



THE STUDY OF BIO-MORPHOLOGIC CHARACTERISTICS OF KING'S RUBY VARIETY UNDER THE CONDITIONS OF TIRANA CLIMATE

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SYNOPSIS

Key words:

King's Ruby grapevine, bio-morphological characteristics, high production rate, big cluster and high percentage sugar rate.

The study examines the reactions of cv. *King's Ruby* under the climate and ground conditions of Tirana in Albania. The research has lasted for three years (2006 to 2008) and an IPGRI descriptor is used to define and assess its characteristics.

King's Ruby variety has a high cluster weight (976g); medium-sized grape berry (3.02g); yield rate 22.2 kg/plant; conversion coefficient (1.3) for converting into HI; 322 HI per ha; sugar percentage 23 %; acidity 3.03 gram per liter, must range 73.5%; resistance of grape berries under pressure is 1,288 gram.

INTRODUCTION

The whole set of cultivars which are cultivated, preserved and introduced constitute a rich resource for society. They should be recognized, collected, preserved and studied. The large genetic diversity of grapevine presents a huge opportunity for improving the genetic features, technologic characteristics and, above all, qualitative standards of wine and table grapes (Muller, 1982).

The activity of introducing new selected varieties and evaluation of our country's climate intends to carry out preliminary characteristics, as well as, recommends the spreading in farm conditions. This activity aims to evaluate the reaction of cultivars *King's Ruby* in Tirana climate as it is introduced in Albania from Middle Asia about 10 years ago.

MATERIAL AND METHOD

The study was carried out for three years between 2006 and 2008 in 15 different cv. *King's Ruby* grapevine varieties in Kamez of Tirana (F.A.O, 1978). The age of the plants is 10 years old old at the start of investigation. The evaluation is

made through measurements and observations based on an Ampelo-graphic theory of representative sample of crops of cultivar elements which consist of 15 plants selected randomly (Bisson, 1962). Characterization and evaluations of their features is performed based on IPGRI descriptor.

Morphological characteristics describe all cv. *King's Ruby* elements such as the tree, sprout, branch pruned from a grapevine, leaf, flowering, bunch of grapes, grape berry and seed (Deshaies, 1993). Physiologic characteristics include: fertility and its coefficient, ripping period, ripping, and fruit connection force. Technological characteristics include: fertility, production, sugar content and acidity.

Observations have been carried out on a minimal set of 50-100 varieties of organs, clusters, fully-developed leaf, flowers of the middle part while for the fruit there have been observations for over 100 fruits (Truel, 1985).

All the assessments are performed based on 2007 SAS Version Variances which have resulted following the measurements and observations.

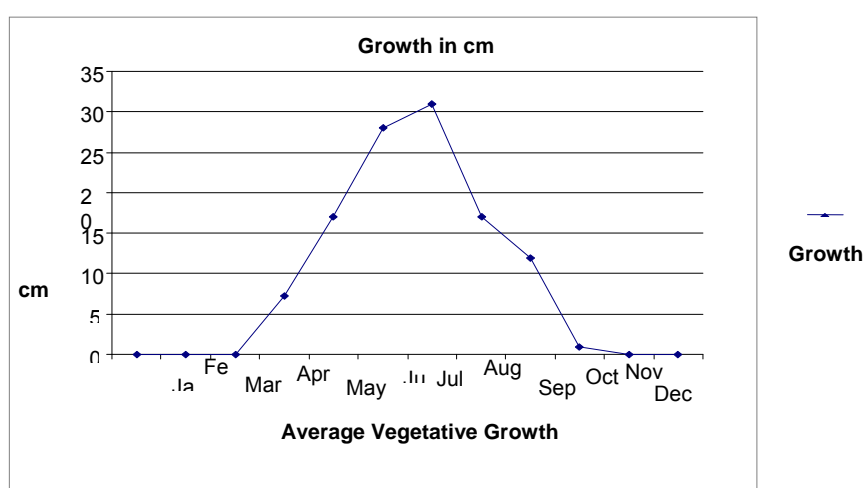


Figure 1: CV. King,s Ruby Bioclimatogram in Tirana Area.

