PINOT NOIR : IS IT HOME SWEET HOME?

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Institut Jules Guyot

Founded in 1992
1st university term in 1994
Director: Dr Michèle Guilloux-Benatier

2 Sites

- University campus
- Marsannay la Côte
  Experimental center
  2.4 Ha for production
Teaching missions

- 269 students in 2013-14
- 26 permanent people
  - 14 academics
  - 11 technicians
- 40 partners of the wine and vine area
- 150 partner companies
Education

◊ University degrees

BSc (2), Master (2), Enologist graduate

◊ Continuing education

4 degrees
Research areas

- **Vine science**
  - Vine natural defenses
  - Climate viticulture relationships

- **Wine science**
  - Microbiology
  - Physical chemistry
  - Sensory analysis
Pinot noir in the world

Wine areas adapted from Jones and Schultz (2010)
Climate conditions worldwide

- From 14 to 18.5°C during the growing season (Apr. to Oct)

<table>
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<th>Country</th>
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<td>USA</td>
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</tbody>
</table>
Climate conditions worldwide

- Whole range of hydric status conditions...

Unpublished data
Pinot history, genealogy and genetics

- Origins: North-East of France Cultivated at least during the 14th century in Burgundy (Charles VI banning the Gamay southwards for Pinot N)
- No Pinot parent was ever found
- Known for a large genetic diversity
- Some varieties are mutants of Pinot
  - Rosé or Red: Pinot gris (or Beurot), Pinot meunier...

Fig. 2. Proposal for the pedigree of the Pinots and some related cultivars.

Vouillemoz et al. (2007)
Regner et al. (2000)
Ecophysiology and agronomy

• Pinot N is early

• Climate: high temperature → risks of over ripening, lower anthocyanin, wines too « soft ».

• As many red cultivar → moderate hydric deficit leads to higher brix, more anthocyanins and less acids in grapes (e.g. Spring, 2010)

• Sensitivity to leaf/fruit ratio?
  • Burgundy → AOC grand Cru : less than 45 hL/ha i.e. 6 tons / ha for 1.5 of exposed leaf area → 2.5 m² leaf / kg.
Phenology

Heat requirements
Véraison
Base 0°C temperature from March 1st
Parker et al. (2012)
Climate

- Sensitivity to high temperatures

Effect of night temperature on the color of clusters (cv. "Tokay", according to the author; probably Pinot Gris).
From Kliewer and Torres (1977)

Pinot noir, Mori et al. (2005)
Water status

- Water status and grape quality

*Pinot noir in Valais, Switzerland*
*A. Zufferey et al. (2000)*
Water status

- Water status and grape quality

*Pinot noir in Valais, Switzerland*  
Zufferey et al. (2000)
Anthocyanins

- Berries before fermentation
  - Solids extracted during fermentation
  - Wine
    - 23% of potential / berries
    - 93% of potential / berries

Tannins

- Berries before fermentation
  - Solids extracted during fermentation
  - Wine
    - 14% of potential / berries
    - 60% of potential / berries

D. Peyron
Revue Française d'oenologie
2007
Pinot from Bourgogne (Burgundy)
The terroirs of Burgundy

230 to 470 m asl (mostly around 280 m)

Sources (top & bottom pictures) : www.bejot.com, Yelkrokoyade
Burgundy: some figures

27,966 ha (3% of French vineyards)
- Whites: 15,706 ha
- Reds: 10,412 ha
- Sparkling: 1,848 ha

185.7 millions of bottles
- Whites: 60%
- Reds: 32%

100 "Appellations d'Origine Contrôlées" (477 in France)
684 "climats" (premiers crus including 33 grands crus)

3,800 wineries ("domaines viticoles")
250 trading wineries ("négoce")
23 shared wineries ("caves cooperatives")

"Grands crus" appellations: 550 ha (194 ha white – 356 ha red)

Source: BIVB
Hierarchical production system
The "Côte d'Or"

3,775 ha
89% Pinot noir
11% Chardonnay

6,013 ha
57% Pinot noir
43% Chardonnay

Source: BIVB
The "Côte d'Or": slopes...

Source: Les terroirs du Vin, Jacques Fanet
Figure 2. Carte géologique de l’appellation Marsannay.

Source: Vannier-Petit et al. (2012)
The hierarchy of terroirs

Grands Crus
1ers Crus
Communale
Régionale

Bourgogne Grand Ordinaire

Romanée-Conti
Vosne-Romanée
1er cru les Chaumes
Vosne-Romanée

Limons d'épandage
Cailloutis (plio-quaternaire)
Marnes, conglomerats et calcaires lacustres (oligocène final)
Oolithe blanche
Calcaires de Premeaux
Marnes à Ostrea acuminata (bajocien supérieur)
Calcaires à entroques (bajocien)
The hierarchy of terroirs

Hierarchical levels around the hill of Corton. The dashed area indicates the Grand Cru vineyards (credits: E. Vincent).

From: Vincent et al, 2014
Soils

From: Brillante et al. (2014), Ayachi (2010), De Ciantis (2012)

SWC from 40 to 180 mm

A « rendzine » soil

A « limestone » soil

A marl soil
Climate

Climate classified as *fading oceanic climate* by Joly et al (2010) or sub-humid cool climate with very cool nights (Tonietto, 1999; r Jones et al, 2009)
Climate

Unpublished results
Recent climate change in Burgundy

Avr. - Oct Temperature (°C)

Source: Météo-France (Homogenized data)

Bois et al, 2013 (Ampelos conference – Unpublished)
Recent climate change in Burgundy

Source: Météo-France (Homogenized data)
Recent climate change in Burgundy

Phenology from Savigny-les-Beaune and Aloxe Corton
Comparing with other regions
A good vintage in Burgundy?

Source: Guide Hachette des vins – Unpublished results
In the vineyard

- High density
- Lots of soil tillage (5 times a year)...
...and thus lots of erosion
In the vineyard

- VSP training system
- Guyot pruning (+ cordon, gobelet)
- Early shoot removal (4/5 unfolded leaves)
- Trimming when too high (10 to 30 cm over the row)
- Major diseases (from 6 to 12 spraying a year)
  - Mildews (dawy and powdery)
  - Esca
- Hand picking mostly (sometimes mandatory)
Winemaking

- In vat (20% stems, no crushing)
- Prefermentation (4-5 days, 13-14 °C)
- SO₂
- Enzymes 2 g per 100 kg of harvest (function of phenolic maturity)
- Alcoholic Fermentation
  - Indigenous yeasts
  - punching / pumping over
  - Temperature control (26-27 °C) at the end
- Devatting after 17 to 20 days
- Sedimentation with pressed wine added
- Tasting
- Barrels
  - Turbidity
  - MLF, ageing on lees (% coarse/fine lees….)
Thanks!

Acknowledgements:
- Regis Gougeon (Institut Jules Guyot)
- Michèle Guillox-Bénatier (Institut Jules Guyot)
- Luca Brillante (Université de Bourgogne)
- Greg Jones (South Oregon University)
- Alain Carbonneau (Montpellier SupAgro)
- BIVB (funding)