Table Olives Cultivars

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AOA Webinar Sep 28 Sep 2021

Fundamentals of table olives

Table olives are a food

They must be:

- Safe – growing conditions, processing and packaging - testing
- Nutritious and beneficial – cultivar, growing conditions, cultivar, and packaging
- Edible – cultivar processing and packaging tasting and organoleptic assessment
- Appealing – cultivar, maturation state, harvesting, processing, elaboration, and packaging
- Marketable – cultivar and presentation
- Other?

Domestication of Olive

Domestication involved adapting wild olive (Oleaster) for human use known to day as the cultivated olive (Sativa).

Wild olive - *Olea europaea ssp.europaea* var. *sylvestris*

Cultivated olive - *Olea europaea ssp. europaea* var. *europaea*

Cultivars

- Cultivars, previously called varieties, are a selection of individuals of selected for one or more interesting characters
- Over years some 2000 olive cultivars exist with many country specific
- A cultivar is distinct, uniform and stable in these characters
- These characters are retained and passed on by vegetative propagation
- New cultivars are generated by crossing 2 different individuals then growing out the seed
- Each cultivar has an identifiable genetic map
- The physical expression of a plant part eg olive fruit is influenced by its genetics and the growing environment
- the existing genetic heritage is generally stable

Wild olive - *Oleaster*

- progenitor of the domesticated olive
- derived from 6 other species of *Olea europaea* that includes the African olive
- leaves and fruit are smaller, oil is more bitter than EVO because of higher PP levels
- wild and cultivated forms can interbreed
- oil and wood were used before domestication

Feral ("Wild") olives in Australia *Olevaster*

- not a true wild olive – but a feral olive
- cultivated olive fruit eaten by vectors - birds, animals or humans – after which the seed is transferred to a more distant site where it germinates.
- the olives are generally small round to ovoid shaped
- when heavily grazed – bushes are non productive & show similarities to the true wild (oleaster)
- some may be hybrids of the cultivated olive and the African Olive

African Olive

- introduced into Australia as an ornamental and for hedging
- used as root stock for grafting cultivated olives
- has small fruit with little flesh
- leaves are greener than the cultivated olive
- can go feral

Olive cultivar characteristics

. Cultivar characteristics are much more than fruit characteristics.

• Tree
- Vigour - weak, medium and strong
- Growth habit - drooping, spreading, erect
- Canopy density - sparse, medium, dense

• Rooting ability (IBA + mist) - low, medium, high
• Flowering time - early, intermediate, late
• Fertility - self fertile, partially self fertile, self infertile
• Pistil abortion - low, medium, high
• Fruit removal force - low, medium, high
• Leaf characteristics - shape, colour
• Fruit characteristics - weight, shape, F:S ratio, flesh detachment from stone
• Flesh composition - oil, sugar, polyphenols, fibre
• Stone characteristics - weight, shape, freestone vs clingstone
• Start of bearing from planting - early (3rd y), intermediate (4th y), late (5th y+)
• Productivity – low, medium, high
• Bearing – alternate, constant
• Sensitivity to biotic factors - infection, infestation
• Sensitivity to abiotic factors - nutrition, cold, drought, salinity, lime (iron deficiency)

Table Olives

Table olives are prepared from the sound fruits of olive tree (Olea europaea L.) cultivars that have characters that make them particularly suitable for processing, such as:

- weight
- comfortable shape
- thin delicate skin
- flesh:stone ratio - of 5 or more
- firmness for all maturation states
- easy flesh detachment especially for large olive fruit

Olive types

- Green olives – green olive fruit that have reached their natural cultivar size
- Olives turning colour – olive fruit harvested at colour change (veraison)
- Black olives – olive fruit harvested just before or when fully ripe
- Over-ripe black olives – when olive flesh loses firmness and softens

Olive styles

- whole olives
- destoned olives
- stuffed olives
- cracked olives
- specialty – Greek style - green, TC, black; Dehydrated; Ferrandina styles; Spanish style green; Picholine style, Castelvetrano, Californian black ripe

International table olive scene

10% of world olive crop is processed as table olives
Total provisional production for 19/20 = 3,058,000 tonnes

Cultivars – Manzanilla, Hojiblanca, Sevillana, Cerignola, Nocellara del Belice, and Kalamon, Chalkidiki, Volos

Main TO producing countries (Tonnes)

Egypt	750,000
Spain	458,000
Turkey	414,000
Algeria	323,000
Greece	222,000
Morocco	135,000
Syria	117,000
Iran	98,000
Argentina	95,000
USA	81,000
Peru	50,000
Total	**2,743,000 (90%)**

Spanish style olives

Major TO exporting countries: Spain, Egypt, Morocco, Turkey, Greece, Argentina

World cultivars for table olive processing

Spain - Alorena, Arbequina, Gordal Sevillana, Gordal de Granada, Hojiblanca, Loaime, Manzanilla de Cacerena, – Manzanilla Prieta, Manzanilla de Sevilla, Molar de Cienza, Morisca, Morona, Nevadilo Blanca, Picual, Rapasavo, Villalonga

Italy – Ascolana Tenera, Carolea, Cassanese, Coratina, Cucco, Frantoio, Giarraffa, Itrana, Leccino, Majatica di Ferrandina, Nocellara de Belice (Sicily), Nocellara Etnea (Sicily), Oliva di Cerignola, Pizz'e Carroga, Sant' Agostino, , Santa Caterina, Taggiaca

Greece – Amigdalolia, Chalkidiki, Kalamon (Kalamata), Konservolia (Volos), Mastoidis, Megaritiki

Turkey – Ayvalik, Cekiste, Celebi, Domat, Erkence, Gemlik, Izmir Sofralik, Memecik, Memeli, Uslu

Portugal – Carrasquenha, Cordovil de Castelo Branco, Cordovil de Serpa, Galega Vulgar, Macanilha Algarvia, Redondal

France – Aglandau, Cailletier (Taggiasca,) Grossane, Lucques, Picholine Languedoc, Salonenque, Tanche

Israel - Barnea, Kadesh, Merhavia

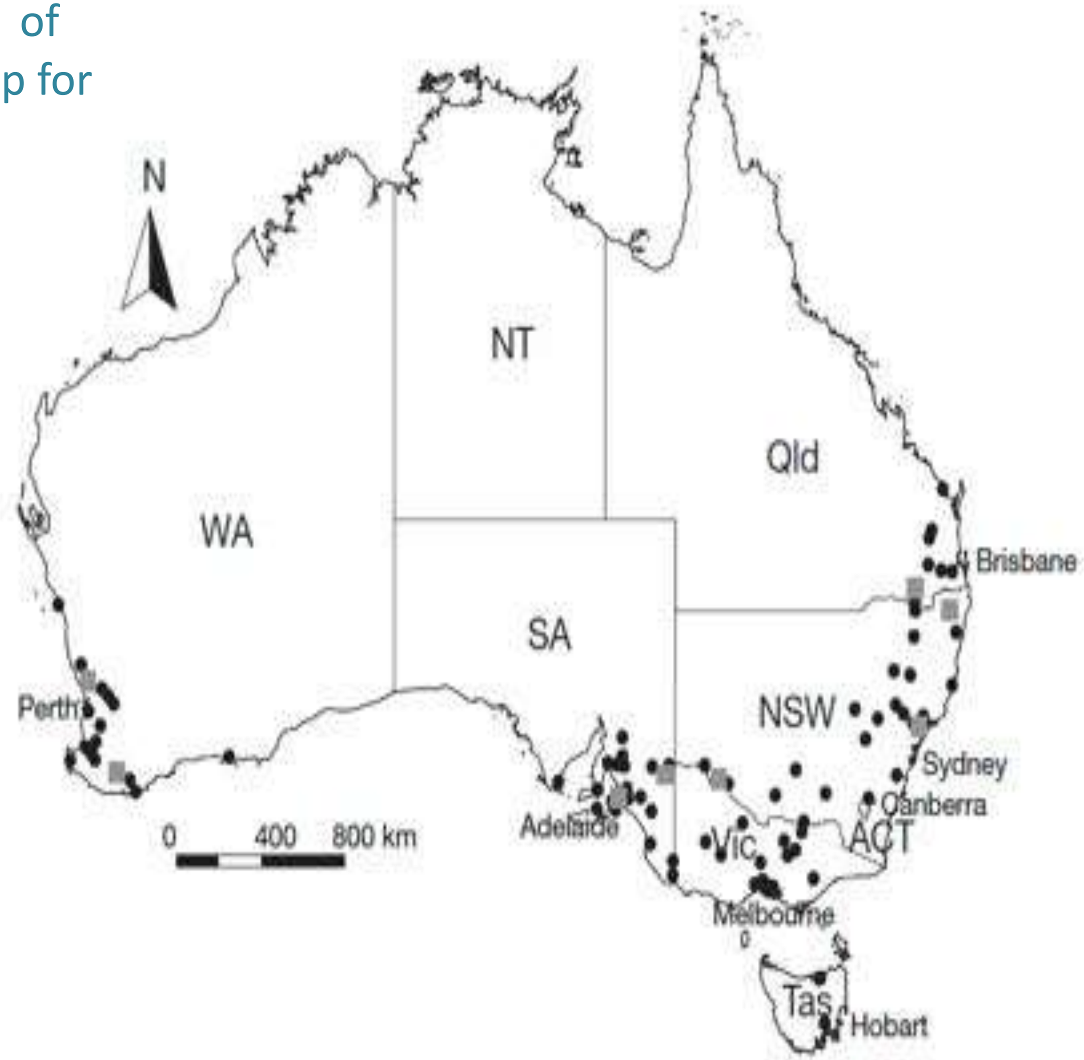
Tunisia – Barouni Chetoui, Gerboui, Meski, Oueslati

