INFLUENCE OF THE ABSOLUTE MINIMUM TEMPERATURES RECORDED IN THE PERIOD OF JANUARY-FEBRUARY 2012 ON THE VINE PLANTATIONS IN THE COPOU-IASI VINEYARD CENTER

INFLUENȚA TEMPERATURILOR MINIME ABSOLUTE ÎNREGISTRATE ÎN PERIOADA IANUARIE - FEBRUARIE 2012 ASUPRA PLANTAȚIILOR DE VIȚĂ DE VIE DIN CENTRUL VITICOL COPOU-IAŞI

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Abstract. *The analysis of the absolute minimum temperatures below freezing resistance limit of the vine for a period of 50 years (1961 - 2010), shows that their frequency is of 28 % and that they have a periodicity of 3.6 years (Zaldea Gabi et al.2010). These temperatures have led to recording large losses of the main buds, annual and multiannual wood damage and, thus, lower grape production. During the period of January - February 2012 have been recorded absolute minimum temperatures of -26,7 ºC in the air and -33,0 ºC at the soil surface. The influence of these temperatures on the vine plantations and the rehabilitation measures will be presented in this pa per.*
Key words: absolute minimum temperatures, vine, winter buds

Rezumat. *Din analiza temperaturilor minime absolute situate sub limita de rezistență la îngheț a viței de vie, pe o perioadă de 50 de ani (1961-2010), s-a constatat faptul că frecvența acestora este de 28% şi au o periodicitate de 3,6 ani (Zaldea Gabi şi colab. 2010). Aceste temperaturi au condus la înregistrarea unor pierderi mari de muguri principali, afectarea lemnului anual şi multianual şi implicit la scăderea producției de struguri. În perioada ianuarie-februarie 2012 s-au înregistrat temperaturi minime absolute de până la -26,7ºC în aer şi de -33,0ºC la suprafața solului. Influența acestor temperaturi asupra plantațiilor viticole şi măsurile de refacere vor fi prezentate în lucrarea de față.*
Cuvinte cheie: temperaturi minime absolute, viță de vie, muguri de rod.

INTRODUCTION

The cultivation of the vine trunks, in the conditions of the vineyards from the North-East of Moldova, is possible in a semiprotected system. Through this system the tendrils that grow out of the main stem are buried in the ground (Pițuc et al., 1992). When there are minimum temperatures that are under the freezing limit of the vine, that affect the main vine bud and the annual wood, will be used the tendrils that grow out of the main stems in order to compensate the fruit load and to refresh the trunks and the affected tendrils. Some years ago people used to

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burry the tendrils but lately they noticed that the expenses for this kind of procedure were bigger than the eventual losses (Amăriucăi et al., 2003).

During 1961 – 2011 were registered very low temperatures and in the years: 1963, 1985, 1987, 1996, 2006, 2010 (Zaldea et al., 2010) there was between -25°C and - 27°C in the air and between -30,4°C and -35°C at the surface of the ground.

The minimum absolute temperatures that are a climatic accident, registered in January-February 2012, lead to a high frequency of negative temperatures that will make serious damages in the vine plantations.

MATERIAL AND METHOD

In order to develop the researches there were used the climatic data that was registered at the weather station and AgroExpert, an automatic registration system, of the Research Development Station for Viticulture and Vinification Iaşi (minimum absolute temperatures in the air and at the surface of the ground), as well as those from the Regional Weather Center Moldova Iaşi. In order to test the viability of the buds it was used the method of the longitudinal sectioning of the loop on the length of the tendril, starting from the base towards the top and by examining them with a binocular eyeglass.

