

English Translation - Persimmon Sections from the Uploaded Ukrainian Proceedings

Source: Abstracts of Reports of the All-Ukrainian Scientific-Practical Online Conference "Berry Growing in Ukraine. Quality Management of Berry Crops through the Introduction of the Latest Technologies of Growing, Harvesting, Postharvest Handling, Storage and Processing", Kyiv, April 28-29, 2021.

Scope note: this PDF translates the front matter/title, the table of contents, and the complete persimmon-related sections found on pages 37-45 of the uploaded 97-page volume. The remainder of the proceedings is not translated in this file.

Translated front matter

Ministry of Education and Science of Ukraine
National University of Life and Environmental Sciences of Ukraine
Agrobiological Faculty
Department of Technology of Storage, Processing and Standardization of Crop Products named after Prof. B. V. Lesyk
Berry Cluster "Agrovesna"

ABSTRACTS OF REPORTS

All-Ukrainian Scientific-Practical Online Conference

"Berry Growing in Ukraine. Quality Management of Berry Crops through the Introduction of the Latest Technologies of Growing, Harvesting, Postharvest Handling, Storage and Processing"
Kyiv, April 28-29, 2021

Recommended for printing and online distribution by the Academic Council of the Agrobiological Faculty, Protocol No. 3 of April 22, 2021. Editorial board: H. I. Podpriatov, A. V. Bober, V. I. Rozhko, O. V. Zavadzka, V. A. Nasikovskiyi. The collection contains scientific research results by Ukrainian researchers on current problems in modern technologies for growing, harvesting, postharvest handling, storage, and processing of fruit and berry crops.

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Prospects of Persimmon Varieties in Ukraine

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In an era of scientific and technological progress accompanied by worsening environmental conditions, the introduction and acclimatization of new and little-known fruit plant species in Ukraine is especially relevant, because it enriches the biodiversity of the country's flora.

Persimmon as a fruit crop has been known in Ukraine since the last century. At present it is represented here by three deciduous species - Caucasian persimmon, American persimmon, and Oriental persimmon - as well as by hybrids of American and Oriental persimmon. These bear edible fruits and are used rather widely in southern and subtropical horticulture.

Purposeful selection of forms adapted to new conditions of existence is a factor without which creative introduction is impossible. The path from introduction to breeding proceeds through the following stages: search for and identification of source material; introduction; study of plants under new conditions; study of propagation characteristics and cultivation technology; selection of promising forms; creation of cultivars; and introduction into practice.

The introduction of new plant species together with an integrated system of agrotechnology will make it possible to minimize pesticide use and obtain environmentally clean products.

Persimmon fruits are an excellent dietary product, consumed fresh and also used for various kinds of processing. Their nutritional value is determined by a high sugar content, mainly glucose and fructose (12-25%), vitamins C (10-20 mg/100 g), B1 (0.03-0.05 mg/100 g), B2 (0.02-0.05 mg/100 g), B5 (0.05-0.3 mg/100 g), and beta-carotene (0.6-1.6 mg/100 g). An important feature is very low acidity - up to 0.2%. Mineral composition, mg/100 g: potassium 174.0-176.0, calcium 6.0-10.0, iron 0.3-3.0, sodium 2.0-6.0, phosphorus 10.0-26.0, iodine up to 50.0.

Experience growing *Diospyros* L. outside the southern coast of Crimea shows that the weather and climatic conditions of Kherson Oblast correspond well to their biological characteristics and, with proper agrotechnology, they are suitable for cultivation in household plots, dachas, amateur orchards, and farm orchards.

Long-term research has established that in Kherson Oblast persimmon plants pass through all stages of seasonal development during the growing season and set fruit that ripens fully and produces viable seed. Long-term research also makes it possible to evaluate the success of introduction and adaptation of persimmon accessions in the collection of the State Enterprise Research Farm "Novokakhovske" of the Institute of Rice of NAAS.

