

Hot winegrape production: Italian lessons

By Mark Downey¹ and Pietro Scafidi²

¹Future Farming Systems Research Division, DPI Victoria, PO Box 905, Mildura, Victoria, 3502.

Email: mark.downey@dpi.vic.gov.au

²Department DEMETRA, University of Palermo, Sicily.

Hot winegrowing regions around the world potentially hold examples of 'climate ready' management practices that have been adapted to hot and dry climates over centuries, and include the selection and identification of appropriate varieties and clones. As part of a joint project between the Victorian DPI and Grape and Wine Research and Development Corporation, those lessons are being captured through a series of study tours to hot viticultural production areas, most recently to southern Italy.

The hot production areas in Australia, in the Riverland and Sunraysia, are comparable to many other wine-producing regions with a similar climate. As we face a hotter, drier climate, it is worth looking at production areas with similar or hotter climates to see what ideas and innovations we could use to adapt to a hotter climate, and to gain a new perspective on our current conditions.

Previously, a tour of California reported

(*Australian Viticulture*, Vol. 14, No. 6, pp59-62) that the primary strategy for managing high temperatures in California, particularly in the Central Valley, has been to apply irrigation. While this strategy to some extent already has been adapted in Australia, limited water availability and the potentially negative effects of excess irrigation on fruit quality makes such an approach less than ideal for most of the industry.

To explore other strategies in regions with limited water availability and temperatures similar to current climates in Australia, or conditions that might reflect climate change forecasts for Australia, we examined some of the production systems in southern Italy.

Southern Italy and Sicily are wine-producing regions where daily average temperatures range from 10°C in winter, to 24°C in summer. The average maximum

ELECTROCOUP

INFACO
www.infaco.com

VINITECH
SIFEL
TROPHÉE
BRONZE
2010

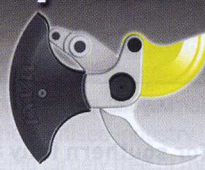
**The complete range of battery operated tools
for the professional pruner**



F3010 Standard



Kit Medium



Kit Maxi



POWERCUP

For a clean and precise cut.



RYSET
AUSTRALIA

For a demonstration contact:
RYSET (Aust) Pty Ltd
Ph: (03) 9457 2982 or email: info@ryset.com

www.ryset.com

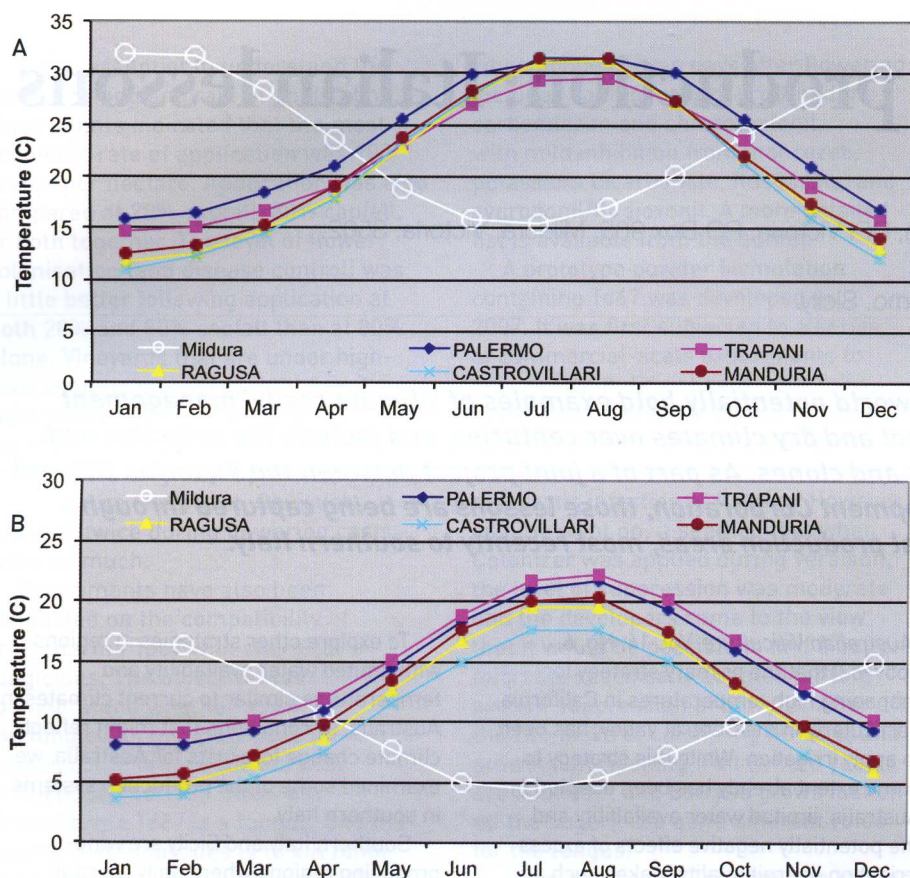


Figure 1. Average daily (A) maximum and (B) minimum temperatures for viticultural production areas in southern Italy and Sicily, as well as Mildura (Victoria) for comparison.

