

“AKHASHENI”

WINE OF APPELLATION OF ORIGIN

Production micro-zone of wine “AKHASHENI”

Geographical location. Akhasheni is located in Inner Kakheti, in Inner Kakheti, in the middle stream of the river Alazani, with the coordinates of northern latitude of $41^{\circ}48'$ and eastern longitude of $45^{\circ}44'$, between the Chermiskhevi and Papriskhevi, the right tributaries of the Alazani of latitudinal direction. Distance from the settlement area of Akhasheni to the river Alazani north-eastwards is 9,5 km, and the distance to the crest of Tsiv-Gombori Ridge, south-westwards, the opposite direction is 14,5 km. In respect of location of vine-making, the territory of Akhasheni includes the continuation of forest-edge slopes of Tsiv-Gombori Ridge and the second terrace of Alazani plain. The vineyards in the micro-zone are located on the areas at 350-700 m above sea level and includes middle and upper parts of the villages of Akhasheni and Chumlaki, and the massif of “Papris Mindvrebi”. The main area of the territory are slightly inclined aprons with a wavy surface south-westwards, north-eastwards and eastwards. The aprons transfer into plains north-eastwards and border the first terrace of the Alazani along Chermiskhevi and Papriskhevi.

Climate. The weather in the micro-zone is formed by atmospheric processes developed in subtropical and moderate latitudes and displaced from west to east. Climate is moderately damp here, with hot summer and moderately cold winter. The direction of the gorge of the river Alazani plays a significant role. Cold air masses blowing from high peaks of Kakheti mounts covered with the Caucasioni glaciers move from north-west to south-east, to the foothills of northern-western slope of Tsiv-Gombori and to the plain areas.

The sun altitude from the horizon for Akhasheni latitude during the formation of grape seeds is $70-60^{\circ}$, and $50-40^{\circ}$ during the grape ripening period what creates an efficient radiation regime for the vine on the slightly inclined ($2-3^{\circ}$) slopes north-eastwards.

During the periods of formation (second half of June, July and first half of August) and ripening of the grape seeds (from the second half of August to the end of September) in the micro-zone, the clearness of the dome of the sky

is 6 and 8 days, respectively. The number of cloudy days during the mentioned periods is at most 3 and 1, respectively.

The annual duration of sunshine in "Akhasheni" micro-zone is 2150-2200 hours, with 1600 hours during the vegetation period. Total solar radiation in the micro-zone of "Akhasheni", on the right side of the river Alazani is more than on its left side caused by less cloudiness of the dome of the sky. The annual sum of radiation in "Akhasheni" is 130 kcal/cm², and 95-100 kcal/cm² during the vegetation period. Direct annual radiation on the horizontal surface is 75 kcal/cm², and the dissipated radiation is 54 kcal/cm².

Following the analysis of depth temperature isopleths of alluvial-calcareous soil, at the depth of 5-50 cm, a stable transition of temperature above 10° takes place in the first decade of April, and at higher depths of 50-100 cm, it does not take place until the middle of April.

Activation of the root system starts in the middle of May when temperature in the soil layer of 10-120 cm depth rises over 15°. From the middle of June until the end of September, or for over three months, the temperature in the soil layers of the depth of 5-70 cm is over 20°, and the temperature of soil at the depth of about 40 cm reaches 24° from the middle of July to the end of August.

In the micro-zone the average annual air temperature is 12,5°. The warmest months are July and August, with their average temperature of 23,7 and 23,5°; the average temperature of the coldest month (January) is +1,1°. Following the many-year data, the average of the annual absolute minimums of air temperature is -10, -11°, and the average of the annual absolute maximums is 35°. Extreme temperatures are -23 and +38°.

The first autumn night frosts usually start at the end of November (27.XI). Once in every 10 years, the first frosts may take place earlier, from 26.X what does not endanger vine. The last frosts usually end on 24.III. Once in every 10 years, the frosts may end in the middle of April. In such a case, if buds blossom earlier than usual (at the end of March or at the beginning of April) as it happened in spring of 2004, the night frosts are very dangerous.

The active heat accumulated at the altitude of 450 m in "Akhasheni" micro-zone is 3950°, and 3700° - at the altitude of 620 m. A stable transition of air temperature above 10° at the height of 450 m takes place on 5.IV, and the fall of temperature below 10° takes place from 4.XI.

