

# Olive growing in Australia



By DR JOAN TOUS

Australia is an important agricultural and livestock country in the process of aggressively expanding export products (wool, meat, cereals, oilseeds, fruits, almonds, etc.) to the world market. In relation to the history of the olive tree in this country, I would like to comment that it is not native having been introduced at the beginning of the XIX century by European immigrants. At the end of the twentieth century, specifically, in the mid-90s, olive growers began to establish new intensive plantations in the states of Victoria and South Australia. An estimated total area of about 2000 ha was planted that has given rise to annual olive crops of about 2,500 mt (Tous, 1995). Between the years 2000-2003, was a rapid increase in area, surpassing 20,000 ha of olive trees (Ravetti, 2008). During this period it was considered as a new alternative crop for some Australian states. Some commercial projects from this period benefited from tax incentives. The current area surpasses 35,000 ha, spread out over more than 2000 plantations (Ravetti and Edwards, 2014), and located mainly in four states (Table 1): Victoria-Vic (25.5 %), Western Australia-WA (21 %), New South Wales-NSW (20.5 %) and South Australia-SA (19.8 %). There are also plantings in Queensland-Qld and Tasmania-Tas. Olive groves are located between the latitudes 27 °S (northern NSW/south Qld) and 42°S (Tas), as can be seen in Figure 1.

Australia has a population of over 23 million, about 8% of whom were either born in Mediterranean countries or their ancestors were born there. This has created great enthusiasm for increasing the potential consumption of olive oil and table olives in this country. Currently, the seed oils are the most consumed in this market, with particular emphasis on the sunflower.

In recent decades some institutions, such as the Rural Industries Research and Development Corporation (RIRDC), research centres, such as the Wagga Wagga Research Institute (NSW), Universities, such as Adelaide (SA), and, as in the private sector, companies (highlighting Boundary Bend/Modern Olives) and a commercial organization (Australian Olive Association-AOA), which group most of the sector, have promoted olive tree growing, the olive oil industry and the consumption of olive oil in Australia.

## PRODUCTION AND MARKET

Australian olive production stands at around 93,500 mt of olives, grown mainly in the states of Victoria and South Australia and, to a lesser extent, in WA and NSW. Approximately 97 % of this production is for processing olive oil (18,000 mt, crop 2013/14) and the rest for the trade of table olives (3000 mt), represented, respectively, 0.6 % and 0.13 % of the world crop. The majority of table olives are intended for local consumption. The production of olive oil is more important, and is intended for the self-consumption of the growing areas and the export, which fluctuates around 5-7,000 mt, destined mainly to USA, China, EU, New Zealand and Japan

Australia is an importer of both olive oil and table olives (Table 2). The principal import agents are located in Sydney and Melbourne. In the period 2009-2014 average imports were

