Morphological and agrobiological characteristics of the Bart grape variety

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Abstract. The morphological description of the new Bart table-grade wine grape variety for use, the timing of the vegetation phases and agrobiological indicators of the variety for the years of observation 2014–2018 are given. The cultivar is recommended for cultivation in the 6th region in a non-covering culture.

1. Introduction

Analysis of the achievements in the selection of varieties of wine city showed that the most vulnerable place for varieties is the lack of resistance to fungal diseases. In this regard, the increase in resistance due to the creation of interspecific varieties in combination with coarse-growing and early ripening becomes the most priority direction in breeding [1–5].

The small number of large-berry table varieties in the assortment (with a berry mass of about 10 g) prompted us to continue developing the selection program “Giant. Also, at the moment, we are paying great attention to the work on the cultivation of table seedless grape varieties with high winter resistance and disease resistance.

The assortment shows an insufficient number of non-covering, disease-resistant varieties of grape varieties that meet the high requirements of the consumer, a very small number of early ripening varieties that would meet modern requirements for toxicity to consumer products [6].

Scientific and technological progress in viticulture is determined by two leading factors – the variety and products made from it, as well as cultivation technology, including means of mechanizing the cultivation and protection of vineyards [11].

Improving the varietal composition of vineyards is a natural process of their varietal substitution, varietal renewal and clone improvement. The assortment is being improved in two ways: introduction and selection [8].

The main disadvantages of the regionalized assortment of many areas of industrial winegrowing in Russia are the significant dominance of the same old varieties in all areas of industrial winegrowing, as a result of which we have an increased pesticidal load on the vineyards and a fairly low yield [1, 5]. In many literary sources, it is noted that in the industrial assortment early ripe and late ripening frost-resistant grape varieties are poorly represented. At the same time, scientists note that special attention should be paid to grape varieties with group resistance to biotic and abiotic environmental conditions [2, 4, 5, 7].
One of the most important directions in the development of the agrarian sector of the Russian economy at the present stage is the intensification of innovative activity, which allows accelerating the solution of the country's food security problems through import substitution in agricultural markets, agricultural machinery, and agricultural technologies. Improvement of the domestic selection and seed-growing subcomplex is the most important innovative potential of the agro-industrial complex, which allows in a short time to increase the productivity of agricultural sectors and reduce unit production costs. Selection and seed production are knowledge-intensive and dynamically developing elements of the crop production system. The development of fundamental and applied research in this area can ensure the production of new high-yielding, disease-resistant varieties and hybrids of agricultural crops, the widespread introduction of which will help to solve the problem of food safety and import substitution, increase the country's export potential in the field of food-lusts.

2. Methods and materials
The variety is grafted by green grafting on adult bushes of the rootstock of RB Kober 5 BB variety. All surveys were carried out on 3 varieties of bushes. The variety was studied by phenotypic and agrobiological indicators according to the following methods:

- To study the features of the passage of the annual biological cycle, depending on environmental conditions, the method of phenological observations was used.
- Phenological observations, determining the load indicators of bushes with eyes, shoots and yield, fruitfulness of the shoot, weight accounting of the crop, studying the growth force and degree of maturation of annual shoots, the ripening dates of the berries were carried out according to the method of M.A. Lazarevsky [9].
- Assessment of winter hardiness and frost resistance was carried out according to the “Guidelines for the selection of grapes” [8], by the number of blossoming eyes that developed on the bushes of full-grown shoots, productivity and productivity of bushes.
- Urological assessment of the crop was carried out according to the "Methodological guidelines for the selection of grapes" and according to the method of N.N. Prostoserdova [13].
- Evaluation of the quality of the crop was carried out by determining the content of sugars and acids in the juice of the berries as they ripen. Sugar content of berry juice is determined by the refractometric method, acidity by titration with 0.1 N NaOH solution in bromptimol blue.
- To assess the suitability of varieties for cultivation, “Methodological guidelines for the study of varieties in production conditions” were used [10].
- Assessment of the resistance of the variety against diseases was carried out according to a 5-point system according to the method of P. N. Nedov [11, 12].
- The study of the productivity and productivity of varieties includes determination of the fruitfulness of shoots, weight accounting of the crop, determination of the average mass of the bunch.
- The productivity of shoots is determined according to the method of A.M. Amirjanov and D.S. Suleymanov “Assessment of the productivity of grape and vineyard varieties” [14, 15].
- In determining the fruitfulness and yield, we use the methods of M.A. Lazarevsky [9], and “Methodological guidelines for the study of grape varieties in production conditions” [8].
- Description of the variety at the environmental protection system according to the international methodology, finalized by the FSBI "State Commission" and L.P. Troshin [16, 17].
- An organoleptic assessment of the quality of table grapes was carried out by the tasting committee of the institute.