RESULTS AND DISCUSSIONS

From the analysis of the minimum absolute temperatures that were recorded in January 2012, in the vine center Copou Iaşi, was noticed the fact that, the minimum temperatures were of -17,8°C in the air and -21,8°C at the surface of the ground (29.01.2012), values that are at freezing limit of the vine buds for the table varieties. These very low temperatures were also registered in the first two days of February reaching to -24,7°C in the air and -28,1°C at the surface of the ground (02.02.2012). The second freezing wave was registered during 8-12 February, when the minimum absolute temperatures were very much under the freezing limit of the vine, being registered -21,6°C….-26,7°C in the air and between -27,0°C…-33,0°C at the surface of the ground (table 1). Keep in mind the fact that from the beginning of the first 12th days of February 2012, seven days had temperatures under the freezing limit of the vine (-18±3°C for the fruit buds and -21 ± 3°C for the annual wood) (Martin T. 1972).

Table 1

The minimum absolute temperatures registered during 8-12 February 2012

Date	The minimum absolute temperatures in air, °C	The minimum absolute temperatures at the ground, °C
8.02.2012	-23,4	-33,0
9.02.2012	-22,9	-27,6
10.02.2012	-21,6	-27,0
11.02.2012	-24,4	-28,0
12.02.2012	-26,7	-32,6

We mention the fact that the absolute minimum temperature in the last 51 years (1960–2011) was of –27,2°C, in December 1996, and the minimum absolute temperature at the ground was of –35,0°C in January 2010. These

temperatures caused serious damages in the vine plantations (Zaldea et al., 2010).

In these conditions at the Research Development Station for Viticulture and Vinification Iaşi were preformed viability analysis of the buds through a longitudinal section of the bud and observing it with a binocular eyeglass; in this way being established the percentage of viable loops (main and secondary) according to the position of the loops on the tendril (1-3; 1-6; 1-12) and the loop losses according to variety and the position on the flank (table 2). Following the analysis, that was performed on most varieties, it was noticed a higher viability towards the top of the tendrils.

Table 2

Viability of winter buds in Copou - Iasi viticultural center

Variety	Location	% Eye viable - string position								
		1 - 3			1 - 6			1 - 12		
		P	S	P + S	P	S	P + S	P	S	P + S
Aligoté	tray	49	66	66	38	61	61	38	66	66
Aligoté	middle slope	17	61	61	14	54	54	14	63	63
Aligoté	basic slope	2	17	17	2	32	32	7	56	57
Aromat de Iaşi	tray	22	42	42	19	48	48	19	55	55
Chasselas doré	tray	1	12	12	1	29	29	15	74	74
Cabernet Sauvignon 4	middle slope	56	67	67	36	58	58	38	60	60
Chardonnay	tray	11	18	19	6	22	22	10	62	32
Fetească regală	tray	47	75	75	33	71	71	27	69	69
Fetească regală	middle slope	14	32	32	14	37	37	12	49	49
Fetească regală	basic slope	7	22	22	7	34	34	6	49	49
Fetească albă	tray	39	89	89	25	81	81	17	75	75
Fetească albă	middle slope	25	85	85	19	80	80	16	71	71
Fetească albă	basic slope	7	17	17	3	25	25	3	34	34
Gelu	tray	7	29	29	7	41	41	15	44	46
Golia	tray	83	100	100	83	100	100	83	100	100
Merlot	tray	26	52	52	23	59	59	22	59	59
Muscat Ottonel	tray	60	81	81	49	76	78	59	84	86
Muscat Ottonel	basic slope	42	57	57	30	57	57	27	63	63
Pinot gris	tray	14	32	32	13	44	44	29	67	67
Perla de Csaba	middle slope	4	9	9	4	14	14	5	30	30
Sauvignon blanc	tray	55	60	60	42	55	55	45	62	62

The biggest loss of main buds from 2012 was registered on the North, North-East lots and at the basis of the versants, being situated between 73-97%. Also, a great deal of losses were registered at the middle of the flanks, between 62-95%, and on these plateaus were a slightly few losses, between 41- 90%. The most affected varieties were Feteasca Albă, Feteasca Regală and Aligoté that are mostly in Copou's vine center. A better resistance at freezing temperatures manifested Golia, Muscat Ottonel and Sauvignon Blanc. The Golia variety created at SCDVV Iaşi, reconfirmed the variety's resistance at cold, this having 83% of its main buds.

