CLIMATIC SPECIFICATIONS OF OHRID AREA OF VINEYARDS

Srebra Ilić-Popova

Abstract: The purpose of the research is the examination of the climatic characteristics, indexes and coefficients in the Ohrid area of vineyards.

In the region under study the average annual air temperature was 11.5°C, and the vegetative air temperature had a value of 16.7°C. The annual temperature sum was 4198°C, and ranged from 4033°C to 4524°C. The vegetative sum had a value of 3570°C, and it ranged from 3326°C to 3754°C. The annual rain sum was 665 mm, and ranged from 483 mm to 927 mm. The vegetative rain sum had a value of 342 mm, and ranged from 200 mm to 541 mm.

On the basis of the values of effective temperature sum, it can be concluded that the Ohrid area of vineyards belongs to the climatic zone B.

The values of the hydro-thermic coefficient indicated that in the area of vineyards, where the research was conducted, there was an irregular schedule of humidity. The helio-thermic coefficient had a value of 4.4. The bio-climatic index had a value of 7.7, and ranged from 4.8 to 15.2.

The results of this research indicate that the Ohrid area of vineyards is favorable for production of table and wine grape for varieties that ripen from I to II epoch.

Key words: climatic characteristics, indexes and coefficients, area of vineyards, grapevine.

Introduction

For a normal growth of the grapevine, for attaining high and quality crops, certain conditions of the environment are necessary. Growth of the grapevine is a result of a complex influence of environmental conditions. The requirements of the grapevine for certain climatic conditions are a gained characteristic of the culture during its growing.

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Planning of growing certain varieties of grapevine should be in close relation with the climatic and microclimatic elements of the environment.

The grapevine-wine production in the Republic of Macedonia is an important economic branch. According to the cultivated areas, the ratio of the wine varieties compared with the sweet ones is 65:35%, and the ratio of the red varieties compared with the white wine ones is 45:55%.

The areas of vineyards whose specific ecological conditions provide production of highest quality grapes have a great influence on the production and economic effect of this branch.

One of the areas of vineyards where there are specific conditions for production of grape is the Ohrid area of vineyards.

According to the division of regions (Bozinovic, 1996), the Ohrid area of vineyards belongs to the Pelagonija-Polog viticultural region, and covers the areas of grapevine that are situated in the region of the communities of Ohrid and Struga. The valley of Ohrid and Struga is surrounded by the mountain massifs of the mountains Galichica and Petrinja to the east, Karaorman to the north, Jablanica to the north-west and west, and with Ohrid Lake to the south-west and south. The Ohrid area of vineyards includes the following regions: Potpetrinja and Struga.

In Pelagonija-Polog viticultural region, the leading wine varieties of grapes are: Rajnski Riesling, Italian Riesling, Rkaciteli, Zupljanka, Merlot, Black Burgundac, Game, Cabernet Sauvignon, and Prokupac. Table grape of high quality of the variety Muscat Hamburg is also grown there.

**Materials and Methods**

For the analysis of the climatic conditions in the Ohrid area of vineyards and their suitability from the climatic aspect, and for successful raising of certain varieties of grapevines, we used meteorological data of the meteorological Stations in Ohrid for the period of 1961/1990 and 1991/2000.

We made estimations of the coefficients and the indexes in accordance with the accepted methodologies in the world grapevine circles.

On the basis of the sum of the effective temperatures and the established viticultural zones A, B1, C1, C2 and C3 (Winkler, 1974) we also established division of the areas of vineyards in climatic zones where researches were conducted. The international grapevine circles accepted the division according to Winkler.

Member countries of the European Union have made classification of their regions in climatic grapevine production zones according to which the conditions and criteria for the production of grape and vine are determined.
Results and Discussion

Since the grapevine requires certain conditions in the sense of climatic conditions, it is indispensable, prior to the introduction of every variety in the production, to study the climatic conditions in the production region in terms of the production potential of the culture to be exploited, so that good crop and high quality grape can be obtained. In our researches we have made analysis of some climatic elements (Ilić-Popova, 2001).

In Table 1, data of the warmth and rainy conditions in the areas of vineyards where researches have been conducted are shown.

<table>
<thead>
<tr>
<th>Meteor. Stat.</th>
<th>Year</th>
<th>$T_{\text{year}}$</th>
<th>$T_{\text{v-a}}$</th>
<th>$\Sigma T$</th>
<th>$\Sigma T_{\text{v-a}}$</th>
<th>$\Sigma H$</th>
<th>$\Sigma H_{\text{v-a}}$</th>
<th>$\Sigma \text{Act T}$</th>
<th>$\Sigma \text{Effect. T}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohrid</td>
<td>91/00</td>
<td>11.5</td>
<td>16.7</td>
<td>4198</td>
<td>3570</td>
<td>665</td>
<td>342</td>
<td>3375</td>
<td>1505</td>
</tr>
<tr>
<td></td>
<td>61/90</td>
<td>11.1</td>
<td>16.1</td>
<td>4076</td>
<td>3449</td>
<td>700</td>
<td>317</td>
<td>B</td>
<td></td>
</tr>
</tbody>
</table>

In the Ohrid area of vineyards, the average annual air temperature is 11.5°C and ranged from 10.9°C (1995) to 12.4°C (1994). The vegetative air temperature had a value of 16.7°C, and ranged from 15.5°C (1997) to 17.5°C (1994 and 2000). The annual temperature sum had a value of 4198°C, and the vegetative sum was 3570°C. Compared with the perennial average, the examined elements have higher values.

