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## TERRY OR REVERSION OF BLACK CURRANT UNDER THE CONDITIONS OF THE WESTERN PART OF AZERBAIJAN

*Blackcurrant (Ribes nigrum L.) is one of the most common berry crops in the western part of Azerbaijan. One of the reasons for the low yield of blackcurrant is the loss of production from viral diseases. One of the common and harmful diseases of blackcurrant of viral etiology is terry or reversion. Signs of the disease are clearly manifested in the spring. The affected bush changes its general appearance. It lags in growth, becomes denser, all changes occur according to the type of growth. Analysis of field studies indicates that in affected plants, reversion is transmitted with planting material harvested from diseased bushes. Crop losses on blackcurrant reach 50-100%.*

*The pathogen was identified and its pathogenicity was determined using microscopy.*

*It was found that in the western part of Azerbaijan, terry or reversion is the most common viral disease of blackcurrant. The pathogen was identified as BRV (Currant reversion virus). As a result of the measures taken, the spread of the disease decreased to 30%, the yield increased by 1.5 times.*

**Keywords:** black currant, terry or reversion, virus, bush, harmfulness.

**Introduction.** Blackcurrant (*Ribes nigrum L.*) is one of the most valuable berry bushes. Blackcurrant (*Ribes nigrum L.*) as a crop has become especially popular since it was established that, according to its chemical composition, the berries are natural and complex concentrates of vitamins [1].

Blackcurrant (*Ribes nigrum L.*) can be called a real storehouse of vitamins. In terms of ascorbic acid (vitamin C) content, this crop occupies one of the first places. The berries of cultivated cultivars accumulate up to 200-400 mg% of ascorbic acid, and this vitamin is found not only in the fruits, but also in the buds (150-180 mg%), leaves (310-370 mg%), buds (360-450 mg%), flowers (240-270 mg%) [2, 3].

The aromatic leaves of blackcurrant (*Ribes nigrum L.*) are used as a spice for salting and pickling - the presence of phytoncides in the leaves ensures better preservation of vegetables.

In nature, the range of the species covers almost the entire territory of Europe, the forest zone of the European part of Russia, Siberia (from the Urals to the Yenisei and Lake Baikal), Kazakhstan, China and northern Mongolia. Introduced to North America. It has long been cultivated in many varieties. It grows in coastal thickets, in moist deciduous, mixed and coniferous forests on their edges, in alder groves, along the banks of rivers, lakes, on the edges of swamps and on moist floodplain meadows, singly and in small thickets. The plant prefers well-lit places, although it tolerates partial shade, but blooms less often. Prefers light, loose, well-moistened fertile loams, grows poorly on soils with high acidity [4].

A blackcurrant bush (*Ribes nigrum L.*) 1.0-1.5 m high usually consists of 15-20 zero-order branches of different ages.

Blackcurrant (*Ribes nigrum L.*) has many valuable economic and biological properties. Blackcurrant is a very early-bearing crop, it begins to bear fruit in the 2nd year, and full yields can be obtained already in the 3-4th year after planting. High productivity is maintained from 5 to 15 years [5, 6].

Blackcurrant (*Ribes nigrum L.*) is a perennial shrub with a fibrous root system. It reproduces by seeds, cuttings, layering and dividing the bush. Blackcurrant (*Ribes nigrum L.*) enters the

growing season very early, in late February or early March. It blooms in the first ten days of April. The harvest ripens, depending on the variety, from early June to August [8, 9, 10].

Usually the development of the disease increases from year to year, but sometimes its weakening and partial return to fruiting are observed, which masks the infection, which actually persists on the plants. Terry is most easily detected during the flowering of currants (Fig. 1, 2). It should be noted that currant varieties are not equally affected by terry. In recent years, the disease has been noted on black currants (*Ribes nigrum* L.), which has not been observed before.



**Fig. 1, 2. Blackcurrant buds and flowers affected by reversion**

**Purpose and objective of the research.** The purpose of our work was to study the prevalence, intensity of development and harmfulness of terry or reversion of black currants in the conditions of the western part of Azerbaijan, as well as to develop a system of measures to protect currant bushes from this disease.

