

## GENERAL ASPECT OF HORTICULTURE IN BURSA

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### SUMMARY

*Bursa has a special place in Turkey from the horticultural point of view. Fruit species such as olive, peach, grape, apple, plum, pear, cherry, walnut, chestnut, fig, strawberry and quince and almost all summer and winter vegetable species that have important additives to total production of Turkey are grown in this vicinity extensively. Vegetable species such as tomato, bean, pepper and pea which especially processed in industry, and onion are produced much than others.*

*In this study, current aspect of horticulture in Bursa province was identified; and its economic dimensions and technical problems were explained.*

### ÖZET

#### Bursa'da Bahçe Bitkileri Tarımının Genel Durumu

*Bahçe bitkileri yetiştiriciliği açısından Bursa'nın Türkiye'de özel bir yeri vardır. Yörede Türkiye toplam üretimine önemli katkıları olan zeytin, şeftali, üzüm, elma, erik, armut, kiraz, ceviz, kestane, incir, çilek ve ayva gibi meyve türleri ile hemen hemen tüm yazlık ve kışlık sebze türleri çok yaygın olarak yetiştirilmektedir. Sebzelerden bilhassa sanayide çok işlenen domates, fasulye, biber, bezelye gibi türler ile soğan diğerlerinden daha da fazla üretilmektedir.*

*Bu çalışmada bahçe bitkilerinin Bursa yöresindeki mevcut durumu tanıtılmış, ekonomik boyutları ve belirlenen sorunları açıklanmıştır.*

### INTRODUCTION

It is seldom to find regions which are suitable to horticulture at various altitudes from sea level up to 2.000 m in the world. Bursa has an important place among these regions having about 1.104.301 ha agricultural area according to the recent statistics (Anonymous 1983 c). Morphologic and geologic structure of Bur-

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**Table: 1**  
**The Situation of Fruit Crop Production in Bursa City in 1981, 1982 and 1983 (Anonymous 1981<sub>a</sub>, 1982<sub>a</sub>, 1983<sub>a</sub>, 1983<sub>d</sub>)**

Kind of Crop	Number of Trees Bearing or Area (ha)			Turkey Total	Number of Trees Nonbearing			Turkey Total	Total Crop Production (Ton)				Turkey Total 1983	(%)
	1981	1982	1983		1981	1982	1983		1981	1982	1983			
OLIVE	6.849.000	6.234.750	6.267.400	74.985.000	461.900	452.400	471.700	6.400.000	20.399	73.134	39.350	400.000	9.8	
PEACH	2.266.900	2.297.900	2.325.300	8.500.000	69.340	105.808	130.050	1.750.000	103.847	89.136	87.229	270.000	32.3	
APPLE	735.300	946.100	955.550	29.000.000	146.300	184.232	193.550	9.700.000	55.563	57.726	58.500	1.750.000	3.3	
PLUM	278.950	339.830	340.300	6.410.000	28.600	60.169	67.100	1.213.000	12.374	14.856	15.016	170.600	8.8	
PEAR	240.600	314.200	320.400	11.600.000	49.500	83.538	85.400	3.600.000	6.939	10.705	11.227	384.000	2.9	
FILBERT	150.100	216.150	212.900	248.000.000	24.450	44.973	44.650	23.000.000	388	1.416	2.353	395.000	0.6	
CHERRY	165.600	196.550	200.000	4.200.000	36.600	46.550	48.550	1.100.000	5.937	7.224	7.318	110.000	6.6	
QUINCE	189.620	194.350	195.050	2.650.000	7.170	13.036	12.480	475.000	2.488	2.397	2.712	63.000	4.3	
WALNUT	133.400	140.510	147.350	3.200.000	8.260	17.553	19.260	900.000	5.121	4.930	5.702	125.000	4.5	
SOUR CHERRY	103.250	112.450	112.400	3.065.000	31.750	434.958	33.820	1.225.000	2.123	2.666	2.852	66.000	4.3	
CHESTNUT	73.400	98.800	98.450	1.500.000	2.800	8.478	88.350	540.000	3.769	5.048	4.940	55.000	8.9	
FIG	93.600	95.020	96.250	7.110.000	5.570	5.110	6.570	1.100.000	2.896	2.907	3.066	330.000	0.9	
MEDLAR	34.040	74.400	73.550	400.000	1.070	9.696	10.040	63.000	445	1.605	1.475	7.500	19.6	
MULBERRY	44.250	50.450	50.300	3.500.000	3.090	18.986	18.000	900.000	1.344	2.125	2.115	97.000	2.2	
ALMOND	22.430	18.362	22.000	3.900.000	3.800	5.200	4.450	810.000	457	175	171	41.000	0.4	
CORNEL	22.300	20.525	20.200	1.370.000	905	950	935	400.000	270	245	244	15.000	1.6	
PISTACHIO	29.180	15.310	14.850	17.400.000	17.250	24.700	23.310	12.830.000	9	13	9	25.000	0.03	
POMEGRANATE	12.500	11.810	11.610	1.500.000	1.050	940	750	360.000	152	161	162	34.000	0.4	
APRICOT	2.980	2.890	2.800	5.500.000	960	960	400	2.000.000	30	41	47	170.000	0.02	
JUJUBE	1.950	1.960	1.960	670.000	130	80	50	180.000	13	15	13	10.500	0.1	
GRAPE	18.065 ha	19.451 ha	19.166 ha	655.000	-	-	-	-	95.080	101.445	100.450	3.400.000	2.9	
STRAWBERRY	2.073 ha	1.731 ha	1.758 ha	4.500	-	-	-	-	17.981	15.690	16.063	22.000	73.0	
<b>TOTAL</b>									<b>337.625</b>	<b>393.660</b>	<b>358.902</b>			