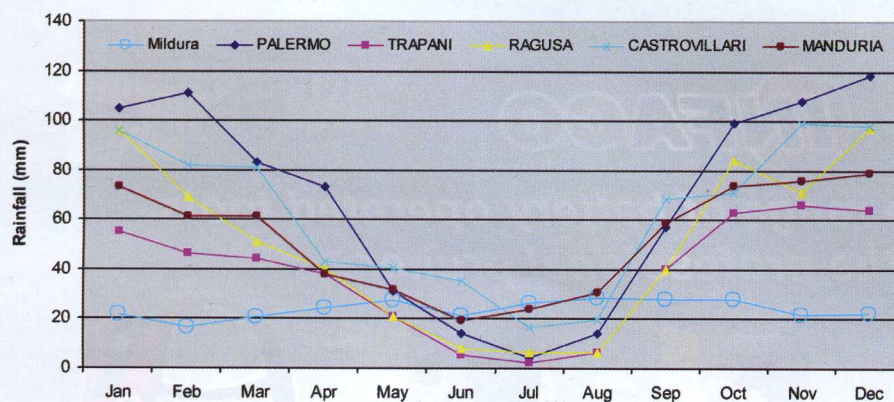


Figure 2. Average rainfall (mm) for southern Italy and Sicily, as well as Mildura (Victoria) for comparison.

temperature in summer is around 29°C (Figure 1), but extreme heat events are also frequently reported as a result of hot winds blowing from the desert regions of North Africa. At these times, temperatures can reach 38–40°C for two to three days at a time and 40–44°C in the south of Sicily (www.scia.sinanet.apat.it/sciaweb/scia_kriging_mappe.html).

Generally in winter, temperatures in Palermo and Trapani (north-west of Sicily) are warmer than in Mildura, Victoria. Notably, the average minimum temperatures are higher as a result of the maritime effect from the Mediterranean Sea (Figure 1). Other areas, such as Manduria (Puglia), Castrovillari (Calabria) and Ragusa (south-east of Sicily), have a similar winter temperature range to Mildura.

The climate of the regions is relatively dry, with most of the rainfall occurring in the autumn and winter (Figure 2). While there are quite high winter rainfalls recorded in some areas, such as Palermo and Castrovillari, there is little or no summer rainfall in Sicily (Palermo, Ragusa and Trapani). Annual rainfall in Palermo is around 800mm (long-term averages 1960–1995); while in Trapani, the average is 450mm and around 592mm in Ragusa. In Manduria, the average is around 625mm, while in Castrovillari, about 750mm of rain falls annually. By comparison, Mildura receives 292mm per year (average 1946–2012).

Given these conditions and their similarity to some wine-producing regions in Australia, the 2010 study tour visited Sicily, Calabria and Puglia. Sicily is an island of around 25,700 square kilometres, with approximately 115,686ha planted to winegrapes, producing around 6.2 million hectolitres of wine and must, of which 1.5 million hectolitres is bottled (200 million bottles)¹.

The main winegrape varieties in production in Sicily are Catarratto Bianco (40,000ha), Nero d'Avola (18,830ha), Inzolia (7084ha), Trebbiano Toscano (6239ha), and Grillo (5629ha)¹. Of these, a few have

VINEYARD CANE RAKES

- Very efficient at raking canes and debris
- Rake and mulch in one pass
- Single or double sided with swing back protection system



An innovative solution for processing pruned canes from the vineyard floor

WHITCO

Vineyard Pruning Equipment

- Hedger Bar Systems
- Cane Rakes
- Masts and Mounting Systems

Designed and manufactured in AUSTRALIA by Whitlands Engineering

Call 1800 702 701 for a colour brochure/DVD or to find your nearest dealer

www.whitcovequip.com.au

SUPERIOR HEDGING SYSTEMS

- Affordable modular system - add as you go
- Available in four lengths and multiple configurations
- Medium or heavy duty
- Between the post and minimal pruning systems
- Easy mounting to tractor with hydraulic masts
- Versatile - Use for pruning or trimming
- Robust construction, low maintenance

The extra edge in productivity and canopy management





Dr Pietro Scafidi (left) and Professor Gabriella Barbagallo, from the University of Palermo (Sicily), visiting vineyards in the Etna region of Sicily.

previously been suggested as possibly suitable to production in Australia.

