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**Shcherbatko V.D., Sharova N.I. Variability of apple fruit chemical composition during storage//** Bull. of the State Nikit. Botan. Gard. – 2015. – № 114. – P. 43-47.

The article presents three-year investigation of 10 introduced apple sorts their chemical composition before storing and in the end of it. The following sorts were marked as varieties combined high parameters of fruit chemical composition by the end of storing and good storability: Waine Spur Delicious, Spilove, Summerland.

**Key words:** *apple tree, sorts, biochemical variations, chemical composition, dry substances, sugars, free acids, ascorbic acid, catechines, anthocyanins, leukoanthocyanins, flavonols, storability.*

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# POSSIBILITY TO INCREASE HARVEST OF EARLY TABLE GRAPE CULTIVAR UNDER CONDITIONS OF SOUTHWEST ZONE OF THE CRIMEAN VITICULTURE

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## Introduction

Viniculture as a branch of plant cultivation is of great economic importance, connected with primary processing of vine, one of the most valuable dietary and food staff. Historically viniculture having quite a small share of agricultural territories (up to 4,4% in the Crimea) significantly affects on regional socio-economic development, filling the state and local budgets. One of the principle task for this sector is expansion of table vine production to keep its quantity consumed – no less than 5,2 kg/person/year in the Crimea – and considerably to increase its consumption in other regions [1, 6]. Thereby researches aimed at solving of these tasks are quite current.

High and stable vine crops are possible if to carry out complex of agrotechnical measures, which could provide regular growth and development of vine bushes and protect crop from pests and diseases [1, 2].

At present the principle method of vine plants protection from diseases is a chemical method, which assumes applying of various fungicides – contact and systematic. As to modern preparations, certified for vine plants, there are strobilurines which possess quite important physiological properties besides fungicidal action: phytohormonnal effect on plant growth which results increasing of photosynthesis intensity and its productivity, lowing of plant breath intensity, reduction of water evaporation by leaves. Investigations conducted on annual cultures revealed antioxidant property of strobilurines, which favored rise plant resistance to drought, temperature variation, over illumination and etc. [11, 7, 8, 10].

The research objective was to investigate combined fungicide and growth regulating action of strobilurine class preparations to apply them in optimal way. That method is aimed at effective protection against diseases and raising the crop of early table grape cultivars under conditions of southwest zone of viniculture in the Crimea ("Estate of Zakharjinyh" Ltd., Bakhchisaray region).

## Objects and methods of the research

Field investigations were carried out on the territory of vineyards with extra early table grape cultivar – Elegant extra early – in 2013-2014 in accordance with conventional methodics in viticulture and plant protection [3, 4, 5].

Fungicide property of these preparations was studied under the field conditions on 30 experimental bushes by three repeatabilities (10 plants per each repeatability). Leaf damage was registered after disease declared itself, further records were made as far as disease develpped (no less than three times per vegetation). Investigations in diagnostics of visual symptoms of disease were conducted during phonologic phases of vine development according to VVSN scale : "the end of blooming", " pea-sized berries, "berries growth", "beginning of ripening", "full berry ripening" [9]. Quantity and quality of crop were registered in the first decade of August during the main harvesting.

## Results and discussion

Experimental scheme included the following variants: control (non-protected against mildew); standard; experimental (table 1).

Table 1

**Experimental scheme**

| Variant | Objects | Applied fungicides | Rate of application (g, kg, j/ha) |
|---|---|---|---|
| Control | Non-protected | | |
| Standard | Oidium | Topaz KE | 0,2 |
| | Mildew<br>Oidium | Antrokol SP<br>Topaz KE | 1,5<br>0,2 |
| | Mildew<br>Oidium | Tanos WG<br>Falcone KE. | 0,4<br>0,3 |
| | Mildew<br>Oidium | Cocide2000 WG<br>Cumuluse WG | 2,5<br>5,0 |
| Experimental | Mildew, oidium | Cabrio Top WG | 2,0 |
| | mildew, oidium, gray rot, blackspot | Quadrice KS | 0,8 |
| | oidium, mildew | Collis KS | 0,4 |
| | Gray rot | Switch WG | 1,0 |

Treatment by fungicides was carried out during the following development phases: "shoots 15-20 sm", "before and after blooming", pea-sized berries".