Keeping in mind the viability of the buds it will be taken the following measures:

- Establishing the load of loops taking into consideration the secondary viable buds, keeping in mind that at the most varieties half of them may be fertile;

- The dry cutting will be done by giving a compensated load by leaving 1-2 fruit links on the tendril, 1-2 tendrils from the basis of the vine stock, if are there any;
- The cutting will be done differentiated depending on variety, speronat (in main stems) or in fruit links, according to the position of the viable loops on the length of the tendrils (1-3; 1-6; 1-12);
- The length of the fruit element will be usually higher with 2-4 loops;
- Once with the dry cutting the basis of the stock will be punctured with the tip of the scissors and also the curve of the tendrils in order to simulate the vegetation start of the sleeping loops;
- During the vegetation period procedures in green (pinching the sterile shoots and directing and forming the tendrils) will be done that will help both at refreshing the stocks as well as getting some productions of grapes that will partially allow the coverage of the expenses and the restarting of the production cycle.

In what the recovering of the vegetative and of the productive potential is concerned of the vines that were affected by freezing temperatures for 2012 we suggest the following:

1. Recovering cuttings of the vegetative and of the productive potential of the stocks with loop losses of more than 50%. In case that there will be performed cuttings for compensation of the fruit load, taking into account the loop losses recorded for each variety, by leaving 1-2 fruit links extra on the tendrils, 1-2 tendrils for compensation from the main stems from the basis of the stock (fig. 1). Also one must have to take into account that the loads of fruit induce the denudation of the tendrils. That is why the loads must not go over 60 loops/stock for sensitive varieties (Muscat Ottonel, Sauvignon Blanc, Chardonnay) and 80-100 loops/stock at varieties with medium and high viability (Aligoté, Feteasca Regală, Feteasca Albă), in the case of plantations with a distance of 2,2 m between rows.

During the growing season will start pinching shoots from secondary buds, and angular, ensuring buds herbaceous issue that will be used to season the following year the seams.

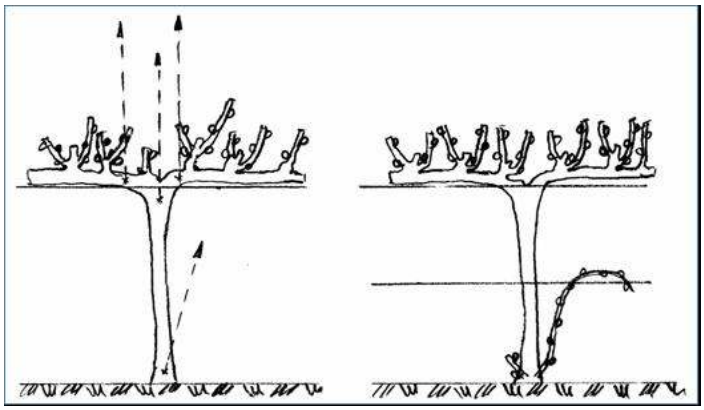

Fig.1 - Compensation cutting of the fruit load.

2. Recovery cutting of the stocks and of the cords from tendrils growing from main stems and from shoots starting that are growing from the basis of the stocks.

a) The recovery of the stocks from tendrils that are growing from the main stems with the projection in green of the cords. From the tendrils that grew from the main stems will be picked one for the formation of a new trunk and 1-2 tendrils for the compensation of the production of grapes.

The chosen tendril for the formation of the trunk will be shortened down to the level of the bearer wire and it will be tied by the old trunk.

During the vegetation the shoots will be removed from the trunk, except for two last shoots from the superior part that will be used for the green formation of the tendrils (fig. 2).

When they will get at half distance from the stock their tip will be cut off, in this way encouraging growth of shoots that will assure the fruits for next year.

