Current situation and perspectives in sour cherry production

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Abstract

Among continental fruit species sour cherry is in seventh place in the world. Most of the production is in Europe with about 70% of the total world production, followed by Asia with 20% and North America with 10%. Leading countries in production are Russia, Poland, Turkey, Ukraine, United States, Serbia and Hungary. The most common cultivars in these countries are Ljubskaja, Vladimirskaja, Ostheim, Schattenmorelle, Üjfehértói Fürtös, Érdi Bötermő, Montmorency and Oblačinska, while dominant rootstocks are mahaleb and mazzard seedlings.

With average annual production of 82,436 t (7% of total world production) Serbia is in sixth place in the world and fourth in Europe is accounts for about and is in sixth place in the world and fourth in Europe. Dominant cultivar is Oblačinska destined for different processing products.

Measures that can lead Serbian sour cherry growing from extensive and semi-intensive to intensive production are: introduction of new cultivars for both fresh consumption and processing, introduction of rootstocks, intensification of production technology, clonal selection of Oblačinska cultivar and grafting on vegetative and generative rootstocks, adjusting cultivars and tree form for mechanized harvesting, introduction of organic and integrated production concept, introduction of new processing products, standardization of production according to market demands, intense marketing etc.

Breeding objectives should go in the direction of selecting less vigorous trees with high and regular productivity, self-compatibility, resistance to frost and pathogens, extending the ripening time, suitability for mechanized harvesting. Also clonal selection of important cultivars like Oblačinska should be carried out.
Sour cherry breeding in Hungary

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Abstract

The sour cherry breeding has been started for 64 years in Hungary. Our breeding work is aiming to get new self fertile, disease resistant or tolerant varieties with excellent fruit quality and to extend the harvest period. As results of the Hungarian breeding work 21 sour cherry varieties were registered into the Hungarian List of Variety in 2014. Now we have three novel bred and disease resistant sour cherry candidate variety as well. Each variety is under examination by The National Food Chain Office in order to be approved by the state.

The Hungarian sour cherry breeding was started by three different ways. The first way was the clone selection of the self sterile ‘Pándy’ and it’s pollinator varieties, the ‘Cigány’ sour cherry types. This work was done by Sándor Brózik from 1950 till 1969. The results of successful clone selection work are the following clonal varieties: ‘Pándy 48’, ‘Pándy 279’, and ‘Cigány 7’, ‘Cigány 59’, ‘Cigány 404’ sour cherries.

The second way was the cross breeding. It was started by Pál Maliga and it has been going on by János Apostol since 1976. Until 1976 the breeding program focused on the crossings by variety ‘Pándy’ using 10 different male parents in order to get new self fertile varieties with excellent fruit quality and to extend the harvest period.

The third way was the landscape selection. It was started by Ferenc Pethő in the North-East part of Hungary, and has been going on by Tibor Szabó for decades. The results of this breeding work are the following landscape selected varieties: ‘Újféhértói fürtös’, ‘Kántorjánosi’, ‘Debreceni bőtermő’, ‘Érika’, ‘Petri’ and ‘Éva’. Furthermore Sándor Kovács is selected the ‘Kőrösi korai’ and ‘Pipacs 1’ varieties in the middle of Hungary and János Apostol is selected the ‘Csengődi’ and ‘Ducat’ varieties.

As result of the cross breeding program the following sour cherry varieties were invented until 1980: ‘Meteor korai’, ‘Favorit’, ‘Érdi nagygyümölcsű’, ‘Korai pipacs meggy’, ‘Érdi jubileum’, ‘Érdi bőtermő’, ‘Maliga emléke’. Among these varieties the ‘Érdi bőtermő’ became one of the most important variety in Hungary and it gives approximately the 35 % of the total annual yield of the country (Apostol, 2011).

A new cross breeding program has been started in 1976. This program lays emphasis to extend the maturity time and to add new top quality varieties to the National Variety List. The results of this program are the following varieties: ‘Piramis’, and ‘Érdi ipari’ and numerous seedlings are under selection.

