

THE VARIATION OF THE ACID ASCORBIC CONTENT IN CYNOSBATI FRUCTUS INFLUENCED BY STATIONARY FACTORS

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Abstract: *Cynosbati fructus* is the false fruit of *Rosa canina* L. (Rosaceae), also called in Romanian rosehip. Rosehips contain as active ingredients 500-1000% vitamin C, 600-10.000 mg% carotenoids, pectins, dextrins, vitamins B2, E, PP, flavones (rutozyd, hyperozyd), carbohydrates, organic acids (citric, malic), tannins, volatile oil (linalol, geraniol, citronelol, nerol), vanillin, triterpenic saponosids, beta-sitosterol, fat substances (lecitin, glycerides of fat acids in seeds), minerals (potassium, calcium, magnesium, iron). In terms of precipitations and temperature the specialized literature situates the rosehip in the category of xerophyte species with low humidity requirements and that do not bear the soils with stagnant water. Water requirement is mainly in the spring months before flowering and early August. High atmospheric humidity has a negative influence on the vitamin C content. The measurements made on atmospheric humidity, including precipitations, air temperature, geographical exposition, relief slope revealed the fact that rosehip grows well even on wet soils, with northern and northwestern exposition, the result consisting in fruit with an important content of vitamin C.

Keywords: *humidity, slope exposition, gradient relief, chemical composition*

1. Introduction

The area of rosehip includes southern and central Europe, reaching even southern Scandinavia. In our country there is the most widespread of the many species of *Rosa*, common in all areas, starting from the Black Sea up to altitudes of approx. 1200 m, in shrubberies, forest outskirts, thinned forests, ditches. [1]

It grows on eubasic-mezobasic soils, dried to moist (xerophyte-mesophilic), often compact soils. [2]

Rosehip fruits are rich in vitamins. The data recorded in the world over time shows the fact that dry rosehip contain ascorbic acid between 0.1% , 0.5% and 1.0%, some varieties even up to 9%. [3-4]

Environmental components that perform actions on the growth and fruit composition are considered living conditions because they condition metabolic activities, reducing or increasing precisely the effects of the ecological factors. This would be the case of certain constituents of the physical and geographical environment, such as heat, light, humidity, acidity, depth, texture, soil structure, etc.

The area of a certain species is the expression of its adaptation to a certain complex of physical and geographical conditions. [5]

The components of the resort – known as „stationary factors” – affect differently the plant life, i.e. directly, the way the light,

the heat, the water and the nutrients act and indirectly, the way the relief, the texture and the soil structure act, only changing values and the regime of the ecological factors, functioning as their determinants. They were also called indirect ecological factors or „physical and geographical conditions”. In order to make the difference between them and the ecological factors, the term „ecological determinants of the resort” was proposed. [6-7]

2. Materials and methods

The material of the study is the rosehip fruit is collected from *Rosa canina* L. in the spontaneous flora, natural dried due to the sensitivity of the ascorbic acid due to light and heat.

The fruits are harvested at full ripeness from the shrubs studied over four years (2007-2010) on the route that includes the following resorts: Suceava-Pătrăuți-Dărmănești-Costâna-Părhăuți-Todirești-Cajvana-Arbore-Solca-Clit-Marginea-Rădăuți-Sucevița-Palma.

At each resort we took three research points or three bushes similar in size. The plant material was shredded up to the stage of powder and used in determination.

For the determination of ascorbic acid content we used the method of titration with iodine solution.

We have determined the morphometric parameters (slope, exposition) by computer processing the altitude terrain models, using the ArcGis program and the Topographic Analyst module.

The average values of rainfall and temperature were processed according to the information given by the weather station in Suceava.

We processed the data using various Excel applications.

3. Results and Discussion

Analyzing the ascorbic acid content of rosehip fruit preserved by natural drying we obtained values ranging from 374.12 mg/100g and 663 mg/100g rosehip powder. The analyses show a significant relationship between vitamin C content values on years of study (see figure 1)

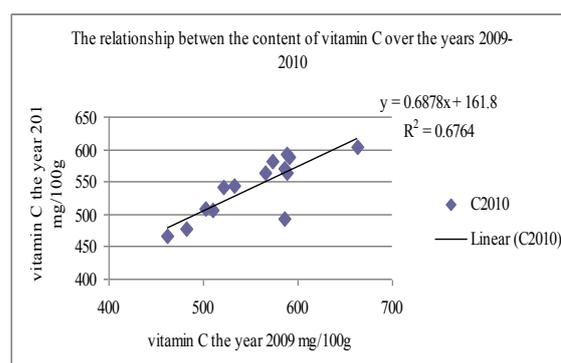


Figure 1. The relationship between the content of vitamin C over the years 2009-2010

The values of the morphometric parameters have been presented in the following table 1.

Table 1.
The values of the morphometric parameters according to the Topographic Analyst module

RESORTS	Altitude m	Exposition N-S, E-V	Slope °
SUCEAVA	344	N	8.7
PĂTRĂUȚI	343	S-E	2.3
ĂRMĂNEȘTI	292	N-E	0.8
COSTÂNA	327	E	2.6
PĂRHĂUȚI	368	S-V	5.2
TODIREȘTI	411	S-E	1
CAJVANA	407	V	0.8
ARBORE	426	S-V	4.5
SOLCA	378	N-E	0.8
CLIT	418	E	3.5
MARGINEA	460	E	1
RĂDĂUȚI	388	N-V	0.1
SUCEVIȚA	550	S-V	0.9
PALMA	1080	S-V	13.4