3. Results
Table Bart grape variety, working name FVO-7-5, Platov's Anniversary, obtained by crossing Talisman and Original varieties. The authors of the variety Krasokhina S.I., Maistrenko L.A., Maistrenko A.N., Mezentseva L.N. Patent application GUP Vinkhoz “Burunny” of the Shelkovsky district of the Chechen Republic.
The variety has a medium-late ripening period, the duration of the production period is 141 days, the sum of active temperatures from the beginning of bud opening to consumer ripeness of berries 3112 °C. Under the conditions of Art. Scarce, a rural type village of Burunny, Shelkovsky district of the Chechen Republic, bud blooming occurs in the second decade of April, flowering in early June, the ripening of berries in late July, full ripeness of berries in the first half of September.

| Table 1. Passage of vegetation phases, variety Bart |
|-----------------------------------------------|
| Indicators | Years of study | average |
|---------------- |---------------- |---------|
| The onset of phenophases | 2014 | 2015 | 2016 | 2017 | 2018 |
| Beginning of budding | 29.04 | 28.04 | 12.04 | 28.04 | 21.04 | 24.04 |
| Beginning of flowering | 30.05 | 7.06 | 5.06 | 8.06 | 25.05 | 3.06 |
| berry ripening start | 22.07 | 17.07 | 23.07 | 27.07 | 15.07 | 21.07 |
| Full ripeness of berries | 25.08 | 1.09 | 13.09 | 2.10 | 20.09 | 12.09 |
| Production period | 2014 | 2015 | 2016 | 2017 | 2018 |
| Number of days | 118 | 126 | 152 | 157 | 152 | 141 |
| Sum of active temperatures °C | 2774 | 2835 | 3042 | 3429 | 3483 | 3112 |
| Analysis Date | 25.08 | 1.09 | 13.09 | 2.10 | 12.09 | 13.09 |
| HAP | 25 | 30 | 21 | 57 | 20.09 | 35 |
| Mass concentration, g/dm³ | 192 | 290 | 185 | 195 | 208 | 194 |
| Sug. | 7.6 | 6.3 | 8.6 | 3.4 | 4.8 | 6.1 |
| Acid. | 6.1 |

Young escape. The crown of a young shoot is wide open, slightly or medium-pubescent, white green. The first two leaves are light green with a web-like pubescence with the upper and lower sides of the leaf, weak or medium density. Young leaves are yellow – green, the back side of the leaf has a medium density cobwebly pubescence (Fig. 1). The young shoot is semi-erect, the color of the dorsal side of the internodes is green with red stripes, the ventral side of the internodes is completely green, the number of antennae on the run is more than three medium or long.

The matured annual shoot of brown color.

The leaves are round, of medium size, dark green, moderately dissected, five-lobed with a widespread central lobe, the top is a smooth or slightly mesh-wrinkled top, the bottom is medium or rare felt pubescence. Upper notches slightly open, deep lyre-shaped with vaulted, less often parallel sides, or less often closed with an elopso-lumen. The lower notches are medium, open lyre-shaped, less often in the form of an incoming angle. Petioles notch, as a rule, open, vaulted or lyre-shaped with a flat bottom. The teeth at the ends of the blades are large, dome-shaped with convex sides. Sometimes the middle lobe ends with a narrow, needle-like denticle. The teeth along the edge of the leaf are medium, saw-shaped with straight sides. Petiole is equal to the middle vein or shorter than it, wine-red in color (Fig. 2).

The flower is bisexual. Five stamens. The stamens are slightly longer than the length of the pistil. The clusters are cylindrical, very large with an average weight of 545 g.

