

coefficient  $K_s$  in the podzol profile is 1272-1592 cm/day, in loamy soil 33 cm/day in the BELg horizon up to 117 cm/day in the AE horizon.

#### REFERENCES

1. Van Genuchten M. T. A closed-form equation for predicting the hydraulic conductivity of unsaturated soils // Soil Sci. Soc. Am. J. 1980. V. 44. P. 892-898.
2. Van Genuchten MTh, Leij FJ, Yates SR (1991) The RETC code for quantifying the hydraulic functions of unsaturated soils. EPA/600/2-91/065. In: Kerr RS (ed) Environmental Research Laboratory. US Environmental Protection Agency, Ada, OK, p 83.

УДК 634.23; 631.52

### DETERMINATION OF CHERRY FRUIT RESISTANCE TO CRACKING

**Shubenko L. A., Vdovychenko Zh. V.**

BilaTserkva National Agrarian University

BilaTserkva, Ukraine

The cracking of fruits in rainy weather is an urgent problem of cherry growing in the conditions of the Right Bank Forest-Steppe of Ukraine. In some years, damage due to cracking can completely destroy the crop [1]. The degree of cracking depends on humidity, temperature, size, fruit density and yield [2]. Resistance to cracking is largely determined by pomological variety and term of maturity (late-ripening fruits are more damaged), but the same varieties demonstrate themselves differently in different areas [3]. The reason of cracking is excessive absorption of water by the surface of the fruit under the action of osmotic pressure caused by sugars. There is the cracking index which is defined as the period of time from immersion of the fruit in distilled water to the appearance of cracks. However, varieties with a higher index are small-fruited, low-yielding and with mediocre taste.

It is known that varieties differ in the intensity of absorption, the structure of the peel and its elasticity. In our studies, more cracked fruits were observed in late-maturing varieties than in early ones. This was affected by the amount of precipitations during the ripening period (in July they were more abundant than in June). However, fruits of the same varieties show different resistance to cracking in different areas [1].

The aim of the research was to establish the resistance of cherry fruits to cracking by immersing them in distilled water. And also to investigate the dependence of resistance to cracking on the cherry fruit peel thickness and elasticity.

The objects of the research were cherries of varieties with different terms of maturity of Ukrainian breeding: Aborygenka, Alyonushka, Amazonka, Biriuzha, Dar Mlieva, Donetsk Ugoliok, Drogana Yellow, Zoryana, Mliiv's'ka Yellow, Meotida, Mirage, Melitopols'ka Mottled. The variety Zoryana was used as the control for the early-ripening group, Meotida was used for the middle-ripening group and Drogana Yellow for the late-ripening group.

The resistance of fruits to cracking was studied using the "Wide Unified Classification of CMEA of the genus *Cerasus* Mill." 50 fruits were immersed in distilled water in accordance with the method. As a result of 6, 12 and 24 hours of exposure, cracked fruits were grouped on a scale: slight cracking – 1-20 %, medium – 21-40 %, high – 41-70 %, very high – 71-100 %. The thickness of the fruit peel was determined with a micrometer.

It was found that after 6 hours of soaking in water fruits of Dar Mlieva and Zoryana were equally damaged (35 % and 36 % of the total amount in the sample, respectively) among the early ripening varieties. After a short immersion, the least damage was observed in the fruits of the variety Mliivska Yellow (15 %).

Keeping the fruit in water for 12 hours had the greatest effect on the variety Zoryana, which had 68 % cracked fruits. After 24 hours of exposure, the damage degrees of the fruits of Dar Mlieva and Zoryana varieties were almost equal (70 %). In contrast, after keeping in water for 24 hours, more than half of the amount of the cherries of Mliivska Yellow remained intact (59 %).

The intensity of water absorption and its distribution, the structure of the peel, its thickness and elasticity affect the resistance of cherry fruits to cracking. The peel thickness of fruits of the early-ripening variety Mliivska Yellow was least (0,0639 mm), so it is likely that the peel of this variety had better elasticity and was less damaged by prolonged external saturation with moisture. In the variety Zoryana the peel thickness was the greatest (0,1053 mm, the maximum among the early-ripening group), so the number of damaged fruits was higher.

In the medium-ripening group, fruits of the Alyonushka variety had the greatest peel thickness (0,1186 mm). Respectively, the cracking degree of the fruits of this variety was the highest.

In the late-ripening varieties, the Donetsk Ugoliok variety withstood best short-term immersion in water. During 6, 12, and 24-hour exposures, this variety had the most uniform fruit cracking, respectively 22, 25, 24 %.

In contrast to early and medium-ripening varieties, the group of the late-ripening varieties had an inverse relationship: higher resistance to cracking was found in the Amazonka variety, in which the thickness of the

peel was the greatest (0,1132 mm). In Drogana Yellow fruits, the peel thickness was the least(0,0723 mm), and the number of fruits cracked to a greater extent during exposure to water (88 %). It is likely that the resistance to cracking depends not only on the elasticity of the peel, but also on other factors.

The results of laboratory studies show that the fruits of early-ripening varieties Dar Mlieva, MliivskaYellow, late-ripening Amazonka, Dro-ganaYellow, DonetskUgoliok, Meotida were relatively resistant to crack-ing among the studied varieties. The fruits of varieties of medium-ripening Alyonushka, Aborygenka, Mirage, Melitopols'ka Mottled and late-ripening variety Biriuzawere unstable to long-term exposure to moisture.

#### REFERENSES

1. Kishchak O. A., Kishchak Yu. P. Ways to increase the productivity of cherry plantations in the northern Forest-Steppe of Ukraine. *Sadivnytstvo*.2015; 50: 5–7. 2.
2. Sas R. Is sweet cherries cracked? *Horticulture in Ukrainian*.Kyiv, 2017. 5: 58.
3. Brüggewirth M, Knoche M. Mechanical properties of skins of sweet cherry fruit of differ-ing susceptibilities to cracking. *J Am Soc Hortic Sci*. 2016; 141: 162-168.