



# Citrus Production in Turkey

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**A**lexander the Great introduced citrus to Turkey, as well as many other areas of the Middle East, in the fourth century BC. Since then, the country has developed considerable acreage, including most of the varieties grown in many other citrus production areas of the world. Acreage in 1970 was around 97,560 ac, and began expanding – especially in the 1980’s – after large irrigation projects had been installed.

Today there are about 300,000 acres, which translates into 3,026,940 tons of all manner of citrus. About half of this tonnage (47%) is oranges, around 25% is mandarins (but rapidly expanding), and about 22% is lemons; the rest is grapefruit and other miscellaneous citrus. As cotton, wheat and tobacco come out of production, it is estimated that the citrus production capacity could increase fivefold (Yesiloglu *et al.*, 2007).

Although there is still some risk of frost, most of the production is in three areas, none too far from the coast. A bit over 75% is produced on the Cukurova Plain near the city of Adana. Another 15% or so is around the town of Antalya, which also grows bananas and avocados. And, the third area (about 9% of the total production) is around Izmir near the Aegean Sea where it is a little colder in winter and they focus on mandarin production. Another area located in the eastern Black Sea region has negligible production (about 0.6%).

Seventy-nine percent of the orange production is navels such as ‘Washington’,

‘Navelina’, ‘Navelate’, ‘Lane Late’ and ‘Cara Cara’. The rest of the orange production is Valencias, ‘Shamouti’ and other local selections. Sixty percent of the mandarins are Satsumas, such as ‘Okitsu Wase’, ‘Owari’ and ‘Dobashi Beni’; the rest of the plantings include ‘Nova’, ‘Robinson’, ‘Fremont’, ‘Clementine’ and ‘Minneola’.

Fifty percent of the lemons are ‘Kutdiken’ lemon (*Citrus limon*, a local selection), 15% are ‘Interdonato’ (Italy) which are less prone to a fatal fungal disease Mal Secco (*Phoma tracheiphila*), but the third variety and gaining rapidly because of high yields and even more resistance to Mal Secco and cooler conditions is ‘Meyer’ (15%).

Virtually all the rootstocks are sour orange because of high soil clay content, high soil pH, and in places over 30 inches of rainfall. This rootstock is more resistant to root rot and to high pH (leading to iron, zinc and manganese chlorosis). Farmers also deal with the problem by building ridges that are about three feet high and five feet wide. This channels rainfall away from the roots, allowing the roots to dry out sooner (reducing

the threat of root rot and reducing the impact of high pH), and they claim it reduces frost threat. Reliance on one rootstock has been an issue, since sour orange is extremely sensitive to tristeza which is found in all the citrus-growing areas, so in new plantings they have been evaluating trifoliolate and the citranges, Troyer, Carrizo and C-35.

One result of the ridge plantings is that it is hard to furrow irrigate the way they have done the older orchards. Nearly all new plantings are set up with drip and filters. This is in part because the government pays for a portion of the system on the condition that growers plant trees certified free of disease. Prior to 1992, plantings were often contaminated with viruses from the nursery. By helping to fund the irrigation systems, infection sources are being cleaned up. This is the only government support for growers. There were lots of government subsidies for various crops in the past, but no longer.

Tristeza has been recognized as a problem since the 1920s. Growers are concerned with other diseases including *Phytophthora* root rot, Mal Secco, *Alternaria* brown rot, citrus blast, stubborn, and viruses and virus-like diseases, such as exocortis, psorosis, crinkly leaf, xyloporosis, gummy bark, chlorotic dwarf, citrus variegated virus and curly leaf.

Some of the insect pests that are problematic to the industry include whitefly, mealybug, Mediterranean fruit



**Adana, Antalya and Izmir, circled, are the largest citrus-growing areas in Turkey. (Map source: US State Dept.)**

fly, California red scale, citrus rust mite and citrus leafminer. The chemicals they are allowed to use are largely dictated by what the European Union and Russia will allow and the cost of the materials. There are fewer registered pesticides in Turkey than in the United States. For some reason, horticultural oils are more expensive in Turkey than in California. The grower will apply a broad-spectrum pesticide like malathion for California red scale because it is cheaper than oil,

but it then can lead to an outbreak of other pests. Growers here know this but are forced to do so by regulations and economics. There is also an insectary modeled after the one in Santa Paula that produces *Leptomastix* parasitic wasp and *Cryptolaemus* beetles for controlling mealybugs. The insectary has an active trade among citrus growers here and also ships to growers in Europe for citrus and other crops.

About 25% of the fruit is exported

with 65% being eaten fresh domestically. Ten percent is processed as juice. In 2005, Turkey was the fourth largest exporter in the world. Most of the fruit goes to Europe with 45% going to Russia and Ukraine. Lemons have the highest export earnings of citrus, with mandarins returning 32% and oranges 20%. There are standards for exported fruit but not for the domestic fruit.

The agriculture industry as a whole is coming to grips with Hazard Analysis



**(Top left)** This particular terrain in Turkey looks so familiar, like a scene in the San Joaquin Valley. **(Top right)** Cukurova Plain with citrus orchards in the background. **(Middle left)** New plantings of 'Meyer' lemon which are resistant to Mal Secco disease. **(Middle right)** Extremely modern facilities for propagating disease-free plants for sale to growers. **(Bottom left)** New plantings of 'Meyer' lemon with mandarins in the distance. **(Bottom right)** Spray application the old way.



and Critical Control Points (HAACP) and European Good Agriculture Practices (EuroGAP). You can imagine how difficult food safety issues would be when the average-sized citrus orchard here is 7.5 acres compared to the average-sized farm in Turkey of 14.5 acres.

The bulk of the fruit is sold domestically, and by law the traders who buy the fruit must sell through wholesale markets and not direct to retailers. The traders judge the crop, negotiate a price, harvest, transport, pack, store and distribute the fruit. The growers take all of the risks of freeze, hail damage and market fluctuations. The fruit is then distributed to consumers in open markets (permanent and temporary bazaars), small grocers and street sellers. More and more, large retail supermarkets are becoming prevalent and are asking for bulk deliveries and cheaper prices. Imagine keeping track of where the fruit is going and where it has been in this system.

The pressures to conform to new markets, an increasing regulatory envi-



**Harvesting lemons. Note ridges where the trees are planted. This is to improve drainage of both water and cold air and to improve soil aeration in wet weather.**

ronment driven by export requirements, and increasing citrus plantings are going to change the look of citrus in Turkey. A better integration between the producers and sellers is going to need to take

place to be able to move the increasing amount of production through this new environment to the consumer. There no doubt will be consolidation of the many pieces in this system in the next several years. With all the new acreage being planted, Turkey will become more and more a world citrus player in the market, and California growers should be aware of what is going on there as well as in other countries around the world.

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The economic data for this article were taken from: Yesiloglu, T., F. Emeksis, O. Tuzcu and T. Alemdar. 2007. Safe and high quality supply chains and networks for the citrus industry between Mediterranean partner countries. National citrus sector analysis: Turkey. EuroMedCitrusNet. Pp39. Visit <http://www.yms.gov.tr/istatistik.aspx>, Common Board of Fresh Fruit and Vegetables Exporter Unions ●

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