Weather conditions in 2013-2014 in the first half of grape vegetation favored the primary infection by mildew. The first symptoms of diseases appeared like an "oily" spots on leaves in the first decade of June. In the second decade of July a lack of precipitations deterred development of pathogen, though insignificant rainfalls with day and night temperature difference in the end of July caused development of mildew (table 2).

In general, share of mildew on leaves and bunches of control variant (non-protected), extra early grape cultivar Elegant, made 1,2 – 1,4% and 1,1 – 1,5% relatively (table 2).

As to experimental and standard variants decrease of mildew development was statistically reliable in comparison with control variant, all deflections were registered in terms of experimental mistake. Appliance of the fungicides Kabrio Top WG., Quadris KS. and Collis KS (experimental variant) regulated disease progression (0,3 – 0,6% on leaves and 0,1 – 0,8% on bunches) as effectively as fungicides Antrakol SP Tanos WG. and Kocide 2000 WG. (0,4 – 0,7% on leaves, 0,2 – 0,9% on bunches, table 2).

Table 2

**Dynamics of mildew spread and development in case of strobilurines appliance ("Estate of Zakharjinyh" Ltd; Elegant ,extra early grape cultivar, 2013-2014)**

| Variant | Spread (P), % | | | | Disease development (R), % | | | |
|---|---|---|---|---|---|---|---|---|
| | "berry growth" | | "beginning of berry ripening" | | "berry growth" | | "beginning of berry ripening" | |
| | leaves | bunches | leaves | bunches | leaves | bunches | leaves | bunches |
| Control | 4,6 | 3,5 | 7,5 | 3,7 | 1,2 | 1,1 | 1,4 | 1,5 |
| Standrd | 1,5 | 1,9 | 1,7 | 2,1 | 0,4 | 0,2 | 0,7 | 0,9 |
| Experimental | 0,7 | 1,3 | 1 | 1,9 | 0,3 | 0,1 | 0,6 | 0,8 |
| $HCP_{05\ (2013)}$ | 1,2 | 0,7 | 1,8 | 0,7 | 0,7 | 0,8 | 0,8 | 0,6 |
| $HCP_{05\ (2014)}$ | 0,2 | 0,2 | 0,7 | 0,4 | 0,1 | 0,1 | 0,4 | 0,5 |

Biologically effective strobilurine protection of grape plants against mildew on average for two years of investigations was constantly on a high level during vegetation period: 95-97,4% and 90-96,6% on leaves and bunches. On standard pattern this parameter made 86,6 – 90% on leaves and 80-90% on bunches (table 3).

Table 3

**Biological efficiency of strobilurine protection against mildew ("Estate of Zakharjinyh" Ltd, 2013-2014)**

| Variant | Biological efficiency, % | | | |
|---|---|---|---|---|
| | "the end of bunch development" | | "full berry ripening" | |
| | leaves | Bunches | leaves | bunches |
| Standard | 86,6 | 80,0 | 90,0 | 90,0 |
| Experimental | 95,0 | 90 | 97,4 | 96,6 |

Growth regulating properties of strobilurines demanded investigation of crop uvological characteristics, quantitative and qualitative parameters of extra early grape cultivar Elegant (table 4,5).

Table 4

**Influence of strobilurines on uvological characteristics of table grape cultivar ("Estate of Zakharjinyh", Ltd; Elegant extra early 2013-2014)**

| Variant | Mechanical composition of a bunch | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bunch mass, g | A number of berries, units | Berry mass, g | Mass of grape bunch skeleton, g | Mass of 100 berries, g | % berries | % Grape bunch skeleton | Indictor of texture, % |
| Control | 437,6 | 149,7 | 420,9 | 9,5 | 271,8 | 96,7 | 3,3 | 36,2 |
| Standard | 443,1 | 166,4 | 438,5 | 9,4 | 283,5 | 96,4 | 3,6 | 46,2 |
| Experimental | 470,4 | 163,1 | 481,4 | 9 | 295,1 | 97 | 3 | 51,4 |
| $HCP_{05\ (2013\ г.)}$ | 3,5 | 3,3 | 3,3 | 1,3 | 3,1 | 0,5 | 0,5 | 0,9 |
| $HCP_{05\ (2014\ г.)}$ | 3,3 | 2,6 | 2,7 | 1,1 | 3,3 | 0,5 | 0,5 | 1,5 |