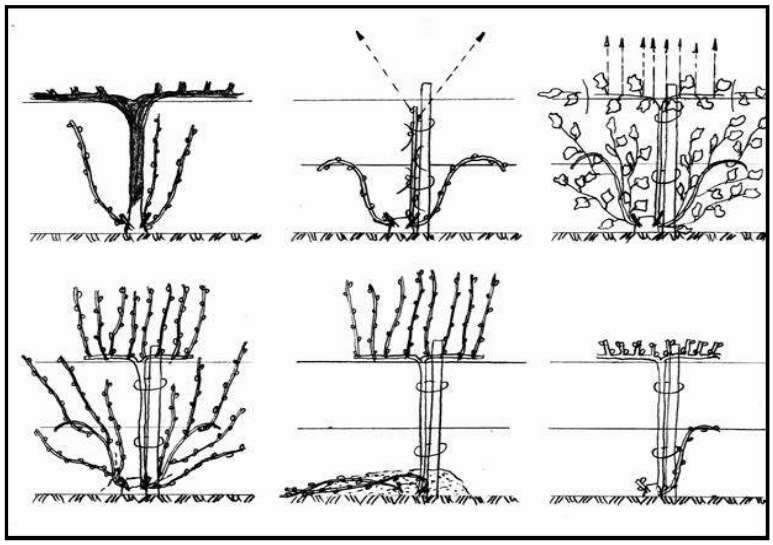

Fig. 2 - Recovery of the stocks from tendrils formed on the main stems with the green projection of the cords.

b) The recovery of the stocks from shoots that came from their basis. 3-4 shoots will be kept from the ones that came out of the sleeping loops from the basis of the stocks and the other ones are extirpated. One of the shoots will be used for the formation of the stock and the others having the role of equilibrating the plants will be pinched at 3-4 leafs. The shoots that come out will loosely be tied by their guardian, following to be used in the next year at assuring 1-2 tendrils for the compensation of the production. The shoot that was chosen for the green formation of the trunck will be tied by its guardian and it will be pinched from under the bearer wire. From the resulted shoots on the superior part of the new trunck, in the next year, half of the length of the tendrils will be dried and the rest will be green (fig. 3).

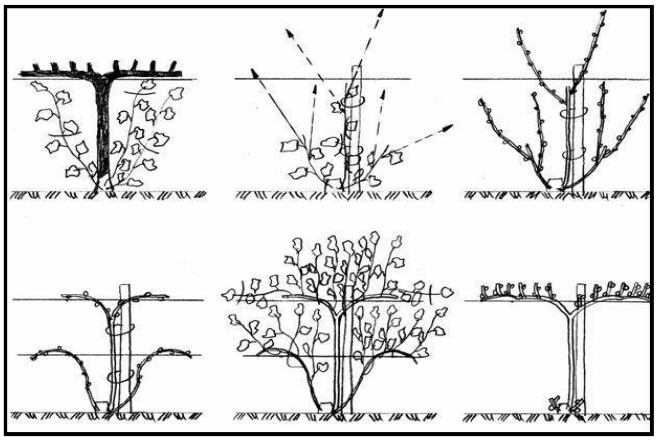

Fig. 3 - The recovery of the stocks from shoots that grow at their base.

CONCLUSIONS

1. The dropping of the minimum absolute temperature in the air under the resistance limit of the vine and keeping the vine longer affected a lot the viability of the winter buds in February 2012.

2. The greater losses of main buds were registered on the Northern lots, North-East and at the basis of the versants, between 73-97%, 62-95% at the middle of the flanks and smaller on plateaus, between 41-90%.

3. The most affected varieties were Feteasca Albă, Feteasca Regală and Aligoté, which are predominant varieties in the vine plantations of the Research Development Station for Viticulture and Vinification Iasi. A better conduct concerning freezing temperatures manifested the following varieties: Golia, Muscat Ottonel and Sauvignon Blanc.

4. Some years ago, in order to protect the stocks from freezing, people used to burry the tendrils that grew out of the main stems but they noticed that the expenses for this procedure were higher than the eventual loss. The fact is that the frequency of years with minimum absolute temperatures grew and imposed finding some efficient methods for protecting the vine culture over winter.

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