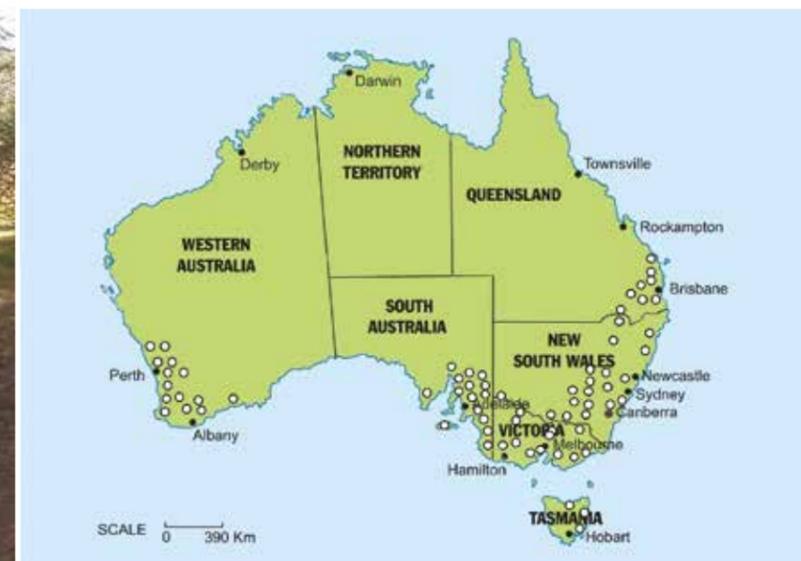


FIG. 1. OLIVE GROWING AREAS IN AUSTRALIA

TABLE 1. COMPARISON OF THE TOTAL AREA OF AUSTRALIAN OLIVE GROVES SINCE THE END OF THE TWENTIETH CENTURY TO THE BEGINNING OF THE TWENTY FIRST.

State	Surface area (1994)		Surface area (2014)	
	ha	%	ha	%
Victoria (Vic)	1.000	50,00	9.000	25,53
South Australia (SA)	933	46,65	7.000	19,86
New South Wales (S)	50	2,50	7.250	20,56
Western Australia (WA)	17	0,85	7.400	21,00
Queensland (Qld)	-	-	4.250	12,05
Tasmania (Tas)	-	-	350	1,00
Total	2.000	100,00	≈ 35.250	100,00

Source:Based on data from Tous (1995), Sweeney (2002) and Sergeeva (2012).

TABLE 2. EVOLUTION IN OLIVE OIL AND TABLE OLIVE PRODUCTION, IMPORTS, CONSUMPTION AND EXPORTS IN AUSTRALIA. PERIOD 2005 - 2014 (1000 TM).

Crop year	Olive Oil				Table Olives		
	Production	Imports	Consumpt.	Exports	Production	Imports	Consumpt.
2005-06	9.0	29.0	34.5	3.5	4.0	15.0	18.5
2006-07	9.0	41.5	47.5	2.5	2.5	16.5	18.5
2007-08	12.0	27.0	35.0	4.0	2.0	17.5	19.0
2008-09	15.0	28.5	37.0	6.5	3.0	16.0	19.0
2009-10	18.0	35.0	44.0	8.0	3.5	18.5	20.5
2010-11	18.0	32.0	44.0	6.0	3.5	17.5	22.5
2011-12	15.5	31.5	40.0	6.5	3.5	17.5	21.0
2012-13	9.5	28.5	37.0	2.5	3.5	17.5	21.0
2013-14	18.0	28.0	44.0	2.5	3.5	18.0	21.5
<b>Mean 09-14</b>	<b>15.8</b>	<b>31.0</b>	<b>41.2</b>	<b>5.1</b>	<b>3.5</b>	<b>18.0</b>	<b>21.5</b>

Source: Author's compilation based on International Olive Council (IOC) statistics.

31,000 metric tons of olive oil, mainly from Spain, Italy and Greece. This figure has increased considerably with respect to the decade of the 90s, in which they were imported between 13,000 and 17,000 mt of olive oil. The domestic yearly consumption per person oscillates around 1.8 liters of olive oil. This is a big increase to 700 grams in the decade of the 1990's (Tous, 1995). The Australian Olive Oil Association (AOOA) is an umbrella organisation grouping together most of the olive oil importers while the Australian Olive Association (AOA) represent the producer sector.

In the main, the types of olive oil sold on the market are "olive oil" and "olive pomace oil". However, "virgin" olive oil, and "extra virgin" (EVOO) in particular, are becoming increasingly popular. Domestic sales are highlighted by the enterprise Boundary Bend (BB), in Lara (Victoria), with average yields about 10,000 mt of oil, which controls 70% of the Australian market share, with their own brand names (different varietal blends and ecological lines) and distribution. Around 15 % of its production is exported in bulk to the USA and also to the Asian market.

In table olives, imports have risen gradually from just over 4,000 mt in 1985, to almost 7,000 mt in 1993, and up to about 18,000 mt in the latest crop years (2012-2014). Greece and Spain dominate the market with 46 % and 34 % respectively. Approximately 75 % of these imports are ready for consumption and are presented in airtight packaging. About 15% of these are green olives, mainly stuffed with pepper. Total annual demand is about 21,000 mt of olives, which is

equivalent to an average per capita consumption of 900 g of olives per year.

