

THE INFLUENCE OF THE CLIMATIC FACTORS ON THE SWEET CHERRY TREE GROWTH AND FRUIT-BEARING IN IAȘI'S CONDITIONS

INFLUENȚA FACTORILOR CLIMATICI ASUPRA CREȘTERII ȘI RODIRII CIREȘULUI ÎN CONDIȚIILE DE LA IAȘI

*IUREA Elena¹, GRĂDINARIU G.², SÎRBU Sorina¹,
CORNEANU G.¹, PETRE L.¹*
e-mail: iurea_elena@yahoo.com

Abstract. *This paper presents some aspects concerning the influence of the environmental factors from 2008-2010 on the both sweet cherry tree growth and fructification. The agricultural years 2008 (a rainy one) and 2009 (a droughty one) can be described as years with special climatic characteristics which influenced negatively the vegetative growing and the tree production in this area. The meteorological factors (during 3 years) were analyzed, the fruit's production (kg/tree) on cultivars was calculated, were made measurements and determinations concerning the trunk's cross-sectional area and the length of the annual increases. In terms of 2008 which was an unusual year with an excess of 338,4 l/m² rainfall compared to the multiannual average and of 2009 which was very droughty with a deficiency of 198,6 l/m² compared to the multiannual average, 'Cociu' and 'Ludovic' were noted as the most resistant to drought.*

Key words: sweet cherry tree, cultivars, young shoots, trunk, production.

Rezumat. *Această lucrare prezintă unele aspecte privind influența factorilor de mediu din anii 2008 – 2010, asupra creșterii și fructificării pomilor la specia cireș. Anii agricoli 2008 (an ploios) și 2009 (an secetos) se pot caracteriza ca ani cu particularități climatice deosebite care au influențat negativ în această zonă creșterile vegetative și producția pomilor. S-au analizat factorii meteorologici (pe perioada celor trei ani), s-a determinat producția de fructe (kg/pom) pe soiuri, s-au efectuat măsurători și determinări privind suprafața secțiunii trunchiului și lungimea creșterilor anuale. În condițiile anului 2008 care a fost un an anormal, cu un excedent pluviometric de 338,4 l/m² față de media multianuală și a anului 2009 care a fost foarte secetos, cu un deficit de 198,6 l/m² față de media multianuală s-au remarcat soiurile Cociu și Ludovic ca fiind cele mai rezistente la secetă.*

Cuvinte cheie: cireș, soiuri, lăstari, trunchi, producție.

INTRODUCTION

The sweet cherry tree is a fruit-growing species with great economic importance, because of the nutritional, technological and commercial characteristics of the fruits (Grădinariu G. & Istrate M., 2003; Petre L., 2006). For a good growth and development (having moderate claims to water), the sweet cherry tree grafted on

¹ Research and Development Station for Fruit Tree Growing Iasi, Romania

² University of Agricultural Sciences and Veterinary Medicine Iasi, Romania

mahaleb succeeds in the NE of Romania area, where the multiannual average value of the rainfall is 524 mm (Dumitrescu Gh. et al., 1981; Grădinariu G., 2002).

During the vegetation period, the water consumption of fruit-growing plants is variable. The phases when the water consumption is maximum are called critical phases (shoots growing, the flowering and the fruit's growing) (Milică C.I. et al., 1982).

The crop years 2008 (a rainy year) and 2009 (a droughty year) can be characterized as years with great climatic particularities which negatively influenced in this area the biometrical increases and the fruit-growing trees production (Iurea Elena et al., 2008).

This paper presents some aspects concerning the influence of the environmental factors from 2008-2010, registered in Iași on growth and fructification of the sweet cherry tree species.

MATERIAL AND METHOD

The researches were realized in 2008, 2009, 2010, using as research material five new sweet cherry cultivars (Alex, Anda, Cociu, Margo and Ludovic) grafted on mahaleb. The fruit-growing trees are planted at 4 x 5 m free crown flattered shape and they are in the 10th year since plantation. The land where the plantation was set up is situated in the depression Jijia-Bahlui, where the annual average temperature was 9,4oC in 2008, 10,8oC in 2009 and 10,2oC in 2010.

Meteorological factors, behaviour of the cultivars compared to the limiting factors of production, namely the behaviour of the cultivars in the conditions of 2008, a very rainy year, with a rainfall surplus of 338,4 l/m² and of 2009 which was very droughty, with a deficit of 198,6 l/m² compared to the multiannual average were analyzed. Observations and performed measurements followed the vegetative growth of the trees (the annual branches and the trunk's thickness) and the fruits production (kg/tree).

The fruits production was determined by weighing, the length of the annual increases was determined by measuring, the trunk's section area was determined by measuring the trunk's thickness with the calliper and the drowm data was converted in cm². The experimental data was statistically expressed by analysis of the variance.

RESULTS AND DISCUSSIONS

For the sweet cherry tree, the critical stages when the water consumption is maximum are: the shoots growth, the flowering and the fruits growth.

The climatic conditions from 2008, 2009 and 2010 influenced differently the vegetative growth of the trees and the fruits production.

In 2008 and 2010, in the period April, May and June when it takes place intensive growth of the shoots, flowering and fruits growth, there was registered an amount of rainfall of 306,2 mm (2009) and 259 mm (2010) compared to 172,4 mm as the multiannual average, the surplus being one of 133,8 mm (2009), respectively 86,6 mm (2010). In 2009, in the same period, there were registered 106,6 mm compared to 172,4 mm as it represents the multiannual average, the deficit being of -65,8 mm.

