

**ECOLOGICAL TABLE GRAPE PRODUCTION IN TURKEY<sup>(6)</sup>**

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**Abstract**

The organic (ecologic-biologic) agricultural practices in Turkey began in 1985 with organic raisins and dried figs demand of European countries. As of 2015, 1829291 tons of organic products from 197 different products, which comprise grapes, in 515268 ha, are produced by 69967 farmers. Currently, the number of registered enterprises operating in organic agriculture is over 1500. As in the entire world and in Turkey, the share of organic production in grape production is increasing. Organic grape production is carried out in 10645 ha area in Turkey. This amount constitutes approximately 2.3% of the total grape production area in Turkey. Organic grape is the second major product of Turkey export, and the export share of organic products in recent years is increased to 20-30%. The share of the organic table grape production in total organic grape production is an increasing trend and the studies in this direction are continuing.

**Keywords:** *viticulture, organic farming, grape growing*

**Introduction**

Turkey has had a grape industry since 5000-6000 years before present, according to the archeological findings. As Turkey is located between 36° and 42° north latitudes country's climate is very suitable for grape production and this is more evident by viticulture's high production rate in total agriculture of Turkey. Turkey has nine agricultural regions. Except very high plateaus of North East and Black sea region where annual precipitation is over 900 mm, in all the regions, viticulture can be done economically. The Aegean, Mediterranean, South East Anatolia and Central south are have more grape production than Central Anatolia, Marmara, Middle East and Black Sea regions. According to State Statistics Institute (TUIK, 2016), 1990604 tons of table grapes have been producing in 55% of vineyards area. Fresh table grape production corresponds to 50% of total grape production; it also reveals the importance of table grape cultivation for Turkey. It seems that interest in the production of organic table grapes is in an increasing trend even though the share in this production is still small. So, grape production in Turkey was/is and

will keep its importance and this study reviews and tries to take attention country's vineyard and organic grape production based on statistical data.

## Materials and Methods

In this paper, Turkey's place in global of viticulture production, global and Turkish organic agriculture, and in particular world's and Turkey's organic grape production were reviewed by employing several data sources given in References along with authors personal experiences.

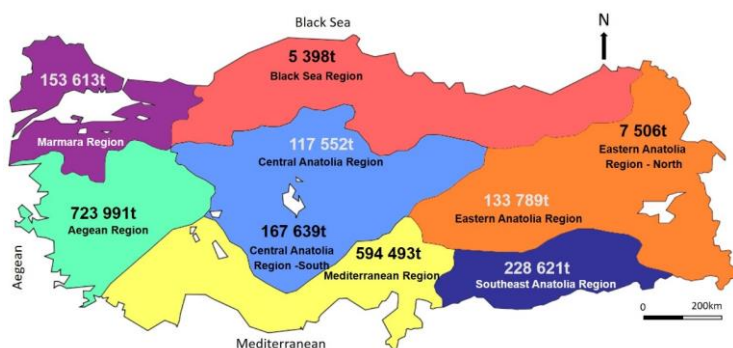
## Results and Discussion

Turkey is the fifth in grape area; sixth in total grape production (Table 1; OIV, 2017); fourth in table grapes and first in raisin production among the grape growing countries. Table grape production in all 9 regions of Turkey are undertaken much or less however the first three in table grape production are Aegean, Mediterranean and Southeastern regions (Figure 1).

Order	Country	2016		Production in 2015		
		Area	Production	Fresh	Dried	Wine
1	China	847	14500	11400	822	1644
2	Italy	690	7900	1230	-	6970
3	USA	443	7100	2920	1314	3066
4	France	785	6400	64	-	6336
5	Spain	975	6000	300	-	5220
6	Turkey	480	4000	1728	1800	72
7	India		2600	832	260	1508
8	Iran	223	2200	1958	220	22
9	Chile	214	2200	992	310	1612
10	South Africa		1900	180	260	1560
11	Argentina	224				
12	Romania	191				
Total		7516	75800	27828	6184	36331

**Table 1**  
Total grape area (x1000 ha) and production (x1000 tons) of first ten countries in the World.

\* Dried grape converted in fresh grape on average 4 kg to obtain 1 kg of raisin. OIV conversion factor used: production of vine 1,325 kg of fresh grape, average quantity necessary to obtain 1 hL of wine.