The organisational structure of the Australian olive industry, unlike the Spanish, is characterized by a vertical integration, mainly by medium-large farms, which have their own mills and own brands, controlling the whole value chain of the product. The distribution chain for olives and olive oils is quite short and, in general, importers or vertically integrated companies & traders work direct with the retailers. Some exceptions are to be found, such as distributors who operate in food store chains in the different states, and 'ethnic' wholesalers (mostly Italian and Greek origin) who specialize in supplying 'ethnic' shops and local supermarkets.

**ECOLOGY OF THE OLIVE**

The commercial olive growing regions in Australia enjoy a Mediterranean climate, with high summer temperatures, low annual rainfall (250-450 mm), mild winters marked by little frost, although with enough winter cold to allow the plant's biological processes to take place without any problems. However, in some areas of cultivation the climate is somewhat different, as, for example, in the state of NSW where olives are grown both in cold and dry areas, such as in warm temperate and high humidity ambient, or SE of Victoria and NE of Tasmania, with cold winters (-6 or -7 °C) and hot summers (35-45 °C) and dry (282 mm). The shortage of water during specific critical periods of the vegetative-productive cycle of the olive,

is perhaps the main limiting factor for obtaining good harvests in some olive growing areas. Table 3 shows the climatic conditions in different areas of South Australia (Loxton and Roseworthy), WA (York) and Victoria (Mildura) where commercial olive orchards are grown, compared with similar areas located in Spain (Jaen-Andalusia and Tortosa-Catalonia).

Temperatures of Tortosa and Jaén are comparable to those in the Australian growing areas, with the logical six-month lag entailed by the difference in hemisphere (Table 3). The orchards in the states of Victoria (Mildura), NSW (Leeton, Euston, Wagga), WA (York) and the great Murray River valley have a climate similar to that of Loxton (SA), which could be categorised as being of the temperate Mediterranean type according to Papadakis' ecological classification. However, the annual rainfall, both in Tortosa (576 mm) and Jaen (600 mm), are twice the volume of Loxton or Mildura (about 280 mm). Evapotranspiration (ETP) in the two Spanish growing areas is nearly half of the two Australian growing areas. With the exception of some traditional orchards, olives are usually grown with drip irrigation, mainly in the areas bordering the Murray River (Vic, NSW and SA) and throughout WA near the Moore and Margaret Rivers.

In general, the soils in the south-eastern Australian growing areas described above are little fertile, and some plantations are located on very poor soil where other fruit crops would prove difficult to cultivate. The olive orchards along the Murray River valley are planted in reddish-brown clay-loam soils which have a pH ranging from 6.5 to 8.5, are poor in phosphorus and often characterised by a high content of soluble salts in the subsoil (mainly in the groves of SA), which are relatively well tolerated by the olive tree. However, in areas of southern Qld and northern NSW, the soils are somewhat different, with slightly acid pH, clayey, and with problems of waterlogging. Australian plantations are found in both coastal and inland areas, and generally not with altitudes above 200 m.



**VARIETIES**

Australia's varietal structure is somewhat diverse, confused, and there are only a few studies on the cultivars behaviour in the different growing areas. This situation is quite influenced at the time of the rapid growth of the crop (end of the 90's), where many plantations were not well designed. Typical errors were choosing table varieties for production of oil not suited to mechanized harvesting or planting in areas not adapted to the olive tree (high rainfall, waterlogging, mild winters, etc.). Over the years, a number of farmers and nursery breeders of Mediterranean origin have introduced numerous varieties from their home localities, many of which have not been tested. The olive plant material nomenclature has a plethora of synonyms and erroneous names. Many trees grown from seed have been grafted with varieties bearing generic names such as 'Mediterranean', 'oil', 'table', etc.

