

OLIVE OIL PROCESSING COURSE

Influence of Agronomic Aspects on Olive Oil Quality



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Agronomic Aspects

Factors which are difficult to change:

- Variety.
- Environmental conditions.

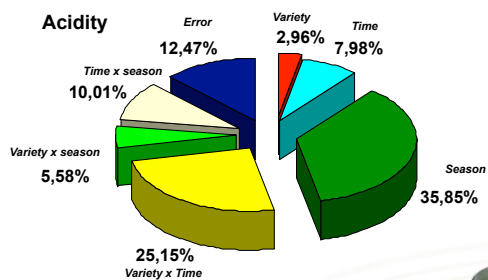
Factors which are easier to manipulate:

- Pests & diseases.
- Irrigation.
- Harvest & transport.
- Pruning.
- Fertilisation.



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Acidity

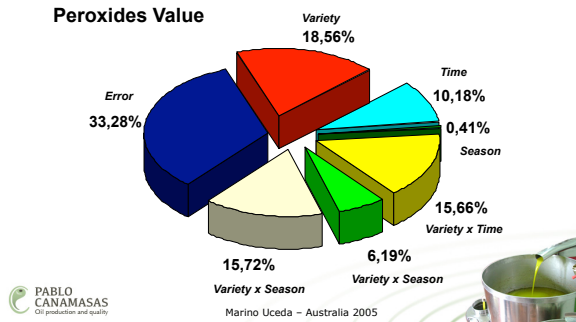


Marino Uceda - Australia 2005



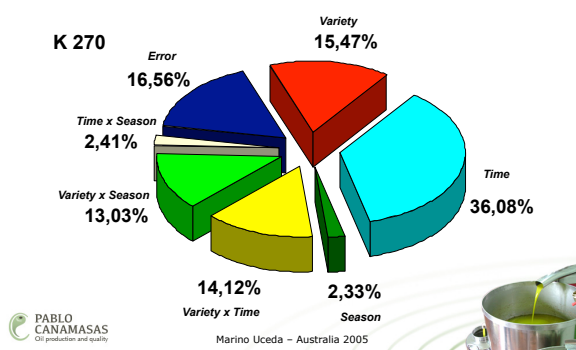
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Peroxides Value



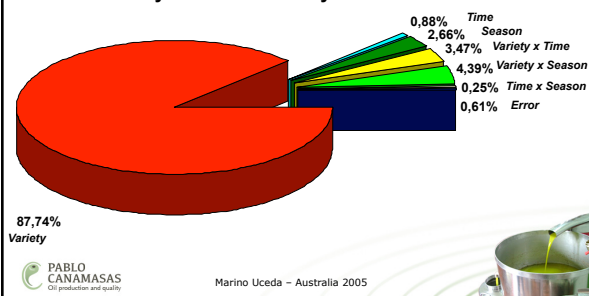
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Mono/Polyunsaturated Fatty Acids



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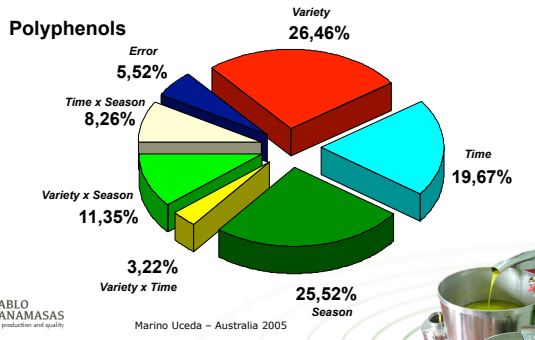
Arbequina Fatty Acid Profile in different environments

Place/Fatty Acids	C 16:0	C 18:1	C 18:2
La Rioja (Argentina)	20	52	21
Andalusia (Spain)	16	65	13
Catalonia (Spain)	13	72	10



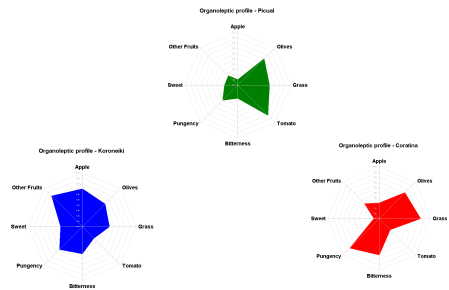
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Polyphenols



Marino Uceda - Australia 2005

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Anthracnose (Soft Nose)



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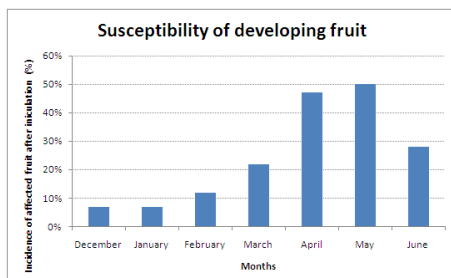
Soft Nose



- Sphaeropsis dalmatica.
- Gloeosporium olivarum.
- Alternaria sp.
- Fusarium sp.
- Cladosporium sp.
- Penicillium sp.

