

1. GENERAL DESCRIPTION OF OLIVE GROWING IN SPAIN

1.1. Introduction



Figure 1. Location of Spain (Source: UN)

The olive tree is a crop native to the Mediterranean eco-geographical region, and olive oil and table olives have a key place in the traditional Mediterranean diet so reputed for its healthiness. Spain is the world's top producer and exporter of olive oil and table olives; it also has the largest olive orchard acreage and the highest number of olive trees. Its production potential is estimated at over one and a half million tonnes of olive oil. At national level, olives are Spain's second largest crop in terms of acreage, after cereals, and can be found in 34 of the country's 50 provinces. Sixty per cent of the total olive acreage is located in Andalusia. (Source: *Agencia para el Aceite de Oliva – AAO*)

Apart from being cultivated over a vast area, olive growing and the products it generates are one of the foremost sectors in the Spanish food industry in terms of their economic and social importance and environmental and public health aspects. In addition, efforts in recent decades have positioned Spain at the forefront of research and technological development in this subject area.

1.2. Socio-economic indicators

- Area: 505 992 sq km (UN, 2008)
- Capital city: Madrid (UN)
- Currency: Euro (EUR) (UN, 2009)
- Population: 45 957 671 (World Bank, 2009)
- Urban population: 77% (World Bank, 2010)
- Rural population: 23% (World Bank, 2010)
- Population growth rate: 0.8% (UN, 2005/10)
- Life expectancy: 78.6 years (men), 84.7 years (women) (UN, 2010/15)
- Main exports by quantity: tangerines, mandarins and wine (FAOSTAT, 2009)
- Main imports by quantity: wheat, maize and soybeans (FAOSTAT, 2009)
- GNI per capita, PPP (current international \$): 31 640 (World Bank, 2010)
- GDP per capita, PPP (current international \$): 32 070 (World Bank, 2010)
- Employment in agriculture: 4.2% (World Bank, 2009)
- Employees in agriculture, female: 3% (World Bank, 2009)
- Employees in agriculture, male: 6% (World Bank, 2009)
- Employment in olive growing: 32 000 000 days paid work (AAO)

2. BACKGROUND DATA

2.1. Olive oils

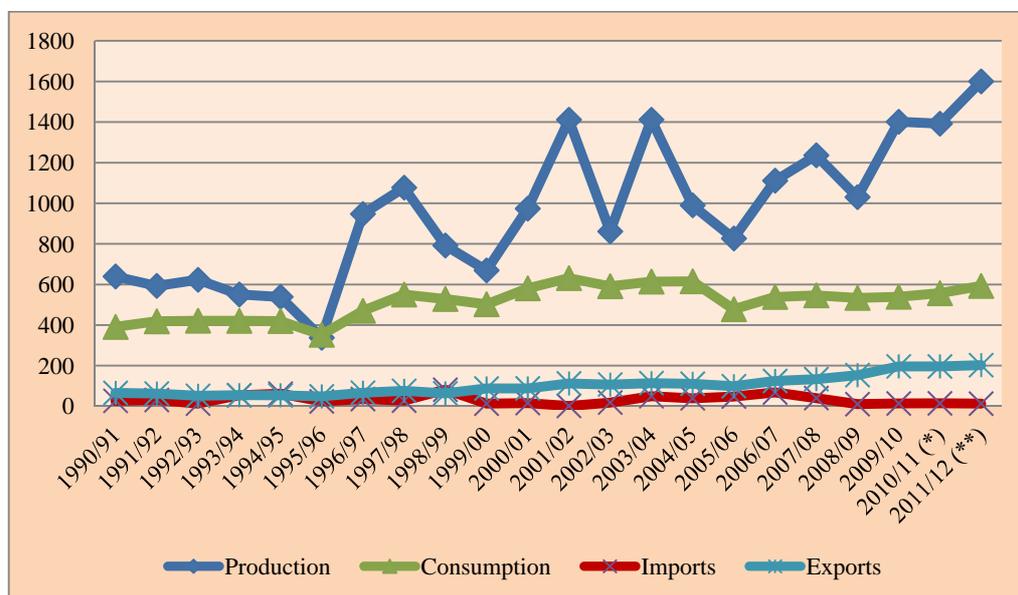


Figure 2. Olive oil production, consumption, imports and exports 1990–2012 (1 000 tonnes)

