

Meteorological Behavior and its Influence on the 1999 Vintage in Serra Gaucha

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The meteorological conditions have great influence on the grapevine behavior and directly interfere in the production and quality of the grapes from Serra Gaucha.

The periods of sprouting, flowering, fructification, ripening, leaf fall and vegetative dormancy need a suitable amount of light, water and heat so that the grapevine can develop and produce grapes with quality.

The meteorological conditions that influenced the 1999 vintage (Figures 1 and 2) showed the following behavior, according to the main phenological stages of the grapevine:

a) Vegetative dormancy – the grapevine, during fall and winter, begins its dormant period due to the decrease in the air temperature. The low temperatures that occur from late May through late August are fundamental for the grapevine, because the colder this subperiod is, the better the dormancy will be and, consequently, the better the conditions for the sprouting of the grapevine will be. During the winter of 1998, there were few frosts and the number of hours when the temperature was below 10⁰ C totaled 544 hours. This figure was 222 hours lower than the average of the years 1976/97. However, despite the lower intensity of cold, there were no major problems regarding the grapevine sprouting, even for cultivars that demand colder periods.

b) Sprouting – the grapevines begin to sprout at the end of winter and beginning of spring time, as the temperature rises. The month of September in 1998 was characterized by presenting medium and maximum air temperature above the climatological normal. The rainfall was similar to the climatological normal 1961/90. October registered medium and minimum temperature above, maximum temperature equal to and rainfall below the climatological normal. These meteorological conditions provided suitable development of the grapevine buds, both for early and late ripening sprouting.

c) Flowering-Fructification – this subperiod is one of the most critical for the grapevine because it determines the quantity of grapes to be harvested during the vintage. For the adequate development of the flowering and fructification, it is necessary dry and sunny weather, with temperatures of approximately 20⁰C. The flowering started, for most cultivars, in the second half of October and continued through late November, for later cultivars. The rainfall in October and November was well below the climatological normal. This was due to the La Niña phenomenon,

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which causes the reduction of the rainfall. The lower level of rainfall combined with the temperature and the air relative humidity favored the flowering and fructification. The onset of diseases caused by fungi was reduced due to the meteorological conditions. The onset of mildew and oidium was easily controlled by the winegrowers.

d) Ripening-Harvest – this is another critical subperiod, since it defines the quality of the vintage. During the ripening subperiod, sunny days with reduced precipitation are fundamental to obtain healthy grapes with balanced rate of sugar/acidity, essential characteristics to make wines with quality. Fig. 2 presents the rainfall and insolation in the cities of Garibaldi, Bento Gonçalves and Caxias do Sul, from December 1998 through March 1999, which corresponds to the grape ripening subperiod in Serra Gaucha. The behavior of the climatic elements was similar in Garibaldi and Bento Gonçalves; there was more precipitation in Caxias do Sul, especially in January.

Grapes with early ripening, such as Chardonnay, Gewurztraminer and Pinot Noir, started to be harvested on the first days of January 1999 and continued through almost the end of the month. During this subperiod the weather was dry and sunny, favoring the evolution of the ripening and the harvest of healthy grapes with suitable sugar/acidity balance.

Grapes with intermediary ripening, such as Riesling Itálico and Merlot, which are harvested from the second half of January until the middle of February, did not have the meteorological conditions of the previous ones, as the rainfall increased. This intensity of the rainfall, which was not excessive when compared with the climatologic normal, combined with the reduction in insolation, may have interfered with the evolution of the grape ripening of this group.

Late ripening grapes, such as Cabernet Sauvignon and White Muscat, which normally ripen on the second half of February through mid-March, had meteorological conditions similar to those of the early ripening, that is, the evolution of the ripening was favored by dry and sunny weather, allowing the harvest of healthy grapes with suitable sugar/acidity balance.

Generally speaking La Niña phenomenon, which damaged other cultures in Rio Grande Do Sul, favored the health and the quality of the grapes from the 1999 vintage.

Fig. 1 Meteorological behavior: average air temperature (—), rainfall (—), insolation (—) and phenolic stages of the grapevine from June 1998 through March 1999, Bento Gonçalves, RS.

Source: Embrapa Uva e Vinho – Estação Agrometeorológica and Banco de Germoplasma de Uva.

Comparative Analysis of the Vintages

The meteorological conditions to characterize the grape ripening in Rio Grande do Sul were established by Westphalen (1977), through the Ripening Helioplviometric Index (QM). This index relates the effective accumulated insolation to the rainfall during the grape ripening subperiod (beginning with the change of the berry color through the grape harvest). The index value 2 was considered by the author as the lowest limit for good meteorological conditions, meaning that the

higher the QM is, the better the conditions for the grape ripening will be. Table 1 shows the QM of the vintages from 1990 to 1999, according to the period of the cultivar ripening.

Fig. 2. Rainfall (—) and insolation (_) that happened during the grape ripening period in the 1999 vintage, Bento Gonçalves, RS.

Source: ¹Garibaldi – De Lantier Vinhos Finos – Estação Agroclimatológica.

²Bento Gonçalves – Embrapa Uva e Vinho - Estação Agroclimatológica.

³Caxias do Sul – Fepagro – E.E. Caxias do Sul - Estação Agroclimatológica.

Table 1. Ripening Heliopluiometric Index (QM)¹ for different ripening periods. 1990/99 vintages. Embrapa Uva e Vinho, Bento Gonçalves, RS.

Vintage	Ripening Heliopluiometric Index			
	Ripening period ²			
	Early	Intermediate	Late	Average

$$^1 \text{QM} = \frac{\text{Total insolation(h)}}{\text{Total precipitation (mm)}}$$

²Early: December 15 to January 15 (Chardonnay, Gewurztraminer); Intermediate: January 16 to February 15 (Riesling Italic, Merlot); Late: February 16 to March 15 (Cabernet Sauvignon, White Muscat).

These indexes show that the meteorological conditions of the 1999 vintage were very favorable for the ripening of the early and late grapes and a little inferior for the intermediate ripening grapes. The indexes obtained in the 1999 vintage have only been supplanted by those reached in the 1991 vintage, regardless of the ripening period.

References

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