Originally the harvesting period of sour cherry took 15 to 30 of June in Hungary. As result of our breeding work we could extend the ripening period from 15 May to 15 July.
Because of diseases of cherries we started a joint breeding programme for disease resistant sour cherry varieties with the Michigan State University in 1991. The breeding work based on the native disease resistant variety called ‘Csengődi’. This variety is self fertile and it has good tolerance against the most important sour cherry diseases such as cherry leaf spot (Blumeriella jaapii (Rehm) Arx) (Apostol et al., 1995), cytospora cancer (Cytospora cincta Sacc. and Cytospora leucostoma (Pers.) Sacc.) (Rozsnyay & Apostol, 2005) and brown rot (Monilia laxa (Ehrenb.ex Pers.) Sacc. & Vogl. / Monilinia laxa (Aderhold & Ruhl.) Honey ex Dennis) (Szödi et al., 2008). This work is currently being continued.

After determination of resistance genetic capacity of ‘Csengődi’ (Apostol & Véghelyi, 1994) great number of crossings has been made with this variety since 1995. The selection of the progenies is started by artificial and spontaneous Blumeriella jaapii and Monilinia laxa infections (Apostol, 2000).

The first results of this work are 3 candidate sour cherry varieties: ‘Érdi korai’, ‘Érdi kedves’, and ‘Érdi bíbor’. Each variety have high level of resistance against Monilinia laxa, Blumeriella jaapii and Cytospora cincta. They have earlier maturity times compared to Érdi bőtermő (from 5 June to 12 June) and have the same quality as Érdi bőtermő variety. They are autofertile as well. Now more than 1 000 bearing sour cherry hybrids are under selection at our experimental field.

Novel sour cherry varieties and candidate varieties since 2000.

Érdi ipari: Ripening time: 20-22 May. Fruit size: 20-22 mm, 3-4 g. Round shape. Skin colour is deep red, glittery. The flesh is firm and red. Juice is red. Taste is delightfully sour-sweet. Very good for fresh consumption too. Stalk is short. Tree habit is moderate with globe form crone, and suits for mechanical harvesting. It bears fruits on the spurs mainly. Early blooming. Autofertile

Piramis®: Ripening time 2-5 June. The fruit size is 25-28 mm, 8-9 g. Fruit shape is flatted round. Colour is deep red, glittery. The flesh is firm like a sweet cherry, and red. Juice is red, and stainy. Taste is delightfully sour-sweet savoury. Very good for both fresh eating and processing. Extra quality early-season fruit. Stalk is medium long and flexible. Tree habit is upright and not too vigorous. It gives fruits on the spurs of branches older than 3. years only. Mid-early blooming. Partly autofertile, its autofertility is about 5-7%. Sweet cherries are good pollinators for this variety: Margit, Linda, Katalin, Carmen, Paulus, Aida. It has a low sensitivity to leaf spot and brown rot (Apostol, 2008).

Ducat: Ripening time: 20-22 May. Fruit size: 23-25 mm, 6-7 g. Fruit shape is flatted round. Skin colour is deep red, glittery. The flesh is firm and red. Juice is light red. Taste is delightfully sour-sweet. Very good for fresh consumption too. Stalk is medium long and flexible. Tree habit is a little upright and not too vigorous, and suits for mechanical harvesting. It bears fruits on the spurs mainly. Early blooming. Autosterile. Good pollinators for this variety: Margit, Linda, Katalin, Carmen, Paulus, Aida, and Van.
Érdi korai: Ripening time 2-5 June. The fruit size is 22-24 mm. Fruit quality like Érdi bőtermő. Colour is deep red, glittery. Juice is red, and stainy. Taste is delightfully sour-sweet. Very good for both fresh eating and processing. Stalk is medium long and flexible. Autofertile.

Érdi kedves: Ripening time 5-7 June. The fruit size is 22-24 mm. Fruit quality like Érdi bőtermő. Colour is deep red, glittery. Juice is red, and stainy. Taste is sour-sweet. Very good for both fresh eating and processing. Stalk is medium long and flexible. Autofertile.

Érdi bíbor: Ripening time 8-10 June. The fruit size is 22-24 mm. Fruit quality like Érdi bőtermő. Colour is deep red, glittery. Juice is red, and stainy. Taste is delightfully sour-sweet. Very good for both fresh eating and processing. Stalk is medium long and flexible. Autofertile.