* Estimates

** Forecasts (Source: IOC)

Table 1. Olive oils (1 000 tonnes) (Source: <http://www.internationaloliveoil.org/estaticos/view/131-world-olive-oil-figures>)

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Production	973.7	1 411	861.1	1 412	989.8	826.9	1 111	1 236	1 030	1 401
Consumption	580.8	631.2	591.3	613.9	615.7	477.8	538.7	546.3	533.6	539.4
Imports	15.8	1.6	18.2	49.4	39.2	48.0	67.9	40.3	10.8	13.7
Exports	88.3	112.5	107.0	114.2	110.9	99.0	124.8	133.9	153.4	196.5

2.2. Table olives

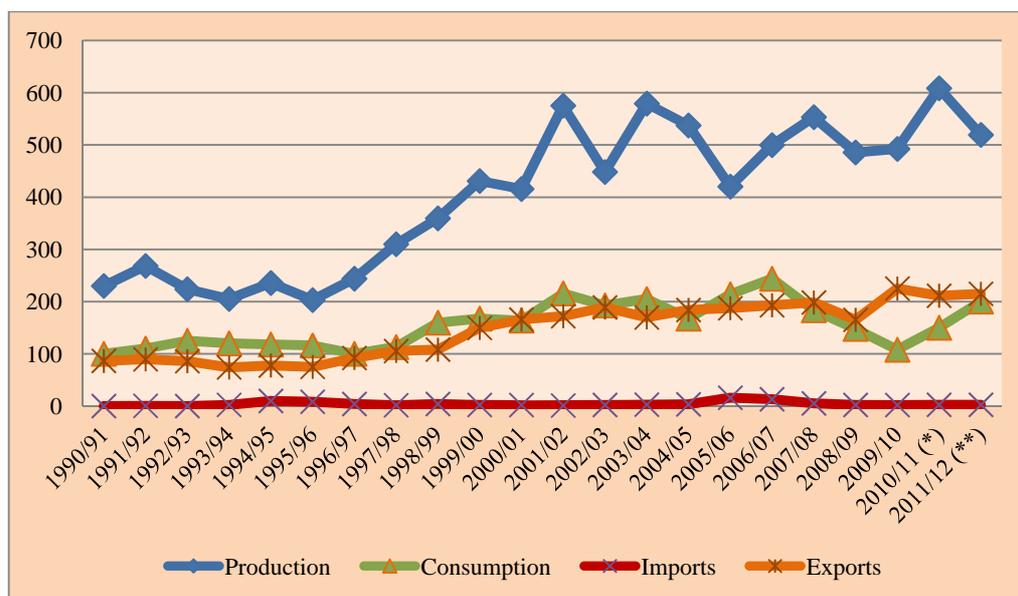


Figure 3. Table olive production, consumption, imports and exports 1990–2012 (1 000 tonnes)

* Estimates

** Forecasts (Source: IOC)

Table 2. Table olives (1 000 tonnes) (Source: <http://www.internationaloliveoil.org/estaticos/view/132-world-table-olive-figures>)

	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Production	415.8	575.4	448.3	579.4	537.5	420.3	499.7	553.3	485.7	492.6
Consumption	163.6	215.6	192.7	205.0	167.4	214.1	243.8	183.6	147.7	107.9
Imports	1.9	1.0	2.1	2.7	3.2	15.8	13.0	5.1	2.0	1.9
Exports	165.7	172.0	188.8	169.7	184.1	187.4	193	198.3	165.2	225.1