Table. Evaluation of the success of introduction and adaptation of *Diospyros* L. under the conditions of the State Enterprise Research Farm "Novokakhovske" of the Institute of Rice of NAAS

Accession	Winter hardiness score	Fruiting	Fruiting periodicity	Viability / adaptation number	Prospects	Adaptation degree
American persimmon: Meader	9	+	regular	95	rather promising	complete
Djon Rik	9	+	regular	95	rather promising	complete
NC-10	9	+	regular	85	rather promising	complete
Korp	9	+	regular	85	rather promising	complete
Prok	9	+	regular	85	rather promising	complete
Evelin	9	+	regular	85	rather promising	complete
Szukis	9	+	regular	85	rather promising	complete
Hybrid persimmon: Rosiyanka	9	+	regular	85	rather promising	complete

Accession	Winter hardiness score	Fruiting	Fruiting periodicity	Viability / adaptation number	Prospects	Adaptation degree
Nikitska Bordova	7	+	regular	82	rather promising	complete
Hora Hoverla	5-7	+	irregular	68	promising	good
Hora Roman-Kosh	5-7	+	irregular	65	promising	satisfactory
Hora Rodgers	5-7	+	irregular	65	promising	satisfactory
Novinka	5	+	irregular	55	insufficiently promising	satisfactory
Sosnivska	9	+	regular	85	rather promising	complete
Podarunok Oseni	9	+	regular	95	rather promising	complete
Universal	9	+	regular	85	promising	complete
Ahrarna	7	+	regular	82	promising	good
Stepova Krasunia	7	+	regular	82	promising	good
Oriental persimmon: Nitari	5-7	+	irregular	65	promising	good
Kostata	5-7	+	irregular	65	promising	good
Chocolate	5-7	+	irregular	65	promising	good
Batumi II	5	+	irregular	55	insufficiently promising	satisfactory
Hiakume	5	+	irregular	55	insufficiently promising	satisfactory

Persimmon accessions were divided into rather promising (American persimmon: Meader, Djon Rik, NC-10, Korp, Prok, Evelin, Szukis; hybrid persimmon: Rosiyanka, Nikitska Bordova, Sosnivska, Podarunok Oseni), promising (hybrid persimmon: Hora Hoverla, Hora Roman-Kosh, Hora Rodgers, Universal, Ahrarna, Stepova Krasunia; Oriental persimmon: Nitari, Kostata, Chocolate), and insufficiently promising (hybrid persimmon: Novinka; Oriental persimmon: Batumi II, Hiakume). The degree of adaptation also differed: complete (Meader, Djon Rik, NC-10, Korp, Prok, Evelin, Szukis, Rosiyanka, Nikitska Bordova, Sosnivska, Podarunok Oseni, Universal), good (Hora Hoverla, Ahrarna, Stepova Krasunia, Nitari, Kostata, Chocolate), and satisfactory (Hora Roman-Kosh, Hora Rodgers, Novinka, Batumi II, Hiakume).

Persimmon Varieties Bred by the Institute of Rice of NAAS

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Recently in Ukraine there has been growing interest in new fruit crops, including Oriental persimmon, American persimmon, and hybrid persimmon. Until recently it was believed that, in Ukraine, persimmon culture was possible only in the zone of the southern coast of Crimea. Of the entire genus *Diospyros*, the most promising species for use as fruit crops in temperate latitudes and cold subtropics today are only two species: *Diospyros kaki* Thunb. and *D. virginiana* L. Each has its own economically valuable traits. In *D. kaki* these are large fruit size, high flavor quality, the presence of non-astringent forms, and many self-fertile forms; disadvantages are insufficient winter and frost hardiness and a short period of biological dormancy. In winter, its hardiest cultivars can withstand temperature decreases to -20 C, which is insufficient for cultivation in steppe Crimea and mainland Ukraine.