References:
Sour cherry breeding activities in Turkey

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Abstract
As for many other temperate fruit species, Turkey is the center of origin for sour cherry. The country also the biggest sour cherry producers in the world with 170.000 tons annual production. Sour cherry (Prunus cerasus L.), has gained growing interest in recent years due to the envisaged health benefits associated with a regular intake of anthocyanins and related polyphenolic compounds in Turkey. Turkish sour cherries are widely consumed as processed products and are renowned for their high juice quality. In Turkey sour cherry production based on ‘Kutahya’ cultivar (90%) and ‘Kütahya’ sour cherry is a well-known very late maturated local variety, with very high fruit quality and attractiveness. Average fruit weight of cv. Kutahya is 6-7 g, fruits is very firm, has dark red-purple fruit color with high juice content. The trees give high amount of fruits and fruits resistant to fruit cracking. ‘Kütahya’ has been grown for centuries in nearly all parts of Turkey. Sour cherry breeding efforts based on a) Clonal selection of cv. Kutahya, b)Selection of cultivar candidates among naturally seed propagated types. Sour cherry breeding usually aims at developing cultivars with improved fruit quality, delayed bloom time to avoid spring freezes and a range of ripening dates. So far many clones of ‘Kütahya’ were evaluated, and in particular 22 selected promising clones used in National Selection Program and adaptation trials. From 1992 to 1999, phonological and pomological characteristics of ‘Kütahya’ sour cherry clones were studied to identify the best from among the 22 candidates that were selected in the second step of the National Selection program. The 22 candidates were established by planting 7 trees of each clone on P. avium rootstocks for evaluation of 12 characteristics, and 8 parameters were taken into account as the selection criteria. These included yield, flesh/pit ratio, juice ratio, juice color, taste, soluble solids/acid ratio, fruit size and attractiveness. The top-ranked clones were selection numbers 1353, 1408 and 1350, which are suggested as promising types of ‘Kütahya’ sour cherry.

In selection study on natural seed propagated material, sour cherry genotypes were selected from the population consisting of native seedling trees. Some physical and chemical traits of 30 promising genotypes were described in comparison with the standard cultivar Kutahya for future breeding efforts. They had a range of 2.01 to 5.19 g in fruit weight; 39.8-92.4 mm in fruit stalk length, 0.22-0.53 g in seed weight, 1.28-2.95% in acidity and 11.0-20.1% in soluble solid contents. The percentage of fruit cracking was 0% in all genotypes. The majority of genotypes had light-dark colored fruit skins, red colored fruit fleshes and free separating stones.
Sour cherry (*Prunus cerasus* L.) breeding in Poland

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**Abstract**

In Poland, the sour cherry (*Prunus cerasus* L.) is an important species of fruit plants. The annual production of sour cherry fruit varies between 130 and 200 thousand tonnes. The dominant variety has long been ‘Łutówka’; its share in the commercial production is around 80-85%. ‘Łutówka’ is a variety of German origin (‘Schattenmorelle’). Its advantages include high productivity, late flowering time, low sensitivity of the flowers to spring frosts and good fruit quality for processing. This variety, however, is susceptible to cherry leaf spot (*Blumeriella jaapi* Rehm, Arx.), and is prone to premature shedding of leaves. Moreover, its fruit ripens quite late, usually in the second half of July, and is primarily suitable for freezing and processing.

The aim of the sour cherry breeding programme in Poland is to obtain new genotypes that will allow extending the range of the cultivated varieties, also with typical dessert varieties, and a further intensification of the production of the fruit of this species, including the use of combine harvesters to harvest the fruit. The selection work on obtaining new varieties of sour cherry began in Poland already before the Second World War, but the scope of that work was narrow. A wider sour cherry breeding programme was begun only after the War, in the 1950s. The breeding work was carried out at the Agricultural Universities in Lublin and Poznań (by Professors Zaliwski and Mackowiak) as well as at the Research Institute of Pomology (now the Research Institute of Horticulture) in Skierniewice. The variety ‘Nefris’ (‘Fanal’) was derived in Lublin. The work in Poznań resulted in the varieties ‘Agat’, ‘Ametyst’, ‘Diament’ and ‘Dradem’, which were entered in the register of varieties in 1997. Subsequently, the breeding work with sour cherry at the universities was discontinued, but it was continued at the Institute of Pomology (it began in the first half of the 1950s, probably in 1954), at the Department of Breeding, Variety Evaluation and Nurseries. The work was initially led by Prof. Stanisław Zagaja – Head of the Department, with contributions by Dr. Alfreda Buczek-Jackiewicz and Alina Wojniakiewicz MSc, and continued later by Prof. Zygmunt S. Grzyb, Dr Tadeusz Jakubowski (since 1972), and Dr. Elżbieta Rozpara. With the establishment of a separate Fruit Breeding Department on 1 January 1985, the breeding of sour cherry has since then been carried out at that Department. The Department of Variety Evaluation and Nurseries continued evaluating the derived breeding materials in terms of obtaining new sour cherry varieties as well as generative rootstocks for sour cherry using the species *P. mahaleb* L.