According to data of table 4, mass of 100 berries of experimental variant made 295,1 g for two years on average, that exceeded parameters of standard and control variants - 11,6g and 23,3 g more relatively. Indicator of bunch texture was registered as 51,4% for experimental pattern, 46,2% - standard, control – 36,2%. It`s well-known than more indicator of texture (ratio of berry mass to bunch skeleton mass) than texture of this bunch is more profitable concerning grapes consumed. Grape cultivar with a high indicator of texture first of all is good for fresh usage. Therefore due to research results it was determined that strobilurines had a positive effect on mechanical composition of grape bunch, berry mass and indicator of texture of extra early grape cultivar Elegant.

Two-years research of quantitative and qualitative crop parameters (experimental variant) showed that having applied fungicides from strobilurine group, crop of extra early cultivar Etalon made 7,3 kg, what is 1,1 kg more than Standard variant and 2 kg more than Control (table 5). So, gain in crop made 16 and 34% relatively. According to data of table 5 the crop increase is caused by considerably large average mass of bunch on the experimental variant.

Table 5

**Effect of strobilurines on quantitative and qualitative crop parameters of table grape cultivar ("Estate of Zakharjinyh", Elegant extra early 2013-2014)**

| Variant | Average bunch mass, g | A number of bunches, units/bush | Crop, kg/bush | Mass concentration | |
|---|---|---|---|---|---|
| | | | | sugars, g/100 $sm^3$ | titrating acids, г/$дм^3$ |
| Control | 418,5 | 13,8 | 5,9 | 17,3 | 5,5 |
| Standard | 432,5 | 14,6 | 6,8 | 17,6 | 5,2 |
| Elegant | 460,3 | 15,7 | 7,9 | 17,8 | 5 |
| $НСР_{05\ (2013\ г.)}$ | 1,8 | 0,8 | 0,9 | 0,5 | 0,3 |
| $НСР_{05\ (2014\ г.)}$ | 2,1 | 2,1 | 1,0 | 0,7 | 0,7 |

Findings indicate positive effect of strobilurines on qualitative crop characteristics of table grape cultivar: mass concentration of sugars (17,8 g/ 100$sm^3$) in berry juice of experimental variant was maximum in comparison with standard and control variants, while mass concentration of titrating acids (5 g/$dm^3$) was minimal (table 5).

## Conclusions

Hereby during the research of combined fungicide and growth regulating action of preparations belonging to strobilurines class it was determined these preparations can be applied either for effective protection of table cultivar elegant against mildew or to increase its crop capacity and improve qualitative and uvological characteristics under conditions of southwest zone of the Crimean viticulture.

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Efficiency level of strobilurines in protection of grapes against mildew was investigated in terms of this research. It was demonstrated that treatment of grape plants by these fungicides favors high protection against that disease, permits to increase table grape crop and improve quality of its fruits.

**Key words:** *vine, mildew, growth-regulating properties, strobilurines, texture of grapes bunch, biological efficiency.*

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# GARDEN STRAWBERRY (*FRAGARIA ANANASSA*): ASSESSMENT OF PROSPECTIVE HYBRIDS BASED ON ECONOMICALLY VALUABLE CHARACTERISTICS UNDER CONDITIONS OF THE CRIMEA

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## Introduction

Strawberry is one of those fruit and berry products which are in a great demand among consumers. These berries are valuable for their food dietary and medicinal properties. They contain sugars, organic acids, microelements and vitamins – so important for human in spring period [3]. Though real strawberry assortment doesn`t cover all population requirements for berries and has a fundamental defects such as: a lack of high-yielding, high-quality and frost-