**Materials and methods.** The article presents data on the prevalence, development and harmfulness of blackcurrant terry or reversion in the western part of Azerbaijan. The dynamics of the disease in plantations is chronic, in recent years there has been an increase in the prevalence of reversion. In the course of scientific research (2022-2024), we diagnosed blackcurrant terry or reversion. Diagnostics of blackcurrant reversion is a set of various stages and methods for determining the type of virus that causes the disease under study. The objects of the study were blackcurrant varieties "*Pamyat Michurina*", "*Liya plodorodnaya*" and "*Pobeda*". Each plant was carefully visually inspected, and if symptoms of terry or reversion were detected, samples (biological material) were taken and examined in the laboratory using a microscopic method for accurate identification of the phytopathogen.

The intensity of damage to blackcurrant bushes by terry was assessed using a scale:

- 0 point – no damage;
- 1 point – 1 to 10% of leaf surface is damaged;
- 2 points – 11 to 25% of leaf surface is damaged;
- 3 points – 25 to 50% of leaf surface is damaged;
- 4 points – over 50% of leaf surface is damaged.

Successful control of viroses is impossible without timely detection of the disease and correct identification of the virus species. The range of technologies used to detect and identify viruses is extremely wide. Modern diagnostic methods are improved or modified traditional phytopathological methods [14].

Viruses are non-cellular submicroscopic pathogens of plants, animals and humans that can reproduce only in the living cells of the host organism. To date, more than 600 phytopathogenic viruses have been registered; it is difficult to indicate the exact number, since some viruses are represented by many strains, sometimes described as independent species [12, 13, 14].

The harmfulness of viral diseases (viroses) is manifested mainly in a decrease in yield and deterioration in product quality. Their defeat has a negative impact on the food and feed value of products, their suitability for industrial processing. Also, under the influence of the virus, varietal purity, cold resistance, winter hardiness of plants are lost, seed germination decreases. On average, the amount of losses from the development of viral diseases is approximately 20% of the total economic damage caused by the activity of all groups of pathogens of agricultural crops [7, 12].

Diagnostic methods used to detect viruses differ in many ways from the methods used when working with fungal and bacterial pathogens. This is due to the morphological and biological characteristics of viruses: ultramicroscopic size, lack of ability to reproduce on artificial nutrient media, ability to infect plants of various botanical families, antigenic activity, etc.

Electron microscopy was used in the work. Observation and study of viral particles were carried out using an electron microscope (magnification up to 100 thousand times). Deformed leaves, flower brushes during flowering and immediately after its completion were used to diagnose reversion and its pathogen.

**Research results and their discussion.** Berry growing is widespread in all agricultural zones; in Azerbaijan, this industry occupies one of the leading places in obtaining high-quality, environmentally friendly products of these industries, which makes it competitive in the world market. This is one of the priority areas of agricultural development in our republic. One of the most important elements of ecological technology of berry crop cultivation is the fight against diseases, pests and weeds.

Terryness or reversion of black currant was widely observed in all surveyed farms in the western part of Azerbaijan. The spread of terryiness of black currant and the degree of its damage varied by year. Thus, the greatest distribution of reversion (*currant reversion virus*) among all observed varieties of black currant in the Goygol region was in 2024 (Table 1).

Table 1

**Distribution and intensity of development of terry or reversion (*Currant reversion virus*) on blackcurrant bushes in the conditions of the western part of Azerbaijan (Goygol district, 2022-2024)**

Blackcurrant cultivars	2022 year		2023 year		2024 year	
	P, %	R, %	P, %	R, %	P, %	R, %
« <i>Liya plodorodnaya</i> »	59,9	29,6	61,7	30,4	62,9	30,7
« <i>Pamyat Michurina</i> »	55,7	28,8	57,0	29,4	59,6	29,9
« <i>Pobeda</i> »	49,9	27,7	56,1	29,0	59,2	29,3

**Note:** **P** – prevalence of the disease, %; **R** – intensity of disease development, %

Our research has shown that agrotechnical and chemical measures give good results in the fight against viral diseases of currants.