Others - Arauco (Argentina), Azapa (Chile), Picholine Marocaine & Sigoise (Morocco)

Australian table olive scene

No of Olive Growers – Approx 500
No of Trees – 6 million
Area – 20,500 Ha

5% of crop for TO



Australian Olive Statistics (IOC)
X 1000 Tonnes/year

Olive oil Production
Around 20

For Provisional years 2019/20 tones

Table Olive Production (steady)	4
Importation	16.5
Consumption	20.5
Exportation	0.3

Consumption/person/year = 0.8 kg

Table Olive Grove
250-300 trees/ha
7-8 Tonnes fruit/ha

Australian Table Olive Sector

- Boutique Industry
- 80% of TO (table olive) producers use less than 5 ha of trees for table olives
- Five known producers have 40 ha of olive trees
- Around 50% of growers are interested in TO production
- Gross production value of TO in Australia 2019 was A$ 12 million

Australian Table Olive Trade

Australian Processed Table Olive Products

- Focused mainly on natural processing methods
- Olive processing is usually undertaken by the olive grower on the same site as the olive farm.
- **Primary Processing** - Fermentation, alkali treated. dehydration
- **Secondary Processing** – destoning, stuffing elaboration (oil, herbs, spices) , olive paste and tapenade, final preservation.

Outlets – markets, cellar doors, on line, specialty food stores as well as in bulk to restaurants and food services industry.

Australian "wild" olives

- This is a feral olive not a wild olive
- Unique group of Australian olives
- Popular with consumers
- Classification small cultivar olives
- cf. Arbequina, Pendulina and Koroneiki
- weed/pest?

RIRDC funded investigations undertaken re germplasm, oil parameters and disease resistance (Ref)

- Rooting ability - 0% to 100% mean = 45%
- Shape - spherical to ovoid
- Oil content at 50% moisture - 8.5% to 28.5%
- Oleic acid 42.9 to 85.3%
- Linolenic acid 0.4 to 1.3%
- Future TO research should be considered on selections identified by the study

Commercial sample

- Shape – ovoid with point
- Weight = 1.2g
- F:S ratio = 2=3:1
- Stone = wrinkled surface

Maximising olive cultivar performance

- Targeted nutrition – based on soil pH and leaf
- Soil characteristics – pH, drainage, active soil biology
- Pruning during/after harvest – to promote new growth and fruiting
- Harvesting control
- Early harvest of green ripe olives allows trees to recover earlier
- Removal of residual olives - hormonal activity of seeds
- compromise next season production
- Pest control – some olive cultivars are less prone to biotic diseases
- targeted and specific
- preventative eg annual copper spray after pruning
- destruction of infected fruit and vegetation

2021 AOA Olive Industry Grove Productivity and Marketing Survey: Table olive survey results

Limitation – sample size

Planting area

One Ha or less	57%
1+ to 5 Ha	28%
Greater than 5Ha	14%

Number of trees

Less than 250 trees	52%
Less than 500 trees	79%

Harvesting method

Hand	72%
Rake	23%
Tree shakers	19%

Limited number of cultivars

Most olives are processed naturally

- Fermentation
- Dehydration

Less interest in alkali treated olives

More scope to use other cultivars

- Barouni, Cerignola
- Picual
- Volos (Konservolia)

2021 AOA Olive Industry Grove Productivity and Marketing Survey Category describing current TO activities	No 87	% 87
Currently growing raw olives + Processing TOs	26	30
Currently growing raw olives for sale to TO Processor	4	5
Currently purchasing raw olives from growers for TO Processing	1	1
Planning on producing TOs in the next year or two	5	6
Thinking about processing TOs	11	13
Not interested in producing TOs	40	46
Total respondents	**87**	
Total non respondents	46	

2021 AOA Olive Industry Grove Productivity and Marketing Survey
Number of cultivars processed by respondents

Manzanilla de* Seville	26	Arbequina*	5	Konservolia* (Volos)	3	Oliva a Prugno (Cerignola)	1
Kalamon* (Kalamata)	17	Hardy's Mammoth (Verdale Aglandau?)	5	Picholine	3	Palermo	1
Frantoio group*	15	Nab Tamri (Sevillana ?)	5	Picual	3	Pendolino* (Pendulina)	1
Coratina	13	Sevillana*	4	Ascolano	1	Pigale	1
Kalamata Jumbo*	11	Verdale SA*	4	Black Italian* (Verdale USA?)	1	UC23A9	1
Koroneiki*	7	Azapa	3	Hojiblanca	1	Wild Olive*	
UC13 A6	7	Barnea	3	Kalamata* Collosus (Kollosus)	1	Arecuzzo**	
Leccino*	6	Barouni (Uovo di Piccione)	3	Mission* (Californian)	1	Picual**	

* Cultivars submitted to table olive competitions ** Additional cultivars

2021 AOA Olive Industry Grove Productivity and Marketing Survey Category of types/styles of TO production	No 47	%
Spanish style green olives (treated with sodium hydroxide + Fermentation	4	9
Greek style olives by fermentation (Kalamata, Ligurian, Sicilian)	33	70
Californian style black ripe olives (Green/TC olives + sodium hydroxide with no fermentation)	0	0
Salt and/or heat dried olives	15	32
Other	6	13
Respondents that answered	47	100
Skipped this part of survey	86	

Australian Industry Survey - varietals planted in Australian groves (%)

42.1 % of respondents producing TO sand 5.1% were considering producing TOs

Frantoio	73.1	Jumbo Kalamata	17.4	Hojiblanca	6
Manzanilla	64.1	Arbequina	17.4	Wild	2.4
Kalamata	47.3	Barnea	16.8	Arbosana	2.4
Correggiolla	37.1	WA Mission	13.8	Fs 17	1.8
Picual	30.5	Coratina	13.8	White	1.2
Leccino	26.3	Sevillana	13.2	Don Carlo	0.6
UC13A6	19.8	Picholine	10.8	Signore	0.5
Verdale	19.2	Volos	7.2	Other	0.6

Cultivars for Table Olive Processing Available in Australia

Arbequina	Frantoio	Manzanilla(o)	Souri
Arecuzzo	Hardy's Mammoth	Nab Tamri	SA Verdale
Azapa	Hojiblanca	Nevadillo Blanco	UC13A6
Barnea	Kalamata (Kalamon)	Oblitza	Volos (Konservolia)
Barouni	Kalamata Jumbo (Cerignola?)	Pendolino	Wallace
Corregiola (Frantoio)	Kalamata Kolossus	Picholine	White
Coratina	Koroneiki	Picual	Others ??
Cucco	Leccino	Sevillana (o)	