2.3. Total area planted

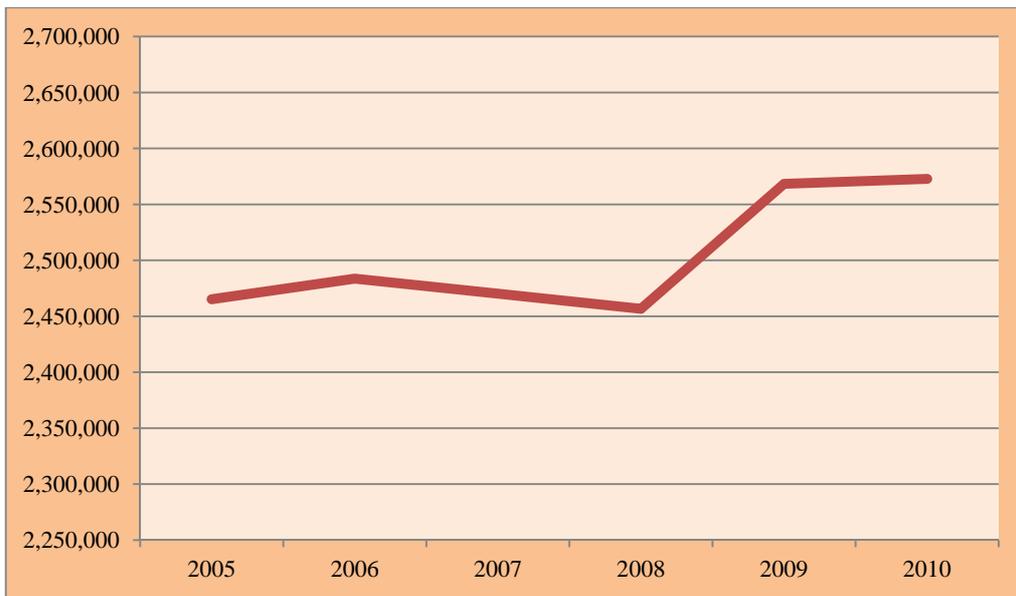


Figure 4. Changes in area planted with olive trees (ha) (Source: IOC QUESTIONNAIRE)

3. OLIVE INDUSTRY IN SPAIN

3.1. Historical background

It is not known exactly when olive growing began in Spain, although the most widely accepted theory is that it was the Phoenicians or the Greeks who were the first to bring it to the country. However, it was not until the arrival of Scipio (211 BC) that olive cultivation became prominent.

During Roman times, olive oil made from olives grown in Hispania was traded the length and breadth of the Western Roman Empire. Proof of this trading past lies in the abundant archaeological remains of the amphoras bearing the seal of Baetica that were used to transport the oil along the great European rivers of the Rhone, Garonne, Rhine and Upper Danube.

However, the bulk of the Baetican oil trade was controlled by, and went to, Rome. This flourishing trade in Hispanic olive oil led to the expansion of olive cultivation throughout the Betis river valley (now the Guadalquivir) as far as the Sierra Morena hills. Oil mills were built in the middle of olive groves and amphora makers established their businesses chiefly along the banks of the rivers Guadalquivir and Genil.

Although the olive was essentially found in the southern half of Roman Hispania, written contemporary references testify to its presence in the Tajo and Ebro valleys. Olive growing is also documented in the Visigoth period, when it advanced significantly; while Arabic reference sources speak of the abundance and expanse of olive groves across the Guadalquivir valley in the early centuries of the Arab presence.

The importance attached to the olive in Alonso de Herrera's work *Agricultura General* highlights the extent of olive growing in Spain in the first half of the 16th century. This is further confirmed by the numerous remains of olive groves found across the country today. Old olive trees growing on their own, or in scattered, irregular groups, bear witness to the existence of former orchards.

The construction of the railway network in the 19th century pushed olive growing inland, until the olive map of Spain was completed. Nowadays, olive cultivation is going through a further wave of expansion, mainly intensive irrigated orchards where advanced cultural practices are applied to obtain high yields. (Source: AAO)

3.2. Orchard resources

The olive tree is an important pillar of the economy in several regions of Spain; annually, it generates around 16 650 000 days' paid work in harvesting and 15 350 000 days' paid work in other tasks (Source: AAO). Therefore, it is a major source of employment, particularly in regions with high rates of unemployment where olive growing is a real monoculture. Besides having a positive impact on employment, olive growing generates additional benefits through the industries it supports: olive oil production, refining and packing.

In 2009, there were 2 568 382 ha under olives in Spain, of which 2 475 367 ha were for oil production and 93 015 ha for table olives. Dry farming is clearly predominant with 1 879 115 ha of olive orchards grown under such conditions.

Olive orchards largely continue to be farmed by their owners. Approximately 10% of the total olive area is farmed by sharecroppers.

Twenty per cent of the farms in Spain specialise in olive growing compared with 25% in Greece and 19% in Italy. Spain accounts for 50% of the total olive area in the 27-member European Union, followed by Italy with 24%, Greece with 17% and Portugal with 8%. (Source: EUROSTAT, 2009)

3.3. Location

Olive acreage has gradually expanded over the years, basically evolving in step with the economic circumstances of the sector. Concomitantly, the areas best suited to olive growing have seen some crop intensification and the introduction of improved production techniques.

