American, Eastern European) and before the other listed factors: forest of origin and tannin potential.

Winemaker-owner **David Ramey** of Sonoma County’s **Ramey Wine Cellars** always stipulates “best fine-grain wood” when ordering barrels for his coveted Chardonnays, Cabernet Sauvignons and other wines (see sidebar). **Jeff Cohn** of **Jeff Cohn Cellars**, also in Sonoma County, routinely ages his Syrahs, Zinfandels and Viogniers in fine-grain wood, too. “Tight-grain oak helps me bring out more of the vineyard character, more of the mineral aspects and gives me more of the mid-palate structure I’m looking for,” Cohn said.





Quercus petraea, Hungary



Kadar quartered logs

But what does grain actually mean, why is it important in the maturation of wine in barrels and is it a reliable indicator of how a barrel will interact with wine? Winemakers everywhere can benefit by knowing the answers to these questions before they launch new varietal programs or adjust their cooperage mix for current wines.

What is Grain?

Oak grain is simply a term for the width of the annual growth rings that develop in the tree trunks. Each annual ring consists of two parts: the spring growth/early growth portion and the summer growth/late growth portion. The spring growth ring is mostly porous and reflects the growth period when sap is flowing quickly from the roots to the rest of the tree. It needs to be porous to let the sap flow through.

The summer growth portion is less porous and denser, reflecting the amount of fiber and cellular tissue the tree was able to store as a result of photosynthesis occurring after its leaves were set.

Foresters and coopers know that the spring growth rings in an individual tree are fairly consistent in size from year to year while the summer growth rings are usually wider than the spring rings and vary more widely based on the growing conditions that year. Very tight-grain wood in certain oak species and in certain soil and climatic conditions can display spring and summer rings of roughly the same widths.

One industry source defines tight grain as less than 3 mm ($\frac{1}{8}$ inch) per annual growth, including both spring and summer growth. Another source states that fine grain (generally synonymous with tight grain) is less than 2 mm, and medium grain is less than 3 mm.

A perception, or perhaps a misperception, has long existed in wine circles that tight grain gave more tannin to a wine and open grain gave more “oaky,” pastry-like vanillin aromatics. But research done by a French university team for the cooperage firm **Chene et Cie** and published in *Wines & Vines* in July 2014 cast doubt on that assumption.

The research was led by **Guillaume de Pracontal** of Chene et Cie and has been used by the company’s cooperages, including **Taransaud**, Canton and **Kadar**, to educate their staff and clients. Their report states that the



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Growth rings in American Oak

more porous, spring portion of the grain conveys most of the aromatics from oak staves into wine while the summer wood portion contributes most of the tannins.

Tight grain has a higher proportion of spring wood to summer wood. For example, similar-size spring and summer rings would mean the ratio is 50-50. Wider summer rings in a medium- or open-grain stave might change the proportion to perhaps 25-75.

“The fact that tight grain has more vessels means that it contains more void and is therefore more porous, which goes against a pre-conceived idea that open grain is more porous—it is actually the opposite,” the report stated.

“It explains why tight grain seems more aromatic: More aromas are released from the vessels, which makes sense as this is where the sap flows with minerals, nutrients and sugars. Our observation also explains why open grain feels more tannic: The wine gets more contact with fiber material, as there is a larger proportion of summer wood.”

One of the study’s main conclusions was that “tight grain releases more aromatic compounds (eugenol, whisky lactones) over time than open grain, and open grain releases more wood tannins (ellagitannins).”

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Oak Species and Grain

Oak grain also varies among species of oak trees. *Quercus robur* (also known as pedunculate oak) and *Quercus petraea* (also known as sessile oak) are the two main species for barrel making grown in Europe. *Quercus alba* (white oak) is preferred for virtually all American oak barrels.

Each species has typical tendencies in grain and aromatics, but these vary widely by the soil, microclimate and exposure in which the trees grow. Of the European types, both grow widely in France, Germany, Hungary, Yugoslavia, Russia and elsewhere. Often, they are intermingled in forests, and hybrids occur naturally, but in some places one species is very dominant, so those individual forests came to have reputations based in large part on the dominant species. For example, the Tronçais forest in France and Zemplen in Hungary have a high proportion of *petraea* trees.

