CONFECTIONERY SUNFLOWER PRODUCTION IN TURKEY

Yalcin Kaya, Trakya Agricultural Research Institute, 22100 Edirne, Turkey
E-mail: yalcinkaya@ttae.gov.tr

Abstract

Confectionery sunflower production is about 80,000 metric tons in Turkey. Planted areas are mainly located in the Middle Anatolia region. Sunflower yield is lower (about 1,200 kg/ha) due to lack of certified seed with production mainly under dryland conditions. Turkish confectionery farmers use village populations for seed, because there are no registered hybrids or open-pollinated confectionery sunflower cultivars in Turkey. These village populations are usually degenerated and branched like wild types and are susceptible to diseases and broomrape parasite (*Orobanche* spp.). Turkish people like consuming confectionery sunflower and the preferred seed types are mainly white with grey stripes. Turkey confectionery production is not large enough for domestic consumption. However, confectionery companies have very modern and large capacity processing factories and packaging units in Turkey. These companies obtain the confectionery seeds from domestic production and also from importing.

Introduction

Sunflower is produced mainly as an oil crop in Turkey and in the world. However, uses as confectionery, in horticulture, silage, animal and bird feed are important and are very common in the world. Although confectionery sunflower is produced in many countries, it cannot be considered separately from the oil type. Additionally, confectionery sunflower data both for production and consumption can not be found in most national or international organization statistics.

Sunflower is produced both as confectionery and as an oilseed in Turkey. However, confectionery sunflower production is not enough for consumption and domestic needs are supplied by importing similar types. Turkey is pays $4 to 5 million each year for confectionery seeds imported from the USA, Israel, Argentina, Hungary, and Canada (Gaytancioglu, 1999).

Turkey has one of the most modern and largest capacity confectionery factories in the world. Factories process not only sunflower but also other confectionery crops such as pistachio, peanut, hazelnut, and pumpkin. These processing companies sell confectionery products in Turkey and export to other European countries.

Confectionery sunflower seed types depend on consumer preference in some countries in the world. Although the favored seed color is white with light grey stripes in Turkey, black seeds are preferred by consumers in Balkan countries such as Serbia, Bulgaria, Moldova and Romania. The confectionery seeds preferred by Turkish people are usually bigger and longer and their 1000-seed weights are higher. Turkish people are one of the highest consumers of confectionery sunflower in the world. Although some nations consume either in-shell or kernel, Turkish people prefer only in-shell as a confectionery.

Results and Discussion

The Present Situation of Confectionery Sunflower Production in Turkey. Confectionery sunflower is mainly produced in the Middle and East Anatolia regions of Turkey. Although confectionery sunflower is grown in irrigated fields in other regions, confectionery types are cultivated mainly under dry conditions in Turkey. However, confectionery sunflower is produced in very low densities (such as 50 cm x 100cm) instead of fallow in almost 30 % of the planted areas due to the dry climate and lower precipitation.

Farmers plant local varieties and village populations with different problems in Turkey. These populations are usually lower in seed quality, are branched, and are taller with small heads like wild types. Lower self-pollination is another problem in these village populations due to the lack of bee populations. Additionally, the appearance of different diseases such as *Verticilium* spp., *Sclerotinia* spp. and *Rhizopus* is very common in the planted areas. Broomrape (*Orobanche* spp.) which significantly lowers seed yield is observed in many areas. Due to confectionery sunflower production in different scattered areas, the damage from birds, such as crows, sparrows and starlings, is another factor reducing yield.

Turkey's confectionery sunflower production between 1991 and 2003 is given in Table 1. Confectionery sunflower production and planted areas were doubled in the last ten years. However, confectionery yield was increased only slightly in the same period due to production mainly under dry conditions and planting of village populations usually having lower yield capacity. Additionally, their yields did not increase because certified seed was not used.

Table 1. Turkey confectionery sunflower planted areas, production, and yield by years (Anonymous, 2003).

