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SUNFLOWER PRODUCTION IN BALKAN REGION: CURRENT SITUATION AND FUTURE PROSPECTS

SUMMARY

Sunflower a vital crop in Balkan area both for existing as a main crop in rotation and also being as the most preferable and consuming vegetable oil in the region. Eastern Balkan countries Romania, Bulgaria and Turkey exist in top ten sunflower producers in the world. However, Serbia and Moldova exist among important sunflower countries too. Mostly hybrid seeds are planting and broomrape parasite, broad leaf weeds, downy mildew are the main problems in sunflower production area in Balkan Region. However, genetically resistant hybrids are developed and used for broomrape, downy mildew and some other diseases. On the other hand, Clearfield System hybrids having genetically herbicide resistant sunflower hybrids and post applied *Imidazolinone* (IMI) herbicide controlling both broomrape and the main broad leaf weeds effectively increase market share recently in the region. Sunflower production increases in the region due to higher demand for oil crops recently. Even though big increase in both planted areas and seed production in recent years, Turkey is the main importer in the region while other countries such as Romania, Bulgaria, Moldova and Serbia exist among the main sunflower exporter countries in the world. Turkey imports especially sunflower seeds from Romania, Bulgaria and Moldova crushes for domestic needs and also exports Middle Eastern and North African countries mainly. It seems that sunflower keep its position as the main oil crop in the region in the future too.

Keywords: Sunflower, Production, Balkan region, Problems, Solutions

INTRODUCTION

The agriculture is the main income for living people in all Balkan countries. Balkan Region has vast and so fertile plains giving the high yielding and quality products in many crops. There are large plains especially around Duna other rivers such as Sava, Kupa, Morava, Maritsa, Tunca and Arda in the Balkan Peninsula. Based on some literatures, Danube-Sava-Kupa river lines define geographically of Balkan Peninsula borders. Although the Southern part of the peninsula and also some other parts is mainly mountainous and rugged and is not suitable for grain production, Balkan region is over two times land use rate than the world (Kaya et al., 2008) (Table 1 and Figure 1).

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Figure 1: The topographic map of the Balkan Peninsula

Table 1: Agricultural Areas and Land use in Balkan countries in 2012¹

Countries	Total Area	Agricultural Area	Arable Land	Irrigated Land	Perm. Pasture	Land Use
	1000 Ha	1000 Ha	1000 Ha	1000 Ha	1000 Ha	%
Albania	2.740	666	551	188	115	21,6
Bosnia				3		19,6
Herzegovina	5.120	1.101	1004		97	
Croatia	5.641	1.580	1.457	4	124	15,9
Greece	13.080	3.799	2.675	1.555	1.124	19,0
Kosovo	1.090	543	263	20	5	17,0
Macedonia	2.486	592	547	128	450	16,1
Montenegro	1.381	514	175	3	325	12,5
Moldova	3.384	2.534	1.843	300	391	53,5
Romania	23.839	14.837	9.398	3.077	4.938	37,7
Serbia	5.093	3.302	3.099	163	833	37,3
Turkey	77.482	41.690	25.938	5.215	13.167	26,2
Total	152.435	76.483	50.305	11.244	23.311	25,5
%	1,14	1,53	3,58	4,06	0,67	
World	13.427.880	5.012.266	1.404.130	277.098	3.471.729	11,0

¹FAOSTAT (2013)

Agricultural production play considerable role in almost all Balkan countries. For instance, Albania, Macedonia, even Serbia and Bulgaria economies depends on heavily agriculture production and trade. Although animal production and also horticulture crops as both fruits and vegetables is also commonly in everywhere in Balkan Peninsula which are mainly located in mountainous parts, the main income of farms in rural areas is coming from grain production. Cereals are such as wheat, barley and corn is common crops almost in all parts of peninsula. However, industrial crops (sunflower, potato, tobacco) also are cultivating in all parts of Balkan countries. As oil crops, sunflower and rapeseed are dominated crops in Balkan Region. However, olive is also a common especially in Mediterranean coastal areas.

Current Situation of Sunflower Production in Balkan Region

Sunflower is earlier history in Balkan region related to Soviet Union times and many new developments such as first hybrids obtained by Fundulea Institute, Romania, first hybrid commercial production, etc. Therefore, sunflower is the most important oil crop in Balkan Region growing largely and traditionally in many Balkan countries. The region is 2nd the most important area other than Northern Black Sea region and has almost 20% of world sunflower production and planted area (Table 2). Romania, Bulgaria and Turkey are leading sunflower countries and exist in top ten countries in the world. However, Moldova and Serbia are other important sunflower producers in the region (Kaya et al., 2008). Recent sunflower production in key countries in the region is given below.