The tour started with the regions of Palermo, Trapani and Marsala, visiting Calatrasi, Feudo Arancio and Rapitalà vineyards and wineries, as well as Florio and Donnafugata wineries, guided by Professor Gabriella Barbagallo and Dr Pietro Scafidi, from the University of Palermo. The white varieties in production were mainly Cataratto and Grillo, and the red varieties were mainly Nero d'Avola, Nerello Mascalese and the usual international varieties, Shiraz, Merlot, Cabernet Sauvignon (13,885ha in Sicily). Grillo, which makes a light white table wine, is drought hardy and not overly susceptible to powdery mildew, and seemed well-suited to Australia. Nero d'Avola, while arousing interest in Australia, as a major variety in Sicily is susceptible to powdery mildew, downy mildew and botrytis, is not drought tolerant and is also susceptible to sunburn. Therefore, it is probably not well-suited to hot wine-producing regions in Australia, although very high quality wines can be made from this variety. One of the features of Sicilian viticulture that was observed was the widespread virus loads in vines, and many vineyards were infested with a sap-sucking pest, *Jacobiasca libica*.

Figure 3 shows the different pedological regions of Sicily and southern Italy. In Sicily, the soils are generally young clays over limestone or sandstone, but can be variable in depth from 0.5m to more than 2m. The cultivated hills have an average slope of 13%, rising to around 250m above sea level. To the west, soils incorporate carbonates, soluble salts and clays, as well as alluvial soils with a lot of variation in thickness and rockiness.

To the south-east, around Ragusa, the mountains are a mixture of limestone and volcanic rock, generally around 300m above sea level and 11% slope. The soils are shallow with high organic matter content, rocky and stony with some heavy clays, high acidity and localised steep slopes.

To the north-east, production is centred on the volcanic soils of Mt Etna, which are highly fertile once excess rock is removed. As a result, the area is characterised by dry-stone walls and numerous other stone constructions. Viticulture in the region is characterised by bush vines that are dry grown at altitudes of above 1000m, producing some good but unusual wines. While interesting, these had little relevance to Australian production.

Viticulture in Calabria is only around 13,500ha, while the most important crop is olives (about 196,000ha)². However, in this region a number of varieties were examined, including Magliocco, Trebbiano, Greco di Tufo, Fiano, Falanghina, Aglianico

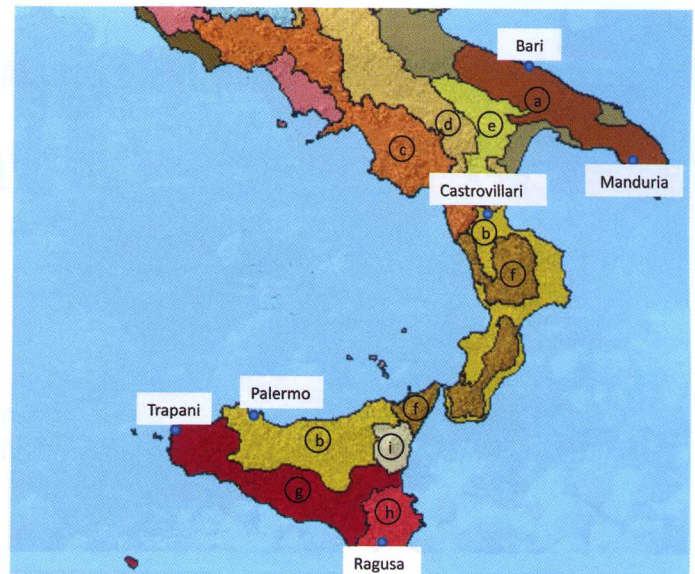


Figure 3. Pedological (soil) map of southern Italy and Sicily. Source: Soil regions of Italy. Edoardo A. C. Costantini, Ferdinando Urbano, Giovanni L'Abate (modified). www.soilmaps.it

and Montepulciano, with good examples of these in the vineyards around Castrovillari. Of these, Fiano, Falanghina, Aglianico and Montepulciano have potential for production in Australia. Being drought hardy and well-suited to hot climates, these varieties also make excellent wines. There are small plantings of these varieties in Australia, and some good examples of their wines are in commercial production.

The hills of Calabria are mainly tertiary limestone rocks, dolomite and associated sediments with alluvial and coastal plains, a mixture of sloping and level land with escarpments. The hills and mountains are generally higher than elsewhere in southern Italy, with the average height of the uplands being around 430m and an average slope of 24%.

Further to the east, the 'heel' of Italy, is the Puglia region. In Puglia, 101,175ha are planted to winegrapes, with about half of the production in the Foggia (32,300ha) and Taranto (18,135ha) area³. The main varieties in Puglia are Primitivo, Nero di Troia and Greco di Tufo, as well as lesser plantings of Montepulciano, Negro Amaro and Fiano. Primitivo is considered to be the same variety as Zinfandel in the US (California) and is well-suited to hot production areas. It is a versatile grape, although it can be hard to grow, because it is thin-skinned and disease prone. While the variety produces some outstanding wines, the production issues make it hard to recommend, particularly in a highly mechanised industry. Nero di Troia might have greater potential, being largely free of the limitations of Primitivo.

