1 The olive tree, olive oil and table olives

The beginnings of olive cultivation go back 6000 years to the Mediterranean shores of Syria and Palestine, from where it fanned out to Anatolia via Cyprus and to Egypt via Crete. In the 16th century B.C. the Phoenicians were to take the olive tree to the Greek islands; later, between the 14th and 12th centuries B.C., they introduced it to the Greek mainland where it spread. By the 6th century B.C. olive cultivation was to be found throughout the Mediterranean region, from Tripoli to Tunisia, from Sicily and southern Italy up through Calabria to Liguria, and from there to Provence in France. The Berbers already knew how to graft wild olives when the Romans reached North Africa, and olive growing was developed throughout the territories they occupied around the Mediterranean.

Trade in olive oil and table olives flourished at the height of the Roman Empire when olive oil from Baetica in particular was traded far afield, from Britannia to Germany and Egypt.

With the discovery of America in 1492 the olive tree was carried to the New World; by 1560 olives were grown in Mexico, then Peru, California, Chile and Argentina. More recently the olive has continued to spread and it is cultivated in South Africa, Australia, Japan and China.

The olive-producing areas of the world are found between 30° and 45° north and south latitudes, characterised by a hot-temperate climate with periods of temperatures of around 0 °C to facilitate vegetative rest and periods of very hot temperatures (Fig. 1). The olive is a tree that can survive on very little rainfall, adapting to 220 mm rain per year; it is not demanding in terms of soil requirements and grows on both siliceous and calcareous soils.

The olive is a member of the botanical family Oleaceae, which contains 30 species such as jasmine, ash and privet. The only edible species is Olea europaea L., which is cultivated for its large, fleshy, oil-containing fruits. The world’s 850 million olive trees belong to almost 1000 recorded varieties.

The olive is an evergreen tree that does not grow generally to a height of more than 10 m. Its leaves are persistent (they last three years) and lanceolate in shape.

They are bright green on the topside, silver on the underside and covered with hairs to limit evaporation. When painting the scenes in Provence that were to immortalise olive orchards Van Gogh described the olives as “old silver, sometimes with more blue in them, sometimes greenish, bronzed, fading white above a soil which is yellow, pink, violet tinted orange”.

The olive is a slow-growing tree, only reaching full production when it is 25–30 years old, but it can live for several centuries, and even for up to 1,000 years. Rejuvenation pruning helps it to maintain normal production levels through its lifetime.

Olives are harvested by hand or by shakers onto nets spread out underneath the trees. If the olives are for oil production, they are picked when their oil content is at its maximum at which point they are straw yellow, violet or completely black according to the variety.

When the olives are intended for processing as table olives they are harvested at a specific point in their ripening cycle depending on the type of product preparation. For green olive preparations, the fruits are picked when they are leafy green to straw yellow in colour. When they...
are for preparation as olives turning color, they are harvested at a rose to winey rose or brown colour, and when they are for black olive preparations, they are reddish black to deep chestnut at harvest.

The olive fruit is an ovoid drupe weighing between 2 and 12 g (some varieties may weigh as much 20 g). It has a wax-coated epicarp that turns from green to black as ripening progresses. The mesocarp contains the bitter compound oleuropein, and has a high oil content (12-30%) that varies from variety to variety and a low sugar content. The endocarp of the olive fruit is made up of tough, fibrous lignin. It is ovoid in shape and grooved to varying degrees, again depending on the variety. The endocarp encloses a kernel (olive seed) accounting for some 3% of fruit weight and containing 2–4% oil (Fig. 2).

Virgin olive oil is defined as the oil obtained from the fruit of the olive tree solely by mechanical or other physical means under conditions, particularly thermal conditions, that do not lead to the deterioration of the oil, and which has not undergone any treatment other than washing, decantation, centrifugation and filtration. It takes an average five kilos of olives to make one liter of olive oil.

Triacylglycerols account for 98–99% of the composition of olive oil. The remaining 1–2% comprises minor components: squalene, triterpene alcohols, sterols, tocopherols (alpha-tocopherol especially), polyphenols (natural antioxidants) and a hundred or so aromatic compounds that differ in chemical composition depending on the olive variety, producing area and organoleptic quality of the oil.

The fatty acid composition of olive oil varies according to variety, climatic conditions and production site. The range of fatty acid values is fixed in the International Olive Oil Council’s (IOOC) trade standard for olive oil and olive-pomace oil (as well as in the Codex Alimentarius standard for olive oils and olive-pomace oils).

The fatty acids in olive oil are distributed as follows in terms of their number of double bonds:

- 14% saturated fatty acids
- 72% monounsaturated fatty acids
- 14% polyunsaturated fatty acids.