White berries in the sun with an amber-brown tan, oval-ovate, 25 mm long, 20 mm wide, weighing 7.3 g (Fig. 3). The flesh is meat-hundred-juicy, of a pleasant harmonious taste, the skin is eatable, the total sugar content is 190–210 g/dm³, the acid content is 3.4–8.6 g/dm³ (Tables 1, 2).

| Table 2. Parameters of Bart grape berries |
|------------------------------------------|
| Years of study | Berry Berries, % | Berry Weight, g | Berries Size, mm |
|----------------|------------------|----------------|-----------------|
|                | Length | Width |                | Length | Width |
| 2014 | 0 | 6.6 | 24.4 | 19.8 |
| 2015 | 0 | 6.6 | 24.4 | 19.8 |
| 2016 | 0.2 | 5.9 | 25.4 | 20.5 |
| 2017 | 0 | 4.4 | 24.5 | 20.2 |
| 2018 | 0 | 6.5 | 24.3 | 20.0 |
| average | 0 | 6.0 | 24.6 | 20.1 |
Figure 1. Crown of a young shoot of Bart variety  Figure 2. Ampelographic image of Bart variety

Figure 3. Berries of the Bart grape variety

Fruitful shoots 54.8 %, fruiting rate – 0.7, fruiting – 1.1. With a planting pattern of 3 × 0.75 m in a continuous culture, 221 c / ha (Table 3). The load of 15–20 eyes on the bush, followed by removal of excess shoots during the first wreckage. Pruning vines for 6 eyes. The fertility of the ocelli at the base of the shoot is high – a short pruning of 3–4 ocelli can be done. Due to the very large clusters (543 g) it is easily overloaded with crops.

| Year of research | Eyes bloomed, % | Fruitful Shoots, % | Fertility Rate | The average mass of the bunch, g | Escape productivity, g | Harvest from 1 bush, kg | Estimated Productivity, c / ha |
|------------------|----------------|-------------------|----------------|-------------------------------|------------------------|-----------------------|-----------------------------|
| 2014             | 83             | 40                | 0.6            | 508                           | 305                    | 3.0                   | 133                         |
| 2015             | 31             | 31                | 0.3            | 680                           | 204                    | 0.8                   | 35.6                        |
| 2016             | 72.9           | 68.8              | 0.9            | 485                           | 436                    | 7.0                   | 311                         |
| 2017             | 80             | 61                | 0.7            | 520                           | 364                    | 3.3                   | 147                         |
| 2018             | 75             | 73                | 0.9            | 520                           | 468                    | 10.8                  | 480                         |
| average          | 68.4           | 54.8              | 0.7            | 543                           | 355                    | 5.0                   | 221                         |

In thickened plantings, when overloading bushes with crops, the ripening period may be delayed. It is advisable to maintain a high agricultural background. Phosphorus-potash fertilizers are effective from the first year of fruiting. With a lack of heat and an excess of moisture and nitrogen fertilizers, overloading bushes with crops – the ripening period is delayed.

The growth rate of the bushes is medium. In a grafted culture on tall rootstocks, growth intensifies and can reach up to tall growth. Shoot ripening is good: by mid-October, shoots ripen by 80–85 %.
Frost resistance –25...–26 °C. After the harsh winter of 2005–2006, in the city of Novocherkassk, Rostov Region, with the sum of negative temperatures 519.30 °C and the absolute minimum temperature minus 28.00 °C, the bushes were restored by shoots from sleeping buds from old wood, the bush stem and skeletal sleeves had medium-sized bruises. The variety withstood sharp temperature changes in March and early autumn frosts (October 6) in 2015. The variety is resistant to mildew – 2.5 points, gray rot – 2.5–3.0 points, oidium 3.0–3.5 points. Requires 1–2 preventive measures to protect against fungal diseases.

Harvest is used for fresh consumption. Transportability is average. Tasting assessment of fresh grapes 8.6–8.8 points.

4. Conclusion

The Bart grape variety is recommended for cultivation in the 6th region (Krasnodar, Stavropol Territory, Rostov Region, Dagestan, Chechen Republic) in a non-covering culture. Variety of canteen use, average transportability. Tasting assessment of fresh grapes 8.6-8.9 points.

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