National Olive Variety Assessment

- Of the 100 NOVA accessions tested (supposedly including 87 different cultivars), only 55 different genotypes were detected.
- A number of cultivars matched international standards including: Ascolano, Arbequina, Barnea, Coratina, Frantoio, Hojiblanca, Kalamata, Koroneiki, Leccino, Manzanilla de Sevilla, Nevadillo Blanco, Pendolino, Picual, Sevillano, Souri and one Verdale type.
- 12 differently named accessions were the same genotype as Frantoio – Belle de Espagne, Boothby's Lucca, Bouteillon, Correggiola, Emu Flat, Frantoio, Frantoja, Leccure, Lucca, Mediterranean, Palsano, Paragon and Pueblana

Wagga Wagga Collection of Named Accessions

Amelon, Arecuzza, Atro Violacca, Atro Reubens, Attica, Barouni, Belle d'Espana, Big Spanish, Blanquette, Borregiola, Bouchine, Bouquetier, Boutillon, Columella, Corregiola, Cucco, Dr Fiaschi, Frantojo, Gaeta, Gros Redoneaux, Hardy's Mammoth, Hawkesbury Agricultural College, Large fruited, Lucca, Lucques, Manzanilla no 14, Manzanilla no 2, Macrocarpa, Nevadillo Blanco, Ode Gras, Oblitza, Oblonga, Oje Blanco Doncel, Olive de Gras, Palermo, Pecholine, Pecholine de Chamise, Pendulina, Pera Bore, Pigale, Polymorpha, Praecox, Regalaise de Languedoc, Regalis, Rubra a'Aix, Saloma, Sevillano, Tarascoa and Verdale.

Yanco Collection of Named Accessions

Corregiola, Hardy's Mammoth, Sevillano, Verdale

Olive flower to olive fruit

Mid spring – anthesis and pollination

Late spring - fruit set

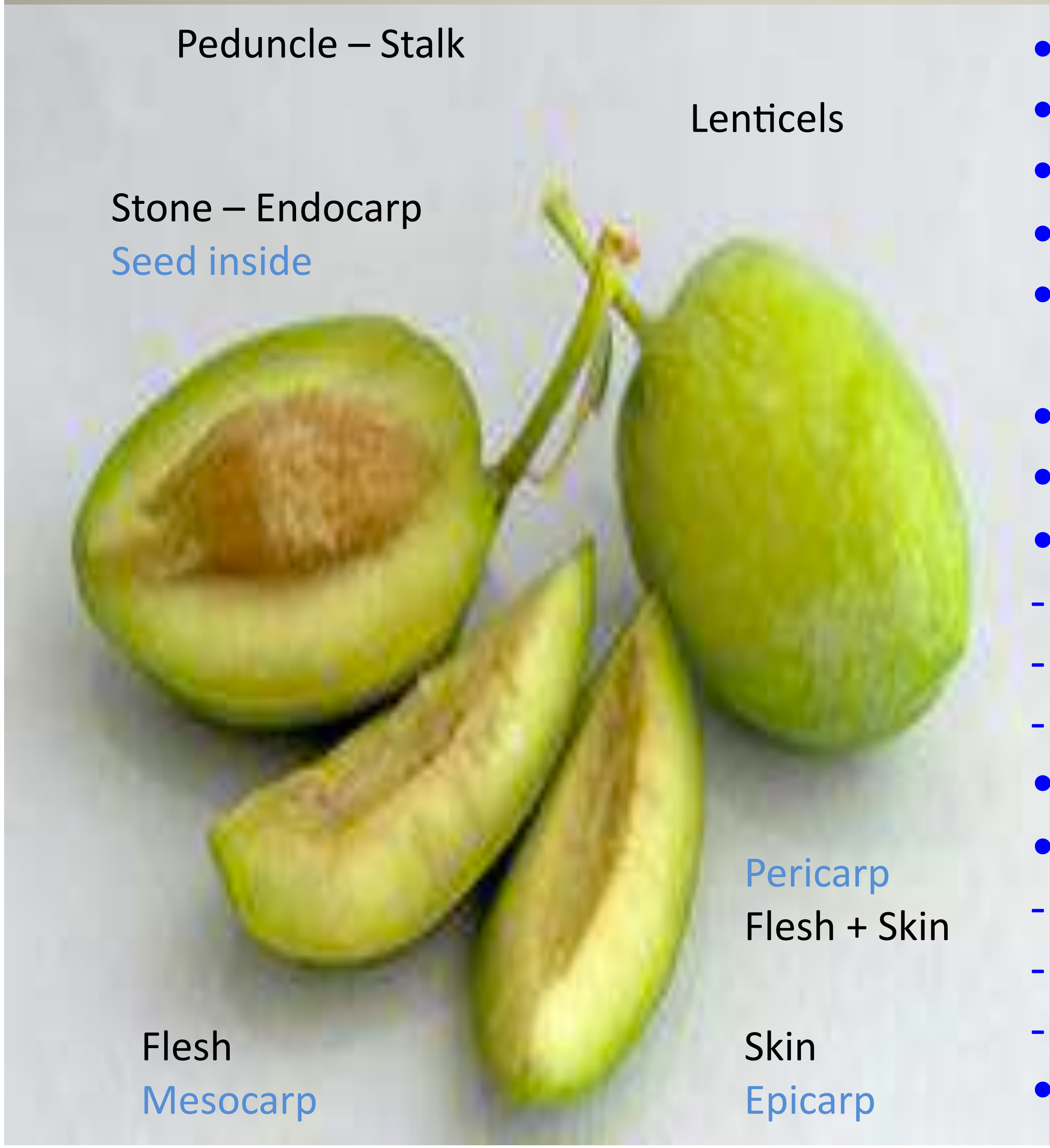
Late spring to autumn – fruit growth

- Initially stone development and hardening is favoured over flesh development (reducing water applications can improve F:S ratio
- Flesh development proceeds over 3 months, then olive fruit reaches maximum weight

Veraison – is the stage of olive fruit development when fruit growth ends and maturation/ripening begins heralded by colour change due to gradual loss of chlorophylls (green) & carotenoids (orange/yellow) with the emergence and increase of anthocyanins (red/purple). Oil levels in olive flesh also reach maximum levels around veraison.

Polyphenol levels increase steadily in the flesh reaching maximum levels at veraison then rapidly falling over 4-6 weeks due to enzymatic action, oxidation and polymerisation.

Olive fruit structure



Edible Parts

- Water - 50%
- Lipids – mostly oil 5-30%
- Total carbohydrates 19%
- Sugars + Mannitol – 2.5-6%
- Fibre – pectin, cellulose, hemicellulose
- Proteins (amino acids) 1.6%
- Organic acids – citric, malic
- Polyphenols (1-3%) >>> EVO

- Water and oil soluble
- Oleuropein, Ligstroside
- Anthocyanins

- Vitamins A, B, C & E
- Pigments

- Chlorophylls - green
- Carotenoids - yellow orange
- Anthocyanins – red/violet

- Minerals - many

Table olive cultivars and growing conditions

Climate/weather effects

- Winter chill – cumulative coldest month/months
- Heat degree days – to ripen olives – autumn – if late in season olives from some cultivars do not achieve black ripeness
- Water requirement – 500mm to 1000mm/year mostly winter/spring also additional irrigation over summer to harvest
- Drought reduces flowering and fruiting
- Rain or excessive wind reduces pollination
- Heat degree days – to ripen olives – autumn – if late in season olives from some cultivars do not achieve black ripeness
- Temperature effects

- Very cold: Temps fall to below -6ºC, frost control required
- Moderate cold: Temps -3ºC to -5ºC (less frost damage); sufficient chill for flowering
- Mediterranean: best for olives; average daily July temp of 12ºC provides sufficient chill
- Subtropical climate with summer rain – warm dry winter/spring – chilling can be a problem

Soil aspects

- Well draining to prevent death of roots through anoxia
- pH 5.5 to 7 – best for nutrient absorption
- Lime (calcareous) soils have high pH 8 – causes iron deficiency and chlorosis

Potential Diseases

- Summer and year round rain promotes fungal diseases
- Dieback – phytophthora (whole tree); verticillium wilt (individual root/branch connections)
- Damaged bark – Olive knot, mist

Olive fruit maturation states

Olive fruit maturation

- Slow and long lasting several months
- Fruit set → Fruit growth → maturation → ripening → senescence
- Olive firmness – Green ripe > T C > Naturally black ripe > Senescent olives

Factors affecting maturation

- Cultivar
- Latitude (altitude) – temperature
- Available water
- Temperature
- Cultural practices