**Figure 1**  
Geographical Regions of Turkey and table grape production (in tons)

## Organic farming in the world

Organic farming activities carried out in 135 countries in 2006 are observed to be carried out in 179 countries with the latest addition of 7 countries in 2015. The 200000 producers in 1999 increased to 2.4 million in 2015. In 1999, 11 million hectares of organic agricultural land in the world, in 2015 has reached a total of 50.9 million ha (including converted areas). This value corresponds to 1.1% of the world total cultivated area. World organic market volume increased from US \$ 17.9 billion in 2000 to US \$ 81.6 billion in 2015 (Willer and Lernoud, 2017).

According to the continents, the distribution of total organic farming areas is 12.7 million hectares (25% of the world's total area) in Europe while the largest area is in Oceania with 22.8 million hectares (which corresponds to 45% of the total organic area). South America has 6,7 million ha (13%) followed by Asia (4 million ha. 8%), North America (3 million ha. 6 percent) and Africa (1,7 million ha. 3%). As of country ranking, the largest area allocate for organic farming is in Australia with 22.7 million ha followed by Argentina and United States with 3,1 and 2 million ha respectively. World organic grape production is undertaken at 333000 ha, which corresponds to about 4.7% of global grape production area (Willer and Lernoud, 2017).

## Organic Farming in Turkey

Organic farming practices in Turkey, where considered within the world's top ten countries in terms of ecologic (organic-biologic) agricultural potential, began in 1985 with the European countries demand for organic raisins and dried figs, and continued with apricots and nuts production. As of 2015, 1829291 tons of 197 different crops including grapes were produced in 547299 ha area by 69967 farmers (Table 2; GTHB, 2016). Turkey, in terms of the number of farmers engaged in organic production among 179 countries is among the top 10 countries (Willer and Lernoud, 2017). Currently, the number of registered businesses operating in organic agriculture in Turkey is over 1500 (GTHB, 2016).

**Table 2.** *Organik Farming in Turkey (Conversion data Included)*

Years	No of Products	No of Producers	Cultivated (ha)	Collected (nature, ha)	Total area (ha)	Production (tons)
2011	225	42 460	442 581	172 037	614 618	1 659 543
2012	204	54 635	523 627	179 282	702 909	1 750 126
2013	213	60 797	461 395	307 619	769 014	1 620 466
2014	208	71 472	491 977	350 239	842 216	1 642 235
2015	197	69 967	486 069	61 230	547 299	1 829 291

The execution of organic farming activities in Turkey, which is authorized by the Ministry of Food Agriculture and Livestock, served by 34 legal control and certification organizations most of them located in İzmir (West Turkey). At the end of the certification period, following fulfilling the conditions stated in the certification decision, 'Organic Agriculture Entrepreneur Certificate' (master

certificate) is prepared and sent to entrepreneurs. The 'product certificate' is prepared under the conditions specified in the regulation.

### Organic Table Grape Growing

Organic grape production is carried out in 10645 ha area in Turkey. This figure constitutes approximately 2.3% of the total grape production of Turkey (Willer and Lernoud, 2017). Organic raisins ranked second after the fig and fig products among the Turkey's most exported crops in 2016.

Grape has a significant share in total organic production, rising to 1829292 tons in 2015. 4.28% of the total organic production in our country is organic grapes (79748 tons as fresh grape). Organic grape production was 55948 tons in 2004, rising to 79748 tons in 2015. About 80-90% of this production belongs to the seedless raisins (GTHB, 2016).

Almost all of the seedless organic raisin production is carried out in Manisa (12394 tons) and İzmir (5555 tons). Denizli and Aydın follow these cities. In 2015, a total of 4240 tons of organic grapes, almost most were seedless, were exported to the European Union countries mainly Germany, France, Italy, Denmark, Sweden and Netherlands and a total income was 13930000 US Dollar \$ (Table 3).