The average annual sum of rain had a value of 665 mm, and ranged from 483 mm (1993) to 927 mm (1996). The vegetative sum of rain was 342 mm, and ranged from 200 mm (1993) to 541 (1998). In some years the annual sum of rain deviate widely from the average. The coefficient of variation of rain during the vegetation period of the culture, for the period 1961/90 was 68.3%. during the year the rain was unevenly distributed. The heaviest rains were during the winter period, then in autumn, and the least during summer.

Numerous researches about the influence of climate upon the grapevine contributed to the formation of bio-climatic data for the culture. With their application, the zones for growing the grapevine varieties can be differentiated and defined.

On the basis of the value of the effective temperature sum, it can be concluded that the Ohrid area of vineyards belongs to the climatic zone B.

For establishing the supply of the vine with the necessary quantities of water, a hydro-thermic coefficient is determined (HiTK). The values of the hydro-thermic coefficient are also determined (HeTK) which is a safe indicator of the warmth conditions and the sunshine. To determine potential conditions for
growing the culture, we have defined bio-climatic index (BKI), which represents a complex indicator, because at the same time it connects warmth, light and rain conditions with a biological characteristic of the grapevine, the duration of the vegetation period.

In Table 2, the values of the climatic coefficients and indexes for the period 1991/2000 are shown.

<table>
<thead>
<tr>
<th>Meteor. Stat.</th>
<th>HiTK</th>
<th>HeTK</th>
<th>BKI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohrid</td>
<td>1.0</td>
<td>4.4</td>
<td>7.7</td>
</tr>
</tbody>
</table>

The values of the hydro-thermic coefficient indicate that in the study areas of vineyards there is an irregular distribution of humidity.

The values of the helio-thermic coefficient > 4 indicate that the viticultural unit is favorable for raising vines. In the Ohrid area of vineyards the helio-thermic coefficient had a value of 4.4 and ranged from 4.0 (1991) to 4.8 (1994 and 2000).

The value of the bio-climatic index is used for evaluating the climatic conditions of the viticultural unit for growing grapevines, and also for correct selection of varieties. Its optimal value is 10, and is considered good enough, increased or reduced by 5. In the study area of vineyards the bio-climatic index had a value of 7.7 and ranged from 4.8 (1998) to 15.2 (1993).

**Conclusion**

On the basis of the performed climatic researches, the following conclusions can be drawn:

The Ohrid area of vineyards is characterized by average annual air temperature of 11.5, vegetative air temperature of 16.7°C, the annual temperature sum of 4198°C, and the vegetative sum of 3570°C. Compared with the perennial average, the examined elements have higher values.

On the basis of the values of the effective temperature sum, it can be concluded that the Ohrid area of vineyards belongs to the climatic zone B.

The annual rain sum is 665 mm, and ranges from 483 mm to 927 mm. The vegetative rain sum has a value of 342 mm, and ranges from 200 mm to 541 mm.

In the Ohrid area of vineyards the helio-thermic coefficient has a value of 4.4 and ranges from 4.0 to 4.8.

The bio-climatic index has a value of 7.7, and ranges from 4.8 to 15.2.

The results of this research indicate that the Ohrid area of vineyards is favorable for the production of table and wine grape vine varieties that ripen from I to II epoch.
Climatic specification of vineyard

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KLIMATSKE SPECIFIČNOSTI ZA GAJENJE VINOVE LOZE U OHRIDSKOM VINOGORU

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RESUME


Godišnja suma padavina iznosi 665 mm, tj. od 483 mm do 927 mm. Vegetaciona suma padavina ima vrednost od 342 mm, tj. od 200 do 541 mm. Koeficient variranja padavina u toku vegetacijskog perioda kulture, za period 1961/90. godine iznosi 68.3%. U poredjenju sa višegodišnjim prosekom (1961/1990) ispitivani elementi imaju niže vrednosti.

Određivanje koeficijenata i indeksa, vršili smo prema usvojenim metodologijama u svetskoj vinogradarskoj nauci.

Na osnovu suma efektivnih temperatura i utvrđenih vinogradarskih zona A, B1, C1, C2 i C3 (Winkler,1974) odredili smo pripadnost ispitivanog vinogorja u

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klimatskoj zoni. Vinklerova podела је прихваћена од меджинародних виноградарских кружева.

Na osnovu vrednosti efektivnih temperaturnih suma može se konstatovati da Ohridsko vinogorje pripada klimatskoj zoni B.


Rezultati ispitivanja pokazuju da je Ohridsko vinogorje pogodno za proizvodnju stonog i vinskog grožđa od sorata koje sazrevaju od prve do druge epohe.