

## Flavour Profile in Riesling around the World

Riesling may be Germany's top drop, with vineyards here covering just over 21,000ha, but it may come as a shock to realise how insignificant it is on a global scale. Total plantings are just 70,000ha or under 0.1% of the world's 7.8 million ha of vines. Australia comes in at Number 2 with just 3,700 ha. With this perspective, it's not surprising that published research into Riesling is very limited. Jurgen Höfmann (Director of Winemaking, Reh Kendermann) presented an overview of some of the research that has been carried out, with particular emphasis on the factors affecting flavour profile in Riesling.

The varietal character of Riesling is related strongly to its terpene profile and both total quantities and relative levels may be important. Flavour profile appears to have a strong genetic component, as shown by Gholami et al (1995), who demonstrated that it is the genotype of the scion that is key. This experiment cross grafted Muscat onto Syrah roots and showed that there were no changes to terpene profile. Typical concentrations of terpenes have been shown to vary considerably by grape variety. For instance, Gunata et al (1985) showed total terpenes for Riesling at 334 •g/l of juice compared to 5553 •g/l for Muscat of Alexandria and 31.3 •g/l for Cabernet Sauvignon. For Riesling, 83% of these terpenes were bound, so changes in aroma profile may be linked to their release during wine making. There is interest in the use of enzymes to release these bound terpenes, an approach that appears to deliver higher flavour profile. One experiment (Gunata et al 1992) showed an increase of 29% of measurable monoterpenes with the use of enzymes. However, this approach also increases levels of polyphenols and therefore reduced ageing ability according to Höfmann. Höfmann is also working with yeasts with glycosidase activity to release bound terpenes during fermentation.

Some important flavour compounds in Riesling include the terpenes citronellol and alpha-terpineol, which give grapefruit and lemon characters; while linalool, geraniol and nerol give blossom and orange notes. Other important flavour compounds include beta-ionone and beta-damascenone which give tropical fruit and berry, while 2-phenylethanol which is responsible for rose and floral notes. It is easy to see how variation in total and relative levels of these compounds should influence aroma and palate profile. This may explain the famous ability of Riesling to reflect terroir as differing terpene profiles may be linked with influences such as vineyard site, slope, orientation, soil type, canopy management and drainage, though there is little formal research on this. Some subjective observations suggest that sandy soils appear to give peach notes and full flavours, while slate gives mineral notes. Research by Rapp (1990) used gas chromatography to compare terpene accumulation in Austria, Barossa, Sonoma and Sud Tirol, Italy. Each region showed distinct profiles and different ratios of individual terpenes.

The development of TDN (1,1,6-trimethyl-1,2-dihydronaphthalene) is a subject of great interest to Riesling producers. Chemically, this is a norisoprenoid and is the most common hydrocarbon in wine, responsible for the kerosene/petrol character in aged Riesling. Its development is not fully understood, but one suspected precursor appears to accumulate in Riesling along with sugar as the fruit ripens. In wine, the level of TDN has been noted to rise from undetectable to around 40ppm after several years. Research in South Africa (van Wyk et al 1992) has looked at TDN development in relation to both picking date and comparing both shaded and exposed bunches. This demonstrated higher levels of TDN in

exposed fruit and in the resulting wine, suggesting canopy management has an influence. There also appear to be clonal differences in development of TDN, shown in work by Marais et al (1991).

It is very clear that there is a lot of scope for research into Riesling to understand better what makes it one of the great white grapes, especially now there is renewed interest in growing it. Höfmann finished his fascinating presentation with a review of typical organoleptic profiles of Riesling in the major countries and regions where it is grown.

© Caroline Gilby 11th Dec 2002