RESULTS

Phenological features: transition from one phenological phase to another in Tirana climate has not shown any obvious differences in comparison with other local grapevine cultivars (Maracchi, 1983). Main pheno-phases are: flowering induction and bud differentiation (Bisson, 1995a). Pullulating, blossoming, connection and ripping are developed over biological zero degree in correlation with temperature values during the months of the year (Bisson, 1995 b). According to observations made during vegetation period, cv. *King's Ruby* variety has a typical bioclimatogram which is compiled through the sum of temperatures ($t-t_0$). The required monthly temperature for the annual biological cycle is described in Figure 1. Bioclimogram

shows the correlation between monthly temperatures in terms of Tirana and vegetative growth of cv *King's Ruby* (Caporali, 1996).

MORPHOLOGICAL CHARACTERISTICS

NEW SPROUT: New sprout has an half opened form. It has a 50-60 grade position on its top, with average depth pigment of anthocyanin, average density fuzz and green with red tint (Fig 2). Twines result with average length of 17.8 cm which are relatively long.

The most intensive growth of sprouts is the period from June to July 15th. The vegetative growth period coincides with the typical cultivars of the zone. The annual average growth is bigger than local cultivars. The highest yield rate is in the segment over the plant nodes 3-5. It has a high production coefficient (Susaj & Kukali, 2009).



Figure 2:
Sprout of vine-grape *King's Ruby*.

LEAF: New leaf has a bronze green color in the upper side of leaf, anthocyanin pigment is tinge and fuzz between the venation systems is missing. The grown leaf has principal venation system 20.03 cm long, with a pentagonal form, lobule with 5-7 pedicellate, dark green color without anthocyanin hue. It has a flat and excellent profile in the upper side of leaf. The teeth-rectilinear leaf form has an average length of 15-17cm, density of hairs is small or absent and the average stem length is 11.9cm. It has a pentagonal form and five lobules. It has a chest form within leaves, (Figure 3). Leaves were taken during the summer, preferably those located between the 8th and 11th plant nodes.



Figure 3: Leafs of grape-vine *King's Ruby*.

BRANCH PRUNED FROM A GRAPEVINE: The cross-section of brunch pruned from a grapevine is oval, color (v-k). Lentils are generally lacking. Density of hair in plant nodes and internodes is missing or too low. Branch pruned from a grapevine has a relatively powerful average growth and a great number of axillaries buds.

Flower is shown as a composed cluster. The number of flowers in a cluster is relatively large and goes over 300. Flower is closed, in a pellet form with green color in yellow. In general, it is functional female. The flowers are female and male organs, with a healthy pistil and craze. Number of flowers grown from the bud of branches pruned from a grapevine results 1.43 flowers per sprout. It has an average coefficient of absolute production (1:43). Length of the first flower is (18:25 cm) with medium length. Connection of flowers is 73.8% (Figure 4).



Figure 4: Flowering of grape-vine in cv *King's Ruby*.

CLUSTER: It is large, average weight 976 gram, and the form of cluster is cylinder-conical, rare, with gradual ripping. The grape berries are friable, moveable in a conical form. Grape berries are average with size 21 mm long and diameter 17 mm. Ratio D/d is (1.22), and weight of grape berry is 3.02 gram. Pulp of grape berry is brittle and stable, colourless, liquid , with a rattling continuity. It has a pleasing taste with a light flavour. In grape berries there are no seeds but some of their remainings. In the ripping time it is distinguished because the fruit which has 23 % sugar and 3.03 gr/liter tartaric acid.