Olive maturation and ripeness stages

Green ripe - fruit reaches final dimensions/weight

Turning colour

- Skin spotted due to anthocyanin accumulation initially in skin
- Deceptive - anthocyanin pigmentation in skin with no flesh pigmentation

Naturally black ripe - total skin anthocyanin pigmentation with significant pigmentation at least 3/4 towards stone

Over-ripe naturally black ripe olives – Soft with fully pigmented skin and flesh

Olive fruit weight/size

Cultivar

Genetic + Growing conditions

Crop load - large crops reduce olive fruit size

Remnant olives on tree – olive seed restricts flowering in the next season

Growing conditions

- Light availability and aeration of canopy - pruning
- Natural precipitation/Irrigation for larger size olives
- Olive trees need adequate soil moisture throughout the year, when olive fruit growth takes place and new fruiting wood develops

- before flowering time in late winter
- in early spring
- during the summer

Olive Stone (Pit, Bone)

- Freestone vs Clingstone
- Freestone - Flesh detaches easily from the stone
- Clingstone best suited for cracked or bruised olives

Clingstone olive cultivars: Aglandau, Arbequina, Azapa, Carolea, Coratina, Domat, Frantoio, Sevillana (o), Hojiblanca, Ladoelia, Memecik, Meski, Cerignola, Picual, Toffahi, UC13A6

Freestone olive cultivars: Ascolano, Arauco, Ayvalik, Barnea, Chalkidiki, Galega Vulgar, Gemlik, Itrana, Kalamon, Konservolia, Koroneiki, Leccino, Manzanilla de Sevilla, Californian Mission, Nocellara de Belice, Oblitza, Picholine Languedoc, Picholine Marocaine, Sigoise, Tanche

Nutty taste/aromas – Barouni, Kalamon following fermentation

Oil content of cultivars for table olive processing

Olive fruit oil levels and small size do not limit their use for table olive processing eg *Koroneiki*, *Arbequina* and Australian *wild* olives. On the contrary, although low oil cultivars may be less useful for EVO production, they do find their way into olive oil processing resulting in unique vintage EVOs of, Sevillana and Hardy's Mammoth cultivars.

Oil content in edible portion

High (> 22%) – Arauco, Ayvalik, Coratina (V/H), Gemlik, Hojiblanca, Kalamon, Koroneiki, Picual, Tanche

Medium/high – Aglandau, Arbequina, Barnea, Carolea, Frantoio, Konservolia, Leccino, Memecik, Oblitza

Medium – Arecuzza, Arauco, Black Italian, Galega Vulgar, Itrana, Manzanilla, Mission (Californian), Nocellara del Belice

Low/medium – Ascolano, Chalkidikis, Domat, Ladoelia, Picholine Languedoc, Picholine Marocaine

Low (<16%) – Azapa, Barouni, Cerignola, Meski, SA Verdale, Sevillana, Sigoise, Toffahi, UC13A6 – some as low as 5%

Bitterness of edible part of olive fruit

Olives are naturally bitter because of a number of polyphenolic glycosides

- Oleuropein
- Ligstroside

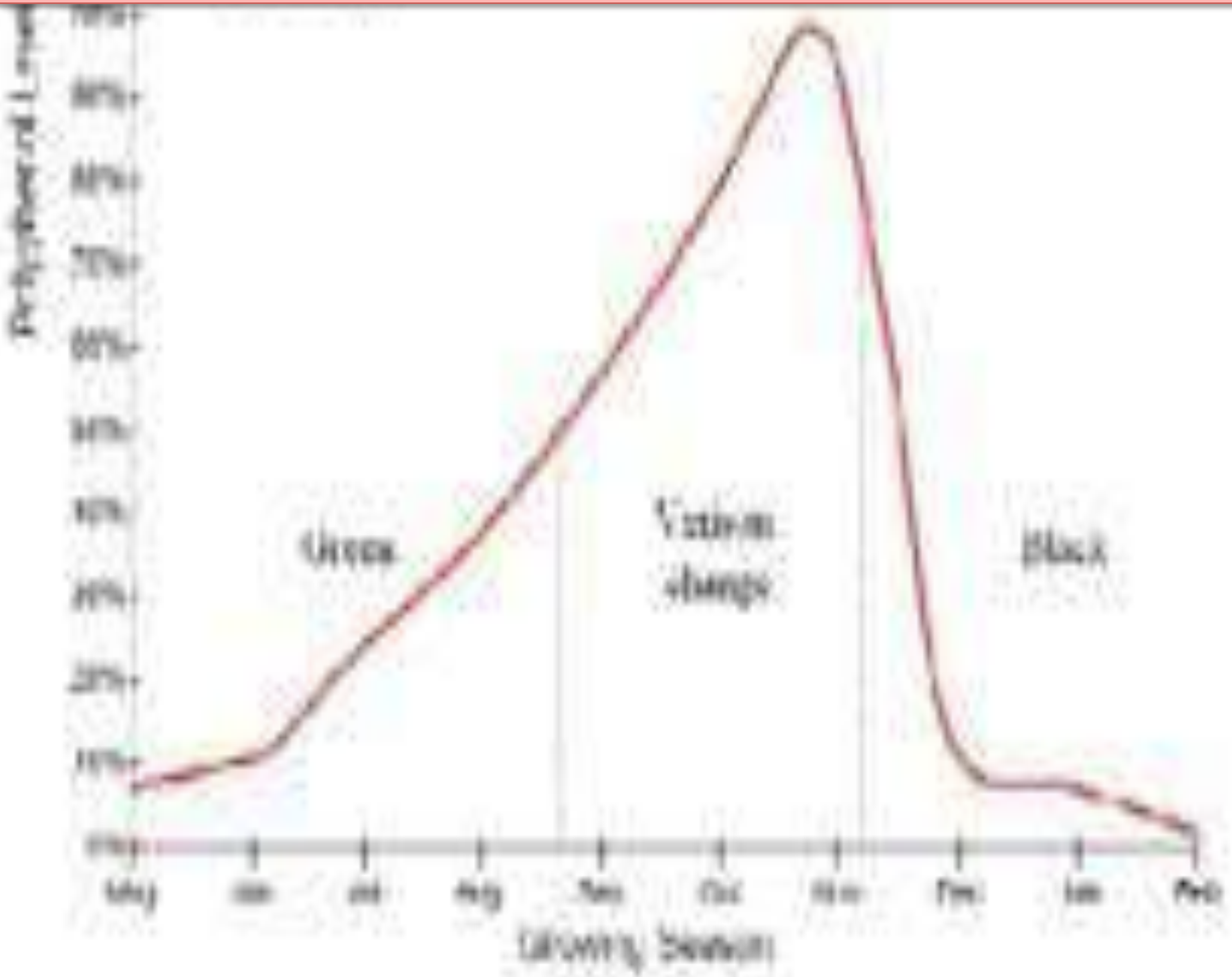
- Glycoside levels depend on cultivar, climate, agricultural practices and olive fruit at harvest
- Glycoside levels on olive flesh are affected by level of water during the growing season

