The cork comeback

In the last two decades, cork producers have been researching ways to combat TCA and salvage the tainted reputation of corks. Carla Capalbo reports on the latest developments

POP! THE CELEBRATORY sound of a cork being drawn from a bottle is thrilling to wine lovers. Cork stoppers are associated with prestigious, long-aged reds and first-class Champagnes, and with the promise of pleasurable drinking. They're kept in jewellery boxes as mementos of special meals and moments.

Yet, for all the good vibes that natural corks can evoke, there's occasionally another, less positive association too. Corks often signal that a wine may have been tainted in the bottle. 'The smell of a corked wine, once learned, is unforgettable: mouldy and dank, taint masks the fruit on the wine's nose and palate to varying degrees,' says Julie Peterson, a consultant to US wine importers.

While only a small proportion of faulty wines can be attributed to cork taint, or TCA (2,4,6-trichloroanisole), the apprehension about corked wines caused the closures industry to undergo major changes. The late 1990s saw the advent of both screwcaps and synthetic solutions as the market share of natural corks dropped dramatically.

The total wine bottle market is currently around 19 billion bottles, of which about 12bn use cork stoppers, either whole or in agglomerates. Screwcaps are around 4.7bn, and the remaining 1.8bn plastic closures.

Investing in research

Far from ignoring the problem of taint, the cork industry has been working hard to eliminate TCA contamination in cork stoppers and now has significant, tangible results to show for its investments in new safeguards.

According to 2017 statistics from the Cork Quality Council, the amount of releasable TCA in cork shipments to its members has reduced 95% since 2001.

To find out more, I travel to southern Portugal at harvest-time to visit Amorim, the largest producer of cork stoppers, making about 5bn every year. Given its position as market leader, it's unsurprising that Amorim has invested heavily in this area, spearheading research to tackle the TCA problem.

'Any industry-leading company in the world has the obligation to also lead the crucial research and development processes that sustain innovation,' says João Rui Ferreira, president of APCOR, the Portuguese Cork Association. 'The cork industry is no different, and our defeating of TCA may well be due to several innovations launched by Amorim. But over the past 12 years, the cork industry as a whole has invested almost €500m in new processes, modernised production and product traceability. The large gains in market share by cork are possible because an entire industry has moved to higher standards. That bodes well for cork's future.'

Fruits of the forest

It's just after dawn on what will be a devilishly hot July day. The cork oak forest quivers with birdsong, but we're listening for the rhythmic beat of hand-axes and the deep voices of the men who use them. There are visual clues to follow too: wherever the group of *descortiçadores* passes, they leave a trail of orange-trunked trees in their wake, vivid against the parched landscape.

We round a bend and find them. Working in pairs, the men coax the cork bark from each tree. With a spare choreography of ➢

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Photograph: Carla Capalbo

Right: a cork oak tree showing its orange trunk after the bark has been harvested

Above: cork oak forests provide wildlife habitats for many species and help to combat soil erosion