Works to develop Australian olive varietal plant material, began with old collections made in the early and mid twentieth century, such as those of Wagga Wagga (NSW), Blackwood near Adelaide (SA), and Stoneville Research Station (Perth, WA). These experimental plots have virtually

TABLE 3. COMPARISON OF CLIMATES BETWEEN SEVERAL LOCALITIES IN SPAIN (JAÉN AND TORTOSA) AND AUSTRALIA (LOXTON AND ROSEWORTHY, SA; YORK, WA; AND MILDURA, VICTORIA).

Latitude: Tortosa (40°49'N), Jaén (37°46'N), Loxton (34° 26'S), Roseworthy (34° 38'S), York (31° 52'S) and Mildura (34°11'S).  
Source: Author's compilation based on data from Hobman (1994), Tous (1995) and Archer (1997).

Crop area	Altitude (m)	Average Tmax (°C)	Av. Temp (°C)	Average Tmin (°C)	Rainfall (mm)	ETP (mm)
Cataluña:Tortosa	14	21.1	16.8	11.9	576	871
Andalucía: Jaén.	578	22.0	17.0	12.1	600	916
SA: Loxton.	66	23.3	16.2	9.0	275	1.778
SA: Roseworthy.	68	22.3	16.9	10.5	440	2.031
WA: York	174	24.7	17.6	10.2	450	1.567
Vic: Mildura	51	23.7	17.1	10.3	292	1.472

PHOTO 1: 'BARNEA' CULTIVAR, OF ISRAELI ORIGIN, STANDS OUT FOR BEING THE MOST CULTIVATED OF AUSTRALIA.



PHOTO 2 (RIGHT): COMMERCIAL OLIVE NURSERY IN LARA (VICTORIA), WITH NURSERY TREE MADE BY ROOTING SEMI-HARDWOOD CUTTINGS UNDER MIST PROPAGATION.

been neglected until the end of the last century (Tous, 1995). However, during the years 1998 and 1999, the National Olive Collection at the University of Adelaide (Roseworthy Campus) was created with 100 accessions of plant material from nurseries and old government collections across Australia. At the same time, between 1998 and 2002, a project was approved, called NOVA (National Olive Variety Assessment), jointly funded by the administration and the private sector (AOA). The aim was to identify synonyms and varietal confusions and, also, to evaluate the performance of all known commercial olive varieties in this country and how some of them perform in different climatic regions of Australia (Sweeney, 2002b). Molecular marker characterizations (DNA fingerprints) of the 100

NOVA accessions tested, identified only 58 different genotypes. In the case of the Italian variety 'Frantoio', up to 14 differently named varieties were found of the same genotype. In relation to the commercial scale evaluation of fruit and oil characteristics (Table 4), differences were observed in the oil content and the sensory and chemical composition of the oil, among the different varieties and cultivation areas (Sweeney, 2002b; Mailer, 2007; Mailer et al., 2010; Ravetti and Edwards, 2014). Traditionally, the most popular varieties used in Australia for the production of table olives, are the following: 'Verdale' (origin France), 'Kalamata' (Greece) and 'Manzanilla de Sevilla' (Spain). There are smaller total areas planted to 'Queen of Spain' (synonym of 'Gordal'), 'Volos' (Greece), "Hardy's

TABLE 4. FRUIT AND OIL CHARACTERISTICS (MAIN FATTY ACIDS) OF 10 OLIVE VARIETIES GROWING IN AUSTRALIA (2001 HARVEST).  
\*Corregiolo' is synonymous with 'Frantoio';  
\*\*Samples, showing average Maturity Index (MI) ≈3 (violet skin fruit), from different regions in Australia.  
Source: Data based from Sweeney (2002).