sa characterized by its mountains, hills, plains, rivers, streams is convenient for horticulture. At the same time, climate and other environmental factors maintain very good conditions to grow fruit and vegetables. Horticultural crops grown in Bursa are consumed in Bursa and distributed to other regions of Turkey and exported to other countries. These various fruit and vegetables are consumed both fresh and processed. On the other hand, Bursa is a supply center of raw materials to agricultural industry.

There are 99.768 farm family in Bursa according to 1983 statistics. In which about 75 % (73.095) have own land and 25 % (26.673) have not and they are working at agricultural sector as labor. Income from horticultural crops was 44.170.345.000 TL. in 1983 and this amount was about 40 % of the total agricultural income. The other 60 % is from field crops and animal products. As it can be seen that horticultural crops have an important share in total agricultural income.

## MAIN FRUITS AND VEGETABLES GROWN IN BURSA PROVINCE

A great number of varieties of fruits and vegetables could be grown in Bursa. Especially, grape, peach, olive, apple, plum, strawberry, cherry, chestnut, walnut, fig and quince are important fruits if we take into consideration of their acreage and total production (Table: 1). Some of them have big share in the total production of Turkey. For example; 32 % of peach, 73 % of strawberry and 19 % of medlar of the total production in Turkey are belong to Bursa. Except these fruits, table grape and olive have also an important place. For example, the production of Müşkülle grape variety grown in İznik is 7.8 % of total production of table grapes in Turkey (Öktem 1977). Some other fruits such as almond, apricot, pistachio, pomegranata, cornel cherry etc. are also produced in small quantities.

There are 10 districts in Bursa. Many fruits and vegetables are grown in all of them. If we put them in order, according to their contribution to the total production of the province in respect of different fruits will be as follows:

