

# Agrobiological Assessments of Gooseberry (*Ribes uva-Crispa*) Varieties Depending on the Quality and Pure Variety of the Planting Material

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**Abstract** – It is possible to get a high-quality crop due to the pure variety and properly formed certified seedlings of gooseberry (*Ribes uva-crispa*). It is known that gooseberry (*Ribes uva-crispa*) is planted in the tree nursery in the form of single trunk trees with 4-5 skeletal branches. In our work, standard clean planting material (seedling) was used, the variety composition of which is diverse. The Round Red local type is of interest in terms of production and selection. At the same time, the species composition of harmful organisms of , gooseberry (*Ribes uva-crispa*), was studied. The purpose of this article is to present the result of a comprehensive comparative study of the local red variety we have studied, to the production, as a variety with weak thorns, stable towards diseases and pests, also as a valuable raw material in the selection.

**Keywords** – Pure Species of Planting Material, Gooseberry (*Ribes uva-Crispa*) Root, Disease, Pest.

## I. INTRODUCTION

Gooseberry (*Ribes uva-crispa*), is one of the relatively rare berry plants in Armenia. It is more common in Dilijan, Stepanavan, Gugark and in other humid regions of the republic. In Armenia comprehensive, thorough, selective, targeted research of local and imported varieties of Gooseberry (*Ribes uva-crispa*) has not been carried out yet.

Our work is relevant in that for the first time in the conditions of Dilijan region the characteristics of the common and local varieties of Gooseberry (*Ribes uva-crispa*) were examined as a selection raw material.

The aim of the work is to single out the varieties with valuable features and local types studied by us as selection raw material for further selection works. From the production point of view, such varieties of Gooseberry (*Ribes uva-crispa*) are valued, which should be either without thorns or weakly thorny, high-yielding, early ripening, sufficiently frost-resistant, anthracnose-resistant, not demanding to soil-climatic conditions, suitable for large-scale mechanized harvesting, easy to reproduce, high quality and with large fruits. As well as to identify the harmful organisms of the Gooseberry (*Ribes uva-crispa*) and to separate the most dangerous ones, to determine their habitat on different varieties.

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## II. MATERIALS AND METHODS

The following tasks have been set to study of local and imported varieties of Gooseberry (*Ribes uva-crispa*) in the Dilijan region:

- (a) Comparative study of phenotypic characteristics of selected varieties;
- (b) To study the transition process of phenopoules of selected varieties;

- (c) To study the quantity and quality of the harvest of the selected varieties;
- (d) To substantiate the economic efficiency of cultivation of selected varieties;
- (e) To separate valuable varieties as a selection raw material;
- (f) To identify the species composition of Gooseberry (*Ribes uva-crispa*) pests, their degree of population on different varieties.

The experiments were conducted in the conditions of Dilijan region in the province of Tavush.

In this study, the morphological characteristics of leaves were studied in 3 varieties. In the summer, 5 random leaves of each variety were gathered. The characteristics were determined according to the International Description (UPOV): i.e. the length, width of leaf blade, length-width ratio, intensity of the green surface of the blade, base form, vertex angle, vertex length, edge cut, edge roughness, cross-section cut, chlorophyll.

The characteristics of the fruit were studied during this study. 5 fruits were collected from each variety.

The characteristics were assessed on the basis of international description, i.e.: fruit - size, form, height, form of the fruit top, the existence of the top, flatness of the fruit skin, hardness, hairy, shine, fruit color, flesh color, flesh hardness, fruit acidity, fruit resistance, sugar, the beginning of fruit maturation.

Some features were measured using special tools. Harvest time is based on the form, taste and color change [1, 5, 6, 7, 13].

Routine surveys, observations, sampling were conducted for pest detection. The skeletal branches, trunk, trunk bark, leaves, fruits both fallen and on the plant, the plant remnants and after the harvest, the waste and mummified fruits were examined. The collected samples were taken to a laboratory where the species composition of pests was identified.

The collection and fixation of harmful organisms was carried out according to the methods adopted in entomology and phytopathology [9, 10, 12].

