

Researches on the evolution of the annual biological cycle at some grape varieties under different pedo-climatic conditions

Dobrei A^{1*}, Mălăescu Mihaela¹, Ghiță Alina¹, Dărăbuș Rodica¹, Cristea T¹.

¹USAMVB Timisoara, Facultatea de Horticultura si Silvicultura

*Corresponding author. Email: alin1969tmro@yahoo.com

Abstract The evolution of the vegetation phenophases is highly influenced by the environmental conditions that are specific to each year and each geographical area and not least by the technology applied. Observations were made during the years 2007-2008 on the grape cultivars: Fetească Regală, Fetească albă, Mustoasă, Riesling Italian, Pinot Gris, Muscat Ottonel, Pinot Noir, Cabernet Sauvignon, Cadarcă, Muscat Hamburg, Victoria, in the pedoclimatic conditions of Banat, in the wine-growing centers Timisoara, Recas and Buzias and targeted the evolution of the main phenophases at the grapevine: bleeding, bud breaking, flowering, ripening and full maturation. Although geographically the three wine-growing regions are relatively close among themselves, between the evolution of the annual biological cycles, there have been small differences which must be taken into account when establishing the technologies of culture.

Vegetation phenophases at Recaş were conducted several days earlier as compared with the wine-growing regions Buziaş and Timisoara, in that order.

Key words

Pedoclimatic resources, vegetation phenophases, differentiated technologies.

Knowing the biology of grapevine is particularly important in order to establish agrophytotechnical measures which focus on both high and quality yields and maintain the biological balance of the logs.

Running technological sequences at optimum time involves, among others, also an accurate knowledge of the particularities of evolution for the main phenophases of grapevine. Fructification pruning, green operations, application of phytosanitary treatment needs to be closely correlated with the vegetation phenophases so that their favorable effect on production is maximum. In order to go through the main phases of the annual biological cycle, the cultivars require a certain sum of temperature degrees that is different, depending on the genetic characteristics of each cultivar. Ecologic conditions that differ from one area to another and from one year to another determine that the evolution of the biological cycle of the cultivars presents small differences from one year to another so it is always necessary to follow the evolution of the vegetation phases in order to implement the most appropriate technology of culture.

Biological Material and Method

The researches were conducted during 2007-2008 in the county of Timis, in the wine-growing

centers Timisoara, Recas and Buzias and targeted the passing through the annual biological cycle at several cultivars of grapes grown in different pedoclimatic conditions. Observations and examinations regarded specifically the evolution of the main phenophases at the grapevine: bleeding, bud breaking, flowering, ripening and full maturation.

Each phenophases was noted in the middle of it, when over 2/3 of each cultivar's logs reached that stage of phenophase. From each cultivar were analyzed 30 logs in three different areas of each wine-growing region for more precise monitoring of the area's conditions. All phenophases were observed at the same logs.

Results and Discussions

For the studied years the evolution of the vegetation phenophases ranged in the multiannual data, with few exceptions due to the climatic particularities of each year. Between cultivars there were small differences in what concerns the evolution of the phenophases according to their genetic specificity.

In 2007 (Table 1) the bleeding began in March 15th in Recaş, March 13th in Buziaş and March 16th in Timisoara. Between cultivars there were differences in what concerns the bud breaking up to 2 weeks, Muscat Ottonel, Cabernet Sauvignon, Pinot Gris, Riesling

Italian cultivars have bud broken earlier compared to Fetească Regală, Fetească albă, Mustoasă de Măderat, Cadarcă, Victoria cultivars. The bud breaking order of the cultivars has been preserved in all three areas, with some differences between areas only due to climatic conditions. In 2008 the bleeding began in all three wine-growing centers with 7-8 days later as compared to the previous year, maintaining the order of staggering for the cultivars and wine-growing areas. Given the evolution of the bleeding phenophase it results that generally the fructification pruning should be completed by around the 10th of March in Receaș, 15th of March in Buziaș and 20th of March in Timisoara.

The bud breaking evolved in 2007 between 11th-17th of April in Receaș, 14th-21th of April in Buziaș and the 16th-22nd of April in Timisoara, with some differences between cultivars according to their specificity. The bud breaking phenophase gives us clues on the date on which the training of the shoots should be completed so that no loss of buds by shaking will occur.

The flowering is a very sensitive phenophase to diseases and pests attack so in the flowering period the grapevine must be phytosanitary protected.

Conclusions

The evolution of the vegetation phases is closely related to the ecological resources of each area of cultivation, the climatic specifics of each year, and genetic background of each cultivar.

References

- 1.Dobrei Alin, Mustea Mihai, Liliana Rotaru ,2005- Cultura viței de vie, Ed. Solness, Timișoara.
- 2.Dobrei A., Rotaru Liliana, Morelli S., -2008 – Ampelografie, Ed. Solness, Timișoara
- 3.Dobrei A., Kuljancic I.,Bongiraud C.,Mălăescu Mihaela, 2001 - Cercetări privind desfășurarea fazelor

In 2007 the flowering took place between May 20th-24th in Receaș , May 22nd-26th in Buziaș and May 25th-28th in Timisoara. In 2008 the flowering took place between May 23rd-25th in Receaș, May 24th-28th in Buziaș and 27th of May – 1st of June in Timisoara.

Full maturation is very important in order to obtain high quality grapes and organize harvesting operations in a more efficient manner. Cultivars have reached full maturity, according to their genetic potential, there are differences between them up to 2 weeks.