According to literature data, the hardiest forms of *D. virginiana* can withstand temperature drops to -32 C. It has flavorful fruits with higher dry matter and biologically active substances than the preceding species. Breeders have long tried to combine the economically valuable traits of both species. The greatest results were achieved by A. K. Pasenkov, who obtained the valuable interspecific hybrid 'Rosiyanka'. Along with valuable economic traits - the ability to withstand temperatures down to -27 C, a much longer period of biological dormancy, relatively large fruits up to 90 g, good taste, and a certain level of self-fertility - it is today the most popular variety among enthusiasts in the southern region of Ukraine. Its shortcomings include insufficient self-fertility, fruit size, and fairly late fruit ripening, even for the south. In Nova Kakhovka there are years when it does not ripen. O. N. Kazas crossed 'Rosiyanka' with *D. kaki* and obtained the second-generation hybrid 'Nikitska Bordova'. It is characterized by larger fruit size and better flavor qualities, although somewhat lower winter hardiness, and the same too-late fruit ripening as 'Rosiyanka'.

At the State Enterprise Research Farm 'Novokakhovske' of the Institute of Rice, work on creating winter-hardy hybrid persimmon forms was continued while the institution was part of the Nikita Botanical Garden. There, with the decisive participation of amateur breeder Yu. Ye. Bohdanovskyi, cultivars were tested and registered that are third-generation hybrids from crossing 'Nikitska Bordova' with Oriental persimmon: 'Hora Hoverla', 'Hora Roman-Kosh', and 'Hora Rodgers'. From crossing 'Nikitska Bordova' with American persimmon, the hybrid forms 'Bozhyi Dar', 'Sosnivska', 'Chuchupaka', and 'Universal' were obtained. The first three were registered as cultivars. In terms of winter hardiness, they proved fully suitable for cultivation in the Steppe zone. Their only drawback is insufficiently large fruit size, and in 'Chuchupaka' the need for pollinizers. From seed received from V. P. Cherniayev from open pollination of 'Nikitska Bordova', the hybrid forms 'Pamiati Cherniaieva' and 'Kolgospnysia' were obtained. In 2019 the cultivar 'Dar Sofiyivky' was entered in the State Register of Plant Varieties Suitable for Distribution in Ukraine. In 2020 the cultivars 'Bozhyi Dar', 'Pamiati Cherniaieva', 'Sosnivska', 'Chuchupaka', and 'Kolgospnysia' were entered in the register.

Bozhyi Dar

Authors: V. M. Derevianko, V. V. Dudchenko, O. N. Kazas, V. M. Svrydovskyi, N. V. Derevianko. Trees are of medium or lower vigor. They enter fruiting in the 3rd-4th year after planting. Yield from one tree reaches 60 kg; the average is about 40 kg. Average fruit mass is 60 g. Under Nova Kakhovka conditions the fruits ripen in the second to early third ten-day period of October. 'Bozhyi Dar' tends toward partial remontancy and, under favorable conditions, may form fruits up to 20 g from repeated flowering on summer growth. The cultivar is distinguished by high flavor quality. Under normal conditions fruits can be stored for up to two months. Leaf fall occurs at the end of October to the beginning of November. Plants are monoecious, forming female, male, and hermaphroditic flowers. Yield is moderate or low, but it can be used as a good pollinizer. 'Bozhyi Dar' pollinates Oriental persimmon cultivars and their hybrids with American persimmon well. In winter hardiness it is inferior to 'Rosiyanka' but superior to 'Nikitska Bordova'. In the winter of 2005-2006, when temperatures fell to -27 C, only one-year shoots were damaged by frost.