### III. RESULTS AND DISCUSSION

1st and 2nd grade pure variety seedling of Gooseberry (*Ribes uva-crispa*), produces fruit on 1-year-old perennial branches, in a garden of complete skeletal branches and one or two flowers appear in the leaf base.

The branches are covered with light reddish shoots, the leaves are lobed, the edges are toothed, covered with hairs from below. Produces broad branches with round or grooved shoots, grows fast.

According to our research in Table 1 Invicta variety stood out with a weak growth force of the bush, 1.6 meters high, and Round red local variety and “Green Bottle” variety stand out with medium growth and a width of 1.8-2.0 meters, are tall, with spreading foliage.

Table 1. Phenotypic features of Gooseberry (*Ribes uva-crispa*) varieties.

Varieties	Bush Growth Rate	Bush Height	The Direction of the Annual Shoot in Space	Thorns of Shoots	The Size of the Bud	The Form of the Bud Top	Shoot Colour
Green bottle	Medium growth	Medium 2,0m	Standing	1 per each, few	Medium	Pointed	Reddish brown

Varieties	Bush Growth Rate	Bush Height	The Direction of the Annual Shoot in Space	Thorns of Shoots	The Size of the Bud	The Form of the Bud Top	Shoot Colour
Round red local	Medium growth	Medium 1,8m	Horizontal	1-2-3 per each, medium	Medium	Round	Grey
Invicta	Medium growth	Medium 1,6m	Semi standing	2 per each, few	large	Wide pointed	Greenish brown

Annual shoots Green-bottle and Invicta varieties are upright, while annual Round red local variety shoots thin, down-hanging and wavy. Annual shoots are reddish brown, and newly grown shoots are green.

The Green-bottle variety has one hard, straight, downwards thorn, the small thorns are absent. There is one thorn at the periphery of the Round red local variety, there are two at the middle and three at the bottom, but thin, light brown, perennial branches have no thorns.

On the shoots of Invicta variety, the thorns are arranged upright and in pairs. Annual shoots are hairless in all varieties.

The tops of the buds of the Invicta species are broadly ridged, at the Green Bottle Variety they are ridged, while the Round red local type has round bud tops.

The results of our research revealed that the leaves of the Round red local variety are naked, light green, a bit heart-shaped. The Green bottle variety, has dark green leaves, the leaf blade is rough, the edges are sharp, the leaves are large. Leaves of the Invicta variety are naked, dark green, medium sized.

There are 3 flowers in the inflorescence of Invicta and Green bottle varieties and the Round red local variety has 2-3, sometimes 1 flower.

The sepal of the Green bottle variety are reddish-purple, while in case of the Local red variety they are white-green with a pink edging, the flowers are small, those of the Invicta variety, are reddish-yellow.

The embryo is yellowish-green in all varieties, the Green bottle and the Round red local varieties are weakly hairy, and the Invicta variety is strongly hairy.

Fruits of Green bottle and Invicta varieties are large, while Round red local variety has small fruits. The form of the fruit of the green-bottle is elliptical, while the Invicta variety has an upside pear form, and the fruit of the Red round local variety is round-shaped. Fruit skin is hard in Invicta variety, and the skin of Green bottle and Round red local variety is of medium hardness, the base of the fruit of Green-bottle and Invicta varieties are of medium length, and the length of the Peduncle is medium, the fruit is slightly hairy in all varieties.

Table 2 presents the results of our research. The changes of the fruit buds are shown in Table 2. Table 2 shows that it takes 55-60 days from the beginning of blossom to full maturity of the fruit.

Table 2. Changes of Gooseberry (*Ribes uva-crispa*) generative sprouts in 2019-2021.

Trial Options	Swelling of the Buds	Opening of Buds	Blossom			Fruit Formation	The Beginning of Fruit Ripening	The Full Fruit Ripening
			The Start	Massive	The End			
Green bottle	20.05.	24.05.	27.05.	01.06.	06.06.	16.06.	16.07.	20.07.

