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ACHIEVEMENTS AND FUTURE PROSPECTS OF NS CONFECTIONERY BREEDING PROGRAM

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In the past decade confectionery sunflower has become an essential part of human nutrition and diet programs. Confectionery sunflower breeding is characterized by the fact that different markets have different demands regarding seed size, hull color and other traits, which makes this process more difficult and costly (Hladni, 2016). When creating confectionery hybrids, it is very important to combine genes responsible for high yield potential and good technical and technological traits of the seed. It is expected that highly-productive confectionery hybrids will replace confectionery varieties, which will influence the increase of surfaces under confectionery sunflower.

Fig.1. Confectionary sunflower genotypes representative for seed descriptor categories (a) size (small, medium, large), (b) shape (elongated, narrow ovoid, broad ovoid, rounded) (c) main colour (grey, light brown, medium brown, dark brown, black) and (d) colour of stripes (white, grey, brown, black).

Market demands for confectionery sunflower seeds influenced Institute of Field and Vegetable Crops, Novi Sad to initiate a special breeding program with the aim of developing modern confectionery open-pollinated hybrids. The specific breeding goals for confectionery sunflower: increase of protein content and quality >25%, low oil content <40%, oil stability with increase of kernel ratio and decrease of hull ratio, 1000 seed weight >100g, easy dehulling, uniformity of seed size, shape and color as well as tolerance to dominant diseases and broomrape in the cultivation region and seed quality maintenance in long term storage.

Land races and OP varieties have huge genetic variation and are well adapted to the local soil types and climatic conditions, as well as other environmental factors. They are the source of many desirable genes, especially those addressing higher adaptability to environmental conditions and resistance to certain diseases. However, little is known about the levels and distribution of genetic variation within the confectionery sunflower gene pool (Fig.1). The high diversity index value (0.7) suggests that the evaluated material is representative as a confectionary sunflower germplasm collection (Hladni et al., 2017).

One of the most important goals in breeding is creation of resistance or tolerance of confectionery hybrids to broomrape and incorporating herbicide tolerant traits in the adapted confectionery hybrids. Clearfield system, IMI resistance hybrids could be successful for controlling broomrape parasite.

Several factors have contributed to the spread of NS confectionery hybrids, including crop uniformity, suitability for mechanized harvesting, and optimal plant density for achieving the desired size, seed quality and color suitable for the Serbian and the world market.

Continuous work on the creation of new highly productive low-oil sunflower hybrids of the confectionery type resulted in the change of assortment offered by Institute of Field and Vegetable Crops, Novi Sad IFVCNS in both Serbian and the world market. In Serbia domestic and foreign confectionery varieties with large black seeds have been replaced by NS confectionery hybrids, such as NS Gricko, NS Slatki, NS Garavi and NS Leviathan. These hybrids have lower oil content compared to standard (below 40%) with protein content of over 20% and good stability and adaptability.

The cooperation and exchange of breeding material from different breeding centers, as well as creation of joint hybrids has gained importance in recent years, as a tool for creation of new, more resilient and productive confectionery hybrids, ready to face both challenges on market and ones caused by the changing climate.

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