Variety	Water content (%)	Oil content (% dry weight)	C16:0 (%)**	C18:1 (%)	C18:2 (%)	C18:3 (%)
'Arbequina'	56.4	48.0	16.1	68.5	9.7	0.5
'Barnea'	61.3	56.8	11.7	71.5	12.9	0.6
'Cortatina'	55.1	54.0	11.6	75.6	8.8	0.5
'Corregiolo**	48.6	54.3	13.5	71.3	10.7	0.7
'Frantoio**	47.7	50.6	14.3	69.1	12.0	0.6
'Koroneiki'	47.4	51.4	13.4	75.9	5.9	0.7
'Leccino'	50.7	44.7	14.2	75.0	6.5	0.6
'Manzanilla'	62.4	43.9	13.1	74.5	6.1	0.6
'Pendolino'	59.3	34.1	14.2	73.6	8.4	0.8
'Picual'	57.8	44.3	13.8	77.2	3.9	0.6

Mammoth" (native of Old), 'Cucco' (Italy) and 'Barouni' (Tunisia).

At the end of the decade of the 90's, began major plantings of oil varieties like the Israeli 'Barnea' (41 % of the total planted), mainly in the state of Victoria, followed by 'Frantoio' (26 %), 'Picual' (15 %), 'Manzanilla' (6 %), 'Leccino' (3 %), 'Coratina' (2.5 %), 'Arbequina' (2 %) and others, such as 'Koroneiki', 'Pendolino', 'Mission', 'Hojiblanca', 'Picholine', 'Arbosana', etc. With respect to the 'Barnea', after several years of observation, it stands out for being vigorous, erect and productive. However it has been seen in some Australian states to be more sensitive to cold, to olive knot and anthracnose than other varieties, because the weather in some areas is more temperate and humid than Israel (Sergeeva, 2012). It is important to also emphasize the presence of forests of olive trees (feral olives), particularly in the suburbs of Adelaide. These trees come from seeds of varieties grown in abandoned plantations, and in some areas it is considered to be a weed problem, having a negative impact on the local biodiversity. Of these feral populations a few trees were preselected and introduced into variety collections established in the period 1997-2001. Of the few trees selected, some of them have high oil content and quality (Wirthensohn et al., 2001; Guerin et al., 2003).

To summarize, it may be said that currently there are many cultivated varieties, although the largest plantings are 'Barnea' (Photo 1). This has an influence on the commercial characteristics of Australian virgin oils. Currently, in large plantations that have high percentages of 'Barnea', growers are replacing it with other Spanish and Italian cultivars to change the composition of the commercial varietal blends. When it comes to the choice of varieties for planting new orchards, farmers normally take the advice of the nursery, or the technical adviser for each farm and/or business group, as there is currently no governmental experimental research network in the country.

**ORCHARD CHARACTERISTICS**

**Propagation**

New orchards use plants obtained by rooting semi-hardwood cuttings under mist propagation, except in the case of certain difficult to-root varieties (as 'Kalamata'), which nurseries supply as grafted plants instead. The largest nurseries market olive plants of various sizes and prices (between 4 and 15 Euro /plant, about 6-20 A\$), which is much more expensive than olive plants sold in Spain. Currently the varieties most in demand by Australian farmers are the 'Arbequina', 'Coratina' and 'Picual' (Photo 2).

**Orchard planting models and size**

Traditional olive groves are found mainly in the state of SA, with densities ranging between 100 and 150 trees/ha. On some farms, olive trees are also used as windbreaks for citrus trees and are planted at a distance of 2-3 m between each other. At the end of the 90's, there has been an expansion of intensive olive groves in almost all states with a Mediterranean climate (Fig 1). These are mainly irrigated, with layouts about 6x4 m, 7x5 m or 8x6 m (200-450 trees/ha), and adapted for discontinuous mechanical harvesting (trunk shaker, Photo 3) or continuous

PHOTO 3: OLIVE ORCHARD (10 YEARS OLD) GROWING THE 'FRANTOIO' CULTIVAR IN WA, ADAPTED FOR MECHANICAL HARVEST WITH TRUNK SHAKER.