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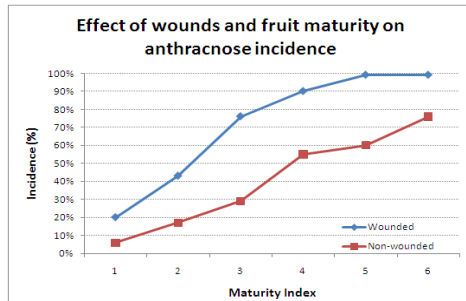
Soft Nose



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Oil production and quality

Source: Boundary Bend Olives - Australia

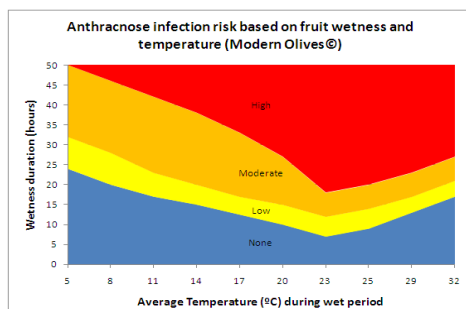
Soft Nose



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Source: Boundary Bend Olives - Australia

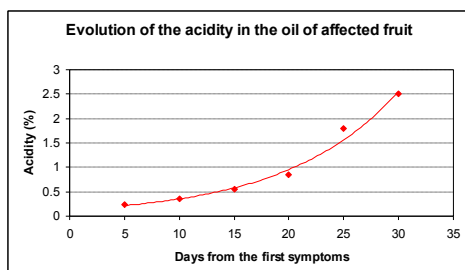
Soft Nose



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Source: Boundary Bend Olives - Australia

Soft Nose



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Oil production and quality

Source: Boundary Bend Olives - Australia

Soft Nose

- Planting resistant varieties (like Picual). Manzanillo, Frantoio and Barnea are considered to be highly sensitive to this kind of diseases;
- Chemical control with fungicides early in the ripening period, particularly if there has been some kind of physical damage (like hail). The most recommended fungicides in the Mediterranean area are copper-containing fungicides such as 0.4% mixtures of copper oxychloride (37.5%) and zineb (15%) and 2% Bordeaux mixture.
- Repeating the chemical control if the environmental conditions are suitable for secondary infections (73°F (59°F-77°F), high humidity & free water (Rain or dew));
- Harvesting as soon as possible, once the oil is completely accumulated.
- Withholding periods!



Frost Damage

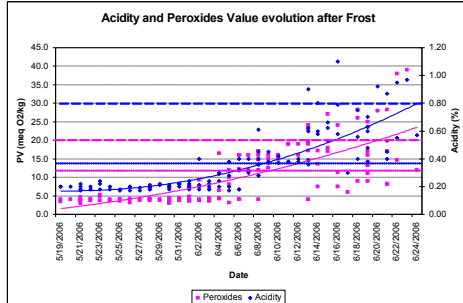


Frost Damage

- Sudden cold change will turn the olives into a brownish colour.
- Gradual cold change could lead to olive dehydration (Reversible or not).
- Both will affect the organoleptic characteristics of the oil, its acidity and peroxides value.

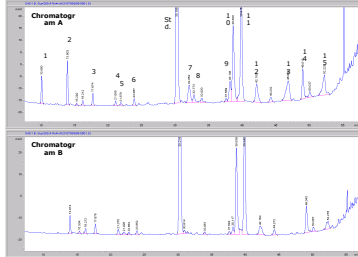


Frost Damage



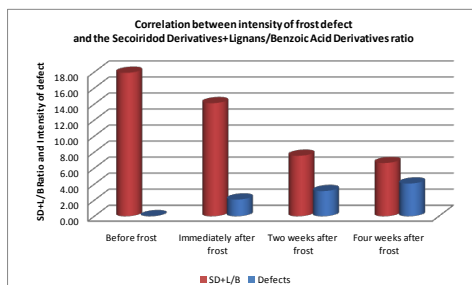
Frost Damage

HPLC chromatograms at 280 nm of phenolic extracts from before frost oil (A) and 4 weeks after frost (B)



