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Testing the possibility of using the fertilizer Panamin in vines.

Report for the activity in 2014

The application was performed under 3 different static conditions:

1) Vines in a container, self-rooted of the species Vitis vinifera subs. Sylvestris;
2) Test of the vines in a vineyard Sangiovese;
3) Test in the experimental vineyard in Colignola of vines Cabernet Sauvignon (black) and Sauvignon (white).

The activities were performed as in the brief explanation.

1) Test of the vines in a container: *Vitisv. subssilvestris;*

- Buying of new containers and substrates and replanting of the plants;
- Application onto the roots and comparison to the above-ground and the control group;
- Inspections of the growth of roots and the sprouts at the end of the season, eventual inspection of the state of stress (based on the accessibility of the plants).
- Control of the gas exchange in order to assess the transpiration, the absorption of CO_2 and the photosynthesis.

This first part of the work is very important. It was carried out on the plants in containers to facilitate the procedure, although the constant rain did not allow greater credibility of the assessment of the eventual differences that may occur in the leaves in situations of stress. Although two different applications were carried out, the observations were limited to three treated objects at leaf level, during three inspections. In one of the cases, there was a decrease in the photosynthesis activity, while the in the other two cases increase was observed. Consequently, the stomata conductance follows this dynamics, while the transpiration of the leaves was the same or higher (Fig. 1). Therefore, it is interesting to continue this study to understand whether there will be significant actual differences in a situation of greater representativeness (adult plants).

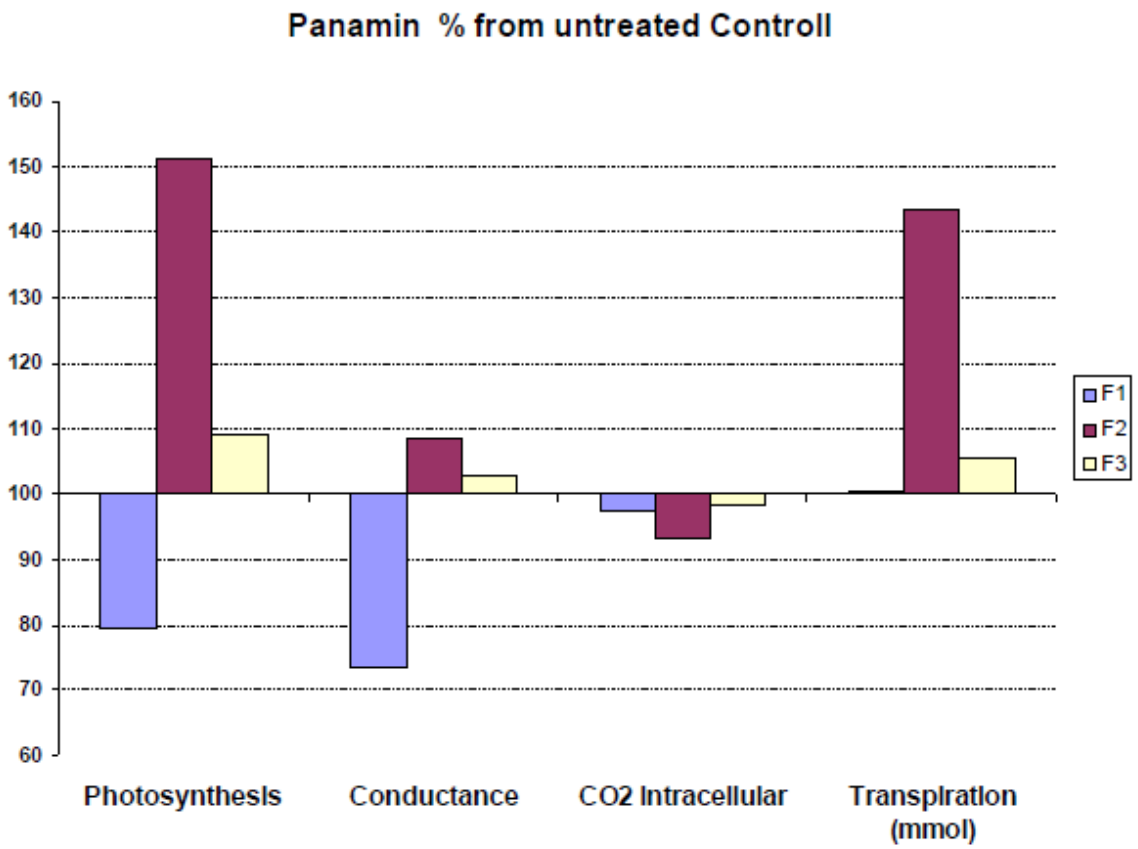

Figure 1 – Results of the gas exchange in vines in containers.