Annual sum of atmospheric precipitations in "Akhasheni" micro-zone is 860 mm, with 637 mm in the vegetation period. The amount of precipitations during the fruit formation period is 250 mm. The sum of moisture deficit in the ground-edged air layer is 765 mm (Gurjaani). The mentioned indicators mean that the moisture-content in the given micro-zone is not sufficient (0,39) for a vine, and therefore, during the given period, vine needs irrigation: $W=0,4 \times 765 - 250 = 306 - 250 = 56 = 560 \text{ m}^3$, i.e. 560 m³ water is needed per hectare. The period of grape ripening is moderately humid and the vine needs no irrigation.

Average relative humidity of air is 71%. Air imbibition is the least in July and equals to 63% and in August equalling to 60%. This indicator is relatively higher at the end of autumn (78%) and in winter (76-75%).

The recurrence of the days with hail during the warm period of the year at northern-western districts (Tsinandali, Telavi) of the right bank of the river Alazani is relatively sharply reduced. The average annual number of the days with hail is 1,6-2,1 on average. May is the month with the most frequent hail (0,7 days) and June with 0,5 days with hail.

The buds of "Saperavi" blossom in the middle of April and flower in May. The grape is ripened in the second half of August. The technical ripening of grape takes place at the end of September. In order to gain a raw material of good quality (with sugar content of >21% and acidity of 6,0-7,5 gr/dm³) for European-type table wine 3800° of active heat is necessary, which in "Akhasheni" micro-zone accumulates at the altitude of 550 m (50%).

The premium-quality "Akhasheni" bulk wine from the areas at the height of 450-500 m can be gained 3-4 times in ten years. The number of the period the same material can be gained is less at lesser altitudes.

The amount of heat (>4100°) necessary for gaining naturally semi-sweet bulk wine (with sugar content of >26%) is accumulated at the height of 350 m (50%) on average. For this purpose, the grape should be harvested in the first half of October. At the height of 400 m, where the average amount of heat is approximately 4000°, naturally semi-sweet bulk wine can be produced once in every 10 years, and also once in every 10 years at the height of 500 m.

The snow cover appears in the last decade of December (from 25.XII) and melts from the middle of March. In 74% of years, the snow cover is not stable. The number of snowy days in winter is 26.

The average of the annual absolute minimums of the air temperature is -10, -11°C. Once in every 10 years, minimum temperature of -15° with little duration is expected what will only slightly damage the vine buds (up to 30%).

Winds of western (32%) and southern-western (23%) directions prevail in the micro-zone. The number of days without wind is about 21% per annum. At night, before the sunrise, the cold air masses flowing down the high tops of the Caucasus Mountains intensify the danger of winter frosts and spring night frosts. Generally, the micro-zone belongs to the third group of wind adverse activity. Average annual wind speed is 1,4 m/sec. the wind speed in different months is almost the same. The number of days with strong wind is only 4 per annum. In the best instance, two-row windbreaks are recommended.

Soil. Following the results of the studies and the study conducted by us, there are two varieties of Rendzina-brown soils, two varieties of alluvial and one variety of dealluvial soil distinguished in the micro-zone:

- Rendzina-brown loamy soil of great thickness;
- Rendzina-brown clay and heavy loamy soil of great thickness, weakly skeletal here and there;
- Alluvial-calcareous loamy soil of great thickness;
- Alluvial-calcareous loamy soil of great thickness, skeletal;
- Dealluvial calcareous loamy soil of great thickness.

The first two varieties of soils are spread in the extreme southern-western part of the micro-zone, on the northern-eastern slopes of Tsiv-Gombori mountains, and namely, in the massif of "Papari Fields" on the territory of Akhasheni and in the southern-western part of Chumlaki territory. The 3-rd and 4-th soil varieties are spread in the central and northern-eastern parts of

the mentioned villages, on the second terrace of the river Alazani, along the rivers Chermiskhevi and Papriskhevi, on the plain forms of inclined relief. The 5-th variety of soils are mainly spread in the central part of the micro-zone, at the foot of the southern slopes of Tsiv-Gombori mountains and are slightly inclined aprons by their relief.

Thickness of profile of the first soil variety is 70-90 cm, and that of the humus-containing active layer is 50-60 cm. Thickness of the profile of the second soil variety is 60-90 cm, with the humus-containing active layer of 40-50 cm thick. They are characterized by skeletal texture here and there. Both soil varieties are spread on high-calcareous loamy-limestone deposits. The soils of 3-th, 4-th and 5-th varieties have deep profiles of over 1,5 m, with the thickness of humus-containing active layer of 50-60 cm. They are developed on loamy-limestone and loamy-sandy deposits. Humus-containing layer of the first two varieties of soils is dark brown, and the soils themselves are of blackish brown color. They are light brown in the transition layer, with straw tint and of light straw color with whitish tint in the lower layer. The soils of the 3-rd, 4-th and 5-th varieties are of light brown color with less differentiated colors in the profiles. The soil of the 4-th variety is characterized by skeletal texture.

