Розміри листків 'Dwarf' 61,4×32,0 мм, індекс форми листка 1,92. У сортів аронії Мічуріна довжина листків коливається в межах 71,6–74,4 мм, ширина – 42,8–45,8, індекс форми – 1,62–1,72. Дисперсійним аналізом даних установлено суттєву різницю між сортами першої і другої групи і відсутність суттєвої різниці між сортами в межах другої групи.

У аронії чорноплодої 'Dwarf' маса найбільших щитків сягає 6 г, кількість плодів у суцвітті сягає 13, середня маса 1 плода становить 0,5 г, а найбільші плоди важать 0,7 г. Сорти аронії Мічуріна характеризуються значно кращими показниками господарсько-цінних ознак. Так, маса найбільших щитків – 25–33 г, кількість плодів у суцвітті – 27–33, середня маса плодів – 1,0 г, маса найбільших плодів 1,3–1,5 г.

Між дослідженими сортами аронії Мічуріна не виявлено суттєвих морфологічних відмінностей. Усі вони походять від родоначальних рослин мічурінської селекції, які є апоміктами і за умов насіннєвого розмноження успадковують особливості материнської рослини. Не виключено, що всі вони, або принаймні багато з них мають однаковий генотип. У перший рік плодоношення урожай з куща різнився в межах одного сорту і між сортами і становив у 'Dwarf' 0,4–0,6 кг, у сортів аронії Мічуріна 0,7–3,6 кг. Висновки щодо продуктивності сортів аронії Мічуріна можна буде зробити після декількох років спостережень.

Таким чином, плодова культура, відома як аронія, у ботанічному сенсі є аронією Мічуріна (або горобиноаронією Мічуріна, що не так суттєво з господарської точки зору). Вона має безперечні переваги над аронією чорноплодою, назву якої садівники тривалий час помилково використовують для позначення аронії Мічуріна.

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INSIGHTS INTO BREEDING FOR HIGH OLEIC SUNFLOWER OIL IN EUROPE

A recent USDA report in 2015 suggest that, Ukraine presently (2014–2015) ranks first in sunflower production globally with an output of 10,20 million tons while Russia and the European Union (EU) are together currently ranked second, as they each produced 8,93 million tons of current total world sunflower output of 40,33 million tons. Sunflower is an industrial crop that is primarily cultivated for oil, and for an extensive period, research hugely focused on increase and expression of genetic potential for high seed yield and oil content in seed of novel hybrids. Only in the last four decades were scientist compelled to tackle oil quality as one of the key challenges in the vegetable oil market. The primary defining parameter in oil quality is fatty acid composition, configuration of fatty acid models in the triglyceride molecule, and overall content and profile of numerous polyisoprenoid lipids that exist in the oil, typically tocopherols and sterols (Fernandez-Martinez J. M. et al., 2009).

Naturally, sunflower oil is valuable to human health as it posses the highest poly- and monounsaturated fat content (linoleic and oleic acids) and the least amount of saturated and trans fats (Kaya Y. et al., 2015). Like other vegetable oils, sunflower seed oil quality is altered to produce oils with improved nutrient and functional properties needing just little, if any, processing for a particular end-use market. However, the consequences of oil processing are mostly harmful to human health. For instance, common uses of sunflower oil, such as deep frying or margarine production, involve prior hydrogenation or hardening of the oil. This process produces artificial trans fatty acid (TFA) and positional isomers that are negatively related to cardiovascular disease. Hence, fatty acid adjustment is of great significance for better human health. Relating to diet, higher oleic acid (70 %) and lower linoleic acids (20 %) are preferred. So, breeding for oil quality in sunflower has principally concentrated on varying the comparative amount of fatty acids via raising oleic acid to have stable and healthy oil and boosting stearic acid for a stable and healthy fat (Zambelli A. et al., 2015).