The first stage of sour cherry breeding at the Institute lasted until 1992 when the assessment of seedlings obtained from pollination programmes carried out in earlier years, especially in the
period 1978-1983, was completed. From that stage come varieties such as ‘Lucyna’ (‘Łutówka’ x ‘Schirpotreb’), ‘Sabina’ (‘Łutówka’ x ‘Schirpotreb’) and ‘Wanda’ (‘Nefris’ x ‘Wołyńska’) (entered on the Polish National List of Fruit Plant Varieties in 1997), and the varieties ‘Koral’ (registered in 2006), ‘Winer’ (2009), ‘Wilena’ and ‘Wilga’ (2010). In 2009, the variety ‘Kolia’ was registered, and in 2011 ‘Ekowis’. In 1992, two rootstocks for sour cherry – ‘Piast’ and ‘Popiel’, were also entered on the List.

In 1997, Dr T. Jakubowski began the next stage of sour cherry breeding; after his death (2006), sour cherry breeding was taken over by Prof. Edward Żurawicz – Head of the Fruit Breeding Department; and in 2010, Marek Szymajda MSc was assigned to the breeding work with sour cherry. In the period 1997-2014, 754 crossing combinations were performed and more than 10.5 thousand seedlings were obtained and evaluated, from which 300 individuals were selected. The result of this work is the variety ‘Galena’ which is a seedling of ‘Ujfehertoi Furtos’ (‘Groniasta z Ujfeherto’). This cultivar was registered and protected in Poland in 2013. Another sour cherry clone - W-18, with the proposed name ‘Granda’ (‘Granatnaja’ x ‘Pandy 103’) was submitted for registration in 2013. In 2011-2012, four more valuable breeding clones were selected, numbered W-10 (‘Pandy’ x ‘Lucyna’), W-31 (‘Keleris’ x Nefris’), W-72 (a seedling of ‘Morina’) and W-77 (‘Groniasta’ x ‘Lucyna’). These clones have been included in comparative variety trials, in which the assessment of their production value is being continued.

The sour cherry breeding programme in Poland is supported by the Ministry of Agriculture and Rural Development from funds allocated for the financing of biological progress in plant production.
Sour cherry breeding work at Fruit Research Institute – Čačak: past, present and future

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Abstract

Sour cherry breeding programme at the Fruit Research Institute – Čačak (FRI) has had a long history of achievements since its initiation in 1960. The breeding goals were to create a self-fertile genotypes with consistent yields, superior fruit quality, suitability for industrial processing and fresh consumption, as well as varied ripening time. A special attention has been paid to obtaining genotypes tolerant/resistant to Blumeriella jaapii (Rehm.) v. Arx. The main method was the planned hybridization within Prunus cerasus L., which until now has involved 33 and 52 genotypes used as female and male parents, respectively, in 125 parental crosses. Two sour cherry cultivars have been named and released so far (῾Šumadinka᾿ and ῾Čačanski rubin᾿), whereas a large number of hybrids are currently being studied intensively. The following four promising hybrids are currently undergoing the procedure of being released as new cultivars: III/23 (‘Köröser Weichsel’ × ‘Heimanns Konserven Weichsel’), III/31 (‘Köröser Weichsel’ × ‘Heimanns Rubin’), II/40 (‘Köröser Weichsel’ × ‘Heimanns Konserven Weichsel’) and XII/57 (‘Čačanski Rubin’ × ‘Heimanns Konserven Weichsel’). Current work is based on the use of domestic genotypes, well adapted to the environmental conditions of the area (either obtained by planned hybridisation or autochthonous), and introduced genotypes - known sources of resistance with good fruit quality. In the same direction, FRI sour cherry breeding programme will continue to develop genotypes with national and international value, which will provide benefits to consumers and the fruit industry.
Sour cherry genetic resources and breeding in Romania