Years	Organic Grape Export			Total Organic Production Export		<b>Table 3</b> <i>Turkey's organic production and grape exports</i>
	Amount (kg)	Share in total (%)	Sum (\$)	Amount (kg)	Sum (\$)	
2011	1 091 078	32,36	3 761 657	3 371 298	15 529 387	
2012	907 067	14,49	2 904 249	6 258 314	24 703 607	
2013	2 699 669	25,72	8 673 404	10 495 217	46 020 389	
2014	4 118 835	26,48	13 557 823	15 552 638	78 779 537	
2015	4 239 709	31,3	13 929 996	13 548 757	69 229 817	

Distributions of organic table grape production of Turkey by years are given in Table 4 (GTHB, 2016). The statistics for the last 5 years covering the years 2011-2015 indicate that the average organic table grape production is around 10 tons and increased to 20 tons in 2014. Studies are ongoing to increase the quantity. Manisa, İzmir (Aegean Region), Mersin (Mediterranean), and in recent years Diyarbakır, Adıyaman (South East) and other provinces have attracted attention.

Some work has been carried out for the development of organic grape growing in Turkey. In these studies, the feasibility of organic farming has been examined using plant nutrition and In these studies, the feasibility of organic farming has been examined using plant nutrition, chemicals and methods allowed for pest management (Özdemir *et al.*, 2008 and 2010; Tangolar, 2007 and 2009).

One of the recent studies on this subject undertaken in Turkey was carried out in the framework of the EU project RESOLVE (Restoring optimal Soil functionality in degraded areas within organic vineyards), Core organic plus. The experiments are employed with Early Cardinal in Ceyhan, and Yalova incisi in Tarsus (Mediterranean Region of Turkey). In this work, 4 different organic treatments

were applied, namely: 1) the Control (CONTR, without any application on the bare soil), 2) Composted organic amendment (COMP, Farm Manure: pruning mixture, 1:1 v:v). In this treatment, 50 ton/ha compost was mixed by a cultivator to the 0-20 cm soil, 3) Dry mulching (DM) of Vetch and Triticale; this mixture was 100:20 kg/ha (vetch:triticale) was left on the surface soil after mowing by “Cutting line scythe” at 50% blooming, 4) Green manure (GM); vetch was sown as 100 kg/ha in November and was mixed by a rotovator to the 0-20 cm soil approximately at 50% blooming.

**Table 4.** Turkey's major organic grape producing cities from 2011-2015 and production quantities (tons)

	2011	2012	2013	2014	2015				
	Table Grape Production	Table Grape Production	Table Grape Production	Table Grape Production	Table Grape Production				
Mersin	1529	İzmir	3001	Manisa	12359	Manisa	13450	Diyarbakır	1264
Niğde	376	Mersin	1356	İzmir	2390	İzmir	2747	Mersin	683
Çanakkale	327	Manisa	754	Çanakkale	414	Mersin	2459	Adıyaman	318
Malatya	173	Kilis	626	Niğde	361	Niğde	441	Karaman	224
İstanbul	130	Niğde	359	Aydın	196	Tekirdağ	419	Çanakkale	156
Tekirdağ	100	Çanakkale	350	İstanbul	146	Çanakkale	378	Niğde	146
Eskişehir	98	Aydın	214	Tekirdağ	143	İstanbul	368	Aydın	129
Ankara	70	Karaman	168	Malatya	135	Aydın	247	Eskişehir	100
Kayseri	40	Adıyaman	153	Muş	107	Ankara	181	Muş	74
Şanlıurfa	38	Tekirdağ	131	Karaman	105	Diyarbakır	142	Uşak	54
<b>Total</b>	<b>2881</b>	<b>7112</b>	<b>16356</b>	<b>20832</b>	<b>3148</b>				

Project studies revealed that about 30-50 tons/ha of biomass could be obtained in green manure and dry mulching applications, depending on years and ecology, and soil erosion caused by winter and spring rains in sloping places could be prevented. The effect of treatments on yield components was not clear. Non-degraded plots have better values compared to treated plots. Soil moisture slightly increased with compost and green manure applications.