Years	Planted Area	Production	Yield
	Ha	M Ton	Kg/Ha
1991	28401	32908	1158.7
1992	23345	26665	1142.2
1993	30872	38850	1258.4
1994	39220	36393	927.9
1995	45515	49228	1081.6
1996	56303	63534	1128.4
1997	51161	64480	1260.3
1998	47768	59596	1247.6
1999	71200	76304	1071.7
2000	77407	89318	1153.9
2001	73617	81403	1105.8
2002	69996	94043	1340.0
2003	64048	78922	1232.2

The Middle Anatolia Region (Ankara, Kirikkale, Konya, Aksaray, Kirsehir, Kayseri, etc.) has more than half of the confectionery planted area (61%) and sunflower production (52 %) in Turkey (Table 2). The Mediterranean Region (K. Maras and Adana), 18 % area and 26 %

production, and the Aegean Region Provinces (Denizli, Afyon and Izmir), 13 % both area and production, followed the Middle Anatolia region respectively (Figure 1).

Table 2. Turkey confectionery sunflower planted areas, production, and yield by Turkish province in 2003 (Anonymous, 2003).

PROVINCE	Area	Rank	Rate	Production	Rank	Rate	Yield	Rank
	Ha		%	M Ton		%	Kg/ Ha	
ANKARA	13797	1	21.5	13343	2	16.9	967.1	28
K.MARAS	11020	2	17.2	20483	1	26.0	1858.7	10
KIRIKKALE	8255	3	12.9	4003	6	5.1	484.9	34
DENIZLI	5259	4	8.2	7431	3	9.4	1413.0	15
BURSA	3835	5	6.0	5412	5	6.9	1411.2	16
KONYA	3503	6	5.5	3993	7	5.1	1139.9	21
AKSARAY	3350	7	5.2	6579	4	8.3	1963.9	9
KIRSEHIR	2365	8	3.7	2165	12	2.7	915.4	30
KAYSERI	2182	9	3.4	3222	8	4.1	1476.6	14
SAKARYA	2138	10	3.3	2437	11	3.1	1139.9	22
KARAMAN	1830	11	2.9	1096	16	1.4	598.9	33
CANKIRI	1785	12	2.8	1300	15	1.6	728.3	32
AFYON	1675	13	2.6	2115	13	2.7	1262.7	18
ERZURUM	1673	14	2.6	2676	9	3.4	1599.5	11
IZMIR	1268	15	2.0	1782	14	2.3	1405.4	17
ESKISEHIR	1177	16	1.8	2511	10	3.2	2133.4	5
BILECIK	922	17	1.4	821	18	1.0	890.5	31
YOZGAT	850	18	1.3	911	17	1.2	1071.8	25
CORUM	447	19	0.7	665	21	0.8	1487.7	13
KUTAHYA	432	20	0.7	518	22	0.7	1199.1	20
SIVAS	381	21	0.6	798	19	1.0	2094.5	6
NEVSEHIR	373	22	0.6	355	25	0.4	951.7	29
MUGLA	200	24	0.3	760	20	1.0	3800.0	1
ADANA	200	23	0.3	220	26	0.3	1100.0	23
NIGDE	170	25	0.3	187	27	0.2	1100.0	24
BINGOL	168	26	0.3	378	24	0.5	2250.0	4
SANLIURFA	150	27	0.2	450	23	0.6	3000.0	2
BOLU	20	28	-	30	28	-	1500.0	12
USAK	20	29	-	25	29	-	1250.0	19
ANTALYA	5	30	-	5	32	-	1000.0	26
KARS	3	31	-	8	31	-	2666.7	3
YALOVA	3	32	-	3	33	-	1000.0	27
BURDUR	1	33	-	2	34	-	2000.0	7
IGDIR	1	34	-	2	34	-	2000.0	7
TOTAL	**64048**			**78922**			**1232.2**	