From the second half of the 1980s, the consumer image of olive oil started to change significantly and the Spanish olive sector started to incorporate European statutory requirements after joining what was then the European Economic Community on 1 January 1986. The olive growing industry experienced marked growth, with new plantings rising from 11 623 ha in 2005 to 20 356 ha in 2008 for oil-olives, and from 12 954 ha in 2005 to 21 409 ha in 2008 for table olives.

(Source: IOC questionnaire)

As mentioned above, olives are grown in 13 of Spain's 17 Autonomous Communities. However, this crop is concentrated in the southern half of the Peninsula where Andalusia accounted for 83.92% of total olive area in 2009, followed at a great distance by Castile-La Mancha (5.7%), Extremadura (4.4%) and Catalonia (2.3%). In short, 96% of all the olives produced in Spain is concentrated in four regions. (Source: *Anuario de Estadística Agraria MAPA*, 2009)



Figure 5. Diversity of local varieties (Source: AAO)

Zone 2 or the Hojiblanca Zone: This covers the province of Cordoba (except for the districts of Bujalance and La Carlota), plus the districts of Estepa (Seville), Loja (Granada) and Antequera (Malaga). The most representative variety is the dual-purpose Hojiblanca.

Zone 3 or Western Andalusia: This zone encompasses the province of Seville (except for the Estepa district), the district of La Carlota (Cordoba) and the provinces of Huelva and Cadiz. It is one of the most heterogeneous zones in varietal terms in that oil varieties (Verdial de Huévar and Lechín de Sevilla) are grown in addition to typical table varieties (Manzanilla and Gordal Sevillana).

Zone 4 or Eastern Andalusia: The province of Malaga (except the Antequera district), the province of Granada (except the Iznalloz and Loja districts) and the province of Almeria come under this zone. Apart from Picual and Hojiblanca, three other varieties typical to the area are grown: Verdial de Vélez-Malaga and Picual de Almeria (for oil) and Aloreña (dual-purpose).

Zone 5 or West: This zone extends over the provinces of Badajoz and Caceres and the producing districts of Avila, Salamanca and Zamora and is quite heterogeneous in varietal terms.

The Spanish agriculture ministry divides Spain into ten olive growing zones (these do not coincide strictly with the administrative divisions of the Autonomous Communities) (MAPA, 1972). These are detailed below together with the most representative varieties grown in each one (Source: AAO):

Zone 1 or the Picual Zone: This comprises the province of Jaen and the districts of Iznalloz (Granada) and Bujalance (Cordoba). The predominant variety is Picual, used for oil production.

The Cacereña table olive variety is predominant in Caceres while the Morisca (for oil) and Carrasqueña (for table production) are the commonest varieties in Badajoz, chiefly in the Barros region. The Verdial de Badajoz variety is also important.

Zone 6 or Centre: The Autonomous Communities of Castile-La Mancha and Madrid are covered under this zone. The most important varieties are the Cornicabra, which gives top quality oils, as well as the Castellana, Alfafara and Gordal de Hellín.

Zone 7 or Levante: This comprises the provinces of Alicante and Valencia and the Autonomous Community of Murcia. Many varieties are grown, most of which are native to the zone, such as the Villalonga, Changlot Real and Blanqueta, although they are not significant at national level.

Zone 8 or Ebro Valley: This zone extends over Aragon, La Rioja, Navarre and Alava. The most widespread variety is the Empeltre, grown alongside the Farga variety in many districts.

Zone 9 or Tortosa-Castellón: This covers the south of the province of Tarragona (Bajo Ebro-Montsiá) and the province of Castellón. The majority of varieties are native, such as the Farga, Sevillenca and Morrut.

Zone 10 or the Arbequina Zone: The Autonomous Communities of Catalonia (except for the south of the Tarragona province) and the Balearic Isles fall under this zone. Besides the Arbequina variety, after which the zone is named and which gives top quality oils, other varieties such as Verdiell, Empeltre and Argudell are grown (nowadays, Arbequina is grown very widely in the main olive growing zones because it gives oils with a high commercial value).

3.4. Varieties

More than 100 varieties of olive are cultivated in Spain, many of which are native and confined to a limited geographical area. A list follows of the most representative oil and table varieties. (Source: AAO)

Arbequina

This is the most representative variety of Catalonia. It gives fruity oils ranging from green to yellow in colour, with mild, sweet aromas reminiscent of apples and fresh almonds. The tree is not vigorous; it is lightly branched and has long shoots. The leaf is grooved and widens at the apex, while the fruit is small, oval and almost symmetrical.