Trial Options	Swelling of the Buds	Opening of Buds	Blossom			Fruit Formation	The Beginning of Fruit Ripening	The Full Fruit Ripening
			The Start	Massive	The End			
	16.05.	20.05.	24.05.	29.05.	04.06.	14.06.	14.07.	18.07.
Round red local variety	23.05.	27.05.	30.05.	05.06.	10.06.	20.06.	20.07.	24.07.
	19.05.	23.05.	26.05.	01.06.	06.06.	16.06.	16.07.	20.07.
Invicta	18.05.	22.05.	25.05.	30.05.	05.06.	15.06.	16.07.	20.07.
	13.05.	17.05.	20.05.	25.05.	30.05.	10.06.	11.07.	15.07.

Blossoming lasts 7-10 days due to varieties; Fruit maturation varied from 1.5 to 2 months due to varieties. Invicta variety bears fruit along the entire length of the branch.

Blossom of Gooseberry (*Ribes uva-crispa*) takes place at +7 - (+ 18) °C temperature, the varieties we studied are early blossoming varieties, the flowering period depends on the variety, local conditions, the best flowering conditions are +15 - (+ 20) °C temperature, 60 -65% relative humidity, 1-3m / s wind speed.

Gooseberry (*Ribes uva-crispa*) is a honey-producing variety, pollinated by bees and high yields are obtained by cross-pollination, but it is obvious that all varieties of Gooseberry (*Ribes uva-crispa*) are self-pollinating.

The inflorescence is a raceme, that has 1-5 flowers, the sepals green to red, the petals are green, white-pink and small. The flowers are bisexual, hairy, sessile, do not have a pedicel, are bell-shaped. The fruit sepal is non-falling. The fruit is a fake multi-seeded berry [11]:

We studied the infection of the seedling with harmful organisms, according to which the first-class seedling was free of harmful organisms, there were *Synanthedon tipuliformis*, *Tetranychus urticae* on the second-class seedling.

The third type seedling was the most infected, on which was recorded *Aphis grossulariae*, *Synanthedon tipuliformis*, *Tetranychus urticae*, *Powdery mildew gooseberry* [8, 13, 15].

As a result of our research The Invicta and Green bottle varieties stand out with high yields, providing a yield of 12.0-15.0 t / ha, respectively.

The Green Bottle variety is in the first place by size of the fruit, after comes the Invicta variety, and the smallest fruits has the Round red local variety.

Gooseberry (*Ribes uva-crispa*) is widely used in organic agriculture. The harvested berries can be stored for 7-10 days at a temperature of 0-0.5°C and 80-85% relative humidity in fruit refrigerators.

All of these varieties and the local one have a multifunctional nature, are resistant to spotting. The Green bottle variety stood out with the highest yield, and the Round red local variety with the lowest.

The Round red local variety is sweet and more importantly the ripe fruits of this variety stay on the bush for a long time without falling, the Invicta and the Green Bottle varieties stand out with pleasant acidity [2, 3, 4]:

The results of our research are summarized in Table 3.

Table 3. Average quality features of the Gooseberry (*Ribes uva-crispa*) fruits.

Name of the Varieties	Average Height of Fruit, mm	Fruit Diameter, mm	Total Number of Acids, %	Total Number of Sugar, %
Green bottle	30	10	1,0	8,0
Round Red local variety	10	6,0	0,5	10,0
Invicta	27	15	0,7	9,0

In order to detect harmful organisms, 12 species of harmful organisms were recorded as a result of our research on the following Gooseberry (*Ribes uva-crispa*) varieties; Green Bottle, Round Red local and Invicta, 7 of which are insects: *Pteronidea ribesii*, *Synanthedon tipuliformis*, *Abraxas grossulariata*, *Aphis grossulariae*, *Myzus persicae*, *Dolycoris baccarum*, *Parthenolecanium corni*, 2 of which are tick - *Tetranychus urticae*, *Schizotetranychus pruni* [8], and 3 diseases: *Sphaerotheca mors-uvae*, *Gloesporium ribis*, *Septoria ribis* [9, 14, 15]. The species composition of pests on Gooseberry (*Ribes uva-crispa*) is presented in Table 4.

Table 4. Pest species composition of Gooseberry (*Ribes uva-crispa*) (2019-2021 pp.).