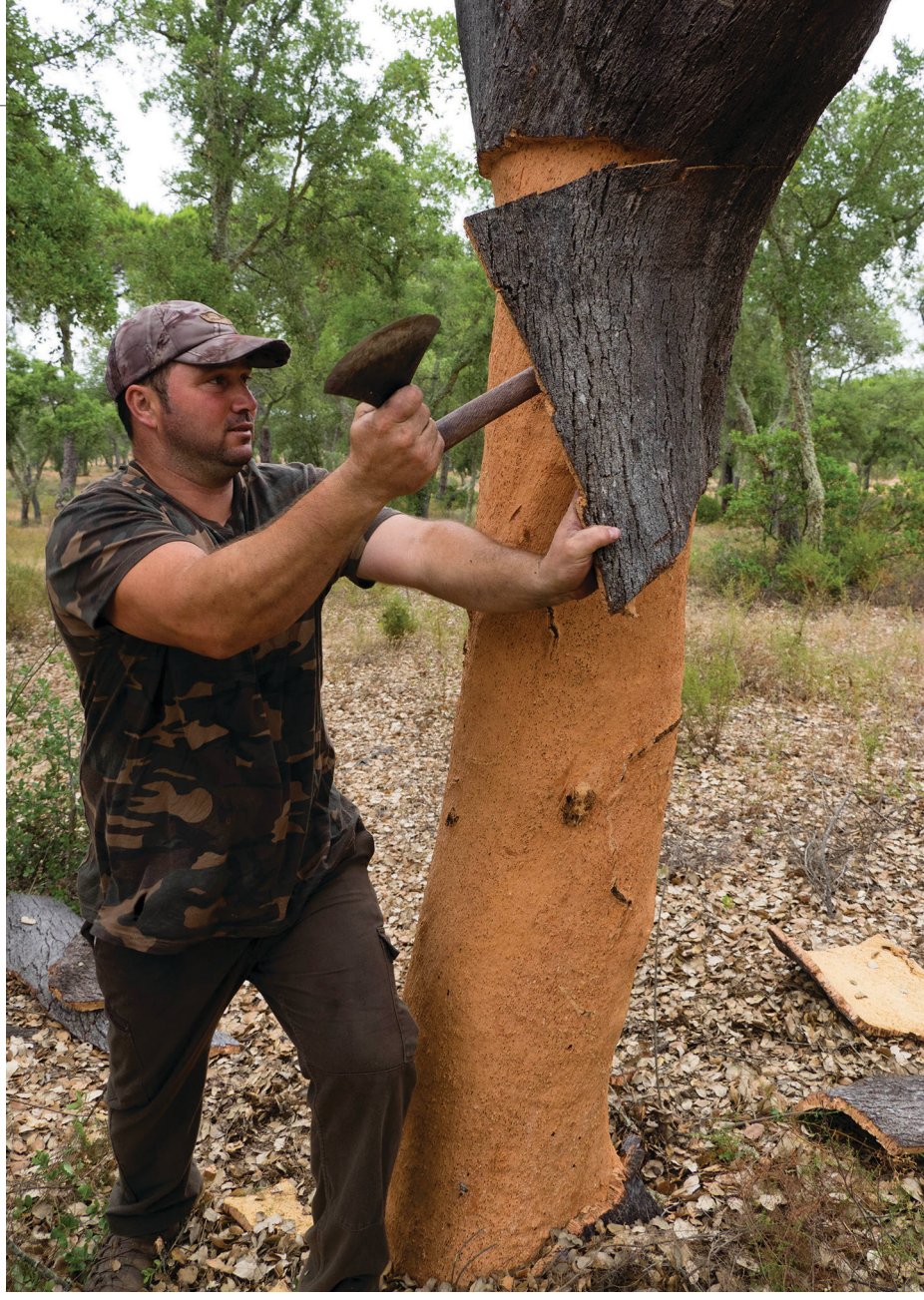
movements they first make a ring – or 'crown' – of cuts at a height about two to three times the tree's circumference. These are followed by long, vertical cuts down through the yielding bark from the crown to the ground – sectioning the circumference into three or four pieces – before the men prise each 'plank' from the harder trunk beneath it using the handles of their *machadas*. The skill is not only to remove the planks intact, but to cut through the bark (or phellem) layer without damaging the life-giving phellogen layer below it. The extractor's art has remained unchanged for millennia, passed down through the generations who have tended these forests.

'Cork oaks, *Quercus suber*, are sustainable, long-term investments,' says Conceição Santos Silva, a forest engineer for the APFC, Coruche Forest Landowners Association. 'We say that you plant cork for your grandchildren, not for yourself. The cork tree begins producing bark thick enough to use for high-quality cork stoppers after around 43 years, and is then only harvested once every nine years. So you begin recouping your investment after 70 years. But the trees can last for centuries as they are not felled for cork production.'

The harvest takes place between May and August. After a tree has been stripped of its bark below the branches, it's marked with the harvest year so the *descortiçadores* know when to come back. In the meantime, forest undergrowth is managed by machine or by grazing cattle to lessen fire risks.