1. Hydroxytyrosol; 2. Tyrosol;
3. Vanillic acid; 4. Vanillin; 5. p-coumaric acid; 6-
Hydroxytyrosyl acetate;
7. DDOA; 8. DAO; 9. DLA; 10.
Pinoselinol; 11. Cinnamic acid;
12. Luteolin; 13. AOA; 14.
Apigenin; 15. ALA

Frost Damage



Frost Damage

- No significant problems with chemical quality parameters up to 2-3 weeks after frost event.
- Chemical parameters significantly affected but within the EV category 4 weeks after frost event.
- Peroxides above EV limits 5 weeks after frost event.
- Acidity above EV limits 6 weeks after frost event.
- Organoleptic issues almost immediate.

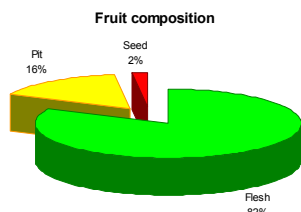


Frost Damage

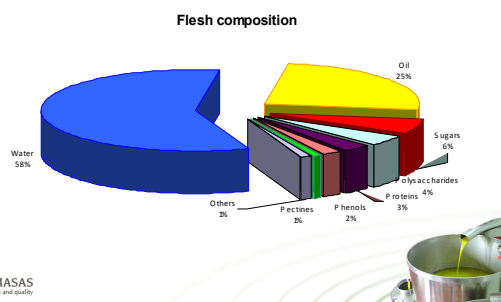
- Frost fans.
- Harvest immediately.
- Frantoio first, Barnea second and then Picual.
- Low areas first.
- Crush with large grids and low temperatures in the malaxer.
- Deodorization.



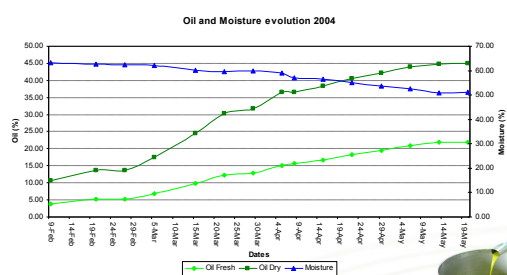
Fruit and moisture levels



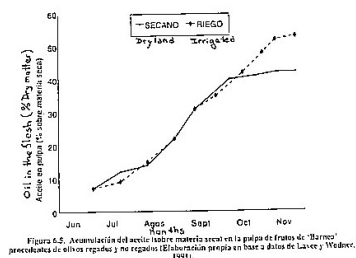
Fruit and moisture levels



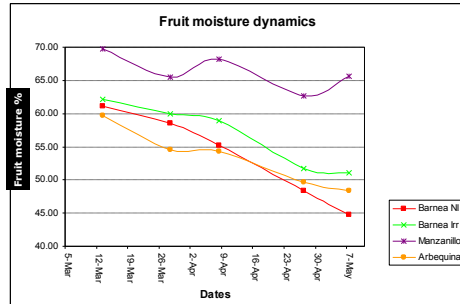
Fruit and moisture levels



Fruit and moisture levels

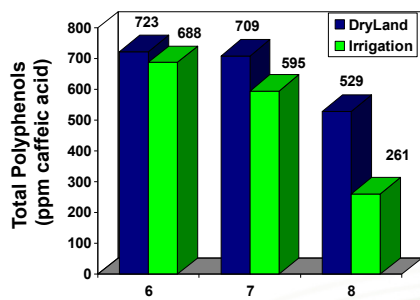


Fruit and moisture levels



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Fruit and moisture levels

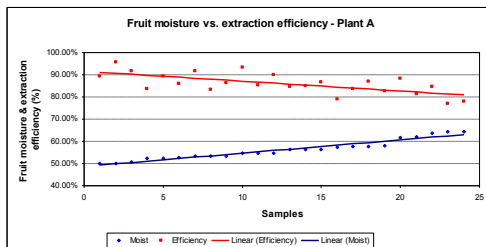


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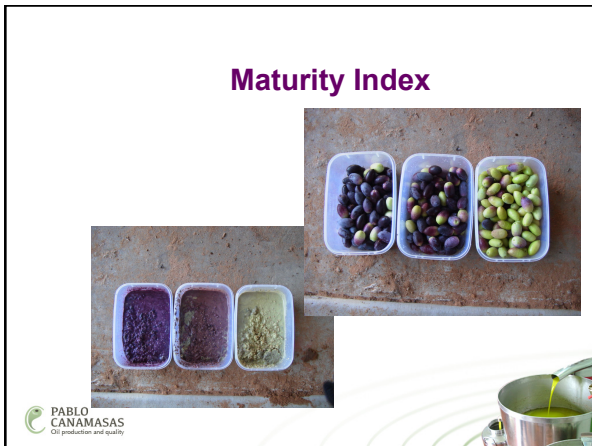
Harvesting Time