The length of bunch of grapes is classified as very long (32.3cm), and average width (16.2 cm). The ratio L/l is (1.99). Number of grape berry is 322.7 per bunch of grapes, and constitutes variety of bunch grapes with many grape berries. Stem of a bunch of grape is long (11.1cm). Form of a bunch of grape can be according to IPGRI. It can be conical, pyramidal, cylinder, with wings, rump, composed, and dub. Variety *King's Ruby* is characterized to have clusters with wings and compact bunch (Figure 5).



Figure 5: Clusters of grapevine cv *King's Ruby*.

GRAPE BERRIES: Fruits emerged after parthenocarpy (virgin fruit) have a uniform size, equipped with stem. Fruit is false. Ratio of grapes is over 95% of total weight. It is rich with dye and aromatic substances. Endocarp (inner layer of a fruit) is brittle and very rich in sugar and organic acids. Diameter (D) is 21.02mm. Diameter (d) is 17.2mm, Ratio D/d (1.22). These are considered long (O.I.V).

Grape berry has pink maroon in green colour. It is in conical form with acme, and layer of purine covers the whole surface of fruit's pith. Fruit's pith is pasted with pulp, and is very thin and frail. Fruit is brittle. Pulp is strong, not watery, sustainable, with a light colour of vinegar, rattling, with a dominant pink color. Presence of prune is average. Epidermis (outer layer of skin) + hypodermis are very thin (100 mkr), with an easily colored pulp (Somers & Veritte, 1988). Quantity of must is average. Pulp is sustainable with a light flavor. Stem's fruit is 11.1mm. Fruit connection with the stem is light and there is no formation at all. Forms of grape berries under IPGRI could be 10. Grape berry of the *King's Ruby* is in the extended elliptical form (Figure 6).



Figure 6: Fruit (grape) cv King's Ruby.

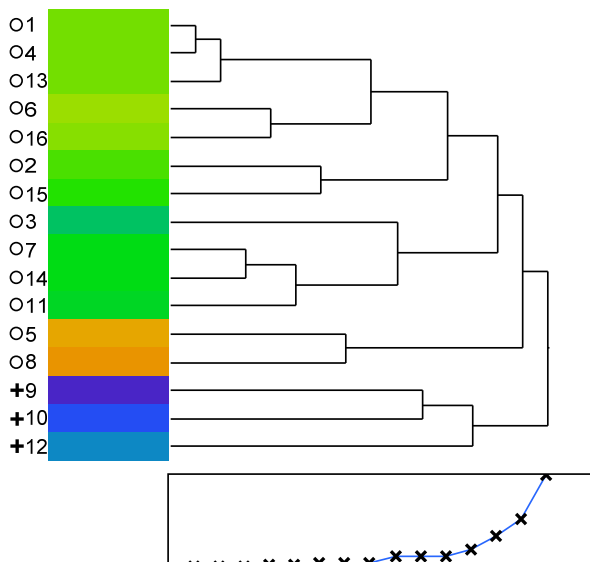


Figure 7: Dendrogram Hierarchical Clustering, Method Ward % Sugar different replication.

TECHNOLOGICAL CHARACTERISTICS

Weight of high clusters is (976 g). Average weight of average grape berry is (3.02g).

Resulted rate is 22.2 kg /plant. It is clasified high with a convertable coefficient which is (1.3) converted to HI, 322 HI/hektar.Contents of sugar in must results high. Percentage of sugar is 23%. Estimated tartiric acidity per gram/liter results 3.03 gram/liter which means it is very low.

Mechanical indicators of grape berries: cluster is 3.85. The consumed part of cluster is very big. The quantity of must weighted in a cluster is 73,5%. Sustainability of grape berries under pressure is 1,288 gram. It is classified in varieties with a greater sustainability towards the diseases and pests.

Table 1: Figures for yield rate of experimental plants of cv. *King's Ruby*.