In 2007, in Receaș, full maturation began on the 30th of June at the Victoria cultivar and ended on the 24th of September at the Cadarcă cultivar. At Buziaș, the cultivars reached maturity in the same order beginning with the Victoria cultivar on the 1st of September and ending in the 30th of September with the Mustoasă de Măderat cultivar. In Timisoara, full maturation began several days later (on the 5th of September at the Victoria cultivar) and ended on the 5th of October with the Mustoasă de Măderat cultivar .In 2008 it was observed a maturation of the cultivars with 2-3 days later as compared to the previous year.

In order to obtain balanced production qualitatively and quantitatively, cultivation technology must be very well correlated with the progress of the biological cycle so that their effectiveness is the highest.

Between the studied wine-growing areas there have been differences in what concerns the evolution of the vegetation phases, differences that must be taken into account when developing cultivation technologies that are specific for each area.

de vegetație la câteva soiuri de struguri pentru vin în anul 2000, cultivate în ecosisteme diferite, Cercetări științifice., seria a Va, Facultatea de Horticultură Timișoara.

Table 1

Researches on the evolution of the annual biological cycle at several grape cultivars in different pedoclimatic conditions, in 2007

Cultivar	Bleeding			Bud breaking			Flowering			Ripening			Full maturation		
	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș
Fetească Regală	1 IV	26 III	28 III	16 IV	11 IV	13 IV	28 V	23 V	24 V	10 VII	2 VIII	5 VIII	30 IX	23 IX	25 IX
Fetească Albă	3 IV	28 III	30 III	16 IV	11 IV	13 IV	26 V	21 V	23 V	5 VIII	27 VII	3 VIII	25 IX	15 IX	20 IX
Mustoasă	26 III	21 III	23 III	16 IV	11 IV	13 IV	28 V	24 V	26 V	13 VIII	5 VIII	9 VIII	5 X	27 IX	30 IX
Riesling Italian	20 III	15 III	17 III	17 IV	12 IV	14 IV	27 V	23 V	24 V	12 VIII	4 VIII	6 VIII	28 IX	26 IX	26 IX
Pinot Gris	20 III	15 III	17 III	17 IV	12 IV	14 IV	26 V	21 V	23 V	7 VIII	28 VII	2 VIII	28 IX	17 IX	20 IX
Muscat Ottonel	16 III	11 III	13 III	16 IV	11 IV	13 IV	25 V	20 V	22 V	8 VIII	3 VIII	4 VIII	28 IX	20 IX	22 IX
Pinot Noir	25 III	20 III	22 III	22 IV	17 IV	19 IV	25 V	20 V	22 V	10 VIII	5 VIII	6 VIII	28 IX	16 IX	19 IX
Cabernet Sauvignon	19 III	14 III	16 III	21 IV	16 IV	18 IV	27 V	23 V	25 V	13 VIII	5 VIII	8 VIII	30 IX	20 IX	24 IX
Cadarcă	25 III	20 III	22 III	21 IV	15 IV	16 IV	28 V	22 V	25 V	18 VIII	8 VIII	13 VIII	1 X	24 IX	26 IX
Muscat Hamburg	20 III	15 III	17 III	20 IV	15 IV	17 IV	27 V	23 V	24 V	7 VIII	3VIII	5 VIII	16 IX	6 IX	10 IX
Victoria	26 III	21 III	23 III	16 IV	11 IV	13 IV	25 V	20 V	22 V	3 VIII	26 VII	30 VII	5 IX	30 VIII	1 IX

Table 2

Researches on the evolution of the annual biological cycle at several grape cultivars in different pedoclimatic conditions, in 2008

Cultivar	Bleeding			Bud breaking			Flowering			Ripening			Full maturation		
	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș	Timișoara	Recaș	Buziaș
Fetească Regală	4 IV	30 III	1 IV	17 IV	12 IV	14 IV	30 V	25 V	27 V	12 VIII	4 VIII	7 VIII	2 X	25 IX	27 IX
Fetească Albă	5 IV	31 III	2 IV	20 IV	15 IV	17 IV	27 V	22 V	24 V	7 VIII	1 VIII	5 VIII	28 IX	18 IX	22 IX
Mustoasă	4 IV	30 III	1 IV	19 IV	14 IV	16 IV	1 VI	26 V	28 V	15 VIII	8 VIII	11 VIII	7 X	30 IX	2 X
Riesling Italian	5 IV	31 III	2 IV	20 IV	15 IV	17 IV	30 V	25 V	27 V	13 VIII	6 VIII	8 VIII	30 IX	28 IX	28 IX
Pinot Gris	4 IV	30 III	1 IV	20 IV	15 IV	17 IV	27 V	22 V	24 V	9 VIII	1 VIII	4 VIII	30 IX	20 IX	22 IX
Muscat Ottonel	5 IV	31 III	2 IV	20 IV	15 IV	17 IV	30 V	25 V	27 V	10 VIII	6 VIII	7 VIII	30 IX	22 IX	25 IX
Pinot Noir	3 IV	29 III	31 III	18 IV	13 IV	15 IV	29 V	24 V	26 V	12 VIII	7 VIII	8 VIII	30 IX	18 IX	21 IX
Cabernet Sauvignon	3 IV	29 III	31 III	22 IV	16 IV	19 IV	29 V	24 V	26 V	15 VIII	8 VIII	10 VIII	2 X	23 IX	26 IX
Cadarcă	4 IV	30 III	1 IV	23 IV	17 IV	21 IV	30 V	25 V	27 V	20 VIII	10 VIII	15 VIII	4 X	26 IX	28 IX
Muscat Hamburg	2 IV	28 III	30 III	21 IV	16 IV	18 IV	30 V	25 V	27 V	10 VIII	5 VIII	8 VIII	18 IX	8 IX	12 IX
Victoria	2 IV	27 III	29 III	19 IV	14 IV	16 IV	29 V	23 V	25 V	6 VIII	29 VIII	2 VIII	7 IX	1 IX	3 IX