'Cork oaks are critical for soil conservation in these sandy areas,' Santos Silva explains. 'The roots anchor the soil during high winds and rains, and protect against erosion, helping with underground water management.' The forests also provide habitats for many species of plant and wildlife.

Photographs: Carla Capalbo



'You begin recouping your investment in cork oaks after 70 years' **Conceição Santos Silva**

Above: a skilled *descortiçadore* coaxes the bark away from the trunk of the cork oak

Portugal has 730,000ha of cork forests, followed by Spain, Morocco, Algeria, Tunisia, Italy and France, for a total of circa 2.2m hectares in the world. Each hectare contains between 70 and 80 cork oak trees. Cork was used in ancient Egyptian times; in Portugal, it's been protected since the 12th century.

Quality control

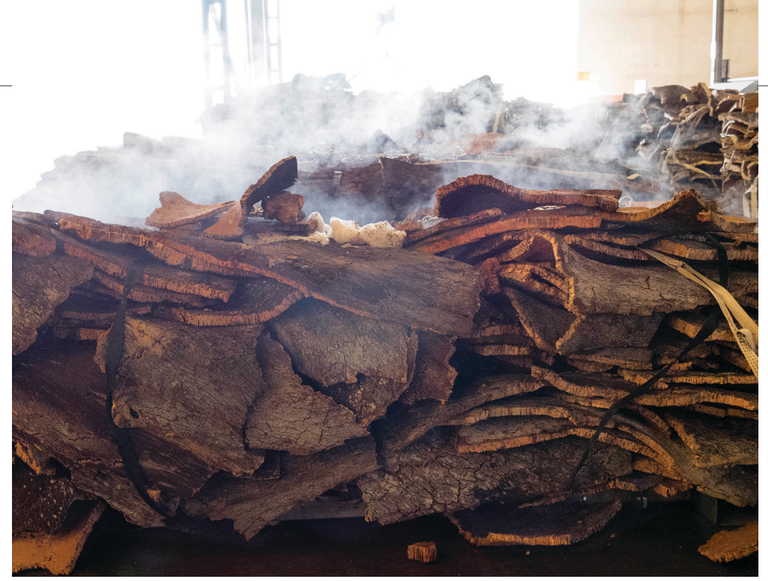
'The best cork – for producing high-end natural cork stoppers – has a clean, even appearance, good thickness and a uniform cellular structure,' explains Carlos de Jesus, marketing and communications director of Amorim. 'That influences how much oxygen can get into the wines. Its physical properties – such as elasticity – ensure the cork will perform well.' ➢

The planks are brought to the processing plant for the initial phases of their transformation into corks. The new anti-TCA strategy begins here. 'We studied the faults that had caused cork's vulnerability to tainting and now adopt practical steps to prevent TCA's precursors from reaching the cork,' says de Jesus. 'For instance, as soon as the planks arrive, we slice off the bottom 15cm of the bark that grew closest to the ground, where TCA can pass from the soil to the cork.'

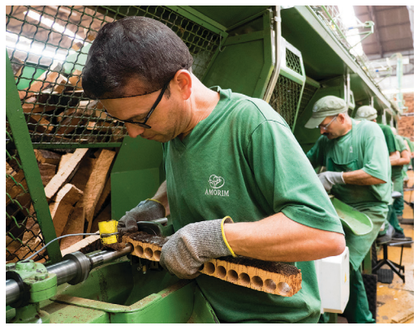
At Amorim, the planks are then stacked in airy piles in a sloping concrete yard where moisture drains away. (Previously cork was kept on bare earth where the potential for contamination was higher.) After six to nine months of drying, the planks are boiled for an hour in plain water to sterilise them, a process which, according to de Jesus, eliminates around 40% of the volatile compounds in the bark that may later be a precursor for TCA.