(large over-the-row machines, Photo 4). In relation to the super-high density (SHD) or hedgerow model (more than 1,500 trees/ha), there is little adoption, estimated around 500 ha between SA and WA. Olive orchards vary in size, with 90 % of the growers having less than 10 ha and another 9 % with between 10 and 100 ha. The remaining 1 % of Australian growers with more than 100 ha produce approximately 90% of the country's olive oil crop (Ravetti and Edwards, 2014). Among them, Boundary Bend stands out with 7000 ha located in the Mildura (Vic) area.

#### Cultivation techniques

In general, the older traditional groves receive little care, while in the intensive orchards, cultivation technology has been improved in recent years, similar to practices currently used in Spanish olive groves. The most salient features of these practices are that:

In the old orchards, traditional mechanical tillage is the soil management practice in greatest use to eradicate competition from weeds. In modern orchards it is common to use other methods to eliminate competition from weeds and simultaneously facilitate olive harvesting mechanization. Standing out are the use of natural green cover between planting rows and, non-tillage with herbicides application under the tree canopies. In some groves grazing with sheep is used to control the spontaneous vegetation.

In traditional olive growing there is no set pattern to pruning. In some orchards the trees receive hardly any pruning, or do so at very long intervals, which encourages regular alternative bearing. In other traditional groves the trees are pruned for production to varying degrees depending on the customs handed down by Mediterranean forbearers. In contrast, the modern orchards are designed with high trunks and pruned in a vase shape with a few main branches to promote mechanical harvesting. In general growers in modern orchards do annual or biannual light pruning.

Water scarcity in some states, especially Vic,



SA, and WA, is a major problem for the olive industry. Some intensive plantations are designed using drip irrigation with variable annual dosages between 3000 to 5000 m<sup>3</sup>/ha. However, in some areas such as Mildura, Vic, with very low rainfall (250-300 mm), growers apply amounts ranging between 5,500 -10,000 m<sup>3</sup>/ha.

Harvesting is the major cost in olive orchards and the methods employed depend on the fruit destination (table and/or oil) and the type of mechanization used. Olives intended for oil production are harvested in the winter (months of May-June) and are highly mechanized (approx. 80 % of the total harvest). Trunk shakers are used with reverse umbrella or platforms (side by side type) in the small-medium orchards (≥ 50 ha). In large orchards, over-the-row machines are used (type Colossus XL) (Photo 5). Table olives

are picked by hand ("milking off") in the autumn (April-May) with the aid of ladders, baskets and hand-held rakes. The fruit is deposited in large boxes for subsequent sale or brine treatment on or off the farm.

#### Yields

Harvest yields obtained in traditional orchards tend to be affected by alternate bearing and very variable. In good dry-farmed orchards where adequate cultural practices can be applied yields are in the order of 3,000 kg/ha, while in modern irrigated orchards yields can exceed 5,000 kg/ha. In the new Australian intensive irrigated plantations, the production potential is high, around 10,000 kg/ha with the 'Barnea' variety (Photo 6), which is similar to yields in irrigated intensive orchards in Spain.

PHOTO 4: YOUNG OLIVE ORCHARD IN MILDURA (VIC) ZONE, DESIGNED WITH ALTERNATING ROWS OF 'PICUAL' AND 'ARBEQUINA', TO IMPROVE THE CROSS-POLLINATION, AND ADAPTED FOR THEIR HARVESTING WITH LARGE OVER-THE ROW MACHINES.  
PHOTO 5: HARVESTING OF OLIVES IS HIGHLY MECHANIZED, HIGHLIGHTING THE LARGE HARVESTERS, AS COLOSSUS XL, WHICH COLLECTED ALMOST 50 % OF THE AUSTRALIAN OLIVE HARVEST.