Table olives are prepared from the sound fruits of varieties chosen for certain characteristics that make them particularly well suited to preserving: volume, shape, flesh-to-stone ratio, fineness of flesh, taste, firmness and ease of detachment of the stone from the flesh. Table olives undergo processes to remove their bitterness; they are preserved by natural fermentation or by heat treatment, with or without the addition of preservatives, and they may or may not be packed in a covering liquid.

Table olives are classified into one of three types on the basis of their ripeness: green olives, olives turning color and black olives.

They can be prepared in several ways, known as trade preparations:

- Treated olives: green olives, olives turning colour or black olives that have undergone alkaline treatment, and that are then placed in brine in which they undergo complete or partial fermentation and which may or may not be preserved by adding acidifying agents.
- Untreated olives: green olives, olives turning colour or black olives placed directly in brine where they undergo complete or partial fermentation, and which may or may not be preserved by adding acidifying agents.
- Olives darkened by oxidation: green olives or olives turning colour preserved in brine which may or may not be fermented, and then darkened by oxidation in an alkaline medium and preserved by heat sterilisation; they are a uniform black colour.
- Dehydrated and/or shrivelled olives: green olives, olives turning colour or black olives that may or may not have undergone mild alkaline treatment, and which are then placed in brine or partially dehydrated in dry salt and/or by heating or by any other technological process.

The IOOC trade standard lays down the essential composition and quality factors for table olives, as does the Codex Alimentarius standard.

2 The world olive oil market

Between 1990 and 2000, world olive oil production averaged 2,071,200 tonnes per crop year. During this period the main producing countries accounted for 96.7% of this production; the European Union alone held a 75.8% share. It is noteworthy that average world production rose from 1,828,200 tonnes during the period 1990/91–1994/95 to 2,314,200 tonnes for the period 1995/96–1999/00 (Fig. 3).
some exporting countries where export earnings take precedence over home consumption when production is not sufficient (Fig. 5).

The European Union (EU) is by far the biggest olive oil producer in that its Mediterranean members produce approximately 75% of the world’s olive oil. Spain, Italy and Greece account for some 97% of EU production (Fig. 6).

The EU also holds a large share of world consumption, some 71%. Fig. 7 shows the consumption per head in the EU countries.

Olive oil consumption per head in the European Union has climbed considerably. Overall, EU consumption rose from an average of 1,371,900 tonnes in 1990/91–1994/95 to one of 1,619,800 tonnes in 1995/96–1999/00.
In volume terms olive oil only accounts for approximately 2% of the world trade in edible vegetable oils (compared with the 45% share of palm oil and the 11% share of sunflower oil). In terms of value, however, it accounts for 30% of trade, set against 30% for palm oil and 12% for sunflower oil.

3 The future of the world olive oil market

The technical activities carried out by the IOOC for its member countries include providing training aimed at raising productivity and improving the quality of olive oil and table olives. Not only has this action swelled the income of olive growers, it has also enhanced considerably the quality image of olive oil.

This quality image is strengthened by releasing research results that document the special nutritional properties of olive oil, which is recommended for preventing cardiovascular diseases, for improving the functioning of the digestive and endocrine systems, and for stimulating bone mineralisation and preventing osteoporosis.

The IOOC also runs campaigns to promote olive oil consumption in countries that are not traditional olive oil consumers. These have led to a noteworthy increase in consumption in these countries where consumers have tuned in to the message that olive oil is a quality product and they have become aware of its health benefits.

Another feature of the steps taken by the IOOC to protect the quality reputation of olive oil is the quality control scheme it has set up in collaboration with olive oil associations to monitor the quality of product sold on the markets where it conducts promotion. This scheme entails collecting samples of product sold on the retail and food-service markets and having the oils tested by IOOC-recognised laboratories to check that they are really what is stated on the label. If analytical or labelling irregularities are detected the relevant national authorities are notified and the firm concerned is struck off the list of participant companies in the quality control scheme which is distributed in the countries where testing is conducted.

The oils are tested in line with the stipulations of the IOOC trade standard, which is regularly updated, above all to reflect developments in methods of analysis. The olive-oil-specific methods that have been drawn up and adopted by the IOOC can be accessed at the IOOC web site.

Fig. 6. Average olive oil production (A) and consumption (B) in the European Union: 1990-2000.

Fig. 7. Average olive oil consumption per head in the EU countries: 1999–2000.
The combination of all this action, and its resultant impact, augurs a bright future for olive growing. This is borne out clearly by the trend of olive oil consumption, particularly in the countries where promotional campaigns are underway; the rise in consumption in the United States, Canada, Australia and Japan is plotted in graph form in Fig. 8.

Also, the increase in olive plantings in both traditional, producing countries and non-Mediterranean countries, such as Argentina and Australia, foreshadows a large rise in production in the next ten years that should see a tandem rise in consumption.

The world table olive market is moving in the same direction as its sister market and promotional campaigns are likewise having an impact in making consumption grow (Fig. 9).

It is not over-optimistic to say that the future of olive growing, like that of olive oil and table olives, looks promising.