Table 2: Sunflower harvested area and production by season in Balkan Region^{1,2}

	Harvesting Area, 1000 Ha				Seed Production, 1000 MT			
	2013	2012	2010	2007	2013	2012	2010	2007
Romania	1095	1.088	810	830	2196	1.260	1.285	570
Bulgaria	860	680	692	520	1.937	1.348	1.380	525
Turkey	630	570	500	475	1450	1.100	1.020	690
Moldova	275	295	252	230	505	295	382	170
Serbia	188	167	169	155	513	366	378	295
Croatia	41	33	26	21	131	90	80	54
Greece	77	65	56	12	336	82	85	19
Macedonia	6	5	4	4	9	9	8	5
Albania	2	2	2	2	3	3	3	2
Bosnia	1							
Herzegovina		1	1	1	1	1	1	1
Montenegro	-	-	-	-	-	-	-	-
Kosovo	-	-	-	-	-	-	-	-
Balkan Total	5.188	4.918	4.522	4.257	9.094	6.566	6.632	4.338
	25.89	25.45	23.92	21.30	40.19	35.97	33.60	26.43
World Total	2	1	3	5	0	6	5	0
%	20,04	19,32	18,90	19,98	22,63	18,25	19,74	16,41

¹Oil Word, ²FAOSTAT.

Romania

Romania is the leading country on sunflower production in European Union. As a traditional crop in Romania, sunflower is the main crop in the rotation system with corn and wheat (Popescu, 2012). Due to higher profitability and higher export demand in recent years, sunflower production increased 60% and had record production in 2013 (Table 3). Romania is a sunflower exporter country both for sunflower seed and also crude oil and meal too.

Bulgaria

Due to higher demand of export as mainly to Turkey, sunflower production is reached almost 2 million MT as record because of both increasing planting areas and also suitable climatic conditions during the vegetation period in 2013 in Bulgaria (Table 4). Because of being neighbouring advantage to Turkey which is one of the main import destinations in the world, Bulgaria imports mainly sunflower seed to Turkey and also European countries. On the crushing capacity is increasing in recent years, then Bulgaria also started to export crude oil and meal.

Table 3: Sunflower harvested areas, seed, oil and meal production (1000 MT), seed domestic consumption, seed crushing and exports by years in Romania^{1,2,3}

Year	Harvested Area	Seed Product.	Oil Product	Meal Product	Domestic Consump.	Seed Crushing	Oil Exp.	Seed Exp.	Meal Exp.
2003	1,153	1506	350	464	795	876	38	366	148
2004	925	1558	387	514	790	970	91	310	177
2005	957	1340	368	465	733	889	83	40	234
2006	981	1526	331	407	738	785	60	26	182
2007	748	547	256	311	685	602	54	47	71
2008	808	1170	173	271	630	524	45	148	271
2009	791	1098	241	356	700	688	92	192	356
2010	810	1262	327	389	715	752	147	192	158
2011	960	1789	319	396	635	765	154	463	215
2012	1088	1260	329	410	680	790	141	105	181

¹Oil Word, ²Index Mundi, ³FAOSTAT.

Table 4: Sunflower harvested areas, seed, oil and meal production seed domestic consumption, seed crushing and exports (1000 MT) by years in Bulgaria^{1,2,3}

Year	Harvested Area	Seed Product.	Oil Product	Meal Product	Domestic Consump.	Seed Crushing	Oil Exp.	Seed Exp.	Meal Exp.
2003	659	788	135	153	305	340	133	297	43
2004	592	1078	154	171	333	379	148	268	41
2005	635	934	192	209	355	465	37	350	53
2006	750	1196	182	195	358	432	48	301	81
2007	602	564	156	168	333	371	43	227	24
2008	721	1300	79	159	275	352	56	243	159
2009	683	1317	116	188	280	415	88	388	188
2010	729	1536	168	163	240	360	99	166	163
2011	684	1439	156	183	240	405	108	221	183
2012	762	1348	148	215	230	475	132	149	215

¹Oil Word, ²Index Mundi, ³FAOSTAT.

Turkey

Turkey is the largest country both for area and also population in Balkan Peninsula having almost 50% of the Peninsula surface. Furthermore, Trakya Region which is European part of Turkey and has very flat areas and vast and productive plains. This region is also the main sunflower production area in Turkey having more than 50% of total sunflower production and planting area. Turkish sunflower production and area increased almost 50% in recent years due to higher prices then increasing production mainly in Middle Anatolia region (Kaya et al., 2008; Kaya, 2014) (Table 5).

Turkey is one the main sunflower importing destination in the world. Total Turkish vegetable seed, crude oil and meal import is over three billion US Dollar in 2013. On the other hand, oilseed crushing capacity of Turkey is for times more than its need (Kaya et al., 2008; Kaya, 2014). Due to logistic advantage, there are many export destinations around Turkey such as Middle East, North Africa, etc. Even in big crisis in those regions recently, Turkish refined oil export reached one million dollar in 2013.

