POSTERS

SESSION 3 RESILIENCE AND STABILITY OF PRODUCTION

The use of crop wild relatives in sunflower breeding for drought response

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One of the major limitations for agricultural productivity around the world, particularly in warm, arid and semi-arid regions, is water stress. Drought is the most restraining factor in sunflower production worldwide, severely reducing yield, oil volume, oil quality, and other important yield traits. Sunflower, being a crop with medium water requirements (Ky<1), has the ability to tolerate a short period of drought. The future of sunflower is probably related to its potential adaptation to climate change The challenge for the sunflower breeding community is to breed sunflower adaptable to these marginal environments and at the same time to increase seed yield. To develop drought-tolerant lines and hybrids in sunflower breeding, breeders need to be aware of the relationship between drought resistance traits and yield and apply effective screening methods for these traits. Genotypes should have such advantages as enhanced leaf area, earliness, and earlier stomatal closure.

The narrow genetic base of cultivated sunflower has been broadened by the infusion of genes from crop wild relatives (CWR). When choosing CWR which can increase the adaptive capacity for tolerance to drought and high temperatures, it is important to opt for species which inhabit desert and semi-desert areas. Helianthus deserticola inhabits the desert and semi desert areas. The name of this species implies what kind of conditions it can withstand in the nature, as it grows on stabilized sandy soil and desert soil, which makes it perfect candidate for introduction of traits connected with drought resistance into cultivated sunflower through interspecific hybridization. Traits connected with this strategy include fast growth and flowering rate, lower plant height in the maturity, increased photosynthesis activity and stoma conductivity. H. deserticola shows both increased photosynthesis activity and stoma conductivity so it is excellent candidate for the adaptation to desert environments.

In this research, the plants were first selected from the interspecific population DES-1474-1, DES-1474-2 originating from annual wild species H. deserticola and then subjected to inbreeding and used with the intention to make cms female and Rf male inbred lines resistant to drought. Several agronomically important traits of new cms and Rf inbred lines and their hybrids were evaluated and could be used for the production of new drought resistant sunflower hybrids.

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