Number of plants	No. Clusters	Weight of Clusters(gr)	Yield Rate Kg/rr	% Sugar
1	21	1002	21.0	22.2
2	20	1030	20.6	21.8
3	25	985	24.6	20.8
4	26	1045	27.1	22.0
5	17	920	15.6	23.1
6	21	880	18.4	22.2
7	22	917	20.1	21.3
8	20	902	18.0	23.3
9	28	1160	32.5	18.8
10	26	1140	29.6	19.4
11	25	1170	29.2	21.2
12	29	1130	32.7	20.0
13	22	700	15.4	22
14	26	680	17.7	21.3
15	27	710	19.2	21.6
16	21	670	14.1	22.1
Total	376	15041	355.8	343.1
	23.5	940.0	22.2	21.4

AGRONOMICAL CHARACTERISTICS: Agronomic characteritic are progressive length, which are 723 cm per vegetation plants, number of axillaries buds per ml is 13. Average length of internodes is 15.4 cm. Diameter of internodes is 11.03 millimeters.

Percentage of flower blossoming in grape berries in time of ripping is 73%. Average weight of bunch grapes is 976 gram. Percentage of sugar in must is 23 %, and contains tartiric acid which is 3.03%

Any plant has in average over 15 clusters with yield rate 22.2 kg / plant or 668 kv/ha. Compared with other cultivars, *King's Ruby*, gave a production about two times greater, in farm conditions (Singleton & Esau, 1969).

It is very important to be careful towards grape berry fungus and moths in vegetation as well as their effect on average clusters because **Pests and Diseases** in vineyards can devastate a crop. Another pest could be the effect of ashes.

PRODUCTION OF BUDS: Buds differ flowering after plant node III, It has an absolute production coefficient which is 1,29, per plant with a very powerful growing vegetation. It is cultivated with a very high productivity.

Table 2: Number of flowers, connected fruits.

Plant	Number of Flowers	No of connected Fruits	Connected Fruits (%)
1	1652	1255	76.0
2	2224	1645	74.0
3	1886	1406	74.6
4	2055	1537	74.8
Total Repetition	7818	5843	73.8

CONCLUSIONS

1. King's Ruby fits very well in Tirana's climate and represents very high indicators of production. Index of production is one of the highest in the group of table grape cultivars.
2. The area of stretch is until the highest 200 meters above sea level.
3. Destination of production in the Tirana climate remains as a variety of table and dried grape.

RECOMANDATIONS

1. Variety of grape-vine King's *Ruby* can be cultivated very well in central and south of Albania, noticing the benefits from bioclimatogram of the study of its biomorphic characteristics.
2. Agro technical services should be of a very high level of mechanization, for this reason the distance in sawing should be. 2.40x 2 m.

Table 3: Some indicators of grapes, bunch of grape and leaf.

Repetition	DIAMETRE (mm) Dd	Weight of cluster GR	Number Of grapes in a bunch of grape	Biometer of a bunch of grape (L) (l)		Weight of Frutit (Gr)	Number of bunch of grape	Growing Vegetation Average/ Annual (cm)	Quantity leaves cm square.
1	2.02a 1.65a	1015a	347	122	58	2.95	23	553	1689
2	2.05a 1.68a	905b	313	136	71	2.89	20	612	1750
3	2.07a 1.70a	1150a	368	128	67	3.12	27	549	1713
4	2.04a 1.64a	690c	209	100	49	3.30	24	574	1606
Total Repetition	8.18 6.67	3770	1237	486	245	12.26	94	2288	6758
Average	2.04 1.66	942	309	30.3	15.3	3.03	5.87	143	270.3
	Tukey-Cramer	Tukey-Cramer							

3. *King's Ruby*, as a cv of grape-vine with early ripping, clusters of big sizes with brittle grape berry fulfil very well the needs of market economy for the table grape.

4. High percentage of sugar, sustainability towards the diseases and pests, sustainability to post harvest (data) justifies recommendation per cultivation of this cultivar.

The high efficiency in production will make requested in market avoiding the introduced cv and not studied so far to be compatible with the eco-clime in Albania.

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