American oak barrels tend to have wider, more open grain and usually give a significantly different set of sensory properties to wine than European oak does, including less tannin.



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Another French study, this one involving **Seguin Moreau's** research and development manager, **Andrei Prida**, and scientists at the **University of Bordeaux**, nicely summarizes differences between the European species. In the April 2017 issue of *Wines & Vines*, the authors observed: "Some coopers classify the qualities of wood according to ring width (also called grain) or geographic origin (forests). However, previous studies have demonstrated that species is a better indicator of chemical composition than morphological parameters or provenance."

The authors go on to explain that *petraea*, on average, is higher in oak lactones and lower in ellagitannins while *robur* oak is the opposite. This finding underscores the general acknowledgment that *petraea* is often preferred over *robur* for high-quality, high-priced wines, especially those that remain longer in barrel. Since *petraea* also has typically tighter grain than *robur*, it's not a big leap to correlate fine grain and suitability for high-quality wines.



Quercus alba (white oak) is preferred for virtually all American oak barrels.

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David Ramey on Barrel Choice

The founder of **Ramey Wine Cellars** in Healdsburg, California is known for his winemaking expertise and his frank opinions about winemaking techniques, including barrel aging. **David Ramey** demonstrated over four decades that traditional, artisanal methods work well in modern winemaking, including sur lie aging of white wines in barrel, malolactic fermentation of Chardonnay, native yeast fermentations, harvesting fully mature fruit, eliminating acidification of red wines and bottling without filtration.

Ramey worked for **Simi**, **Matanzas Creek** and **Chalk Hill** wineries in Sonoma County before coming to Napa Valley as winemaker for **Dominus Estate** and project manager for the construction of its new winery. He then helped **Leslie Rudd** reshape the **Girard Winery** into **Rudd Oakville**.

Wine Business Monthly asked him about his approach to choosing barrels.

WBM: *How did you establish your foundation for making barrel choices?*

Ramey: In about 1987, while at Matanzas Creek, I ran an experiment with the same Chardonnay juice from the same tank put into six barrels each of 10 different kinds: five different forests (Allier, Tronçais, Vosges, Nevers and Limousin) from one cooper (**François Freres**) and the same forest (Allier, I think) from five different coopers. Eight months or so later it was clear: very little difference between oak sources made by the same cooper; vast differences between coopers, ostensibly using the same wood source.

WBM: *How do you communicate to your barrel vendor what you want?*

Ramey: Since then, I've not specified wood source from our two coopers, François and Taransaud, but rather asked for "best fine-grain wood for [fill in the variety]" as well as "house toast for [fill in the variety]." We do pay extra for three-year air-dried wood.

WBM: *Why don't you get more specific about grain or forest or tannin content?*

Ramey: The relationship is based on trust, since you can't tell what forest the wood is from once delivered, and a preference for house style. If you like a cooper's work, buy their barrels—but don't tell them how to make the barrel. It's mental masturbation for California winemakers to try to control the barrel making process—an ego thing.

WBM: *Do you ever experiment with new coopers?*

Ramey: The last time we tried a different cooper, which came out of a seminar I spoke at, the results were awful. I'm a bit of a traditionalist—our coopers have been making barrels for a long time, and tradition is the result of experimentation which has succeeded. **WBM**



LEFT: *Quercus petraea* (also known as sessile oak)
RIGHT: *Quercus robur* (also known as pedunculate oak)

French Forests

Prida elaborates on this issue in a recent email exchange. "Grain tightness is related to species: sessile (*petraea*) oak is characterized by more tight-grain structure, and pedunculate (*robur*) is more coarse grain," he wrote. "So, by sorting of grain we get predominantly sessile oak for fine and extra-fine grain selection, and predominantly pedunculate oak for coarse grain selection. The medium grain is a mixture of two species. But, the grain criterion is not sharp for species distinction: sometimes we can have sessile oak with coarse grain structure and pedunculate oak with fine structure. It depends on the ecologic conditions for vegetation."