- Regular phytosanitary inspections of plantings should be carried out, with culling of plants affected by hard-to-eradicate viral diseases;
- It is recommended to remove wilted plants with a lump of earth;
- It is necessary to grow varieties that are resistant to the most harmful viral diseases;
- Spatial isolation of commercial and mother plantings should be observed;

- Layers and cuttings should be prepared from proven healthy mother bushes free from viral diseases;
- It is necessary to carry out agrotechnical and general sanitary measures that increase plant resistance to viral diseases (increased doses of potassium-phosphorus fertilizers, immunomodulators, micronutrient fertilizing, etc.);
- Avoid unilateral application of nitrogen fertilizers;
- Plant residues should be destroyed or deeply embedded in the soil and severely affected shoots should be cut out in a timely manner;
- It is necessary to combat aphids and currant bud mites - carriers of viral infection;
- Disinfection of cutting tools is mandatory;
- Lignified cuttings can be disinfected by heating in hot water (45 °C) for 13-15 minutes;
- The plantings should be systematically treated with recommended chemicals depending on the type and degree of development of the disease;
- Early spring eradicating spraying (on dormant buds) of plants and the soil under them with 3-4% Bordeaux mixture, usually once every 3 years, is effective against a complex of diseases;
- Treatments during the growing season are usually carried out immediately after flowering, subsequent ones - after 10-15 days (stop 20 days before harvesting), the last one - after harvesting. On mother plants without restrictions. The number of treatments depends on the intensity of the disease.

In the period 2022-2024, we used burgundy liquid in early spring and when signs of infection appeared, for preventive purposes in the fight against viral diseases of currants. Our observations show that chemical control measures, although not complete, partially prevent the occurrence of viral diseases. However, the highest result for this type of currant diseases was obtained with the use of agrotechnical control measures.

**Conclusion.** In Azerbaijan (in the western part of the country), blackcurrant reversion has become quite widespread. The harmfulness of this disease is very high, since with strong development, the affected bush changes its general appearance. It lags behind in growth, is more dense, all changes occur according to the type of growth. The results of three-year (2022-2024) studies on the spread, intensity of development and harmfulness of blackcurrant reversion show that this disease is transmitted with planting material harvested from diseased bushes. From plant to plant, the virus is transmitted by mites and aphids living on the bushes. On blackcurrant, yield losses reached 50-100%.

In 2022-2024, during the research we conducted in the direction of studying the reversion of blackcurrant in the western part of Azerbaijan, agrotechnical measures were carried out to combat this disease. As a result of the measures taken (mainly agronomic), the spread of the disease decreased to 30%, and the yield increased by 1.5 times.

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### **МАХРОВІСТЬ АБО РЕВЕРСІЯ ЧОРНОЇ СМОРОДИНИ В УМОВАХ ЗАХІДНОЇ ЧАСТИНИ АЗЕРБАЙДЖАНУ**

*Чорна смородина (Ribes nigrum L.) є однією з найпоширеніших ягідних культур у західній частині Азербайджану. Однією з причин низької врожайності чорної смородини є втрата продукції від вірусних захворювань. Одним із поширених і шкодочинних захворювань чорної смородини вірусної етіології є махровість або реверсія. Ознаки захворювання виразно проявляються навесні. Уражений кущ змінює свій загальний вигляд. Він відстає в рості, стає густішим, усі зміни відбуваються за типом росту. Аналіз польових досліджень свідчить, що в уражених рослин реверсія передається з посадковим матеріалом, заготовленим із хворих кущів. Втрати врожаю на чорній смородині сягають 50-100%. Збудник був ідентифікований і його патогенність була визначена за допомогою мікроскопії. Встановлено, що у західній частині Азербайджану махровість або реверсія є найпоширенішим вірусним захворюванням чорної смородини. Збудник був ідентифікований як BRV (вірус реверсії смородини). У результаті вжитих заходів поширення захворювання знизилося до 30%, врожайність збільшилася у 1,5 раза.*

**Ключові слова:** чорна смородина, махровість або реверсія, вірус, кущ, шкодочинність.