Table 5: Sunflower harvested areas, seed, oil and meal production seed domestic consumption, seed crushing and exports (1000 MT) by years in Turkey^{1,2,3}

Year	Harvest Area	Production			Tot Seed Supply	Total Oil Supply	Domstc Seed Consp.	Crshlg Seed	Oil Exp	Import		
		Seed	Oil	Meal						Oil	Seed	Meal
1994	550	600	445	408	1185	841	1113	1075	167	316	550	82
2000	540	575	385	346	926	551	914	909	4	106	321	149
2005	430	750	495	441	1186	975	683	676	1	147	165	57
2006	480	850	525	472	1360	810	1167	1161	22	152	529	281
2007	480	700	544	483	1332	910	1165	1159	99	451	407	386
2008	500	830	515	460	1323	1033	1249	1242	34	145	498	403
2009	460	800	626	559	1630	888	1277	1270	54	326	533	222
2010	485	1000	671	597	1838	1082	1216	1209	131	432	446	312
2011	490	925	718	639	1994	1439	1477	1470	68	184	736	432
2012	590	1100	739	659	1869	1676	1577	1570	157	401	705	500
2013	630	1440	918	819	2427	1998	1687	1680	271	651	834	739

¹Oil Word, ²Index Mundi, ³FAOSTAT.

Other Countries

Sunflower is also growing largely in other countries such as Moldova, Serbia, Greece, Croatia, etc... in the peninsula. Serbia is one the leading countries in Balkan Region both production and also the research. Sunflower has long historical background in Moldova and it has been growing from a long time ago and since Soviet Union time. In Greece, sunflower is the main crops in the rotation especially in Northern part of country (Lyra et al., 2013)

The Main Problems in Sunflower Production in Balkan Region

Sunflower is one the most important oil crops because of having high adaptation capability, higher mechanization use, less worker need, etc... It is cultivated generally dry and rained conditions. Because of those advantages, sunflower could grow in many part of the world. On the other hand, its oil is preferred widely especially in Europe and Balkan Region as vegetable oil by many people. However, due to growing in spring and summer season, it affects a lot by seasonal drought and higher temperatures so sunflower yield and production is so dependent summer rainfall and climatic conditions.

Sunflower has not so many diseases like other industrial crops. However, some diseases such as downy mildew, *Macrophomina*, *Phomopsis*, *Sclerotinia*, etc..., affects severely in some years and areas both in Balkan region and in other parts of the world. However, the main problems affecting seed and oil yield in sunflower other than diseases and abiotic stresses are broomrape parasite and weeds. Broomrape (*Orobanche cumana* Wallr.) is the most limited factor for sunflower yield in the region with making epidemics via developing new races every twenty years against resistant cultivars.

Hybrid cultivars are using commonly in the sunflower production in all Balkan countries. On the other hand, in addition to oil type, confectionery sunflower are produced also but while mostly black colour in Balkan area, white and grey type in Turkey.

There are not possibilities more chemical control against those sunflower diseases but genetically resistant hybrids is available for most of the diseases in the market. Genetically resistant sunflower cultivars against new races of broomrape are developed and then used widely in the production. Additionally, Imidazolinones (IMI) herbicide resistant hybrids controls key weeds and broomrape together applied as post emergence and calling Clearfield System. This system which is non-GMO has been used successfully in sunflower production during the past decade.

Future Direction of Sunflower Production in Balkan Region

Sunflower production will continue to produce in the future in Balkan Peninsula both for high export and domestic demand as the main and preferred source of vegetable oil and also existing as the main crop in the rotation due to higher profitability. Due to almost all areas infested by new races downy mildew and broomrape, new sunflower cultivars should be genetically resistant to those

limiting factors. On the other hand, herbicide resistant cultivars to both IMI and also Sulfonyl Ureas (SU) herbicides providing non-GMO strategies will be popular in the region because of giving efficient controls both broomrape and key weeds in sunflower production. Since, sunflower is produced commonly in large areas in the region so it is not easy to control weeds with pre-emergence herbicides and with both mechanically and also by hand hoeing due to lack of workers. Also the combined hybrids having with IMI, SU herbicide and broomrape genetic resistance together plus downy mildew will give farmers an option to apply and select right herbicide controlling weeds based on their field's situation.

On the other hand, higher oleic type sunflower is popular recently in the world because of supplying healthy oil especially for frying to customers so it came to the region and started to produce in little amounts. However, this type of sunflower will increase in the market soon due to higher demand by customers.

CONCLUSIONS

Sunflower is one of the main crops in Balkan Peninsula both for agricultural trade and production and also for consumption as vegetable oil. Turkey both for production and import, Romania and Bulgaria for production play key roles in the world sunflower arena. Its importance in Balkan Region has been started since the beginning of sunflower production in the world and then it will continue in the future with developing new technology and new types of uses too.

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