As for forest of origin, Prida stated: "The French oak forest is a natural one, and no trees were planted artificially. That's why during the ages, the forests were colonized by sessile and pedunculate species, according to the adaptability of each species to environment. For example, we know that pedunculate oak likes rich soil, low elevation, while sessile can better resist dryness and poor soil and can colonize higher elevations, like certain hills and slopes. By sorting the wood according to origin, a cooper chooses forests with different proportions of sessile/pedunculate oak. But, the majority of forests contain both species. So, the wood coming from the same forest can be very different."

This high degree of variability has spurred numerous researchers to develop more reliable gauges of suitability for different wine types than grain.

The Prida team focused on substances in oak wood called sweet triterpenoids as a key indicator in the 2017 report. They found that *petraea* oak contained more sweet triterpenoids while *robur* oak was higher in bitter triterpene. Using liquid chromatography–mass spectrometry the species of the samples tested can be accurately and not-too-expensively determined, they reported.

Other researchers, including a team backed by the **Vicard Generation 7** cooperage in Cognac, France, have focused on ellagitannin levels measured in oak staves before toasting as the key marker for potential quality. Their studies have been published in trade journals.

The tannin analysis approach is beginning to show some traction in the industry, according to results of the Barrel & Oak Survey. Winemakers at mid- to large-size wineries cited tannin potential as equally important to grain as the second highest priority factor in their barrel purchasing decisions. Winemakers at small wineries, however, still significantly prefer grain over tannin potential.

Weighing Grain's Importance

University of California Extension enologist **Anita Oberholster** advises that the choice of cooperage and not grain size is the most important decision for a winemaker. "My understanding is that grain type has a small impact... Due to large sample pools needed to really investigate differences, research findings vary on the impact of grain type, origin, etc. The impact, in general, is found to be small.

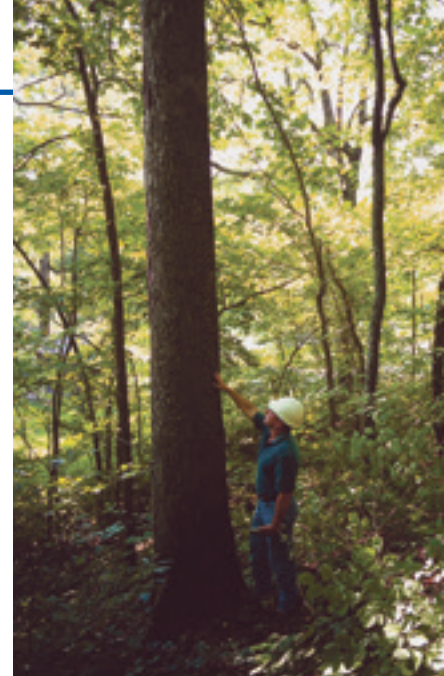
"The cooperage has the largest impact in its seasoning of staves and toasting of the barrel. Size of barrel and age also have a large impact. It is difficult to predict what barrel to use for different varieties. Trial and error is the best way."

The evolution of thinking about barrel quality parameters is well illustrated by the observations of **Elizabeth Vianna**, winemaker and general manager at **Chimney Rock Winery** in Napa Valley. "When I first started making wine almost 20 years ago, French coopers mostly sold barrels by forest—and it was understood that certain forests contained more fine grain, such as Tronçais and Allier, while others such as Limousin were more coarse grain," she wrote.