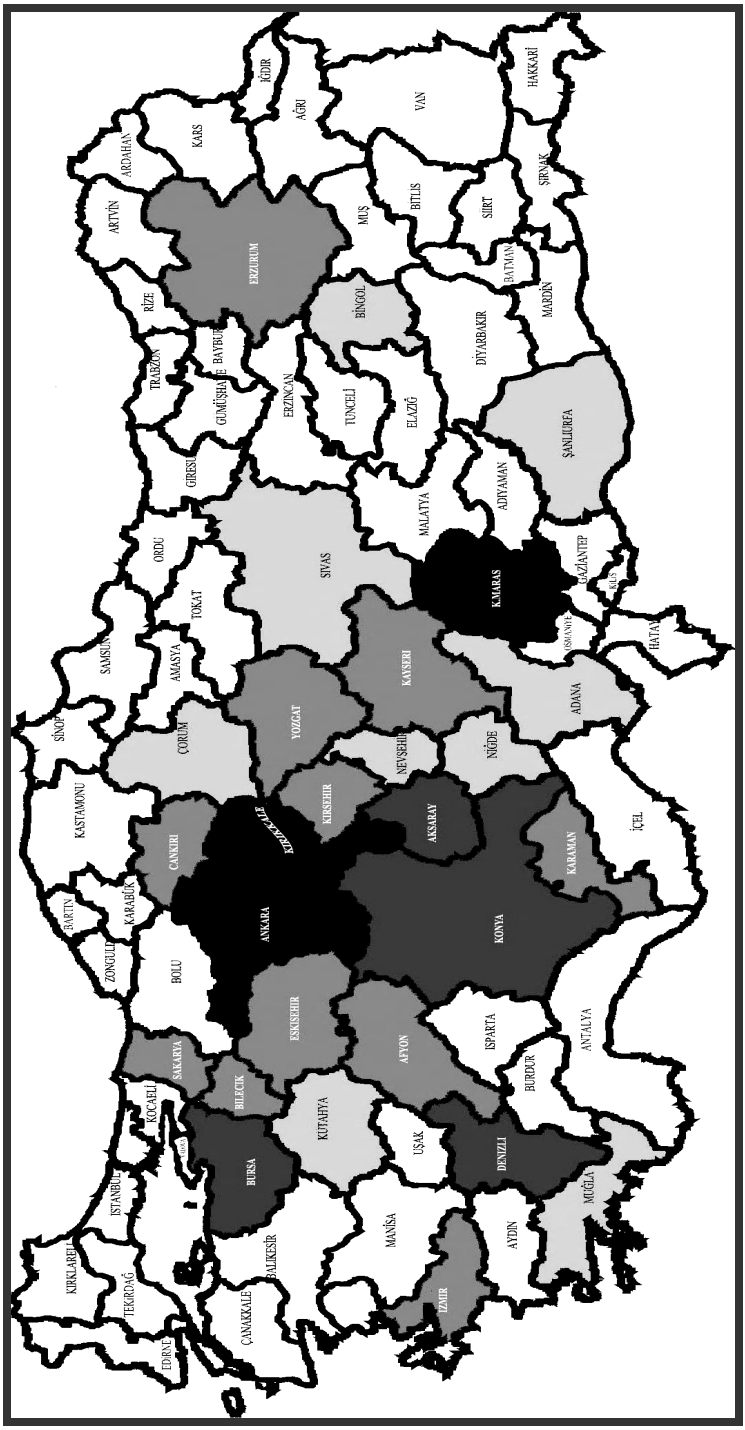

Figure 1. Turkey Confectionery Sunflower Planted Area by Province in 2003.

Confectionery sunflower yield is usually lower in the Middle Anatolia provinces (Ankara, Kirikale, Kirsehir, Karaman, Cankiri and Nevsehir) due to low plant density and dry conditions. However, confectionery sunflower is mostly cultivated with irrigation in some eastern provinces having higher yield such as K. Maras, Erzurum, Sivas, Aksaray, etc. On the other hand, higher seed yields were obtained without irrigation in some western provinces such as Bursa, Sakarya, Izmir and Kutahya due to higher precipitation during the vegetative period.

The Present Situation of Confectionery Sunflower Seeds in Turkey. Confectionery sunflower farmers do not get higher yields even under irrigated conditions, due to not using certified and high quality seed. Actually, there were no registered confectionery hybrids or open-pollinated cultivars until today in Turkey. Farmers plant different village populations called Alaca, Inegol, Kibris, etc., depending on seed color or type. Due to using the same seeds each year, plants from the confectionery seeds degenerated to branched-type and are susceptible to diseases as wild types are (Kaya, 2002). Additionally, confectionery sunflower farmers lose money when harvesting seeds with different sizes.

Kaya et al. (2001) collected 83 village populations from different parts of Turkey and observed very large variations and unacceptable types in seed and other characteristics and observed foliar and head diseases. They observed that head diameters ranged between 7 cm and 33 cm, plant height between 82 to 215 cm, 1000-seed weight between 49 to 168 g., hectoliter weight between 242 to 431 g., kernel length between 11 to 23 mm and kernel width between 5 and 9 mm in these populations planted under dry conditions.

Confectionery sunflower breeding research has been initiated and accelerated on a national basis at both the Trakya and the Aegean Agricultural Research Institutes in the last few years. Both population improvements and hybrid breeding works are conducted at these Institutes. Additionally, some private seed companies brought some hybrid cultivars via introduction and tested them under different conditions in 2003.