Treatments	2016-2015	2017-2015
ND	-5,31 c	-24,57 c
CONTR	-1,51 c	13,62 b
DM	12,39 bc	10,65 b
GM	33,80 b	5,48 b
COMP	70,18 a	36,37 a

**Table 5**  
Relative increasing (%) of TOC after 1 (2016) and 2 (2017) years of treatment

Soil total organic carbon (TOC) showed an increase in COMP significantly higher (+ 70% in the first year, and +36% in the second year) than CONTR (-1.5%), whereas GM showed an increase significantly higher (+33%) than CONTR only in

the first year. DM did not show TOC increase significantly different than CONTR (Table 5). Nitrogen did not show any significant differences respect to CONTR.

## **Conclusions**

Grape production in Turkey is mainly undertaken in areas with limitations such as sloping lands, shallow-moderate deep and low organic matter containing soils which necessitate precise land and soil care alike terracing against erosion and increasing soil nutrition capability by employing organic additives. As these managements are not properly executed vineyard soils are degraded at an alarming state. Thus, special attention should be given to vineyards, as grape production share in Turkish agriculture cannot be neglected. However, even these problems exist, organic raisin farming in Turkey reached a significant level. But more research involving increasing plant and soil fertility practices for the development of organic table grape cultivation is needed for overcoming degradation of vineyard soils. Along with increasing soil organic matter, governmental subsidies may also helpful to sustain country's organic grape production.

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## **References**

- GTHB (2016) Statistics of Organic Agriculture. [www.tarim.gov.tr/Konular/Bitkisel-Uretim/Organik-Tarim/Istatistikler](http://www.tarim.gov.tr/Konular/Bitkisel-Uretim/Organik-Tarim/Istatistikler). Accessed on 01/02/2018.
- OIV (2017) OIV Statistical report on World VitiViniculture. 2017 World VitiViniculture Situation. International Org of Vine and Wine 18, rue d'Aguesseau 75008 Paris. [www.oiv.int/public/medias/5479/oiv-en-bilan-2017.pdf](http://www.oiv.int/public/medias/5479/oiv-en-bilan-2017.pdf). Accessed on 24/02/2018.
- ÖZDEMİR G., TANGOLAR S., GÜRSÖZ S., ÇAKIR A., TANGOLAR S.G., ÖZTÜRKMEN A.R. (2008) Effect of Different Organic Manure Applications on Grapevine Nutrient Values. *Asian J. of Chemistry*, 20(3):1841-1847.
- ÖZDEMİR G., AKPINAR Ç., SABIR A., BİLİR H., TANGOLAR S. ORTAŞ, İ. (2010) Effect of Inoculation with Mycorrhizal Fungi on Growth and Nutrient Uptake of Grapevine Genotypes (*Vitis* spp.). *Europ.J.Hort.Sci.*, 75(3):103-110.
- TANGOLAR S., ÖZDEMİR G., GÜRSÖZ S., ÇAKIR A. and TANGOLAR S.G. (2007) The Effects of Some Organic Fertilizer Applications on Phenological Growth with Cluster Berry and Must Characteristics of Grapevine (*Vitis vinifera* L. Cilores). *Akdeniz Univ. J. of the Fac. of Agric.*, 20(2):319-325.
- TANGOLAR S., ÖZDEMİR G., GÜRSÖZ S., YÜCEL A., TANGOLAR S.G., ÇAKIR A. (2009) A Research On The Pest Management In Organic Grape Growing in Şanlıurfa Conditions 1. GAP Organic Agriculture Congress, 17-20 November 2009. Şanlıurfa/Turkey.
- TUIK, (2016) Turkish Statistical Institute. [www.turkstat.gov.tr/UstMenu.do?metod=temelist](http://www.turkstat.gov.tr/UstMenu.do?metod=temelist). Accessed on 01/03/2018.

WILLER H., LERNOUD J. (2017) The World of Organic Agriculture. Statistics and Emerging Trends 2017. FIBL-IFOAM. <http://www.organic-world.net/yearbook/yearbook-2017.html>. Accessed on 31/01/2018.