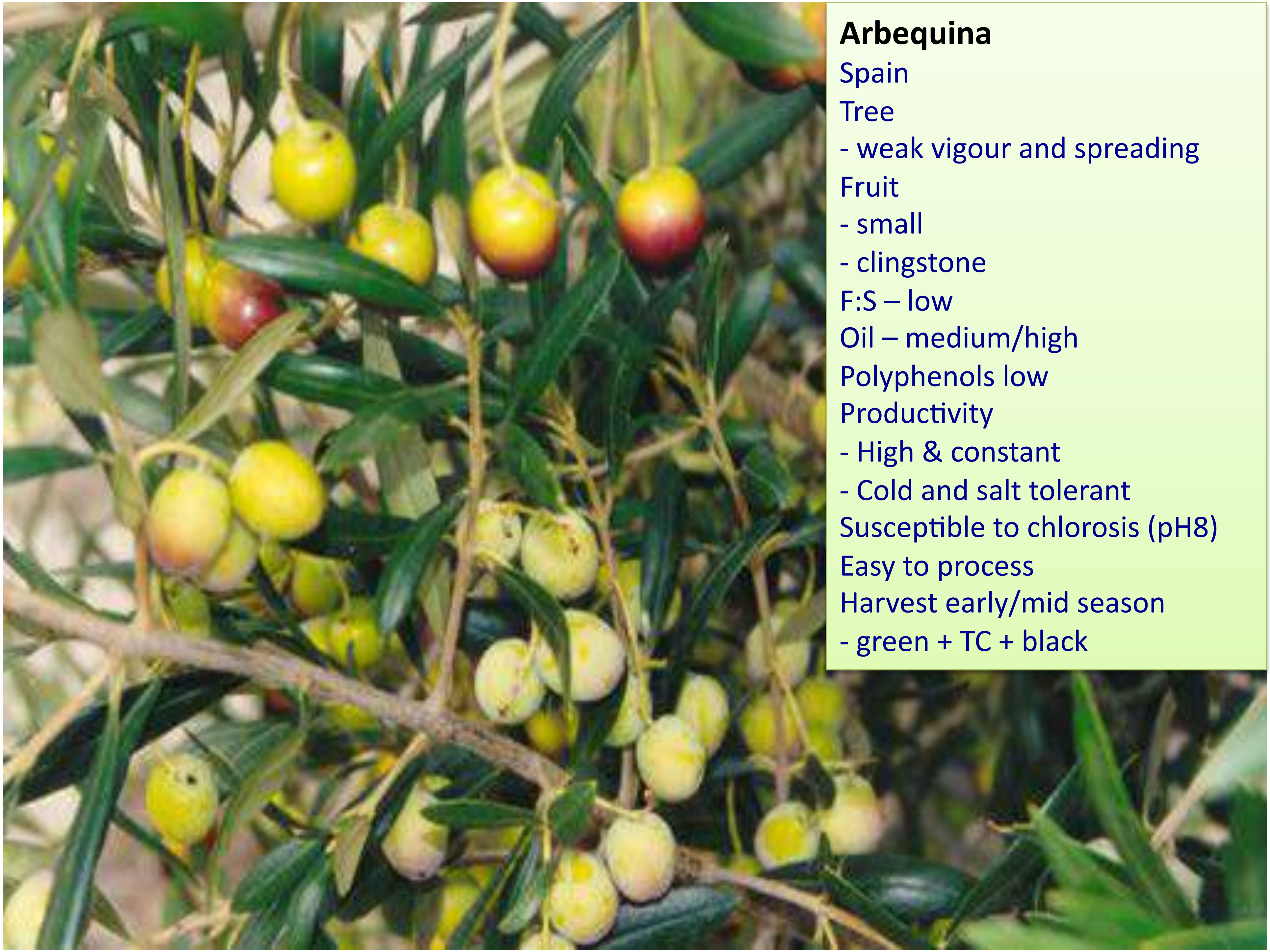
- Irrigation decreases levels
- water deficit increases levels

- Glycoside in olive flesh are increased at low latitude/ and high altitude growing sites and the opposite at high latitude and low altitude
- Glycosides decrease naturally as olive fruit ripens
- Overall reaction during processing

Bitter Glycosides → Less bitter compounds + sugar (glucose)

Olive fruit polyphenol level and colour change during the growing season





Arbequina

Spain

Tree

- weak vigour and spreading

Fruit

- small
- clingstone

F:S – low

Oil – medium/high

Polyphenols low

Productivity

- High & constant
- Cold and salt tolerant

Susceptible to chlorosis (pH8)

