

Improving wine quality by using fertigation: Pinot Grigio case study.



Three year fertigation trial results, on Pinot Grigio in the Isonzo zone (in Gorizia Province, close to the Slovenia border), are presented. The positive effects of this technique on wine yield and final quality are confirmed. This technique also has significant economic advantages when compared to less advanced agricultural practices.

by Matteo Marengi

Why should innovative techniques to manage vine water and nutrient supply be recommended? This question only appears to be obvious. In fact, despite the fact that the vine has rather developed “saving” mechanisms when it comes to water and nutrients, it is impossible to not consider other factors such as the marketplace. On top of this is the reality that not all of the world’s vineyards are grown in ideal ecopedological locations (Australia is a prime example, but is not the sole); even several national zones have similar limitations. Beyond differentiating between ideal and real there are also climate changes, that are causing once ideal zones to become no longer perfect, in fact they must now resort to irrigation and nutrition supplementation in order to maintain qualitative and quantitative production levels. Finally there are market requirements, such as particular wine sensory characteristics; in particular today white and sparkling wines



must be fresh, with a moderate aroma profile and not too high alcohol content... these are characters with are very difficult to obtain when relying solely on natural environmental water supply (rain, which is continually more sporadic) and mineral nutrition from common immediate effect granular fertilizers.

The technical meeting, organized by **Haifa Italia** in collaboration with the **Società Agricola Tenimenti Angelini (Puiatti)**, Romans d’Isonzo (GO) and **Irrigazione Veneta Srl**, Torri di Quartesolo (VI), during **ENOVITIS 2011**, began with an introductory speech about the experiments, where it was possible to follow **Duilio Porro**, Fondazione E. Mach di San Michele all’Adige researcher, who offered a thorough description of vine nutritional requirements. During the discussion of various element functions and requirements **Porro** underlined that a fractioned supply and a correct mix in

each phenological stage is key for quality wine production. This is all aimed and to not have deficiencies. Specifically, for quality wines, it is essential to have healthy, not too compact bunches, a good sugar/acidity ratio, good FAN values (for the fermentation), adequate Brix degree, colour and aroma patrimony.

The agronomist **Giovanni Bigot** then followed-up with an in-depth analysis of the experiments. “The vineyard water supply- explained **Bigot** – was guaranteed by a sub irrigation system that supplied equal water volumes for all the three fertilizer treatment. The treatments were differentiated as one traditional fertilization with immediate effect granular fertilizer, and two distinct fertigation treatments that were different in particular for the nutritional element mix supplied at each phenological stage and for the final ratio between the supplied fertilizing





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units (Nitrogen and Potassium). In the trial it was possible to also observe the interaction between the fertilization treatments and five different rootstocks of the same Pinot Grigio clone (R4). It was possible to demonstrate – **Bigot** continued- how with fertigation it was possible to increase the yield per hectare (average increase of >1 ton/ha/year.) and hence greater must yield that with common granular fertilization. Furthermore, being able to manage mineral element ratio, it was possible to reach the specific objectives relating to sugar content (consistent despite greater production), total acidity and FAN (increasing). Chemical and sensory analyses showed that the fertigated treatments had greater wine freshness, greater total acidity and higher malic acid content. Hence they were also considered more pleasant, fresh and with a greater aromatic complexity in comparison to wines obtained from traditional granular fertilization. As for the exploitation of supplied nitrogen (recovery), the fertigation trial with a 1:1 N:K ratio had a 50% greater recovery than the granular fertilization treatment.



Furthermore in the fertigated treatments there was a greater gross revenue/ha for the grapes (8% more) and the wine (17% more) (greater production, greater grape/must yield, improved Pinot Grigio typicity.)”

The delicate but critical grape aroma aspect, a fundamental character for wine quality, was covered by **Diego Tomasi**, Conegliano Cra-Vit researcher. “The aromatic profile- **Tomasi** explained- is determined genetically by each grape variety but its expression is modified by the climate and soil characteristics. Vineyard management (training system, bunch position, microclimate), leaf surface, grape yield per vine, health and harvest period all play their role. Water and nutrient availability in certain phenological stages has a primary

role, since aroma molecules are formed during precise moments and from matrices that must be present in the right quantities. From the aromatic profile analyses of the different treatments- continued **Tomasi** - it was possible to note concentrations and aroma types in the fertigation trials that resulted in notably positive improvements in the fertigation trials when compared to the traditional granular fertilization.



The closing discussion lead by **Mauro Schippa** from Haifa Italia and **Matteo Pasqualato** from Irrigazione Veneta examined the greater efficiency of micro-irrigation and in particular of sub-irrigation, in comparison to other irrigation forms and also the winning synergy that can be obtained between water and hydrosoluble nutrients when applying fertigation. “High quality viticulture- explained **Schippa and Pasqualato**- is turning more often to drip micro-irrigation in order to reach production, environment and economic goals. With this technique it is possible to contemporaneously manage

nutrition, by using fertigation fertilizers that are more effectively supplied in comparison to traditional immediately effective granular fertilizers. In this way viticulture productivity is better sustained, with performance being less influenced by climate. Comparative fertilizer cost examination between traditional granular fertilizers and fertigation demonstrated that with granular fertilizer it was possible to have a greater cost from 14 to 27% depending on estate dimensions.”



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