2) Farms capo D'Uomo Monte Argentario: application at intervals of 15 days from May until the end of July 2 kg/ha as 0,5% aqueous solution in the vineyards in **Sangiovese**.
   - Observations, vegetative activity at the end of the cycle;
   - Eventual differences, visible attacks of pests;
   - Vegetative status and ripening;
   - Sensory analysis of the grapes at ripening;
   - Physical and chemical analysis of the grapes.

Based on the carried out analyzes, we indicate in synthesized form the most important data showing a positive effect on the size of the grapes and on the ripening, which was favored by the application of Panamin in a very difficult year due to the heavy rains (table). The vineyard showed no difference in the tolerance to plant diseases because as it was in good health.

Table 1. Characteristics of the grape by Aug 15th 2014 (Sangiovese).

Plots	Average weight of the grape	Average weight of the berry	° Brix	% technological ripeness
Control group	323	2,06	18,60	79
Treated	278	2,64	20,80	88

The sensory analysis showed that the application made the integument more dense (more resistant), there are less bitter notes in the integument and the consistency of

the flesh in the grape berry is greater. Moreover, increase was observed of the effort needed to separate the berry from the stalk, while no impact on the phenolic ripeness of the grape pips was observed (Fig. 2). In general, the overall phenolic and aromatic ripeness of the grape was improved (Fig. 3).