Easy to process

Harvest early/mid season

- green + TC + black

Ascolana Tenera

Italy

Tree – vigorous, erect

Fruit

- very large
- freestone
- F:S – very high

Oil – low/medium

Polyphenols

- firm flesh
- bruises easily

Productivity

-medium & constant

Cold tolerant

Harvest early

– green

Barouni

Tunisia

Tree – small, spreading

Fruit

- very large
- freestone
- F:S – high

Oil - low

Polyphenols - medium

Handles well

Productivity

- Medium

Cold & warm climate tolerant

Harvest mid to late season

- green, TC, black

Coratina

Italy

Tree

- medium vigour, spreading

Fruit

- medium weight
- clingstone
- F:S - medium high

Oil - high

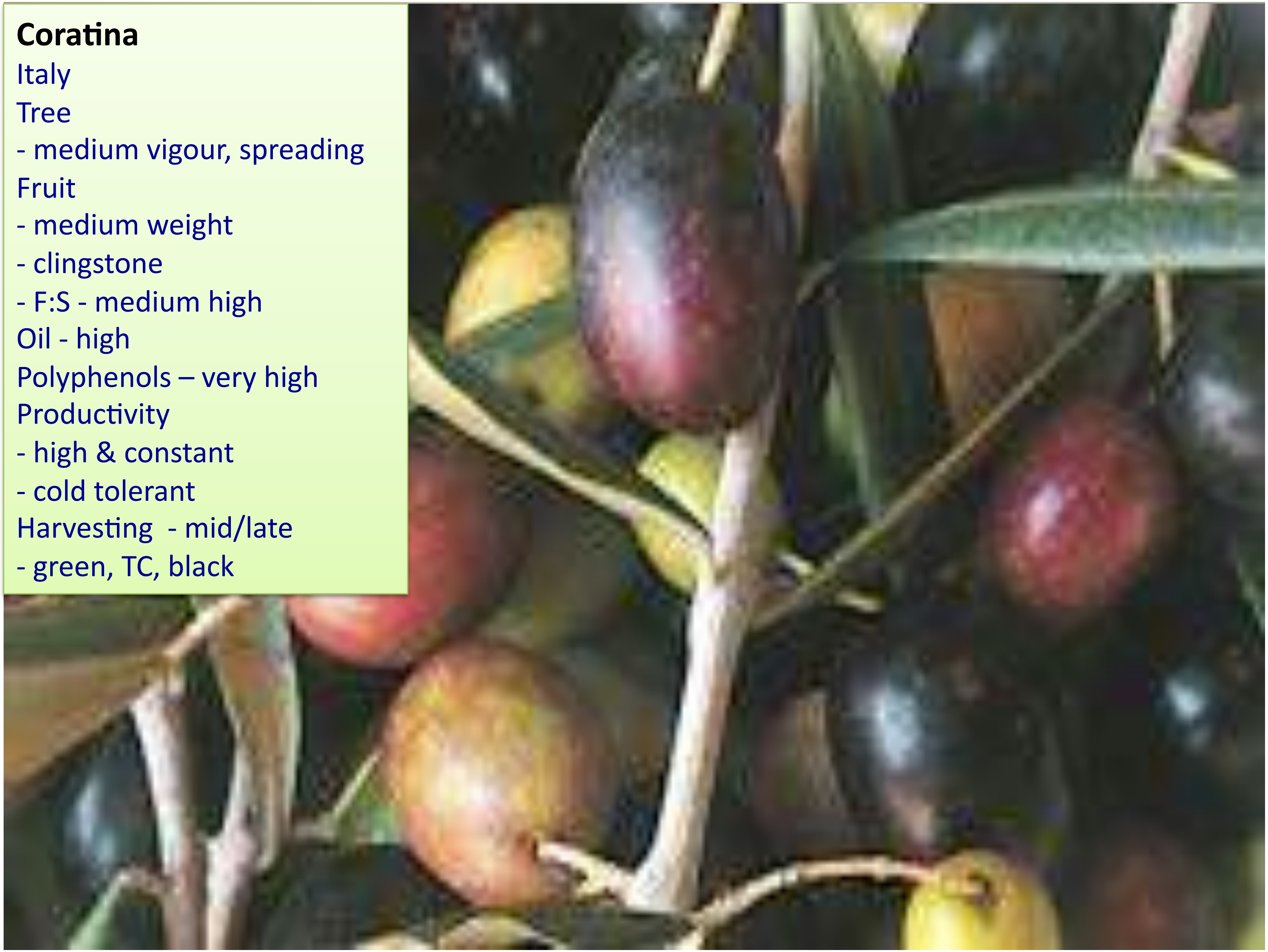
Polyphenols – very high

Productivity

- high & constant
- cold tolerant

Harvesting - mid/late

- green, TC, black



Frantoio

Numerous ecotypes

Italy

Tree

- Medium vigour, drooping

Fruit

- medium size
- clingstone
- F:S - medium

Oil - high

Polyphenols

Cold sensitive

Productivity

- high & constant

Harvest - mid/late

- green, TC, black

  or green + TC + black

Jumbo Kalamata

Origin? Cerignola

Tree – low vigour

Fruit

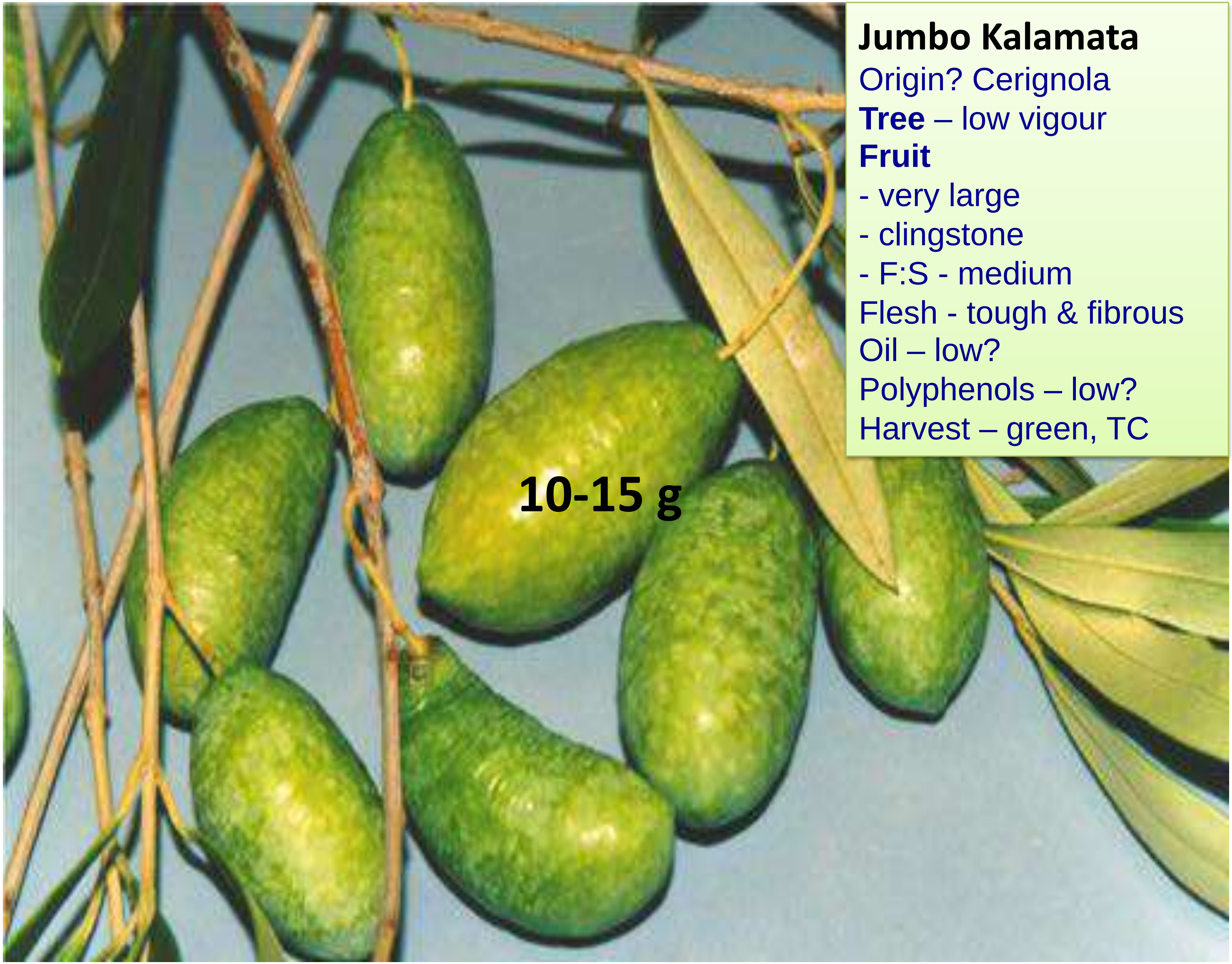
- very large
- clingstone
- F:S - medium

Flesh - tough & fibrous

Oil – low?

Polyphenols – low?

Harvest – green, TC



Kalamon (Grafted**)**

Greece

Tree – vigorous. erect

Fruit

- large
- freestone
- F:S – high

Oil - high

Polyphenol - low

Productivity

- high & alternate

Cold resistant

Harvest – intermediate/late

- green, TC, black

Dehydrated olives

- suitable

Koroneiki

Greece

Tree

medium vigour, spreading

Fruit

- Small
- F:S – low/medium

Oil – high

Polyphenol – very high

Productivity

- high & constant

Drought resistant

Cold intolerant

Harvest – early/intermediate

green, TC, black

or green + TC + black

Manzanilla

Spain

Tree

- weak/medium vigour,
- spreading

Fruit

- medium size
- freestone
- F:S medium/high
- flesh fleshy and versatile

Oil - medium

Polyphenols - high

Productivity

- high & alternate
- susceptible to chlorosis (ph8)

Harvest - early

- green, TC, black

Picual

Spain

Tree

Medium vigour, spreading

Fruit

- medium size
- clingstone
- F:S – medium/high

Oil - high

Polyphenols – very high

Productivity

- high & constant

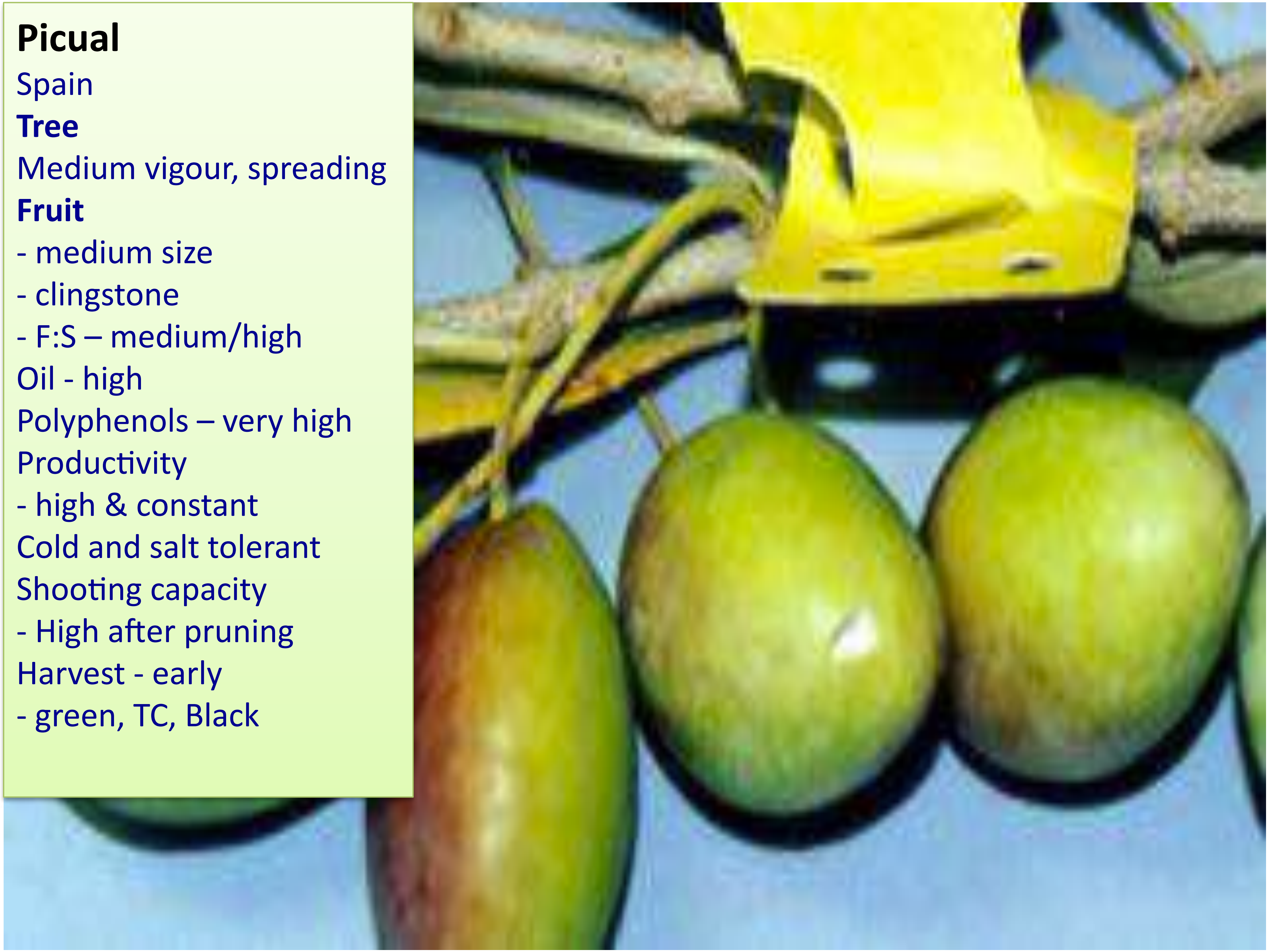
Cold and salt tolerant

Shooting capacity

- High after pruning

Harvest - early

- green, TC, Black



Leccino

Italy
Tree – vigorous, drooping
Fruit
- medium size
- Freestone
- F:S – medium
- oil – medium/high
- polyphenols - medium

