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# CONFECTIONERY SUNFLOWER HYBRID BREEDING STUDIES IN TURKEY: CURRENT AND FUTURE STRATEGIES

Yalcin KAYA, Necmi BESER

TRAGEN

Trakya Genetics R&D

Trakya University Genetic & Bioengineering Dept., Edirne, Turkey  
TRAGEN R&D Ltd. Co., Trakya University University Technopark., Edirne, Turkey



Sunflower (*Helianthus annuus* L.) mainly grows for oilseed in the world, but it is one of most preferable and consuming confectionery seeds too. For confectionery production, it generally produces in irrigated lands to get bigger kernel sizes but it also produces drylands with less plant densities. As a summer crop, sunflower influences from higher summer temperatures especially during grain filling period leading more empty seeds in the production. On the other hand, some biotic stress such as broomrape parasite (*Orobanche*), rust, *Verticillium*, downy mildew and weeds are the main reducing factors confectionery sunflower yield too. Although open pollinated (OP) seeds still exist in the production as big portions in some countries, confectionery hybrids which give more seed yield and quality, homogenous and bigger size seeds are mainly in sunflower production almost in all part of the world. Therefore, most of confectionery sunflower breeding programs in the world focus on develop new hybrids having tolerant genes to these biotic and abiotic stress in addition to higher seed yield, bigger kernel sizes and higher adaptation capability. Meanwhile, mostly OP confectionery local seeds (Inegol type) plants mainly in Turkey. Turkish people mostly like consuming white color with grey stripe seeds so all the production is these OP seeds in Turkey. Although there are some registered confectionery hybrids in recent years, these are not considerable market share yet in Turkey. On the other hand, Clearfield System hybrids resistant to Imidazonone (IMI) herbicide which controls both broomrape and also key weeds are starting to dominate markets in oil types as well as confectionery seed sector too. Since to develop resistant genes to new races of broomrape and other diseases are not easy in confectionery sunflower breeding, so IMI types solve both broomrape problem and also especially large leaf weeds which are two devastating disasters in sunflower production. On the other hand, higher oleic acid and *tocopherol* (E vitamin) content in the seeds increase both shelf life and also nutrient quality of confectionery sunflower seed. Beside, some molecular methods esp. MAS selection are so useful tools both developing new hybrids and inbred lines with presenting accurate and precise selection to breeders and also accelerating breeding program in sunflower. Therefore, new confection sunflower inbred lines and hybrids should have resistant to both broomrape and some important diseases mentioned above and also be Clearfield type as well as being oleic type and higher kernel size and yield capacity in the sunflower breeding program in Turkey. Furthermore, more heat tolerant hybrids, developing new plant designs to increase leaf area with having shorter petioles to increase plant numbers per area then new hybrids catching higher heterosis on seed yield and quality will be main targets in sunflower breeding programs in the near future both in Turkey and also other countries in the world.

**Keywords:** Confectionery sunflower, Sustainable production, Hybrid breeding, Inbred lines, MAS, Clearfield, IMI herbicide, Broomrape, Disease resistance,