Chuchupaka

Authors: V. M. Derevianko, V. V. Dudchenko, V. M. Svrydovskyi, N. V. Derevianko. Adult trees are of medium vigor and enter fruiting in the fourth to fifth year after planting. Yield from one tree reaches 60 kg, with an average of about 40 kg. Fruits are almost spherical with an average mass of 70 g. The rather uniform fruits ripen

in the second to early third ten-day period of October. Flesh is tender or slightly dense and has a color close to orange-brown. Depending on how hot the summer was, fruits can be stored under normal conditions for more than two months. The cultivar is distinguished by high flavor quality; fruit on the trees had excellent taste even at the end of January. During storage, the skin turns black over 40-90% of the surface. This cultivar is dioecious, with low expression of parthenocarpy, so for normal fruiting it requires pollinizer cultivars ('Bozhyi Dar'). It is more winter-hardy than 'Rosiyanka'. In both winters with extreme absolute minima (2005-2006) and adverse temperature patterns (2011-2012), plants not only did not freeze back but, unlike 'Rosiyanka', formed a full crop. Because of higher winter hardiness and a shorter growing season than 'Rosiyanka', 'Chuchupaka' is suitable for growing farther north than 'Rosiyanka', with fruit used both locally for fresh consumption and for shipment.

Sosnivska

Authors: V. M. Derevianko, V. V. Dudchenko, I. V. Mitrofanova, V. M. Svyrydovskyi, N. V. Derevianko. Trees are of medium vigor, long-lived, and enter fruiting early. When budded into an existing crown, the first crop forms as early as the second year. Today 'Sosnivska' is considered the most reliable hybrid persimmon cultivar in Ukraine for household and dacha plots, with prospects for small-scale commercial production in regions whose frost-free period is long enough to ripen the fruit. The plant is purely female, forming only pistillate flowers.

Morphologically its plants are closer to American persimmon. Fruit mass is up to 60-90 g. Yield from one tree reaches 100 kg, and on average is 40-60 kg. This hybrid form has a clear tendency toward parthenocarpy, so in single-cultivar plantings without pollinizers, 'Sosnivska' forms fairly high yields of beautiful, uniform, extremely tasty seedless fruits. When pollinizers are present, seeds form in the fruits; in some cases there are very many seeds, which is undesirable for consumption. In Nova Kakhovka, in an autumn of average warmth, fruits ripen in the second ten-day period of October, but almost immediately drop; leaf fall occurs at the same time. By contrast, fruits harvested ahead of time, while firm but with characteristic color, can be stored for up to three weeks. In winter hardiness, plants of 'Sosnivska' exceed 'Rosiyanka'. After the winter of 2005-2006, when temperatures fell to -27 C, unlike 'Rosiyanka' it bore a full crop. According to reports from amateur gardeners, this cultivar withstands brief drops below -30 C, close to the figures for American persimmon cultivars. Because of its higher winter hardiness and much shorter growing season than 'Rosiyanka', 'Sosnivska' is suitable for cultivation farther north than 'Rosiyanka', primarily for local fresh use.

Kolgospytsia

Authors: V. M. Derevianko, V. V. Dudchenko, V. M. Svyrydovskyi, V. P. Cherniayev, N. V. Derevianko. The tree is up to 3.0 m high and enters fruiting in the 3rd-4th year after planting. Fruit mass reaches 230-250 g, with an average fruit mass of 170 g. Yield is moderate, up to 60 kg per tree. Fruits have slight astringency even while firm. In an autumn of average warmth they ripen in the second ten-day period of October and can be stored under normal conditions for up to two months. In winter hardiness it exceeds 'Nikitska Bordova' and is characterized by stable fruiting. The plant is purely female and requires a pollinizer. It is suitable for use in the Right-Bank Steppe zone.

Pamiati Cherniaieva

Authors: V. M. Derevianko, V. V. Dudchenko, V. M. Svyrydovskyi, V. P. Cherniayev, N. V. Derevianko. Trees are of medium vigor. The mother tree bore fruit in its fifth year. Fruit mass is in the range of 300-320 g and even more. Fruits have few seeds. In an autumn of average warmth they ripen at the end of October and can be stored under normal conditions for more than two months. The plant is purely female and requires a pollinizer. In winter hardiness, 'Pamiati Cherniaieva' is at the level of 'Nikitska Bordova', but it is characterized by high potential yield and large fruits. Growing it on a trunk or framework of winter-hardy American persimmon, and in some places even without such a framework, is entirely possible in the southern part of the Right-Bank Steppe or in regions with similar climatic data.