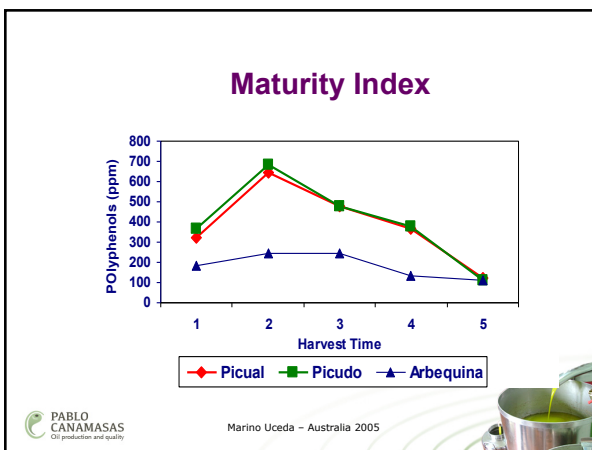
Source: Marino Uceda, 2005.

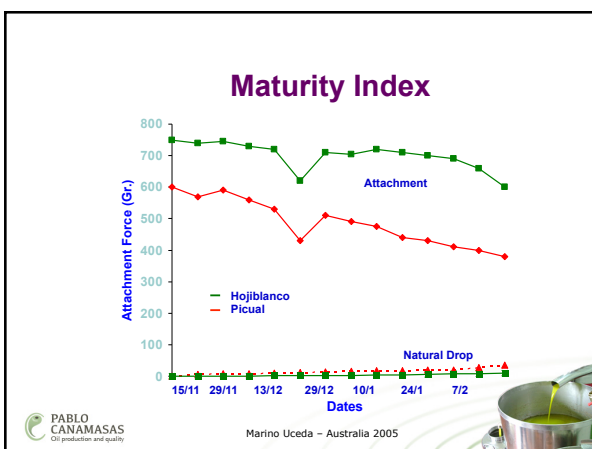
Fruit and moisture levels

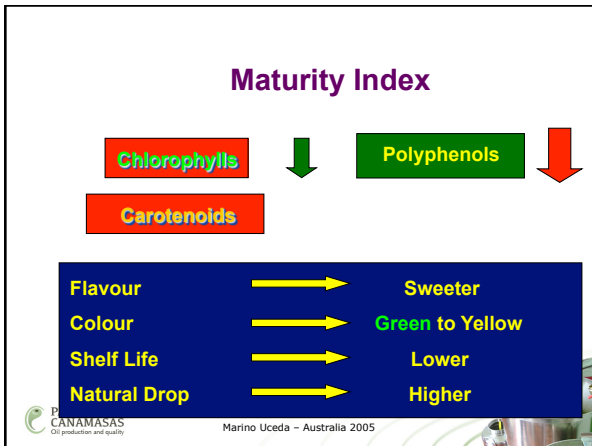


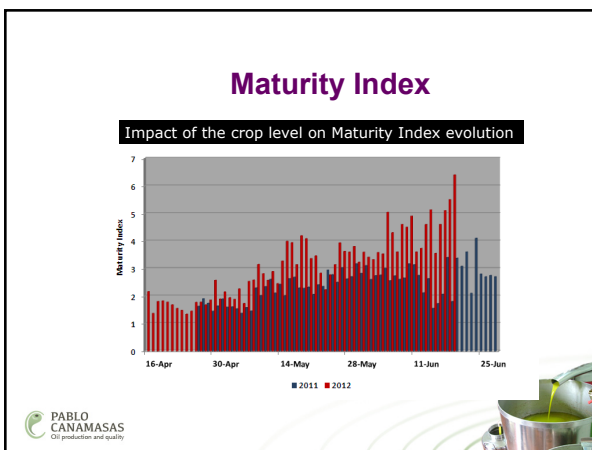
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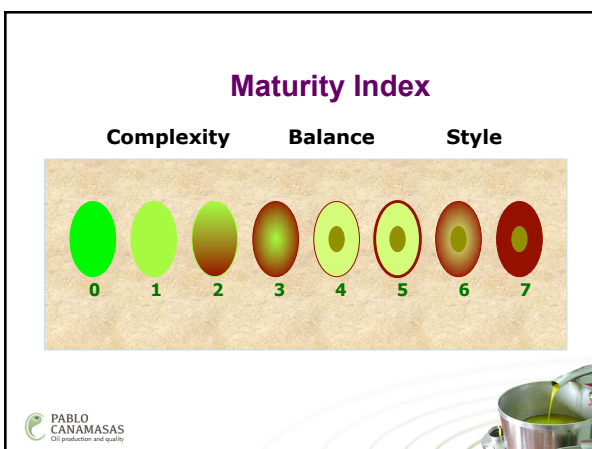