Next, they're graded. Trees are subject to many growing conditions, from drought to ant attacks, and each leaves its traces in the bark. TCA can gather in cracks and crevices, so the cork must be inspected carefully, by the human eye and by machine. 'Initially, we prefer to rely on experts to assess the cork for quality and thickness by eye and touch, removing any unseasoned or irregular areas,' explains de Jesus as we tour the factory. 'Later analyses take place using gas chromatography and lasers. No cork is wasted here: discards are sterilised and ground into agglomerates or burned for energy.' All Amorim products, whether they be natural whole cork stoppers or technical stoppers that may include smaller cork discs at one or both ends, are also treated with steam to reduce TCA.

The thickest and best planks are used for producing single-piece, high-end cork stoppers, the kind we find in the most prestigious wines. It's fascinating to watch these corks being punched from the widest planks by men using hand-guided mechanical punches. 'These premium natural corks are put through a compressed-air machine to make sure they are free of defects such as wormholes that could cause leakage,' says de Jesus.



Above: cork planks are stacked to be dried out



Above: cork stoppers being punched out from the planks of cork oak in the Amorim factory

The alternatives

'The truth is, no closure system is 100% perfect at present,' says Dr Miguel Cabral, who heads the research and development team at Amorim, where the annual research budget is around €7.5m. 'Our research shows that neither synthetic stoppers nor screwcaps can completely block out gases and environmental off-flavours over time, and this can be problematic in winery storage areas and hot export containers. Cork and micro-agglomerates don't have that problem.'

Synthetic stoppers have increasingly been losing market share in recent years. In 2010 there were 30 producers worldwide; today the majority of synthetic stoppers are produced by just one company. Synthetic stoppers can be hard to get out of and back into bottles and they also raise questions about sustainability. Screwcaps are convenient, but they may cause reduction in wines and are not immune to TCA (which can attach itself to the plastic seals inside the metal).

'When I became involved with my family's cork business in 1996, alternative closures were experiencing a huge boom,' says António Rios de Amorim, CEO of Amorim. 'When I was president of the Portuguese Cork Association, we believed in cork's value and its future.

'The truth is, no closure system is 100% perfect at present' **Dr Miguel Cabral, Amorim**

'The industry invested heavily in improving its products and creating new ones. Now we're seeing the positive results. Amorim's current goal is to be able to guarantee TCA-free corks by 2020,' he adds.

'We've spent 20 years focusing on eliminating the negatives in cork. Now it's time to start accentuating the positives of this natural and historic material. What can cork uniquely give to wines, especially over long ageing? How much phenolic influence does a cork bring to a wine [cork, like wood, contains over 40 phenolic compounds that can be released into wine]? Why have Champagne and Cava houses started doing their second fermentation in bottles stopped with cork instead of capsules? These are some of the questions we look forward to answering.' D

Carla Capalbo is an award-winning food, wine and travel writer. Her books include The Food and Wine Lover's Companion to Tuscany

Cork and TCA: the facts

Corks don't allow air into bottles

• TCA (2,4,6-trichloroanisole) is a chemical compound created when natural fungi come into contact with chlorides (specifically 2,4,6-trichlorophenol or TCP) which are found in bleach, other fungicides and pesticides.

• As well as cork, TCA can attach to wood, cardboard and plastics – including the linings of screwcaps and glass closures.

• TCA does not travel through cork. It can only be transferred to wine if it comes into direct contact with it.

• You can sometimes improve a corked wine by pouring it into a jug lined with plastic food wrap for several minutes, as the polyethylene in the wrap attracts the TCA away from the wine.

• According to research published in the *Journal of Agricultural and Food Chemistry*, the air chamber, or head space, in a well-closed bottle of wine contains such high humidity that there's no need to store the bottle on its side: the cork will not dry out (unless it has been inserted defectively).

• Cork stoppers do not allow air to pass from the outside of the bottle to the inside. A cork contains around 800 million cells, each containing a minuscule amount of oxygen. When a cork stopper is compressed to seal a wine bottle, oxygen is forced out of the bottom of the cork and into the wine.

When a cork is said to 'allow a wine to breathe', it refers to the small amount of oxygen that remains within the lower cells of the stopper and will be released naturally into the wine within six to eight months of bottling.

Photographs: Carla Capalbo