*Apple and pear:* İnegöl, Bursa-Center, Keles, Orhangazi, Yenişehir, İznik, Orhaneli, Mudanya and Mustafakemalpaşa. *Peach:* Bursa-Center, İnegöl, Yenişehir, Orhangazi, Gemlik, Mustafakemalpaşa, İznik and Mudanya; *Cherry:* Orhaneli, Bursa-Center, İnegöl, İznik and Mudanya; *Plum:* Bursa-Center, İnegöl, Orhaneli, İznik, Mustafakemalpaşa, Yenişehir and Mudanya; *Sour cherry:* İnegöl, Bursa-Center and Yenişehir; *Olive:* Mudanya, Gemlik, Orhangazi, İznik, Bursa-Center, Karacabey and Mustafakemalpaşa; *Strawberry:* Bursa-Center, İnegöl, Keles, Yenişehir and Orhaneli; *Fig:* Mudanya, Gemlik, Bursa-Center and Karacabey; *Mulberry:* İnegöl, Bursa-Center, Mudanya, Gemlik, Karacabey and Keles; *Grape:* İznik, Bursa-Center, Orhaneli, Mudanya; *Walnut:* Bursa-Center, İnegöl, Mudanya, Yenişehir, Keles, İznik and Gemlik; *Chestnut:* İnegöl, Bursa-Center, Gemlik and Orhangazi; *Pistachio:* Yenişehir, İznik, Karacabey, Keles and Mustafakemalpaşa; *Almond:* Orhaneli, Mudanya and Bursa-Center; *Filbert:* Mustafakemalpaşa, İnegöl, Gemlik and Bursa-Center.

In addition to the various kinds of fruits, some economically worldwide cultivars are also grown in the area. Some of them and the important local cultivars are shown below:

- Peach* : Early Red, Dixired, Red Haven, Red Globe, J. H. Hale etc.  
*Strawberry* : Aliso, Tioga, etc.  
*Pear* : Williams, Santa Maria, Akça, etc.  
*Apple* : Starking Delicious, Golden Delicious, Starkspur Golden Delicious. Starkrimson Delicious, etc.  
*Cherry* : Various cultivars.  
*Grape* : Müşkülle, Hafızali, Razakı.  
*Olive* : Gemlik, etc.  
*Fiq* : Bursa siyahı.  
*Chestnut* : Osmanoğlu, Sariaşlama.  
*Plum* : Stanlev, President.

Table: 2  
 The Situation of Vegetable Crop Production in Bursa City in 1981, 1982 and 1983 (Anonymous 1981<sub>a</sub>, 1982<sub>a</sub>, 1983<sub>a</sub>, 1983<sub>d</sub>)

KIND OF CROP	TOTAL PRODUCTION (TON)			Turkey (1983) Total (Ton)	According to 1983 (%)
	1981	1982	1983		
TOMATO	596.330	619.650	743.510	3.700.000	20.1
EGGPLANT	26.032	33.905	34.360	655.000	5.2
CUCUMBER	27.495	38.130	33.340	600.000	5.5
CABBAGE	20.695	24.225	26.700	468.000	5.7
GREEN PEPPER	15.805	19.580	26.450	240.000	11.0
LEEK	13.815	23.705	25.015	300.000	8.3
STUFF PEPPER	8.997	16.812	19.655	400.000	4.9
GREEN BEAN	13.472	20.010	18.847	350.000	5.4
SPINACH	7.545	10.738	16.319	120.000	13.6
SOUASH	6.890	10.480	9.870	320.000	3.1
GREEN PEA	4.060	8.165	9.261	41.000	22.6
CALAVENCE	13.065	4.100	7.470	65.000	11.5
BLACK CABBAGE	285	3.325	6.675	160.000	4.2
PUMPKINS	4.480	4.150	4.220	70.000	6.0
CAULIFLOWER	1.074	3.020	3.455	52.500	6.6
ARTICHOKE	2.125	2.344	2.348	7.500	31.3
HEAD LETTUCE	1.796	2.120	2.100	57.000	3.7
GREEN BROAD BEAN	3.214	2.465	1.942	47.000	4.1
GREEN ONION	1.459	1.345	1.920	140.000	1.4
DRY ONION	185.839	151.509	173.600	1.000.000	17.3
HORSE RADISH	377	450	1.740	20.000	8.7
CELERY	1.508	1.508	1.562	15.000	10.4
CARROT	1.585	1.660	1.550	100.000	1.5
OKRA	881	761	1.076	23.500	4.6
LEAF LETTUCE	237	333	865	15.000	5.7
RED RADISH	705	615	698	26.000	2.7
GREEN GARLIC	845	747	258	21.000	1.2
DRY GARLIC	1.530	1.545	2.270	81.000	2.8
<b>TOTAL</b>	<b>774.772</b>	<b>854.343</b>	<b>1.001.206</b>		

From the vegetable production point of view tomato takes the first place and other various vegetables are produced in important quantities. These are both evaluated as a raw material by the agri-industry and consumed freshly (Table: 2). The shares of the green pea, artichoke, spinach, green pepper, celery and dry onion production of Bursa province in the total production of Turkey are 22.6, 31.3, 13.6, 11.5, 10.4 and 17.3 percent, respectively.