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Abstract

Sour cherry genetic resources is preserved in Romania in two locations as Research Institute for Fruit Growing Pitesti and Research Station for Fruit Growing Iasi. Total number of accessions is 178 of which 73 autochtonous and 99 from foreign countries. According to IBPGR Cherry Descriptors 154 genotypes have been evaluated concerning fruit use, plant use, blooming period, harvest maturity, fruit shape, fruit size, fruit skin colour, juice colour. Also, 100 sour cherry genotypes (cultivars, clones, local types) have been investigated several years, in the natural infection conditions, to leaf spot (Blumeriella jaapii (Rehm) Arx.) and brown rot Monilia laxa (Aderh&Ruhl).

Specific breeding objectives were self fertility, red colored fruit, tolerance to leaf spot and brown rot, upright or spreading tree habit, small and spherical stone shape and high yielding capacity.

In the last 20 years have been released five new sour cherry cultivars.
S' allele studies in sour cherry

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Abstract

Sour cherry is a natural allotetraploid hybrid (2n=4x=32) between the tetraploid ground cherry, *Prunus fruiticosa*, and unreduced pollen of the diploid sweet cherry, *P. avium*. Sour cherry cultivars are frequently considered to be self-compatible, although self-incompatible and partially self-compatible cultivars do also exist. Self-incompatibility of sour cherry is caused by a gametophytic self-incompatibility system. According to a one-allele-match model self-compatible sour cherries have to contain a minimum of two nonfunctional S alleles. In our studies S alleles of 34 sour cherry genotypes, including 25 cultivars not previously genotyped, were determined by PCR analysis. Twelve different S alleles in 22 combinations were distinguished and 17 new incompatibility groups were found.

Overview of 'Maraska' and 'Oblačinska' sour cherries

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Abstract

'Maraska' and 'Oblačinska' are the most important varieties of sour cherries in Croatia. 'Maraska' is leading variety in Mediterranean part of Croatia, highly adaptable to climatic conditions and specific skeletal soil characteristics in Dalmatia. 'Oblačinska' is leading variety in northern, Pannonian region. It is highly yielding variety, adaptable for continental climate. Both varieties are clonal populations with significant morphological diversity detectable on molecular level. It suggests that these populations may be a pool for clonal selection and their genetic improvement. However, molecular genetic analyses also revealed high genetic similarity between the two varieties, in spite of visible morphological differences.

Both varieties have important use in processing. 'Oblačinska' is used for juices and conditory industry and 'Maraska' for production of famous liquor 'Maraschino', among the other products. This presentation will show the literature overview of these two varieties, assess the current state of production and predict the prospects for the future.
Effect of postharvest treatments on the germination of seeds of three sour cherry (Prunus cerasus L.) genotypes

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Abstract

A major problem in the breeding of sour cherry (Prunus cerasus L.) is that only a small number of seeds in relation to the pollinated flowers is obtained, because the fruit contains only one seed. Moreover, the seeds are in deep physiological dormancy, which in the species of the genus Prunus is caused by the presence of germination inhibitors in the endocarp, the seed coat and the endosperm, as well as in the embryo itself. Even subjecting seeds to a prolonged process of stratification does not guarantee good germination. Therefore, the number of hybrid seedlings obtained in sour cherry breeding programmes is generally small, which makes the breeding work fairly inefficient.