The first significant modification in sunflower oil quality and the first source of enhanced oleic acid content was reported by Soldatov K. I. at the All-Union Research Institute of Oil Crops in the former USSR in 1976 after treatment of seeds of variety ('VNIMK 8931') with the chemical mutagen dimethyl-sulfate (DMS). Soldatov K. I. separated single plants with more than 50 % of oleic acid in the M_3 generation before selecting variety ('Pervenets') containing 80–90 % of oleic acid in oil. According to Jocić S. et al., (2015), several inbred lines and hybrids with the increased oleic acid content have been derived from ('Pervenets'), even though the mode of inheritance and the number of genes regulating this trait are yet to be established. Recently in 2013, Leon A. J. and corroborators reported two new high oleic sunflower varieties with induced mutations affecting oleate desaturase gene FAD2-1. The two dissimilar high oleic sunflower mutants were created by treatment of seeds with X-rays. The isolated mutants (named as '29065' and '29066') experienced individual polynucleotide insertions on the FAD2-1 gene caused by the mutagenic treatment. Contrary to 'Pervenets' high oleic mutation, which generates a down regulation of the FAD2-1 transcription, '29065' and '29066' high oleic mutations are structural, influencing enzyme activity by producing a truncated protein and both exhibited an oleic acid percentage above 90 %.

Presently, standard linoleic type and high oleic or mid oleic type are two main sunflower types in the global market. Standard sunflower oil respectively comprises averagely about 70 % and 20 % polyunsaturated linoleic acid and monounsaturated oleic acid. High oleic sunflower oil boasts of the highest oleic acid content (above 90 %) relative to all vegetable oils present in the global market (Jocić S. et al., 2015), and it has superior oil resistance to auto-oxidation, which avoids the build-up of poisonous products during oil processing, storage, and direct utilizations (Kaya Y. et al., 2015). As well, it is very suitable for food purposes, including oil for spraying of snacks, crackers, and dry breakfast cereals; frying oil; food products for toddlers and aged; and for increasing oxidation stability. Still, high oleic sunflower generates high yields and is moreover tolerant to the chief diseases, weeds, and broomrape, which are limiting factors on high oleic sunflower field.

In spite of this impressive oil quality and biological properties, majority of farmers are unaware of the characteristics of high oleic type sunflower. Thus, there is limited demand and knowledge on the benefits of high oleic sunflower oil presently in the major production and consumer countries like those in the Black Sea region. For example, the conventional linoleic oilseed hybrids are still largely cultivated in Ukraine and Russia – the leading sunflower producers globally. Ukraine and Russia in 2010 respectively reported a small market share of 2,2 % and 1 % high oleic sunflower (Kaya Y. et al., 2015). Conversely, the EU-27 countries are now increasingly becoming aware of the potentials of oleic types with special interest from large-scale crushers in France and Spain, due to the possibility of offering healthy oils for that market (APK Report, 2013; Kaya Y. et al., 2008; Ozip I., 2011).

According to Kaya Y. et al., (2015), while the mid-oleic type is common in the United States (80 % NuSun [mid-oleic], 10 % high oleic, and 10 % conventional) and Argentina, the high oleic type leads in European countries with production reaching 75 % in France, 50 % in Spain, and 10 % in Hungary. Though, in 2014, the share of high oleic sunflower oil type cultivated against conventional types in France, Spain, Ukraine and Russia were respectively, 56 %, 13,7 %, 8,5 % and 3,5 %, the percentage against total high oleic of these countries were as follows: France (31 %); Spain (9 %); Ukraine (34 %); Russia (18 %) of all high oleic plantings (Ukraine News Agency, 2016). Interestingly, this recent report by Ukraine News Agency suggest that, Europe (Western Europe), particularly France, one of the largest high oleic sunflower oil producers globally has attained most of its likely production. Therefore, future European expansion of high oleic sunflower is largely dependent on Ukraine and Russia, jointly planting 52 % of total high oleic crops in 2014, with Ukraine having the greatest potential for growth. Indeed, it was estimated that Ukraine would have a total area of 10 % under high oleic cultivation in 2015—an increase of 1,5 % from the previous year (2014).

Moreover, based on reports by analysts of APK-Inform Agency recently, Russia and Ukraine have huge potential to produce high oleic sunflower seed and oil for simple export. Additionally, the promising use as a biodiesel source is expected to expand planted areas and demand for high oleic type in the Black Sea region (APK Report, 2013; Kaya Y. et al., 2008; Ozip I., 2011). According to the State register for Ukraine in 2016, there are currently, 663 sunflower hybrids registered in Ukraine with 52 categorized as high oleic. Nevertheless, efforts should be directed to Ukraine and Russia to create further awareness of the benefits of high oleic sunflower oil types in order to realize the maximum production potential in Europe and perhaps the world.