Although the first Confectionery Sunflower Seed Standard was prepared by the Turkish Standard Institute (TSE), this standard is not being initiated and implemented now. The desired seed type is determined by large confectionery seed companies and the consumer preference is also changing depending on the year. In addition to the production of bleached seed color with grey stripe types grown mostly in Turkey, a very large amount of seed is being imported from other countries, mainly Dakota (short length with grey stripes) and Nevada (longer seed with grey stripes) types.

The Future Prospects of Confectionery Sunflower in Turkey. Confectionery sunflower seed in shell should ideally be at least 8-9 mm in length, and 2.5 cm in width with a kernel/shell ratio of 50:50, 1000-seed weight 80 g, and oil content lower than 30%. Additionally, confectionery seeds should have a lower cadmium content, higher protein, and higher vitamin E content to increase the nutritional value of the seed and the shelf life (Hofland and Kadrmas, 1989; Lofgren, 1997; Jovanovic et al., 1998). Therefore, developed confectionery sunflower cultivars should have higher yield capacity, larger seeds and the desired seed quality characteristics mentioned above.

Although confectionery sunflower production and market are very large, there are no certified and registered seeds and cultivars grown in Turkey. Therefore, farmers cannot obtain higher yield and income from confectionery production in spite of using all the agronomic practices such as fertilizer, water, etc. Due to the urgent need of the certified seed by confectionery sunflower farmers, confectionery breeding research in both public institutes and private seed companies should be accelerated. Hybrids or open-pollinated cultivars existing in

other countries and having similar seed types desired in the Turkish market could be introduced and registered by private seed companies. Additionally, village confectionery populations largely planted by farmers should be improved immediately using basic population breeding techniques. Confectionery sunflower plant density research should also be conducted, seed size being influenced significantly by plant density.

In the oil type sunflower production and market, all standards for production, processing, and registration have been initiated and are being utilized without any problems. Farmers could sell their products easily for oil type both to dealers or the national stockyard. However, the confectionery market is very limited and farmers cannot sell confectionery seed in the bazaar. There is no farmer association for confectionery as exists for oil type producers and they are not subsidized by the government as is the oil type sunflower in Turkey. Therefore, confectionery seed and market standards, production brochures, processing manuals, etc. should be prepared as in other countries. The Turkish government should support confectionery farmers and both public and private research sectors to create improved confectionery sunflower seed.

Conclusions

The Turkish confectionery sunflower market is very large and improvements are in their initial phase. Certified seed, organization, production, processing, packaging, seed standards, cultivar development, and other research needs are existing problems in the market. Turkish confectionery farmers are very open to new developments. Additionally, they are producing confectionery sunflower seeds by renting land in some neighboring countries such as Ukraine, Moldova, and Bulgaria. If the problems are solved and their seed needs are produced sufficiently in Turkey with desired quality, companies could supply enough seed for Turkey. Furthermore, they could export confectionery seed products to European and other neighboring countries.

References

Anonymous. 2003. Province Agricultural Extension Service Statistics of Turkey.

Gaytancioglu, O. 1999. Cerezlik ayciceginin üretim ve dıs ticaret sorunlari. Cerezlik Aycicek Cekirdegi Dıs Ticaret. Semineri. 9 Haziran 1999. İstanbul.

Hofland, C. and N. Kadrmas. 1989. Confection Sunflower Handbook. 2nd Edition. National Sunflower Association. Bismarck. ND. USA.

Jovanovic, D., D. Skoric. and B. Dozet. 1998. Confectionery sunflower breeding. Proc. 2nd Balkan Symposium on Field Crops. 16-20 June. 1998. Novi Sad. Yugoslavia. p. 349-352.

Kaya, Y. 2002. The Problems of Confectionery Sunflower Seed Production of Turkey and World. 1st Turkish Seed Congress-IZMIR. September 11-13. p. 75-86.

Kaya, Y., H. Mutlu and G. Evci. 2001. Confectionery Sunflower Production and determining some characters of village populations planted in Turkey. 4th Turkish Field Crops Congress, Tekirdag. September 17-21. p. 91-94.

Lofgren. J. R. 1997. Sunflower for confectionery food, bird food and pet food. *In:* A. A. Schneiter (ed.) Sunflower Technology and Production. ASA. SCSA. and SSSA Monograph. No. 35. Madison. WI. p. 747-764.