Cornicabra

This is the prominent variety throughout the Central zone (Toledo, Ciudad Real and Madrid). The oil is greenish yellow to golden in colour, with a fresh aroma and taste ranging between sweet, bitter and slightly pungent. The tree is moderately vigorous and has medium-length branches and few shoots. The leaf is long and lanceolate while the fruit is long and asymmetrical and has a distinctive curved horn shape.

Empeltre

This variety is typical of Lower Aragon. Its oil is straw yellow to burnished gold in colour and it has a fruity aroma reminiscent above all of apple and a mild, sweet flavour. The tree is very vigorous with upright branches and broad, slightly warped leaves. The fruit is asymmetric and elongated.

Hojiblanca

This is the preponderant variety in Malaga and Cordoba, and goes for both oil and table production. The oil is deep green in colour, with aromas of ripe fruit and reminiscences of avocado, and a pleasant taste with a slight touch of bitterness and pungency.

The vigour of the tree is medium to high and its canopy density is medium. The leaf is elongated and partially grooved and the fruit is large and oblong.

Picual

This variety predominates in Jaén. Its oil is very stable and it has personality and body. It is fruity and robustly bitter with clear peppery overtones. The tree is vigorous and develops a leafy canopy. The leaf is elongated and the fruit is elliptic in shape.

Blanquet

This variety is grown in southern Alicante and Valencia. It produces oils that are leafy green in colour with fruity aromas and overtones of green tomato. It has a mouthfeel with pungent characters and light bitterness. The tree is not vigorous and has short branches. The leaf is short and lanceolate while the fruit is quite oval and slightly asymmetrical.

Cacereña

Also known as Manzanilla de Cáceres because it is found in the province of Cáceres, this dual-purpose variety is highly rated for producing both green and black olives because of the excellent quality of the fruit's flesh. It is not vigorous at all and flowers and ripens early. Its leaves are flat and medium in length, and the fruit is spherical, although somewhat asymmetrical.

Verdial de Badajoz

This variety is found in the Guadiana lowlands. It produces oils with a fragrance reminiscent of green olives and almonds. In the mouth, it is distinctly sweet. The tree is resistant to drought and is used as rootstock. The fruit is large and dual-purpose.

Carrasqueño

This is a sub-variety of Manzanilla which is known by this name in the province of Cáceres.

Lechin de Sevilla

Mainly distributed through the provinces of Seville and Córdoba, this variety gives oils that are relatively unstable with a medium, balanced aroma and bitter taste. The tree is vigorous and has short branches and a thick canopy. The leaf is short and almost flat and the fruit is elliptic and slightly convex.

Manzanilla

This variety is cultivated in the province of Seville, especially in the vicinity of the city of Seville, the capital of the province. The tree is not vigorous and has a sparse canopy. The leaves are short and thick and the fruit is oval. It is used primarily for table olive processing.

Gordal

Both the origin and cultivation of this variety are linked to the province of Seville. The tree is moderately vigorous with long, thick branches. The leaf is long and very straight, and the fruit is large, heart-shaped and slightly asymmetrical. It is intended for table olive processing.

3.5. Olive oil: production and yield

Nowadays, orchard expansion coupled with more rational cultural practices has resulted in a sharp increase in production.

When speaking of crop yields, a distinction has to be drawn between oil-olives and table olives. In the first case, yields in non-organic olive orchards oscillated from 2 051 to 2 606 kg/ha between 2008/09 and 2009/10, and in the second from 4 262 to 4 483 kg/ha.

Analysis of production trends over the period 2000/01–2009/10 shows that olive oil production averaged 1 125 390 t per year, which represents a significant increase (+66.27%) on the average annual tonnage (676 810 t) over 1990/91–2000/01. However, during the latter period, bumper harvests led to two very striking peaks in 2001/02 (1 411 400 t) and 2003/04 (1 412 000 t). Olive oil production in 2011/12 is assessed at 1 600 000 t.

3.6. Olive oil: processing sector

There are 1 740 oil mills in Spain distributed across 13 Autonomous Communities (2010). The highest percentage (45%) of olive oil processing facilities is located in Andalusia, where 40% are to be found in turn in the province of Jaen. This Autonomous Community and province produce 77% and 32% respectively of Spain's olive oil.