N	Scientific Name of Pest	English Name	Damaging Phase	Damaged Organ
1	<i>Pteronidea ribesii</i>	Common gooseberry sawfly	larva	Leaf
2	<i>Synanthedon tipuliformis</i>	Currant borer moth	larva	Branch,shoot
3	<i>Abraxas grossulariata</i>	Magpie moth	larva	Leaf
4	<i>Aphis grossulariae</i>	Gooseberry aphid	Larva, adult	Trunk, branch
5	<i>Myzus persicae</i> (Sulzer)	Potato (green peach) aphid	Larva, adult	Leaf, young shoot, fruit
6	<i>Dolycoris baccarum</i>	Hairy shieldbug	Larva, adult	Leaf, branch, fruit
7	<i>Parthenolecanium corni</i>	Brown fruit scale	Larva, adult	Trunk, branch, shoot
8	<i>Tetranychus urticae</i>	Red Spider Mite	Larva, adult	Leaf, young shoot, fruit
9	<i>Schizotetranychus pruni</i>	Garden Spider Mite	Larva, adult	Leaf, young shoot, fruit

Table 5. Species composition of diseases on Gooseberry (*Ribes uva-crispa*) (2019-2021 pp.).

N	Scientific Name	Pathogen	English Name	Infected Organ of Plant
1	Powdery mildew gooseberry	<i>Sphaerothecamors-uvae</i> Berk. Et Curt.	Powdery mildew gooseberry	Leaf, fruit, shoot
2	Anthraxnose currants	<i>Gloesporiumribis</i> <i>Pseudopezizaribis</i> Kleb.	Anthraxnose currants	Leaf
3	Gooseberry leaf spot	<i>Septoria ribis</i> <i>Mycosphaerella ribis</i>	Gooseberry leaf spot	Leaf

During the research conducted by us, the population of different varieties of Gooseberry (*Ribes uva-crispa*) with harmful organisms was studied (Table 6).

Table 6. Population of different varieties of Gooseberry (*Ribes uva-crispa*) with harmful organisms (2019-2021թթ.)

N	Scientific Name of Pest	Population%		
		Infection rate, %		
		Green Bottle	Round Red Local Variety	Invicta
1	<i>Pteronidea ribesii</i>	61,2	41,6	48,0
2	<i>Synanthedon tipuliformis</i>	68,7	43,8	50,1
3	<i>Abraxas grossulariata</i>	35,9	18,4	20,7
4	<i>Aphis grossulariae</i>	59,3	47,3	51,8
5	<i>Myzus persicae</i> (Sulzer)	24,4	19,7	39,2
6	<i>Dolycoris baccarum</i>	43,5	26,2	35,1
7	<i>Parthenolecanium corni</i>	33,3	40,8	35,7
8	<i>Tetranychus urticae</i>	39,5	16,4	20,4
9	<i>Schizotetranychus pruni</i>	30,6	18,2	19,9
10	Powdery mildew gooseberry	78,9	42,1	56,4
11	Anthracnose currants	62,5	39,7	40,5
12	Gooseberry leaf spot	42,7	33,7	48,2

It is clear from the presented data that among the studied varieties of Gooseberry (*Ribes uva-crispa*) the Green Bottle variety is the most contagious, and among the harmful organisms *Pteronidea ribesii*, *Synanthedon tipuliformis*, *Aphis grossulariae*, *Sphaerotheca mors-uvae*, *Gloesporium ribis* stood out, and the round red local variety has shown high resistance towards diseases and pests.

#### IV. CONCLUSION

Pure variety and quality Gooseberry (*Ribes uva-crispa*) seedlings have a decisive influence on the quality and quantity of the yield, as well as to show resistance towards various environmental factors, resistance to harmful organisms.

Green Bottle and Invicta varieties are valued for their selectivity, high yield, fruit size, and less thorn, and the Local red variety is valued for the fact that its ripe fruits remain on the bush for a long time without falling.

In terms of use as selection raw material, these varieties are valued for their fruit multifunctionality, resistance to spotting, and the Round local red variety is immune to other fungal diseases. Gooseberry (*Ribes uva-crispa*) is valued in terms of production because it is widely used in organic agriculture.

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