Bursa-Center, İznik, Mustafakemalpaşa, Yenişehir, İnegöl and Orhangazi districts have relatively important place in total vegetable production of the province. The districts can be ordered according to their importance in the production of some vegetables as follows:

*Tomato*: Karacabey, Mustafakemalpaşa, Bursa-Center and İznik; *Green pepper*: Karacabey, Yenişehir, Bursa-Center and İnegöl; *Green broad bean*: Bursa-Center, Orhangazi and Mustafakemalpaşa; *Green pea*: Karacabey, Yenişehir and Bursa-Center; *Artichoke*: Gemlik and Bursa-Center; *Green bean*: Bursa-Center, İnegöl, Orhangazi, İznik and Mustafakemalpaşa; *Carrot*: Bursa-Center; *Cucumber*: İznik, Bursa-Center, İnegöl, Yenişehir, Orhangazi and Karacabey; *Spinach*: Bursa-Center, İnegöl, Karacabey and Yenişehir; *Squash*: Orhangazi, Bursa-Center, Yenişehir and Mustafakemalpaşa; *Cauliflower*: Karacabey, Bursa-Center, Orhangazi and İznik; *Celery*: Bursa-Center and İznik; *Cabbage*: İnegöl, Bursa-Center, Karacabey, Yenişehir, Orhangazi, İznik and Mustafakemalpaşa; *Lettuce*: Mustafakemalpaşa and Bursa-Center; *Eqqplant*: Orhangazi, Karacabey, Mustafakemalpaşa, Bursa-Center, Yenişehir and İznik; *Leek*: Karacabey, Bursa-Center, İnegöl and Yenişehir; *Green garlic*: Karacabey and Orhaneli; *Green onion*: Bursa-Center, Mudanya, Yenişehir and Karacabey; *Radish*: Yenişehir and Mustafakemalpaşa.

A lot of cultivars have been grown and commercial seeds are often used in the production. The production of standart cultivars and hybrid seeds have not been reached yet to the required quantity.

Bursa has high potential as it could be understood from the former explanations. However this potential could not be evaluated in respect to the export possibilities for foreign trade. For example; if we examined the data of Chamber of Bursa Commerce and Industry, would see that the horticultural crops exportations as fresh or processed in very low quantities compared with the total production (Table: 3). If this status is explained by some samples the following results can be seen. In 1983 total vegetable production was 1.001.206 tons but only 6.540 tons (0.65 %) of this production were exported in the same year. If we added the processed vegetables to this value, we would see that, this value reached only to 1 % level. In 1982 totally 393.660 tons fruit were produced but 21.057 tons (5.3 %) of which could be exported as fresh. If we added the concentrated fruit juice and pickling olive to this quantity, it would reach nearly 23.254 tons (6 %). This situation can be seen in the Table 3. Also, in the year 1981 about 2-2.5 percent of the total fruit production was exported as fresh, concentrated fruit juice and fruit mash. As it can be seen, the share of the exportation in the total production was not over 6 %. The main reason of this situation is not the domestic demand. There are a lot of problems about exportation of fruit and vegetables. For example the marketing organization in Bursa are insufficient.