For that reason, research was begun in 2001 at the Research Institute of Horticulture in Skierniewice aimed at increasing the efficiency of sour cherry breeding by obtaining good germination of seeds from crossing programmes. To this end, various treatments are tried that may improve seed germination, such as varying the duration of stratification and removing endocarps and seed coats with the endosperm, where the inhibitors of germination are. The tests are conducted on the seeds of three sour cherry genotypes: ‘Wróble’, ‘Wanda’ and ‘Łutówka’. Within each genotype, 10 experimental combinations are tested:

1) Control – seeds stratified for 130 days,
2) Seeds stratified for 100 days, endocarps removed before stratification,
3) Seeds stratified for 70 days, endocarps and seed coats with the endosperm removed before stratification,
4) Nonstratified seeds, isolated embryos + the length of cotyledons shortened by two thirds (20°C),
5) Seeds stratified for 30 days – seed coats with the endosperm removed after stratification,
6) Seeds stratified for 30 days – after stratification, seed coats with the endosperm removed and the length of cotyledons shortened by two thirds,
7) Seeds stratified for 60 days – seed coats with the endosperm removed after stratification,
8) Seeds stratified for 60 days – after stratification, seed coats with the endosperm removed and the length of cotyledons reduced by two thirds,
9) Seeds stratified for 90 days – seed coats with the endosperm removed after stratification,
10) Seeds stratified for 90 days – after stratification, seed coats with the endosperm removed and the length of cotyledons reduced by two thirds.
Before stratification, all the seeds/stones were disinfected in 0.1% solution of the fungicide Captan. Then they were mixed with the substrate (perlite) and placed in plastic bags. The stratification treatment was carried out at 5°C in a ‘SANYO’, Japan incubator for seed stratification.

Seeds of the genotype ‘Wróble’ – germinated best after 90 days of stratification in combinations 9 (93.3%) and 10 (86.7%), those of the genotype ‘Wanda’ after 30, 60, and 90 days of stratification in combinations 5 (51.2%), 6 (49.9 %), 7 (35.8%), 8 (74.4%), 9 (56.6%) and 10 (64.2%), and also nonstratified seeds with seed coats removed and shortened cotyledons in combination 4 (43.5%), while the seeds of the genotype ‘Łutówka’ after 30, 60, and 90 days of stratification in combinations 6 (48.5%), 7 (73.8%), 8 (69.7%), 9 (98.6%), and 10 (100.0%). The study found a very positive effect of the removal of endocarps, seed coats and the shortening of the cotyledons on the germination of sour cherry seeds.
Improvement of cherry plant growth by endophytic *Fusarium* isolated from weeds

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Abstract

Weeds are well known as unwanted invaders of cultivated land, resistant to extreme climate conditions and anthropological treatments, but at the same time they are less known as a source of beneficial, endophytic organisms that can have positive effect on plant growth and development. We investigated the influence of five *Fusarium* endophytic fungi isolated from symptomless weeds on the growth and development of cherry plants grown from tissue culture. In the first stage of research, fungal inocula were added to tissue culture growth media, and cherry shoots were placed into it. After the rooting of tissue, culture plants in second stage were dipped into the fungal suspension for one hour and transplanted into the greenhouse. Plants were maintained in the greenhouse for two months and after that, stem length, length and width of the oldest leaf, number of leaves, root length and fresh plant weight were recorded. Our results showed significant differences between control plants and inoculated plants. Identification of secondary metabolites revealed several major compounds: beauverin, cyclosporines, enniatins, equisetin, fusaric acid, integracide A and trichosetin. Our conclusion is that endophytic *Fusarium* sp. isolated from weed and their secondary metabolites made positive influence on growth and development of axenic cherry plants.
Promising sour cherry cultivars for Polish orchards

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Abstract

‘Łutówka’ (Schattenmorelle type) is still the most important sour cherry cultivar in fruit production in Poland. Trees of this cultivar are grown over an area that makes up 70-80% of all sour cherry orchards in our country. The fruit of ‘Łutówka’ is recommended for fresh consumption, as well as for processing and export. The susceptibility to Blumeriella jaapi L. and also a late ripening time are the main disadvantages of this cultivar. Polish producers are interested in new sour cherry cultivars with very good fruit quality, tasty, but with an early ripening time. A desirable trait is good keeping quality of the fruit on the market (in trading). The demand for such fruit is associated with the growing consumer interest in sour cherry fruit intended for direct consumption. Finding just such varieties was the goal of this research.