#### PESTS AND DISEASES

Australian olive orchards do not have excessive crop health problems. Black scale (*Saissetia oleae*) is the most widespread pest, while attacks from the Olive lace bug (*Froggattia olivina*) also appear in regions of WA. As regards diseases, the most important is anthracnose or soapy olives (*Colletotrichum spp.*), which affect both the crop and the oil quality. Sporadic outbreaks of sooty mould (*Capnodium elaeophilum*) and olive leaf spot (*Fusicladium oleagineum*, *Pseudocercospora cladosporioides*) do occur, but mainly in orchards receiving little in the way of crop care, or in limited areas with mild climates and high humidity such as Southern Qld and northern NSW. Recently there have been some problems with olive knot (*Pseudomonas savastanoi*) in orchards harvested with large over-the-row machines. In most of those groves varietal differences were observed in damage caused to the branches: 'Barnea' is the most sensitive, and 'Coratina', the more tolerant.

Where newly planted orchards are concerned, mention should also be made of the damage caused by birds that destroy tender shoots on the young trees. Also animals (rabbits, kangaroos, etc) gnaw the bark of the trunk and eat the leaves, mainly in drought years when food becomes scarce for the native fauna.

PHOTO 6: COMMERCIAL IRRIGATED ORCHARD, VARIETY 'BARNEA', LAYOUT 7X4 M, IN MILDURA (VICTORIA) WITH AVERAGE YIELDS BETWEEN 10-12,000 KG/HA, AT 7-8 YEARS OLD.



**INDUSTRY AND OLIVE OILS CHARACTERISTICS**

In Australia there are more than 190 table olive processing facilities, most of which are family-owned and distributed mainly in the States of NSW, Victoria and WA (Kailis and Harris, 2007). These either buy the fruit directly from the growers or use their own harvest. Both green and black olives intended for table consumption undergo brine treatment and fermentation prior to being packed. Production is largely sold to the Sydney and Melbourne markets, directly or through wholesalers. There are also approximately 100 olive oil mills, some are large scale, and the rest are very small, with an average density of one mill for every 300 ha of surrounding orchards. Most mills utilize modern continuous two-phase extraction systems (Ravetti and Edwards, 2014). The processed olive oil is sold for both domestic consumption and export, directed mainly to Asian countries. Within this context, there is increasing demand for olive oil in the Chinese market. Some Chinese companies are acquiring shares and/or buying Australian companies dedicated to the production and export of olive oil.

The Australian olive industry produces virgin oils with various chemical and sensory characteristics. This is due to differences in environmental conditions and the range of olive varieties which causes variability mainly in the fatty acid profile, sterol fraction and wax content (Mailer, 2007; Mailer et al., 2010; Ravetti and Edwards, 2014). The results of more than 2000 oil analyses indicate that there are significant variations (Table 5). The oleic acid content ranges from 54.5 % in 'Arbequina' in southern Qld and northern NSW, to

83.4 % in 'Picual' in cold areas of the southeast of Victoria and Tasmania. The palmitic content varies from less than 7 %, in cold areas to 20 %, in the warmest. The linoleic acid content ranges from 3% in 'Picual' to 23 % in 'Barnea'. Within the total sterols, variations have been observed between 790 to 2,500 mg/kg. 'Arbequina' and 'Barnea' have a greater sterol content than 'Coratina', 'Koroneiki' and 'Pendolino'. Especially highlighted are the high Campesterol levels of the popular varieties 'Barnea' and 'Koroneiki'. The wide range of these parameters was found to be significantly affected by growing region for some cultivars (Mailer et al., 2010).

**CONCLUDING REMARKS**

Australian olive oil volumes will continue being small in comparison to the world market level. However, during the last two decades in specific areas of NSW, Vic, SA, and WA, there has been considerable interest in promoting new intensive olive orchards, in grove modernization and mechanization and obtaining extra virgin olive oil (EVOO) quality. Currently, olive acreage is expected to stabilise in the coming years. There has been a noticeable upward trend in imports lately and an accompanying rise in total olive oil and table olive consumption. This indicates that industry promotion campaigns are affecting Australian consumers, mainly with knowledge about the nutritional characteristics of olive oil and the beneficial effects it has on human health.

