

**THE DEGREE OF RIPENING OF THE GRAPEVINE IN THE
VARIETIES OF SELECTION OF NATIONAL SCIENTIFIC CENTRE
“INSTITUTE OF VITICULTURE AND WINE-MAKING AFTER V.YE.
TAIROV” IN THE CONDITIONS OF THE NORTHERN PART OF THE
FOREST-STEPPE OF UKRAINE**

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ABSTRACT

One of the most important factors in the selection of grape varieties for cultivation north of the usual area of distribution is the heat supply of the territory. The absolute minimum air temperature recorded in the northern part of the Forest-Steppe was -32.2 °C. Soil temperature is always above air temperature and usually does not fall below the critical, so the most common way to protect vine from damage in winter is to cover the bushes in autumn after full and quality ripening of the vine. Only well-ripened vines can withstand the harsh conditions of the winter. The degree of maturation in different varieties of grapes in different climatic zones is different and is one of the main indicators of the suitability of the variety for cultivation in a particular region.

The purpose of the study is to determine the degree of maturation of the vine in grape varieties of Odessa selection, grown in the northern part of the Forest-steppe, and to identify among them the most prepared for wintering conditions in this area.

The degree of maturation of the vine was determined during 2018-2019 in the autumn before the cover of grape plants by the method of primary fluorescence using a microscope MBS-2 with fluorescent illuminator OI-18 and by the method of N.V. Matuzok. To identify winter hardiness of plant varieties, the condition of the buds and tissues of shoots in the spring of 2019 was checked after opening the bushes.

Studies have shown that the degree of ripening of the grapevine depends on the weather conditions during the growing season and varietal characteristics of the plants. Analysis of meteorological conditions over the years of the study showed that the spring of 2018, 2019 differed in higher temperature indicators compared to long-term values. The largest deviation towards warming was recorded in April 2018, at the end of the month it was 2.7 times higher than the long-term value; during this period, 6 times less precipitation was recorded. The summer period was characterized by intensive accumulation of heat, August 2018, 2019 was marked by dry weather, in 2018 for this month the amount of precipitation was only 32% of the long-term norm. Autumn 2018, 2019 was characterized by long warm weather. In September 2018, the first frosts were recorded in the second decade of November. September 2019 was marked by dry weather, the amount of precipitation was 2 times less than the long-term value. The first frosts were observed at the end of the month.

Weather conditions between 2018 and 2019 differed the most in temperature in the spring. The years of the study were marked by quite favorable conditions for the maturation of shoot tissues (August - September), namely, higher heat supply in September and a deficit of precipitation in August. At the end of September, the vines of all varieties had a brown color of the bark of different shades, only in the plants Zagadka and Kometa the upper part of the shoots (20-25% of the total length) was dark green. In the upper part of the shoots (10–15% of the total length) of the plants of the cultivars Yarilo and Muskat odeskij no cracking of the bark was detected, in the varieties Zagadka and Kometa cracking of the bark was not detected on the greater length of the vine.

During the ripening of grape shoots, their anatomical structure changes, in particular, a ring of cortical cambium (phelogen) is formed. The degree of maturation of the vine is diagnosed by the structure and color of the felem (cork layer) of the periderm. Our research showed that in different areas of grape shoots the tissues matured differently. The best maturation of the vine is observed in the lower zone of shoots of all studied varieties (0–100 cm from the base of the bush). The highest score (5.0) in this zone of the vine was assessed by the condition of the cork layer of cells in

plants of the varieties Aromatnij, Kardishah and Kishmish tayirovskij. The lowest degree of tissue maturation was observed in the upper part of the shoots (> 200 cm from the base of the bush) of grapes – from 1.5 points in varieties Illichivskij rannij, Shkoda, Zagadka, Kometa and Persej to 2.5 points in the variety Aromatnij.

Determination of the conditional coefficient of maturation of shoots allowed to find that in the varieties Aromatnij and Kishmish tayirovskij vine matures best ($K_v = 0.90$), the lowest indicator was in the variety Kometa. A satisfactory degree of maturation of shoots was observed in the variety Kardishah. All other varieties, according to the value of K_v , had a weak degree of maturation of the vine ($0.71–0.77$). The lowest K_v index was determined for Kometa and Yarilo plants.

Weather conditions during the winter of 2018–2019 and 2019–2020 were favorable for overwintering grape plants, the absolute minimum air temperature was recorded on December 3, 2018 (-14.6 °C), as well as in January 2019 (-14.0 °C). On days with a minimum air temperature, the soil temperature (0–20 cm) was 0.2 °C. Under such conditions, the number of dead main buds by variety was 3–10% of their total number on the bush. The least number of dead main buds was recorded on plants of Aromatnij, Kishmish tayirovskij, Kardishah, Persej varieties, the most on Kometa and Zagadka varieties. The tissues of grape shoots were slightly damaged by frost, in the varieties Kometa, Zagadka, Yarilo, Muskat odeskij, Illichivskij rannij, Shkoda, Persej froze no more than 10% of the surface of the vine, damaged only the bast. Very weak damage was found in plants of the varieties Aromatnij, Kardishah, Kishmish tayirovskij – on the vines there were isolated damaged areas.

Based on the data obtained from the results of complex studies, it was found that the varieties Aromatnij, Kishmish tayirovskij and Kardishah are the most prepared for wintering in the northern part of the Forest-steppe of Ukraine.