Table: 3

The Quantity and Value of Some Horticultural Crops Exported as Fresh or Processed by Bursa Chamber of Commerce and Industry in 1981, 1982 and 1983 (Anonymous 1981<sub>b</sub>, 1982<sub>b</sub>, 1983<sub>b</sub>)

KIND OF CROP	QUANTITY (KG)			VALUE (\$)		
	1981	1982	1983	1981	1982	1983
Fresh Fruit	4.793.384	21.057.283	—	3.421.826	1.832.850	—
Fresh Vegetable	1.222.699	1.649.129	6.539.592	345.560	785.971	3.362.106
Dry Onion	379.225	1.571.845	87.115	128.759	258.743	25.197
Concentrated Fruit Juice	214.750	237.470	—	25.374	159.404	—
Fruit Mash	167.657	—	—	29.883	—	—
Apricot Mash	—	—	572.820	—	—	391.863
Olive	34.240	—	—	39.830	—	—
Olive Oil	15.300	—	—	28.220	—	—
Olive Processed	—	296.584	417.822	—	227.229	403.140
Chestnut	65.752	—	4.500	34.214	—	6.075
Dried Apricot	—	—	11.572	—	—	22.000
Dry Bean	—	—	50.000	—	—	14.750
Potato	—	—	10.000	—	—	3.290
Freezed Fruit and Vegetable	—	—	240.225	—	—	184.296
TOTAL	6.890.007	24.812.311	7.933.646	4.053.666	3.264.197	4.412.717

## OTHER HORTICULTURAL ACTIVITIES IN BURSA

As it is well known that cold storage is an important phase in the fruit and vegetable marketing. On the cold storage Bursa has a great potential. The total cold-storage capacity is about 50.000 tons (apple) according to the official data. Unfortunately this capacity can not be used efficiently. Only a few fruits such as apples and grapes are stored. It is not profitable to keep storages unused during a year except about one month that it is the period of maintenance. Unused of the storage capacity must be planned according to the harvest period of the fruits and vegetables. Thus the storage capacity would be used profitably and products can be supplied to foreign and domestic demand. Another one of the important activities is landscape architecture. This activity has gained importance because of the increasing environmental problems in our century. Conservation and protection of nature and natural resources making recreational arrangements are the main topics. The requirement of recreational arrangements is getting bigger and bigger because of the rapid urbanization and industrialization especially in Bursa province. Therefore it is urgently necessary to maintain available recreational potential (Memlük and Öztan 1980).

### SOME OF THE MAIN PROBLEMS OF HORTICULTURE IN BURSA

In general the methods followed by the farmers in the growing of annual and perennial crops are more advanced than the other regions of Turkey. However the selection of the cultivars and the cultural practices should be chosen carefully in the future. New irrigation methods and mechanization should also be taken into consideration.

The production level of standard cultivars is not sufficient for the demands of the foreign markets. Increasing the production of standard cultivars is one of the main topics in the fruit growing.

In spite of the richness of the fruit species and cultivars in Bursa, the propagation of the standard and clonal rootstocks has not been improved. Generally the seeds of the wild form of the species are used in the propagation of rootstocks. For this reason, the selection of the seedling rootstocks, introduction and adaptation of the clonal rootstocks are also necessary. One of the important subjects of the rootstock studies is to obtain the resistant rootstocks to the diseases and pests. As a specific example, *Phytophthora* sp. (ink disease) problem of the chestnut trees is the most serious and it must be needed to make some researches. So, a research project has been conducted to select rootstocks resistant to the disease and compatible with the cultivars.

The practices of the new plantation and training systems are also necessary for the region. High density planting systems in fruit trees have taken more attention during the past 15 years and very satisfactory results have been obtained especially with apple trees. Good results have also been obtained with peach trees in some countries (Bargioni et. al. 1983). Peach trees are still being trained to the open centre (or vase), rarely to modified lyder and the orchards planted in a classical systems. The new systems using dwarfed rootstocks should be tried in our region in the future.

Spring frosts is often take place in the region and harmful especially on the early flowering cultivars of the plums, peaches and sometimes olives. For this reason, besides taking the frost protection methods, choicing the resistant cultivars should be more important for the area.

Harvesting of the horticultural crops is depended mainly on the labor force. Since labor wages getting more expensive the mechanical harvesting methods have gained more interest.

Production of the standart and productive cultivars seeds is the main goal in growing of vegetable.

A a result, it can be said that the central district (Bursa) and other districts have favorable conditions for horticulture. But the level of activities from production to marketing must be improved to a point better than present situation. It is possible to realize this improvement by adaptation all new techniques to the region condition. Existing of an Agricultural Faculty can be accepted as a chance for Bursa province.

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