According to the data of laboratory analysis, the soils of the first two varieties are of clay and heavy loamy texture, and the soils of the 3-rd, 4-th and 5-th varieties are loamy soils. According to the content of humus in the soils of the 1-st and 2-nd varieties, it is average in the active layer amounting to 3,5%, and decreasing in the lower layers. The same indicator in the 3-rd, 4-th and 5-th varieties of soils is relatively less varying between 1,5-3,0% in the active layer, decreasing in lower layers. The soils are poor in hydrolysis nitrogen, soluble phosphorus and exchange potassium. The content of carbonates in the first and second varieties of soil is average in the upper layers, reaching extremely high amounts in the lower layers of 40-50%. The same indicator in the 3-rd, 4-th and 5-th varieties of soils is mainly average. The reaction of soil area (pH) is average and mostly within the limits of 7,5-8,6.

Following the conducted studies, the agricultural characteristics of the soils spread on the territory of the micro-zone enable to produce high-quality bulk wine "Akhasheni".

Agro-technological regulations

In order to produce the bulk wine of appellation "Akhasheni", the following agro-technological regulations should be observed by considering the soil and climatic conditions.

Species of "Saperavi"

Growing area: Up to 350-700 m above sea level.

Plot of planting: 3,0 x 1,5 m; 2,5x 1,5 m; 2,5 x 1,25 m.

Height of stem: 60-90 cm

Form of pruning: Free and Georgian two-sided trellis.

Norm of loading per 1 m²: 8-10 buds; 80-100 thousand buds per hectare.

Harvest: 7-8 tons per hectare.

Soil cultivation

The vegetation irrigation in the irrigation area should be ended one month before the vintage; autumn and spring ploughs of soil. Minimum soils cultivation. Moisture-preservation measures - preservation of soil surface in a loose state (cultivation, milling, mulching).

In dryland - on the slopes of average inclinations carrying out anti-erosion measures with minimal and zero soil cultivation; soil mulching.

Fertilization

Application of organic-mineral fertilizers under cartographic agricultural regulations.

Phyto-sanitary regulations

Principal diseases: Mildew, powdery mildew, rots.

Pests: Ticks, western grape worm, mealybug.

Pest and disease control measures: Using proper contact and systematic preparations registered in Georgia.

Urgent measure: Rationing high-yielding tillers in accordance with the established agricultural regulations.

Economic-technological characterization of the species of "Saperavi"

"Saperavi", by its economic designation is red-grape wine species. In the given micro-zone it produces invaluable material for semi-sweet bulk wine.

The vine is stronger than that of average grow. The harvest per hectare to gain the conditional production varies between 7-8 tons. Sugar content of the ripe grape reaches 260 gr/dm³, with the acidity of 7,5-8,5 gr/dm³. The bunch on average weighs 140-145 gr. It is characterized by fall of flowers, against which the tips of tillers should be torn off 2 or 3 days before flowering. It is not sensitive to fungus diseases.

Wine "Akhasheni"

"Akhasheni" - Controlled high-quality, red naturally semi-sweet wine of geographical appellation. It is characterized by dark ruby color, with species-specific taste, harmonious, elaborate, full, piquant, pleasant sweetness, fruit tones and species-specific aroma.

Chemical and organoleptic properties of the wine "Akhasheni" should correspond to the following indicators:

Volumetric spirit-content, % - 10,5-12,0

Mass concentration of sugars of no more than 30-50 gr/dm³

Titrated acidity - 5,0-7,0 gr/dm³

Volatile acidity of no more than 1,2 gr/dm³

Mass concentration of finished extract of no less than 20 gr/dm³

Concentration of total mass of sulphuric acid of no more than 210 gr/dm³

Concentration of free sulphuric acid of no more than 30 gr/dm³

The rest norms should correspond to the legislative acts of Georgia and the EU Directive No. 1493/1999 of May 17, 1999.

Available areas for raw materials of wine “Akhasheni”

The areas for raw material of the wine “Akhasheni” is approximately 112 ha.

Approximately 728 tons of harvest is possible to produce in the micro-zone. At the output of 65 decaliters out of 1 ton, 47,000 decaliters of bulk wine may be produced.

The location of “Akhasheni” micro-zone, the microclimate of forest-edged slopes of Tziv-Gombori mountains, calcareous and loessial, loamy-clay and alluvial-dealluvial soils and high indicator of sugar content of the vine species of “Saperavi” make for peculiar values of wine “Akhasheni”.