The research was carried out in the sour cherry collection of the Research Institute of Horticulture in Skierniewice, which is located in Dąbrowice near Skierniewice (central Poland). In total, more than 200 varieties of sour cherry have been gathered in this collection. The collection contains both local genotypes coming from different parts of Poland (50%) and those brought from Polish and foreign collections and breeding centres. Each taxon is represented by 3 trees growing on Prunus mahaleb L. seedlings in a sandy soil. This unusually rich set of genotypes makes it possible, above all, to preserve the biodiversity existing within the species.

In this work, a pomological evaluation of ten sour cherry cultivars was carried out. Sour cherry genotypes suitable for fresh market were looked for among them. The resistance of trees to frost, susceptibility of flower buds and flowers to spring frosts, the course of phonological phases, growth, yielding, and fruit quality were observed. The fruit of all the evaluated cultivars ripened earlier than the fruit of ‘Łutówka’. In some of them, the fruit ripened even more than 1 month earlier. The most promising among the 10 genotypes evaluated were: ‘Czudo wisznia’, ‘Piramis’, ‘Galena’, and Hybrid W 12/02. The first cultivar comes from Hungary, the second from Ukraine, and the last two from the Polish breeding programme.
Evaluation of sour cherry cultivars for various ways of usage in Latvia

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Abstract

Sour cherries are consumed as fresh fruits or used for processing. For each purpose different traits of the cultivars are needed. The suitability of sour cherries for consuming as fresh fruits or processing was evaluated for 25 cultivars, landraces and clones. Following characteristics were tested: fruit weight, edible part of fruit, rotted fruits, cracking, soluble solid content (by refractometer ATAGO N20). Stem retention force was measured for 16 cultivars (by device TMS-PRO).

Fruit quality of most widespread landrace ‘Latvijas Zemais’ varied depending on the clone. Good fruit quality was detected for ‘Latvijas Zemais’ Dumbrava clone: fruit weight 5.3 g, edible part of fruit 82 %, no rotted or cracked fruits, soluble solid content 16.2 ºBrix. The most appropriate cultivar for fresh consuming was ‘Haritonovskaya’ with fruit weight fruit weight 6.2 g, edible part of fruit 83 %, no rotted or cracked fruits, soluble solid content 18.3 ºBrix.

Low stem retention force was detected for ‘Shokoladnica’, ‘Orlica’, ‘Molodyozhnaya’, ‘Turgenevka’, ‘Vytenu Zvaigzde’ as well as for ‘Haritonovskaya’ and ‘Morozovka’ which is precondition for mechanical harvesting.
Variation in breeding progeny and selection for differential products in sour cherry

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Abstract

Sour cherry has traditionally been an important industry fruit in Denmark mainly for producing juices. In the last 10 years production area has declined from over 2500 ha to about 1000 ha due to problems with low fruit set possibly associated with climate change with more mild winters but still late spring frost. A four year project ‘rapid cycling breeding methods’ was carried out from 2004 to 2008 and produced a large pool of both controlled cross and open pollinated seedling progeny. The population of seedlings is being characterized in relation to tree growth, plant health, resistance to disease and insect attack and most importantly fruit quality. We aim to find smaller more disease resistant trees with stable yield of very high quality and differentiated quality of fruits to target the specialty products and luxury products market that may be economically viable in Denmark for producers. Bulk market fruit is due to international competition not the main target for our selection. High color content, high and good balance of sugar/acid for taste and aroma and high content of assumed health components will be preferred. We aim to identify cultivars with differentiated quality attributes that match specific products, i.e. specific cultivars to be used for juice only, cultivars to be used for high quality wine, cv’s to be used for jam/marmelade/purees, dried fruit/fruit ingredients etc. Examples of variation in fruit quality and attributes will be presented.
Conservation and utilization of genetic resources in sour cherry and heritage as a concept of rural sustainable economic development

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Abstract

Thanks to the unique diversity, the Balkan Peninsula could be considered as secondary center of genetic diversity *P. cerasus*. Conservation, utilization and sustainable use of its natural resources in West Balkan countries could play central role in sustainable rural development and economic growth through wise use of natural resources. But, it has never been a field for dismantling the divide between indigenous and scientific knowledge.