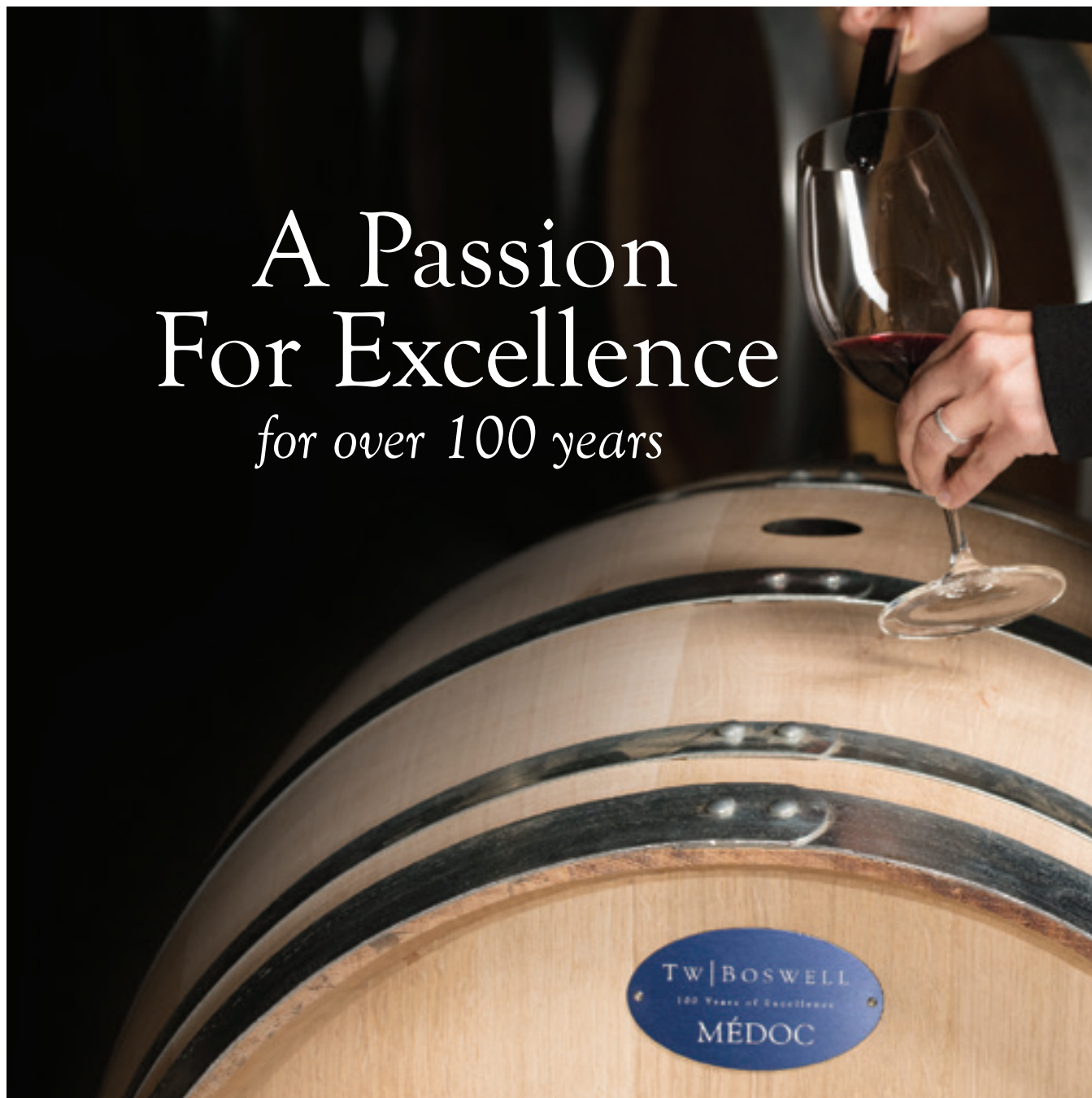
"The less-fine grain favored varieties that spent less time in oak while the extra-fine grain was more for longer aging varieties, such as Cabernet Sauvignon, Merlot and Petit Verdot. Over time, with better technology and understanding, it seems that coopers shifted to making proprietary selections by grain tightness rather than forests and marketing it as such. In my experience it is best to get to know each cooper and familiarize yourself with their style, consistency, selection criteria and technology."

Asked if she thinks coopers are doing a better job of keeping the oak grain consistent in their barrels, she added: "I remember going through this evolution, particularly with one of our longest standing house coopers. Back in the day they sold their barrels by forest designation exclusively, but probably just over a decade ago they started to select their wood simply by grain tightness. I was skeptical at first, but we did a trial and found their grain-selection barrels were, in fact, very consistent from year to year."

Concerning her own preferences in oak, she stated the following, which seems an appropriate way to conclude the discussion: "I hate speaking in absolutes, and I don't think there is a 'better' grain choice—it is all about style, variety, AVA, length of aging, etc. In the end it is a lifetime of discovery, finding what barrels 'elevate' or support your fruit in the best way." **WBM**



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