Giant steps towards clean & green

Cutting edge technology... available today

Slashing
production costs
& your carbon
footprint



GL 4K

Product of Italy



fischer
AUSTRALIA PTY LTD

For more information, please contact Jurg Muggli on 0409 572 581
 Phone: 08 9433 3555 >> Fax: 08 9433 3566
 Email: jmuggli@fischeraustralis.com.au >> Web: www.fmg.bz.it



Figure 5. Land preparation for vineyard planting in Puglia (southern Italy). Where the soil is shallow and underlain by limestone, the limestone is broken up, then crushed before planting of new vineyards. (A) Dr Nino Pisciotta (left) and Dr Pietro Scafidi, from the University of Palermo, watch an excavator breaking the limestone, (B) before and after crushing, (C) a recently planted vineyard on the crushed limestone - where's the soil?

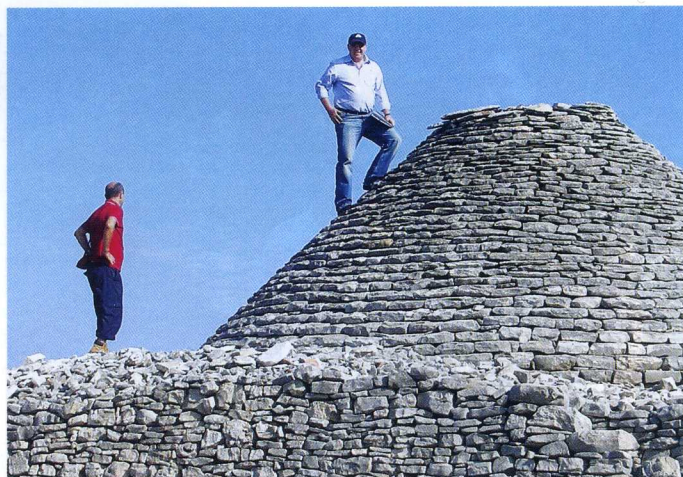


Figure 4. Dr Mark Downey (right) and Dr Luigi Tarricone (Institute for Experimental Viticulture, Puglia) examining a traditional limestone 'trullo' (plural trulli) in Puglia, Italy.

The Puglia region is characterised by shallow clay soils over limestone, often with excessive limestone on the surface. In the Manduria region of Puglia, where Primitivo is the major wine produced, the soils are easily crumbled limestone clays, on a fairly level coastal plain with adjacent hills less than 200m above sea level. The soils on the hills are often shallow and eroded carbonates, with clay and iron oxide accumulations at depth and a very mild slope (3%).

Further to the east, the region is famous for the dry-stone walls and small, conical-roofed stone cottages known as 'trullo' (Figure 4). In some parts of Puglia, major earthworks to break and pulverise the limestone to around 1m is undertaken at a cost of around 20,000 Euro per hectare (Figure 5). Montepuciano is widely grown in this region and performs well under both water and heat stress.

Generally, the climate of the viticulture regions of southern Italy is similar to that of major growing regions in Australia. Soils in some areas were notably different, as were many of the production practices. Irrigation systems are a relatively new adoption, and knowledge of irrigation management or scheduling is low. While there are many new plantings and some highly mechanised operations, much of the viticulture still follows traditional practices. A major difference between southern Italian and Australian winegrape production are the comparatively low yields, as low as 4-5 tonnes per hectare or lower in some cases. Other areas achieved yields of 25t/ha or more. However, in many DOC (Denominazione di Origine Controllata - controlled designation of origin) regulated areas, production is limited to around 12t/ha or less.

The most noticeable difference in Italian viticulture was the range of cultivars in widespread production, and array of wines produced that are not commonly seen in Australia. Of the many varieties observed in southern Italy, some seemed particularly well-suited to warm or hot production conditions in Australia, including Grillo, Fiano, Falanghina, Aglianico, Nero di Troia and Montepulciano. Despite all of these varieties being grown in Australia, only a few of these great wines appear in our bottleshops.

REFERENCES

- ¹ Salvia Francesca (2011), The Sicilian viticulture in numbers. Regione Siciliana, Istituto Regionale Della Vite e Del Vino.
- ² Source: ISTAT (Italian National Institute of Statistics) http://www.istat.it/it/calabria/dati?q=gettable&dataset=DCSP_COLTIVAZ&dim=113,1,9,0,0&lang=2&tr=0&te=0
- ³ Source: ISTAT (Italian National Institute of Statistics) http://www.istat.it/it/puglia/dati?q=gettable&dataset=DCSP_COLTIVAZ&dim=104,2,9,0,0&lang=2&tr=0&te=0