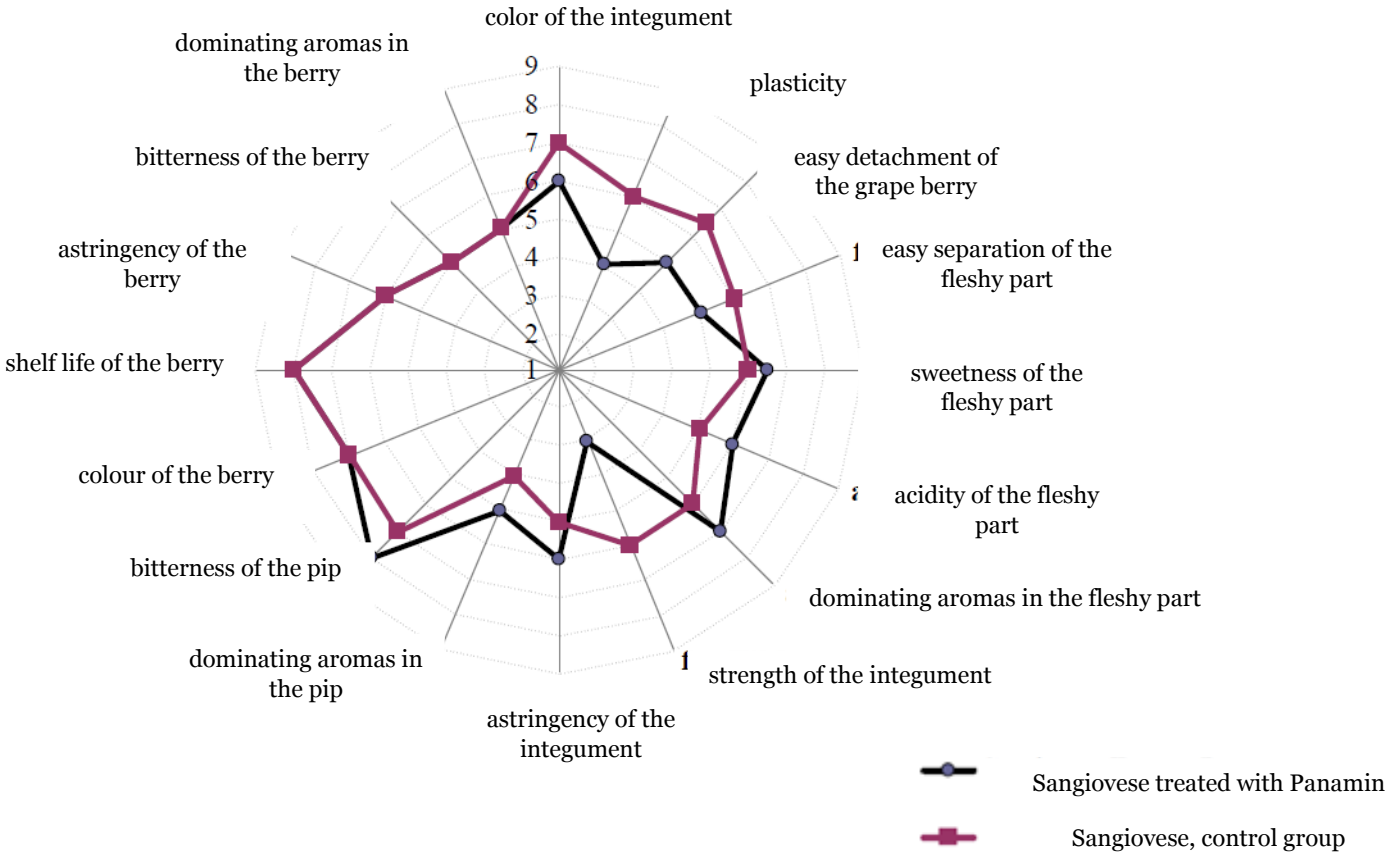

Figure 2. Sensory characteristics of the grape berries by Aug 15th 2014

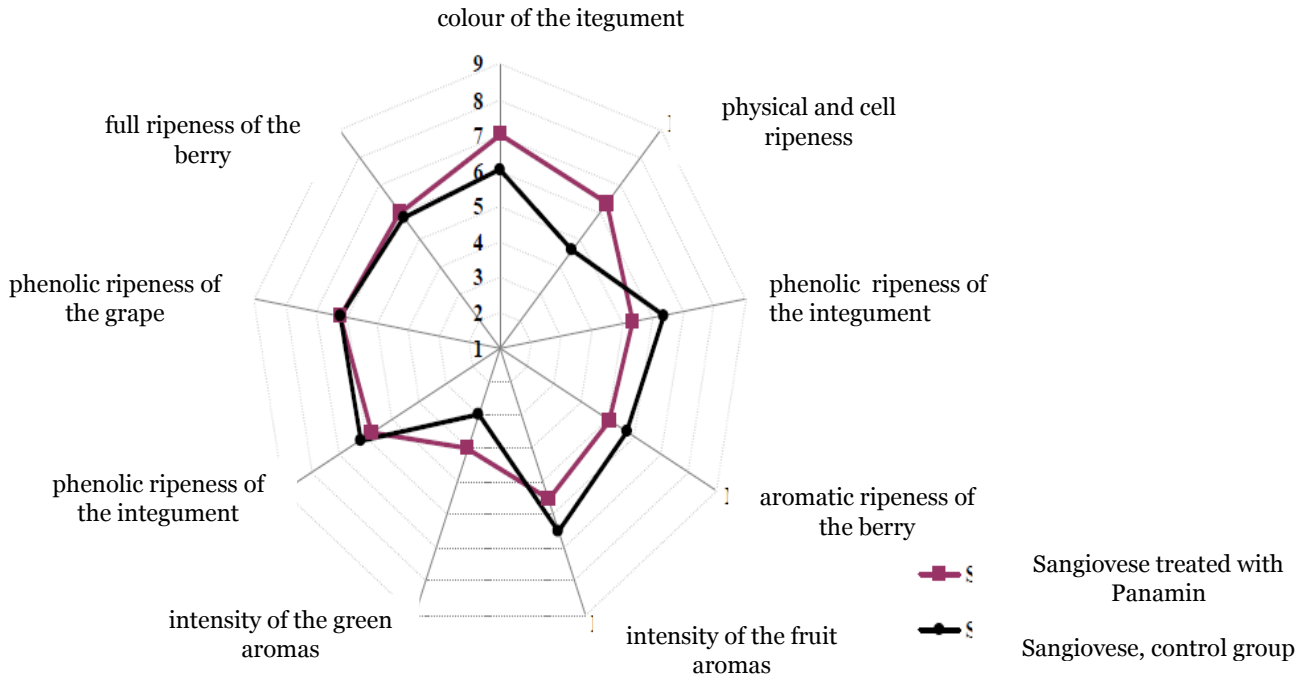

Figure 3. Sensory characteristics of the grape berries by Aug 15th 2014

3) Tests of the experimental vineyard in Colignola on vines Cabernet Sauvignon (black) and Sauvignon (white), application at intervals of 15 days from May until the end of July 2 kg/ha as 0,5% aqueous solution.
   - Observations of the growth of the sprouts at the end of the season;
   - Eventual assessment of the condition of stress;
   - Sensory analysis of the ripening grapes;
   - Physical and chemical analysis of the grapes and weight of the grape berries;

In Sauvignon (white) there was an increase of the sugar degree and increase of the ripeness, calculated by means of sensory analysis (Fig. 3).

In Cabernet Sauvignon the opposite trend was observed, although the greater density of the integument and the fleshy substance seemed to have helped for less presence of acetic fermentation (Table 3).