Productivity
- high & constant

Cold resistant
Harvest – early ripens together
green, TC, black
Dehydrated olives - suitable

Oliva de Cerignola

Italy

Tree – medium vigour, erect

Fruit

-very large

- clingstone

- F:S – small/medium

Flesh – tough & fibrous

Demanding

Productivity

- medium alternate

Oil – low

Polyphenols- low

Cold - sensitive

Harvest early

– Green, TC

Hojiblanca

Spain

Tree -

Fruit

- large
- clingstone
- F:S – medium
- flesh - firm with good texture

Oil - high

Polyphenols - medium

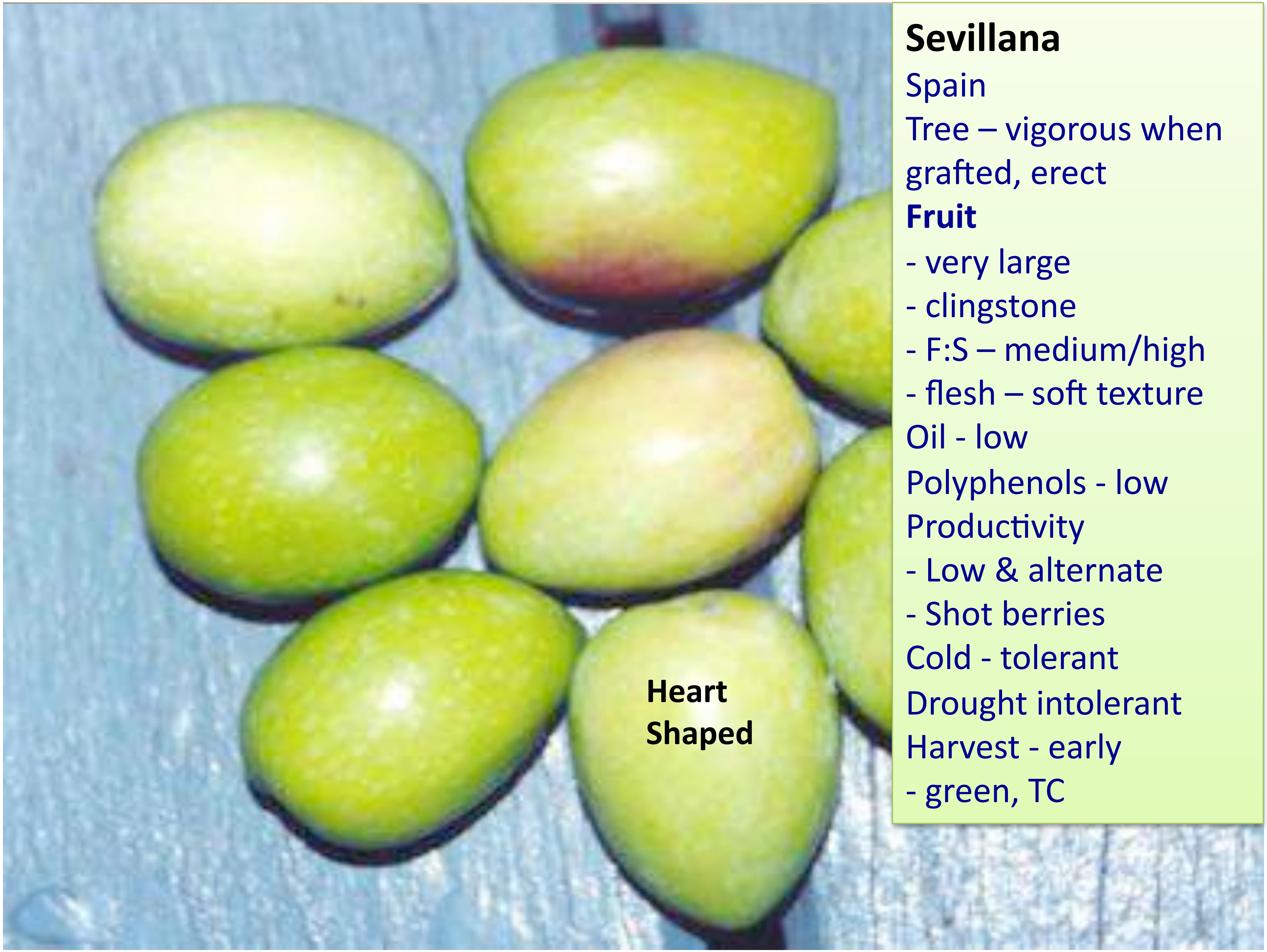
Productivity

- High and alternate

Cold & drought resistant

Harvest – mid/late

- green, TC, black



Sevillana

Spain

Tree – vigorous when grafted, erect

Fruit

- very large
- clingstone
- F:S – medium/high
- flesh – soft texture

Oil - low

Polyphenols - low

Productivity

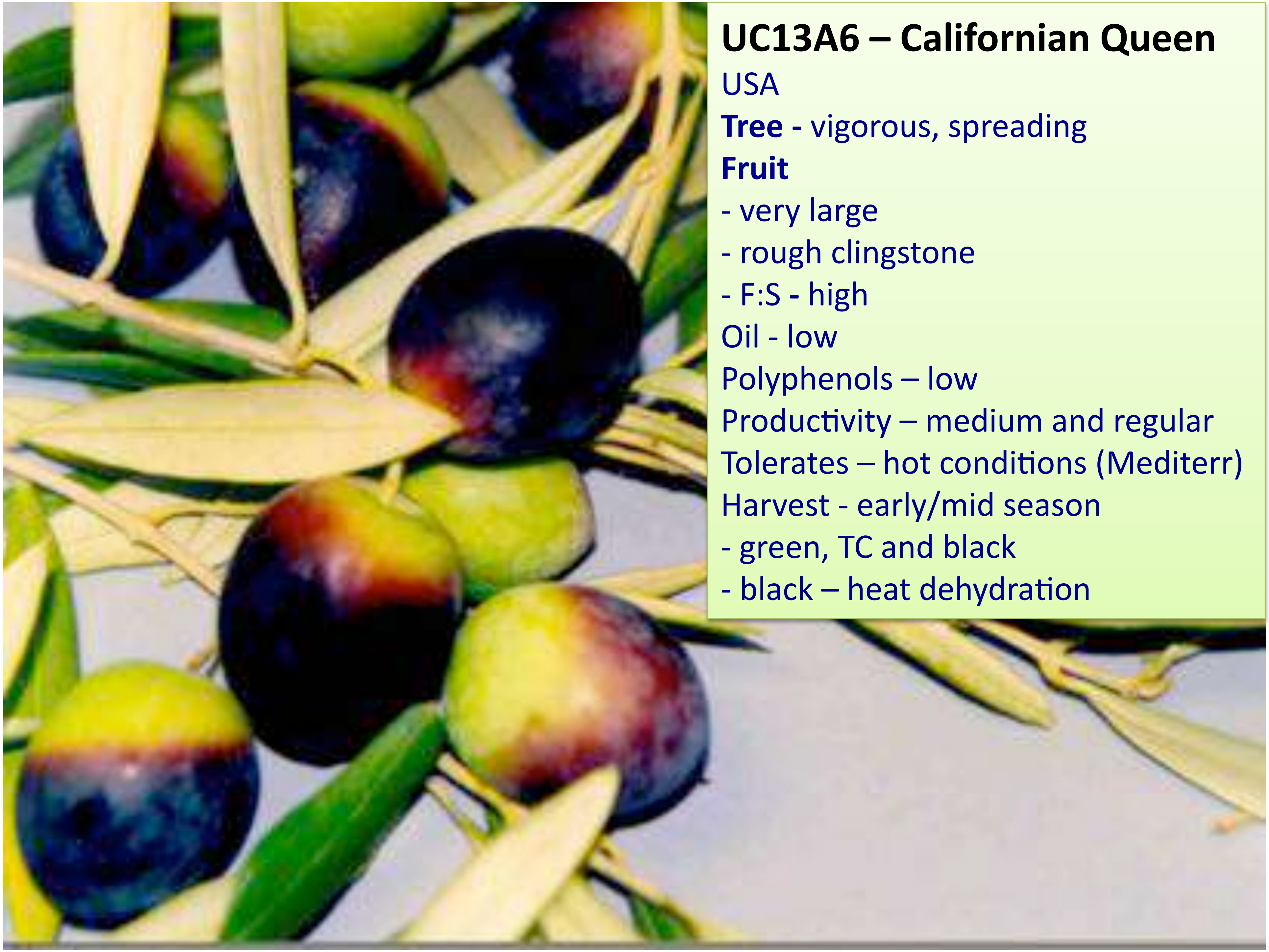
- Low & alternate
- Shot berries

Cold - tolerant

Drought intolerant

Harvest - early

- green, TC



UC13A6 – Californian Queen

USA

Tree - vigorous, spreading

Fruit

- very large
- rough clingstone
- F:S **-** high

Oil - low

Polyphenols – low

Productivity – medium and regular

Tolerates – hot conditions (Mediterr)

Harvest - early/mid season

- green, TC and black
- black – heat dehydration

Verdale

French

Tree – moderate vigour, drooping

spreading

- medium weight
- large clingstone
- F:S low/medium
- excellent texture

Oil - medium

Polyphenols -

Cold tolerant

Easy to process

Harvest – early/mid season

Green, TC

Volos (Konservolia)

Greece

Tree – vigorous and spreading

Fruit

- large
- freestone
- F:S high
- Firm and handles well

Oil – medium/high

Polyphenols - medium

Productivity

- high & alternate

Can be grown up to 600m

Easy to process (green)

Cold resistant

Sensitive to dry climates

Harvest – early/mid season

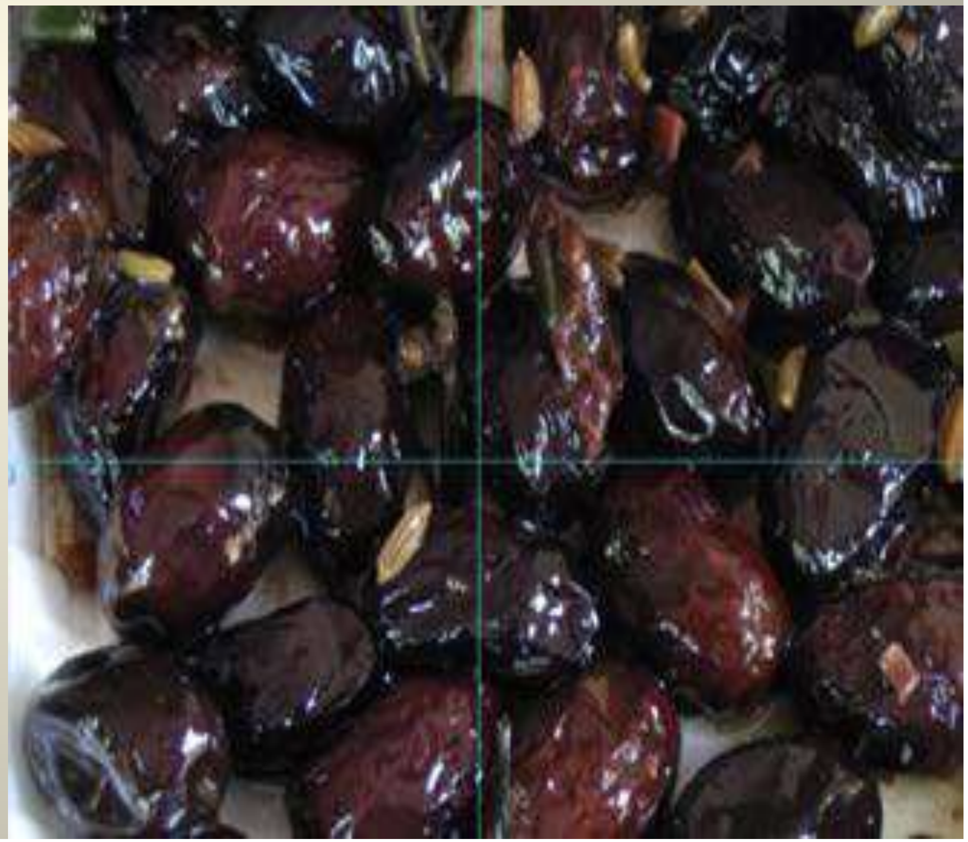
- Green, TC, black
- black can be dehydrated

BAROUNI **UC13A6** **HARDY'S MAMMOTH** **NAB TAMRI**

Olive debittering methods 1

Dehydrating

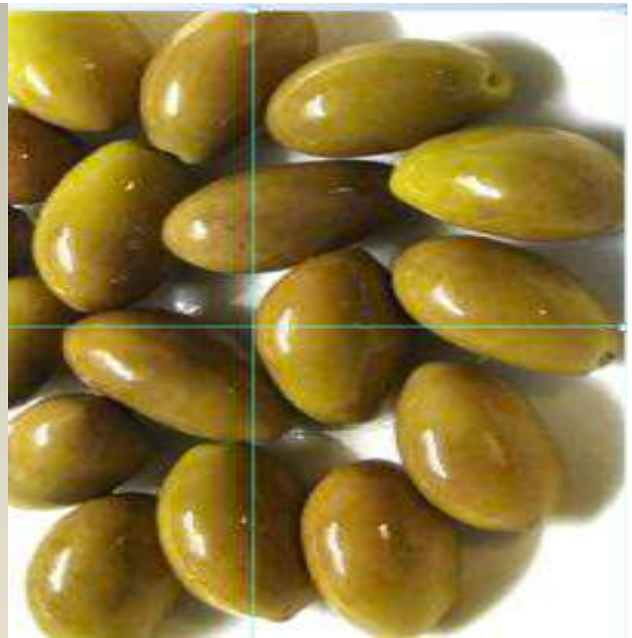
