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Guest contributor

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Pergola - an agronomist's view

Agronomist Maurizio Gily, pictured above by Andreas Maerz, is a specialist in viticulture and oenology as well as editor and publisher of scientific articles on these topics, which he publishes on his website www.gily.it. Currently Gily consults for several estates and producers in Piemonte where he lives, as well as in other wine regions in Italy. He also writes on viticulture for technical and trade journals and lectures on viticulture at the Università degli studi di Scienze Gastronomiche in Pollenzo. See also Walter's article [Debunking the pergola myth](#) and [Some great pergola wines](#).

My first confrontation with pergola-trained vineyards took place at the beginning of this century when I received several assignments for consultancy in Abruzzo. In this region the majority of vineyards are trained on the traditional tendone. My Piemontese background and training as well as the technical literature (more than the scientific one) of much of the academia of that time contributed to my distrust of this way of training vines. The dominant idea of the time was that pergola was a system adapted to fertile soils that allowed the production of high yields of grapes at the disadvantage of quality or was, at best, a way of producing table grapes.

My dislike for 'expanded' training systems was based especially on the belief that to make wines of quality you always and everywhere need high vine density with modest growth of each plant. Under these conditions the competition between the vines for water and nutrients would impose on each plant a dietary regime, a mild stress which consequently would lead to an increase of sugar, polyphenols and aromatic precursors. I believed that in training systems where each vine is given ample space, as is the case with pergola, the result would be a dilution.

This theory has its logic, but has several weaknesses. The first is that not always and not for every wine is maximum concentration something positive. Excess concentration exists too, and a problem that is more and more evident due to global warming. The second, and perhaps more important, weakness is that the theory doesn't take into account the enormous differences that exist between different viticultural areas and between different grape varieties. The wide range of climates, characteristics and fertility of soils, and behaviour of individual grape varieties just doesn't allow for a single, preconceived idea.

Italy, with its enormous diversity of terroirs and ways of cultivating the vine, the result of hundreds of years of experience with the correlation between its indigenous varieties and the environment where they are cultivated, eloquently demonstrates the impossibility of that idea.

Pergola is particularly widespread in Italy because it is strongly connected with the domestic, small-scale viticulture which has been typical for our country, because it is a system that cannot be mechanised, or only very little and where work on the canopy is almost exclusively done by hand.

I decided, together with my colleagues from Abruzzo, to verify through a range of measurements and the collection of large amounts of data, the presumed superiority of wired, vertical shoot positioning systems (VSP) compared with tendone. We obtained results that were the opposite of what I was expecting. In almost all cases the pergola systems did produce a little more volume of grapes, but of higher quality, at least in warm years with little rain. The only case in which the results differed was when a producer forced a production of grapes of over 16 or 17 tonnes per ha [approximately 110-120 hl/ha].

In short, I concluded that it is the producer who is the cause of high yield either on tendone or on VSP trellis systems, and that pergola cannot be blamed for what is a human error. Edoardo Valentini, a staunch supporter of pergola both for his famous Trebbiano d'Abruzzo as well as his Montepulciano, once told me the only time I met him in Pescara (he passed away soon after): 'It is the vine that tells us how it wants to be kept.' At that time I still believed in the absolute superiority of wired trellis system compared with pergola, but Valentini's words made me think that perhaps we had lost the capacity to observe and listen to the vine. Distracted by our demands/requirements rather than concentrating on those of the vines instead. Ours were mechanisation and the required uniformity of the vineyards and when planting new vineyards the convenience of using existing, standard viticultural models.

In the meantime in Italy funding from the European Union became available for the restructuring of vineyards and replacing pergola with wire trellis systems, but also for uprooting indigenous varieties and planting international ones instead. It was important to show some 'innovation', but in fact it was a deplorable policy, blessed by certain quarters of academia.

In the following years research began to re-evaluate considerably pergola systems, at least in those regions and for those varieties with a pergola tradition. Important work was done by Diego Tomasi of CREA in Conegliano together with collaborators in Soave and Valpolicella (Veneto) and those of the Fondazione Edmund Mach in San Michele all'Adige (Trentino).

A particular case in point was that of grapes destined for appassimento (drying) for Amarone (the varieties Corvina and Corvinone), Recioto di Soave (Garganega) and Caluso Passito (Erbaluce, and the only variety in Piemonte which was traditionally cultivated on pergola, except for Nebbiolo in the tiny alpine enclave of Carema). Pergola allowed them to harvest more intact bunches, and because they hang down from the canopy they are less affected by sunburn or damage to the skins during summer pruning and harvesting.

The main disadvantages of pergola, apart from the fact that it is not suitable for all areas and climates, is primarily the difficulty of mechanisation, a certain susceptibility for rot in a rainy autumn because of the fact that the bunches are partially shaded by the canopy overhead, which also traps the dew. Then there is the risk of over-cropping and the consequent dilution of the wine, but this risk consists primarily in the case of fertile soils and generous varieties such as Trebbiano, Garganega and Schiava. It is a risk that can be managed by applying appropriate viticultural techniques. Although I do not know of specific research, one could hypothesise that pergola systems have a higher water consumption than that of other systems, however the partial shading by the canopy reduces the risk of dehydration of the tissue. In areas with very poor soils pergola isn't very widespread, instead bush vines are prevalent.

The main advantages of pergola, on the other hand, are:

- Reduced risk of late spring frost because of the distance off the ground where temperatures are lowest (2 m/6.5 ft between the soil and the canopy). This explains the widespread pergola vineyards in alpine regions such as Alto Adige and Trentino.
- Partial shading of the fruit, especially during the hottest hours of the day, reducing possible damage caused by excessive heat such as sunburn. In a well-maintained and not too vigorous vineyard, the roof created by the leaves does not shade everything but leave ample 'light windows' (or 'sunlight patterns' as Dr Richard Smart refers to them) for the sun to penetrate, especially in less hot hours of the day when the rays are oblique and guarantee an optimal microclimate even in very sun-drenched climates.
- An optimal correlation between production level and quality thanks to maximum photosynthetic efficiency. Pergola allows for maximum luminosity and very little sunlight reaches the soil, because almost all of it is intercepted by the canopy and at every hour of the day, whereas with wired training systems, one side of the vine is shaded for a part of the day.
- Even if there isn't any experimental work to confirm this, according to several observations, an expanded canopy entails less incidence of esca and other grape trunk diseases.