The main aim of the research was to connect in situ/on farm conservation and evaluation of sour cherry germplasm with ethno botanical heritage of nations and ethnic minorities. The main outcome of the research is improved in situ/on-farm management and evaluation of genetic resources by the farming sector and derived products with enhanced health benefits for consumer as a foundation for economic benefits for farmers. Diversification of such products comes from the traditional ways of fruit processing in ethno botanical heritage of living nations and ethnic minorities. Socio-economic dimension have its relevance in farming innovations, diverse product outcomes as a foundation for regional networking between farms, within and between regions, leading towards a recognizable food chain. It is a precious possibility to improve the quality of life and economic well-being of people living in relatively isolated and sparsely populated areas.
Evaluation of some native Sour cherry genotypes ex situ collected in Iasi-Romania

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Abstract

Romanian territory is located in the extended area limits of the geographic genetic center for cherries which are growing, in a high genetic diversity, all over the country. In the past, sour cherry has been propagated to a large extend by seeds, resulting a wide range of variability. Subsequently, by selection and clonally propagation of valuable individuals within seedling population from different growing areas, many local cultivars were framed. Additionally, as a result of breeding programs stared more than 50 years ago, 18 new varieties were released. Some of them are preserved in sour cherry collections of Iasi, Research Station for Fruit Growing which include 102 sweet cherry accessions (from which 37 are autochthonous biotypes, old and new local cultivars). Sour cherry collection from RSFG Iasi was established in 2000 as a replication of the RIFG Pitesti National Collection (Iasi area being very suitable in terms of the climate and soil conditions to maintain cherry genotypes).

In the paper is presented a synthesized overview of 7 native genotypes evaluated for some morphological and biological characteristics as well as agronomic traits like fruit size, weight, stone weight, soluble solids in juice, acidity, vitamin C, tree vigor, full blooming and harvest maturity season, fertility, susceptibility to Blumeriella jaapii and Monilia laxa.
Technology of sour cherry production in R. Macedonia

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Abstract

About 30 fruit species are being cultivated on the territory of R. of Macedonia thanks to the different ecological conditions. Given the quantity of produced fruit, the leading culture is the apple, followed by the plum, peach and sour cherry with significantly lower production.

The sour cherry is present on the whole territory. It’s being cultivated mainly on large planting orchards owned by agricultural corporations. The only variety which is being produced is Oblachinska. The average annual production is close to 8 thousand tons. The participation in the total fruit orchards is approx. 12%. Unlike the other fruit cultures which are cultivated on smaller parcels, the sour cherry is being cultivated on large plantations mostly above 20 ha.

During the establishing of the orchards, mainly are used the own rooted seedlings, but lately there is a trend on establishing orchards on P. mahaleb rootstock. The own rooted plants are poorly vigorous and easily picked by hand from the ground. Due to the poorly developed and shallow root system, the fruits are very sensitive to draught, suffer root borer and irrigation is essential. The trees grafted on P. mahaleb are more vigorous, taller, have strongly developed root system and are more resistant to draught. Also they can be picked mechanically. Most of the existing orchards are being irrigated drop by drop or with artificial rain, but there are large areas which do not have water for irrigation. The orchards with irrigation the yield is 15-20 t/ha, whereas the orchards without irrigation 8-10 t/ha. Diseases comes mostly from monilinia spp, blumerella jappi and stigmina carpophila. Besides the root borer, the economic damage is caused by the cherry fly.

The fruits are sold fresh, frozen, semi processed in alcohol and processed in compote and juice. Most of the production is sold in the foreign markets as fresh, processed and semi processed.
Selection of Feketićka sour cherry based on pomological characteristics

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Abstract

A total of 12 Feketićka sour cherry accessions were collected from two different location and analysed within this research. The highest fruit weight (6.47g) was observed in accession Pc_1105 and the lowest in accession Pc_1112 (4.39g). Stone weight was smallest within accession Pc_1107 (0.23g) and the largest in Pc_1109 (0.40g). Fruit ratio, the edible part of the fruit (mesocarp and skin) in the total fruit weight, ranged from 92.38% (Pc_1112) to 95.25% (Pc_1107). Accessions stalk length varied from 42mm (Pc_1112) to 56.89mm (Pc_1111). The lowest average soluble solids content exhibited genotype Pc_1107 (10.38%) and the highest Pc_1106 (15.22%). Fruit flesh has firm consistency with red colour of juice and excellent taste.

Selection of “Feketić” sour cherry should be continued to improve yield and fruit size.
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