- On the tree - some olive cultivars debitter and sweeten on the tree as they ripen – Thrubolea cv. (Greece), Hurma olives Erskence cv (Turkey) - Oleuropein levels ie bitterness falls to 5% fresh weight
- Sun-dried - naturally over-ripe medium size black olives eg Leccino, Kalamon, Picual



- Heat dried - blanche in weak brine, then oven dry on trays at 50ºC for 10 – 15 hours – use olives medium size eg naturally black ripe
- Microwave dried
- Salt dried – pack olives in dry salt and continually remove water

Olive debittering methods 2

Fermentation in brine



- Place olives in 5-10% brine and allow spontaneous aerobic (naturally black ripe olives or anaerobic fermentation (with or without added culture).

Alkali treatment (treated olives)

- Green ripe olives treated with alkali, washed, then packed in acid (vinegar) brine (or citric acid) – Picholine, Castelvetrano methods
- Green ripe olives treated with alkali, washed, fermented in brine, then packed in acid brine – Spanish style green
- Green ripe/TC olives treated with alkali, washed, placed in weak brine + iron salt and aerated to develop black colour – Black ripe


Traditional TO Grove


Super High Density Grove
for TO
• Arbequina
• Frantoio
• Koroneiki
New
•
Potential advantages
• Mechanical pruning
• Easier to hand harvest

The future

Table Olive production and consumption

increase production of Australian TOs – use 10% of the olive crop
Promote Australian consumption of TOs to achieve 1.5kg/person/year
Medium term - develop export markets for Australia TOs

Environmental considerations

• Use methods requiring minimum inputs especially water for growing and processing
• Consider using environmentally acceptable containers – glass vs plastic
• Introduce innovative processing and preserving systems

Consumer and Health Aspects

• Reduce salt levels in TO products
• Promote Australian TOs as healthy, nutritious food
- Natural processing
- Healthy fats
- Fibre
- Antioxidants

Develop distinctly Australian TO products

• Acknowledge safety standards
• Adopt a wider range of cultivars

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Olive
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Institute

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