In recent years, most mills have been completely renovated and equipped with continuous two-phase decanter centrifuges. Currently, 75% of the mills in Spain have such facilities, which have helped to improve oil quality and reduce wastewater output, which for decades caused serious environmental problems.

Oil mills in Spain vary in size, measured in terms of the volume of oil produced per season. The most common size produces 20–100 t of oil/month and accounts for 23.30% of total domestic production. However, although they represent just short of 11% of oil processing facilities, the mills with a production range between 1 000 and 2 500 t per month account for 34.05% of total national output of olive oil.

Many consumers associate the quality of olive oil with its acidity. It is important to note that acidity is one of the chemical parameters used to determine the quality of olive oils and indicates the level of free fatty acids in the oil (expressed in % of oleic acid); it does not have anything to do with the flavour of the oil. A low acidity level guarantees that virgin olive oils have been made from healthy olives under optimal conditions at every stage of the production process. A maximum acceptable level of acidity is established for each category of olive oil (Source: AAO):

- Extra virgin olive oil: 0.8 %
- Virgin olive oil: 2.0 %
- Olive oil: 1.0 %

Taking 2008/09 as an example, 45% of the oils produced were extra virgin grade (up to 0.8°), 42% were virgin oils (up to 2°) and 12% were lampante grade (>3.3°). (Source: IOC questionnaire)

Bottling or packing plants are the last link in the production chain. Besides packing the oil in suitable sizes (capacity ≤ 5L for household consumption and 25L for canneries, hotels and catering businesses and institutions) and packaging types of container, they also blend virgin oils with refined olive oils or olive-pomace oils to obtain a product with specific characteristics.

There are 1 519 packing plants in Spain, 90% of which are associated with an oil mill.

In addition, Spain has 6 260 working plants where oil is extracted from the olive pomace left over after the production of virgin olive oil. This pomace still contains a high percentage of oil, which is extracted by physical (centrifugation) or chemical methods (solvents). The product obtained, known as crude olive pomace oil, has to be refined and blended with virgin olive oil if it is to be sold for human consumption.

Spain produces some 56 000 t of crude olive pomace oil per crop year, 77% by chemical means and 23% by physical processes. (Source: AAO)

Lastly, Spain has 22 refineries.

3.7. Olive oil: marketing, domestic consumption and foreign trade

The olive oil produced by Spain goes to both the domestic and foreign markets. Mean consumption in the recent decade from 2000/01 to 2009/10 works out at a very satisfactory level of 566 870 t and shows an increase of 26.65% versus the average level recorded the preceding decade.

Table 3. OLIVE OIL (Source: IOC)

	Average (t) 1990/91–1999/00	Average (t) 2000/01–2009/10	Change (%)
Production	676 810	1 125 390	66.27
Consumption	447 600	566 870	26.65
Imports*	36 860	30 490	-17.28
Exports*	63 480	124 050	96.34

*Disregarding intra-EU trade

Spain is the world's largest exporter of olive oil. Over the last decade (2000/01–2009/10), Spanish exports averaged 124 050 t per year, recording 96.34% growth compared with the previous decade.

In 2010 Spanish exports inside the European Union (intra-EU trade) totalled 656 334.8 t. The main destinations were Italy (422 768.2 t), France (84 387.3 t), Portugal (74 938.2 t), United Kingdom (32 692.2 t), Belgium (8 760.6 t), Netherlands (8 037.4 t) and Germany (7 191.1 t). Source: EUROSTAT.

The main destinations for Spain's exports outside the European Union were the United States (56 941.4 t), Australia (24 153.7 t), Japan (16 337.6 t), Brazil (12 374.8 t), China (11 316.0 t), Russia (9 308.6 t), Mexico (7 497.0 t) and South Korea (7 293.6 t).

Imports have increased considerably in recent years although they are very dependent on Spain's level of production and product marketing rate. It imports chiefly from Tunisia (8 546 t), Morocco (3 182 t) and Turkey (400 t). (Source: EUROSTAT, 2010)

3.8. Table olives: varieties, production and yield

The main varieties of Spanish table olive are (Source: AAO):

Manzanilla

Internationally speaking, this is the most widespread table olive variety thanks to its quality and yield. It is grown in the province of Seville, particularly in the area around the provincial capital. It goes primarily for processing as green olives in brine, known as Seville olives inside Spain and Spanish-style pickled green olives.