Table 2. Characteristics of the grape by Aug 28th 2014. Sauvignon blanc

Plots	Average weight of the grape berry (g)	° Brix
Control group	2,35	19,93
Treated	2,33	21,87

Table 3. Characteristics of the grape by Sep 30th 2014. (Cabernet Sauvignon)

Plots	Average weight of the grape berry (g)	° Brix	Acetic fermentation (%)

Control group	183	20,40	15
Treated	171	19,00	5

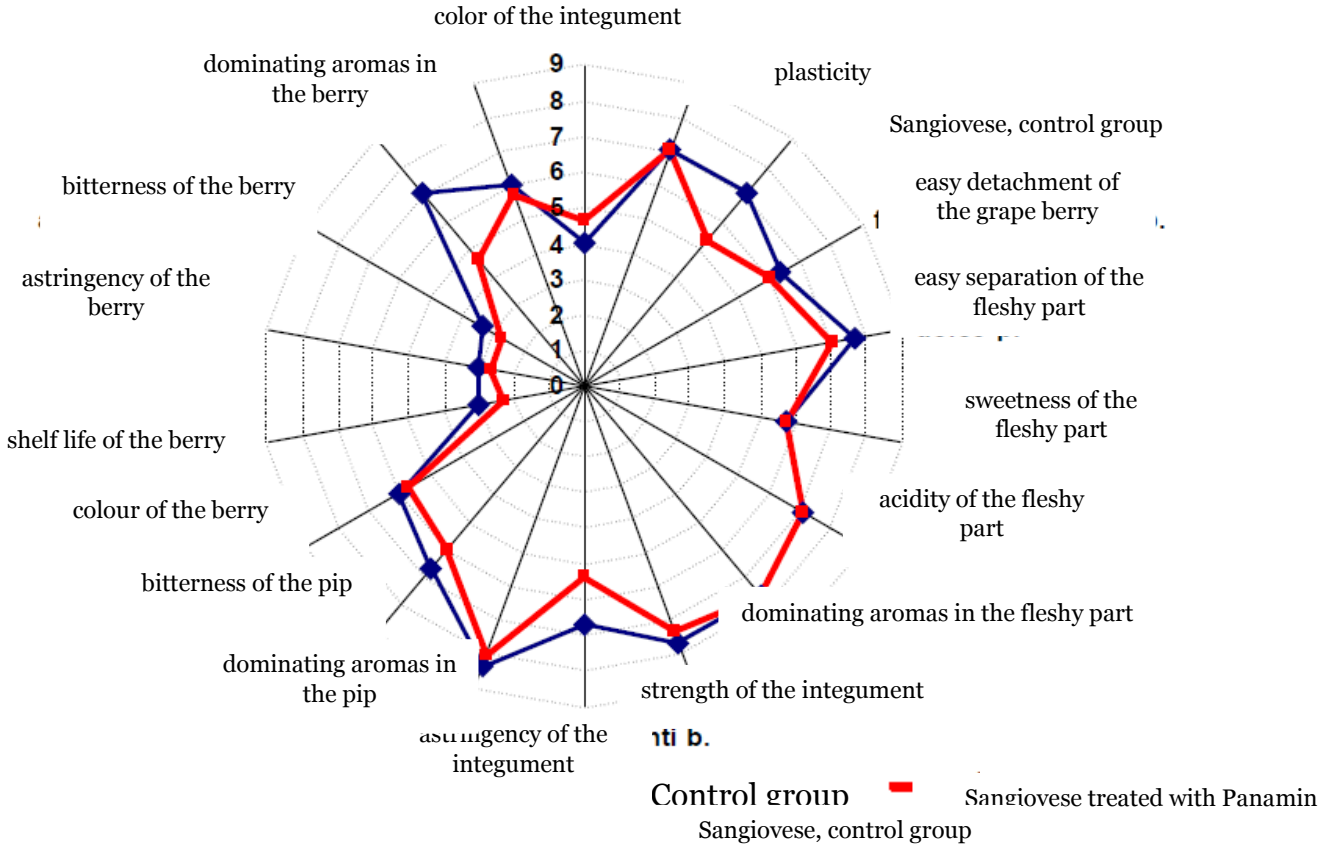

Figure 3. Sensory characteristics of the grape berries by Aug 15th 2014 (Sauvignon)

Conclusions

The data obtained in 2014 through partial tests led to the conclusion that it is appropriate to extend the tests on a larger scale in order to verify the credibility of the positive results obtained in two of the three examined vineyards, we also consider it necessary to continue the tests at level leaf activity and also on the secondary metabolites (polyphenols).

Pisa, February 26, 2015

Giancarlo Scalabrelli