Table2.
The values of the temperatures and rainfall on months and years of study

Monthly and annual average temperatures in Rădăuți

Year	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
2007	3.4	-0.4	5.5	8.7	16.0	18.9	20.9	19.1	13.0	8.0	0.1	-3.4	9.2
2008	-3.4	1.2	4.3	9.1	13.7	18.1	18.4	19.4	12.6	9.0	3.4	0.1	8.8
2009	-3.3	-1.4	1.9	10.1	14.2	17.6	20.3	18.7	14.9	8.2	5.2	-2.3	8.7
2010	-7.6	-3.8	2.5	9.0	14.9	17.7	20.5	20.6	12.8	5.2	7.1	-4.0	7.9
Average 2007-2010	-2.7	-1.1	3.6	9.2	14.7	18.1	20.0	19.5	13.3	7.6	4.0	-2.4	8.6

Monthly and annual average temperatures in Suceava

Year	Jan	Feb	Mar	Apr	Ma y	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
2007	3.6	-0.3	5.9	9.2	16.3	19.9	21.5	19.7	13.6	8.7	0.9	-2.7	9.7
2008	-2.9	1.3	4.9	9.6	13.8	18.3	18.7	20.0	13.0	9.7	3.8	0.6	9.2
2009	-2.5	-1.0	2.3	10.8	14.7	17.7	20.4	18.9	15.7	8.7	5.5	-2.3	9.1
2010	-7.0	-3.5	2.6	9.4	15.1	18.0	21.1	21.4	13.6	5.9	8.0	-3.8	8.4
Average 2007-2010	-2.2	-0.9	3.9	9.8	15.0	18.5	20.4	20.0	14.0	8.3	4.6	-2.1	9.1

Monthly and annual precipitations in Rădăuți

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual amount
2007	10.8	31.3	51.1	28.8	83.8	61.9	85.8	102.0	71.8	92.8	56.7	32.2	709.0
2008	13.6	23.7	18.0	121.8	84.0	73.6	271.8	93.0	72.4	51.8	8.6	28.9	861.2
2009	31.3	17.5	23.8	18.0	90.4	114.1	73.4	33.8	8.4	82.4	19.8	40.6	553.5
2010	28.5	39.5	27.9	38.4	138.2	282.4	129.4	47.8	91.2	42.8	17.3	31.1	914.5
Average amount 2007-2010	21.1	28.0	30.2	51.8	99.1	133.0	140.1	69.2	61.0	67.5	25.6	33.2	759.6

Monthly and annual precipitations in Suceava

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual amount
2007	10.1	45.2	41.8	32.9	53.9	30.7	105.8	135.1	67.3	87.0	43.4	34.3	687.5
2008	5.7	23.9	15.9	135.2	91.5	99.2	297.8	72.3	60.4	43.4	8.0	29.9	883.2
2009	45.3	18.9	29.2	8.4	82.2	154.8	120.8	23.7	20.1	62.9	18.7	37.1	622.1
2010	31.4	35.5	28.5	32.0	152.7	226.5	112.1	72.3	64.3	43.1	38.0	33.1	869.5
Average amount 2007-2010	23.1	30.9	28.9	52.1	95.1	127.8	159.1	75.9	53.0	59.1	27.0	33.6	765.6

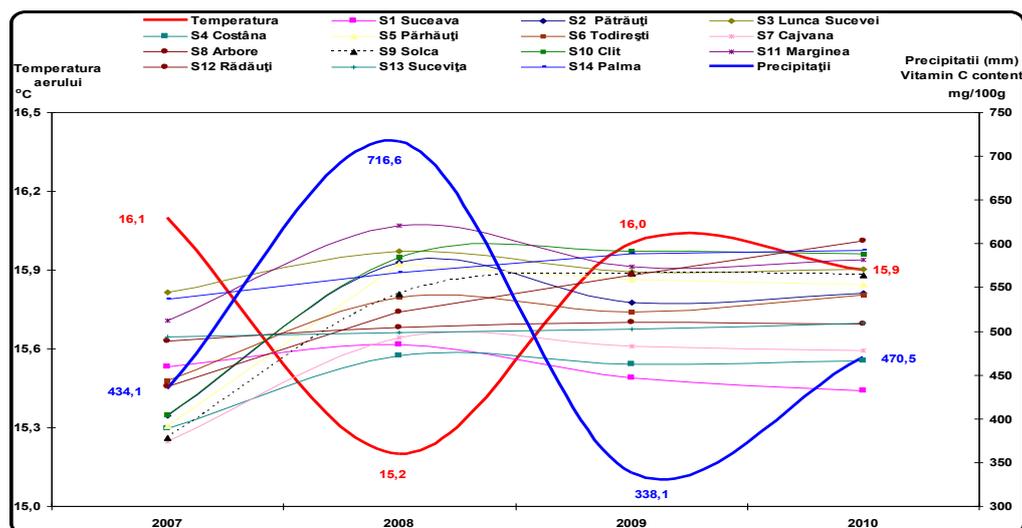


Figure2. The correlation between the air temperatures, precipitations and the quantity of vitamin C

The graphic analysis highlights the large amount of vitamin C in Marginea in 2008, when there is recorded the highest value of rainfall and low temperatures.

Also by comparison with data obtained from the topographic analysis it shows that the resort Marginea doesn't have slopes with southern orientation, as it is found in the specialized literature as a species with preference for sunny slopes.

4. Conclusions

From the obtained data we found out that rosehip has a good development on moist soils as well, with eastern and south-western exposition, shaded, with very good productivity and valuable chemical composition.

It develops itself pretty well in any type of soil, however it has a preference for fine-grained soils.

In the future there can be developed a tool to assess the indicators based on topographic, soil variables, and correlate them with the chemical composition of the species.

Based on the output there could be derived the indicators of the variability of the species *Rosa Canina* L.

The vitamin C content correlates significantly in 2 years time, a fact that is represented in the analysis of the correlation in figure 1.

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