As a result of the observations and determinations taken in three years of study, the largest annual length increases were registered for Cociu (79,4 cm) and

Ludovic (78,6 cm), being distinct positively significant compared to the control cultivar Boambe de Cotnari (67,0 cm). At the other cultivars (Alex, Anda and Margo) the length of the annual increases was near as value to the control cultivars (tab. 1).

Table 1

Data concerning the average length of the shoots registered between 2008-2010

Crt. nr.	Cultivar	The average length of the shoots			
		The average length of the shoots(cm)	Calculated compared to the control cultivar		
			%	Difference	Signification
1.	Cociu	79,4	118,5	12,4	++
2.	Ludovic	78,6	117,3	11,6	++
3.	Margo	67,3	100,4	0,3	
4.	Boambe de Cotnari (Control)	67,0	100	0	-
5.	Anda	64,0	95,5	-3,0	
6.	Alex	62,1	92,6	-4,9	

LSD 5% = 7,1 cm

LSD 1% = 10,3 cm

LSD 0,1% = 15,5 cm

Concerning to the trunk's section area, all the cultivars registered a continuous increase (the annual average rate being between 16-38 cm²). By interpreting statistically the data, Cociu (221 cm²) and Anda (213 cm²) was the most vigorous compared to the control cultivar Boambe de Cotnari, registering distinct positively significant values (tab. 2).

Table 2

Data concerning the trunk's section area registered between 2008-2010

Crt. nr.	Cultivar	The trunk's section area			
		The trunk's section area (cm ²)	Calculated compared to the witness		
			%	Difference	Signification
1.	Cociu	221	130,0	51	++
2.	Anda	213	125,3	43	++
3.	Margo	185	108,8	15	
4.	Alex	182	107,1	12	
5.	Ludovic	179	105,3	9	
6.	Boambe de Cotnari (Control)	170	100	0	-

LSD 5% = 28,6 cm²

LSD 1% = 41,6 cm²

LSD 0,1% = 62,4 cm²

Because the absence of the water determined disorders of production regularity and of crop's size, the production from the three years had to suffer. The drought from 2007 affected the fruit's production and the size of the 2008's harvest.

In 2009, the fruit's production was significantly reduced due to the drought during March-September, the water deficit being one of 166,6 mm/m².

Yield of 2010 was partially affected by the heavy rainfall from June (22-29.06), when during some days there was registered an excess of 78,7 mm/m² (the fruits being

in the maturation stadium, have cracked and have been affected by *Monilinia fructigena*).

As a result of the determinations made in those three years, Cociu and Ludovic registered the largest yields (17,5 kg/tree and 15,7 kg/tree respectively) (tab.3).

Table 3

Data concerning the fruits production obtained between 2008-2010

Cultivar	Yield (kg/tree) in the years:			Yield		
	2008	2009	2010	Calculated compared to the control cultivar (2010)		
				%	Difference (kg/tree)	Significati on
Cociu	14,8	13,0	17,5	132,6	4,5	++
Ludovic	13,5	12,3	15,7	118,9	2,5	+
Margo	13,6	9,9	14,0	106,1	0,8	
Anda	11,2	9,0	13,9	105,3	0,7	
Alex	12,2	8,9	13,4	101,5	0,2	
Boambe de Cotnati (control)	12,0	10,3	13,2	100	0	

LSD 5% = 2,31 kg

LSD 1% = 3,3 kg

LSD 0,1% = 5,0 kg

CONCLUSIONS

1. Under hydric aspect, the crop year 2007-2008 can be characterized as a very rainy year, with a surplus of 338,4 mm rainfall and the crop year 2008-2009 was a very droughty year, the deficit being of 198,6 mm compared to the multiannual average of 524,6 mm.

2. The best length increase of the annual shoots (79,4 – 78,6 cm) and the largest yield (17,5 – 15,7 kg/tree) were obtained at Cociu and Ludovic.

3. In 2008, 2009 and 2010 climate conditions, Cociu and Ludovic have the most rezistence to both drought and excess rainfall.

REFERENCES

1. Dumitrescu Gh., Hrițcu C., Frunză P., Bazgan C., 1981 – *Studiu privind cultura cireșului și vișinului în județul Iași*. Cercetări Agronomice în Moldova, vol. 3, Iași, 6p., 77-82.
2. Grădinaru G., Istrate M., 2003 – *Cultura specială a pomilor*. Editura Matrix Rom, București, 528 pag.
3. Grădinaru G., 2002 – *Pomicultură specială*. Ed. „Ion Ionescu de la Brad”, Iași, 414 pag.
4. Iurea Elena, Petre L., Corneanu G., 2008 – *Study about the behavior of some new sweet cherry, tree cultivars in the soil and climate conditions by NE area of Romania*. Lucr. st. USAMV, seria Horticultură, vol. 52, Iași, CD-ROM, 6 p, 581-586.
5. Milică C.I., Dorobanțu N., Polixenia Nedelcu, Baia V., Suciu T., Popescu Florica, Teșu Viorica, Molea Ioana, 1982 – *Fiziologie vegetală*. Editura Didactică și Pedagogică, București, 375 pag.
6. Petre L., 2006 – *Rezultate obținute în ameliorarea sortimentului de cireș, vișin și nuc la SCDP Iași*. Lucr. Șt. ICDP Pitești-Mărăcineni, vol. XXII, Pitești. 5 p, 45-49.