Gordal

This table olive variety has its roots in the province of Seville where it is also grown. It bears large fruit (100/120 olives per kilo) that is heart-shaped and rather asymmetrical.

Hojiblanca

The predominant variety in Malaga and Cordoba (and also found in Seville and Granada), Hojiblanca goes for both oil and table olive production. It ripens late and is highly rated for making black olives in brine.

Cacereña or Manzanilla Cacereña

This variety owes its name to the fact that it is widespread in the province of Caceres. While dual purpose, it goes mainly for processing as black olives although it is also used to make green olives. The fruit is spherical, although somewhat asymmetrical.

Carrasqueña

This light green variety is the result of grafting the Manzanilla variety onto the Morisca. Owing to its excellent organoleptic characteristics, it goes for table olive processing. It is produced the most in the province of Badajoz.

Other varieties grown for table olive processing are Morona, Lechín, Aloreña, Pico Limón, Cuquillo, Okal, etc.

Table olive production has fluctuated between 400 000 t and 500 00 t, averaging 500 800 t/year during the ten years between 2000/01 and 2009/10 seasons. This represents an increase of 84.77% on the mean volume of production in the 1990s.

Average crop yields (kg olives/ha) vary significantly according to region and rainfall, for instance, in 2009, yields ranged from 1 049 in Catalonia to 1 063 in Castile-La Mancha, 1 368 in Extremadura and 3 569 in Andalusia.

3.9 Table olives: processing sector

The table olive industry (not just processing plants but also packing plants and business operators) is a separate sub-sector of the olive growing industry in Spain, which is the world leader in terms of both production and foreign trade.

In botanical terms, the olive is the only drupe (fruit with a stone) that cannot be eaten straight from the tree because of its intense bitterness, even when ripe. This means it has to be fermented or pickled to make it keep and to make it suitable for direct consumption.

There are 412 table olive processing plants distributed across 11 Autonomous Communities which, with the exception of La Rioja and the Basque Country, coincide with those producing oil. Andalusia, particularly the province of Seville, is the greatest exponent of this industry in terms of the number of processing facilities (55% and 35%, respectively) and level of production (79% and 58%). (Source: AAO)

3.10. Table olives: marketing, domestic consumption and foreign trade

According to the IOC quality standard for table olives (2004), table olives are classified into three types: green olives, olives turning colour and black olives.

- Green olives: Fruits harvested during the ripening period, prior to colouring and when they have reached normal size.
- Olives turning colour: Fruits harvested before the stage of complete ripeness is attained, at colour change.
- Black olives: Fruits harvested when fully ripe or slightly before full ripeness is reached.

Table olives can be presented random or place packed in many styles: whole (with or without stem), stuffed, cracked, halved, quartered, divided, sliced, broken, with capers, or as salad olives, olive paste, or in other distinctive styles such as marinated or seasoned olives.

When intended for retail sale, table olives are packed in jars, tins or sachets. If they are going to other facilities for further processing, they are transported in drums or similar large containers.

Table 4 gives the average data for the Spanish table olive sector over the last 20 years. These confirm the expansion of the sector, apparent in the following:

- Strong growth in production (+84.77%). Scrutiny of the tonnages reported in Table 2 for the second decade shows that production is regularly above 400 000 t/year and peaked at 579 400 t in 2003/04.
- Moderate growth in consumption (+49.80%). In the second decade, consumption was at its lowest in 2008/09 when it totalled 147 700 t.
- Very strong growth in exports (+95.96%), which drives the consolidation of the sector's development.

Table 4. TABLE OLIVES (Source: IOC)

	Average (t) 1990/91 -1999/00	Average (t) 2000/01- 2009/10	Change (%)
Production	271 040	500 800	84.77
Consumption	122 920	184 140	49.80
Imports*	3 190	4 870	52.66
Exports*	94 370	184 930	95.96

*Disregarding intra-EU trade

4. SOURCES

IOC questionnaire

IOC database

<http://www.internationaloliveoil.org/estaticos/view/130-survey-and-assessment-division>

United Nations

<http://data.un.org/Default.aspx>

World Bank

<http://data.worldbank.org/country>

FAOSTAT

<http://faostat.fao.org/site/342/default.aspx>

EUROSTAT

http://epp.eurostat.ec.europa.eu/portal/page/portal/international_trade/data/database

AAO, Agencia para el Aceite de Oliva

http://aplicaciones.mapa.es/pwAgenciaAO/General.aao?idioma=ING&control_acceso=S