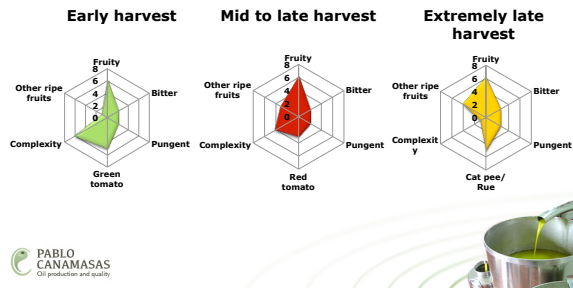






Maturity Index

Picual – Organoleptic changes



Single side shakers



Single side shakers



Side by side shakers



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Grape harvesters



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Gregoire 133



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Straddle Harvesters with Ag Right heads



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Straddle Harvesters with Ag Right heads



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Colossus



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Harvester Performance Fruit damage

Average oil acidity vs. harvester (Olive West)


Harvester	Acidity (%)
Ag-Right Heads	0.31
AOH Shaker + beaters	0.28
Colossus	0.22
Grape Harvester	0.20
Gregoire 133	0.31
Hand harvest	0.13
Sicma shaker + pneumatic rakes	0.56
Sicma shaker	0.13

The level of fruit damage needs to be evaluated!





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Source: Boundary Bend Olives - Australia



Harvester Performance MOO

PHOTO CHART FOR MATERIALS OTHER THAN OLIVES (MOO)
CLASIFICACION AT FRUIT RECEIVAL




MOO: 0 (<2.5% MOO)

MOO: 1 (2.5% - 7.5% MOO)


MOO: 2 (7.5% - 12.5% MOO)

MOO: 3 (12.5% - 17.5% MOO)



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Source: Boundary Bend Olives - Australia



Harvester Performance MOO

MOO vs. harvester (Boort Estate)

Harvester	MOO	MOO %
Grape Harvester	1.54	7.70
Gregoire 133	1.78	8.90
Coffee Harvester	1.59	7.95
Side by side shaker	1.56	7.80
Colossus	1.48	7.40



Source: Boundary Bend Olives - Australia



Materials Other than Olives (MOO)

Optimal: < 5.0% (0-1)
 Good: 5.0-15.0% (2-3)
 Dangerous: 15.0-25.0% (4-5)
 Not acceptable: > 25.0%

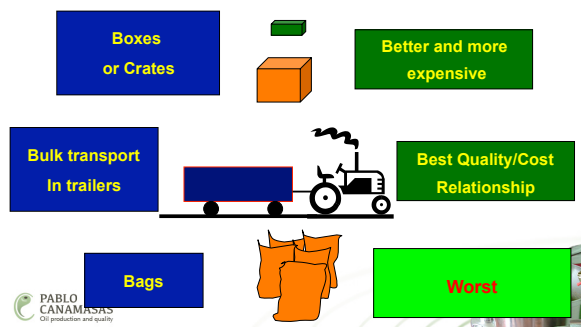
- Feedback to grove manager about harvesters.
- Avoid astringent leaf flavours in the oil (More than 1% MOO).
- Avoid problems with washing equipment.



Source: Boundary Bend Olives - Australia



Fruit Transport



Harvesting-Processing delay



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Harvesting-Processing delay

- One of the most important parameters affecting oil quality
- Fruit should be processed within 12 hours to avoid quality issues
- A delay longer than 24 hours will most likely have an impact on the oil quality
- Aerobic and anaerobic fermentations inside the fruit pile end up triggering the FFA of the oil
- Organoleptic problems = Fusty and Musty!!

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