Modern technology is applied by Australian producers for processing both table olives and oil which is similar to that in Spain. Normally the Australian orchards are larger and employ

a higher degree of harvest mechanisation. This makes the majority of Australian groves quite competitive in the olive oil global market, despite the high cost of their labour. In relation to olive industry R+D which is supported mainly by the private sector, the completed NOVA project is a highlight. Currently research into varietal experimentation, orchard technology (especially improved mechanized harvesting) and the characterization of virgin oils, are some of the important activities to focus on.

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**REFERENCES**

- Archer, J., 1997. World olive climates. Australian Olive Growers, 4: 4-6.
- Guerin, J., Mekuria, G., Burr, M., Collins, G. y Sedgley, M., 2003. Selection of improved olive cultivars. Acta Hort. 622: 231-234.
- Hobman, FR., 1994. The potential for an Australian olive industry. Olives and Carobs National Symposium. University of Adelaide (South Australia), Roseworthy Campus: 29-42.
- Kailis, S. and Harris, D., 2007. Producing table olives. Landlinks Press. Colingwood VIC, Australia, 328 p.
- Mailer, R.J., 2007. The Natural Chemistry of Australian Extra Virgin Olive Oil. RIRDC, Kingston, ACT, Australia, 15 p.
- Mailer, R.J., Ayton, J. and Graham, K., 2010. The influence of growing region, cultivar and harvest timing on the diversity of Australian olive oil. J. Am. Oil Chem Soc., 87: 877-884.
- Ravetti, L., 2008. Evaluation of new olive mechanical harvesting technologies in Australia. Acta Horticulturae, 791: 387-392.
- Ravetti, L. and Edwards, M., 2014. Olive oils from Australia and New Zealand, p. 313-336. In: E. Monteleone and S. Langstaff (eds.). Olive Oil Sensory Science. John Wiley & Sons, Ltd.
- Sergeeva, V., 2012. Following Olive Footprints in Australia, p. 32-47. In: M. El-Kholy, D. Avanzato, J.M. Caballero, K.S. Chartzoulakis, F. Vita and E. Peri (eds.). Following Olive Footprints (Olea europaea L): Cultivation and Culture, Folklore and History, Traditions and Uses. AARINENA, IOC and ISHS. Córdoba, Spain.
- Sweeney, S., 2002a. Olive tree numbers 2002. The Olive Press, Summer 2002: 26.
- Sweeney, S., 2002b. National Olive Variety Assessment Project Update. The Olive Press, Summer 2002: 14-25.
- Tous, J., 1995. The olive in Australia. Olivae, 55 (2): 10-15.
- Wirthensohn, M., Burr, M., Granger, A., Jones, G. and Sedgley, M., 2001. Selection in Australia from feral olives with superior oil quality. Olivae, 87 (6): 39-43.

**About Dr Joan Tous**

*Dr. Joan Tous (Vila-seca, Tarragona, Spain), former researcher of the IRTA, and his experience is in research in plant material, agronomy and quality characterisation in olive and carob trees. Currently consultant and technical coordinator of the national organization Empresas Innovadoras Garrofa (EiG, www.garrofa.org), he has made four technical trips to Australia (1994, 1999, 2001 and 2014), mostly related to the cultivation of the olive, carob and hazelnut trees. Recently, he has been appointed honorary member of the national organization Carobs Australia, Inc.; being the first European researcher to have received this award.*

TABLE 5. AUSTRALIAN OLIVE OIL CHEMICAL CHARACTERISTICS: AVERAGE, MINIMUM AND MAXIMUM LEVELS OF SOME FATTY ACIDS, TOTAL STEROLS AND INDIVIDUAL CAMPESTEROL.

Level	C16:0 (%)	C18:1 (%)	C18:2 (%)	C18:3 (%)	Total Sterols (mg/kg)	Campesterol (%)
Minimum	6.70	53.87	2.21	0.30	789.23	1.88
Average	11.87	73.81	9.25	0.73	1705.45	3.76
Maximum	20.26	84.15	23.79	1.71	2862.00	5.00

Source: Ravetti, L. and Edwards, M. (2014).