Viticulture in Switzerland and Integrated Production of grape

Olivier Viret

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VITICULTURE IN SWITZERLAND
Switzerland

Rolling hills, large plateau, lakes, valleys and mountains

Area: 41’000 km² (16.3x < France)
Altitude: 195 m - 4634 m

- Forest ~30%
- Unproductive ~25%
- permanent snow, glacier, rocks...
- Agriculture ~24%
- Viticulture 0.3%
- Grassland ~13%
- Cities, infrastructures ~7%
Viticulture in Switzerland

15’000 ha, economical value approx. 500 mio. Frs
145’000 ha cereals: approx. 400 mio. Frs
Viticulture in Switzerland

- Organic production: < 2 % area
- Integrated production: >85 % area
Production structures

33,000 grape growers

~ 6000 (5'730) wine producing companies
- 20% < 1 ha
- 54% 1 to 15 ha
- 7% >50 ha

~27,000 part time growers (12'500 in Valais)

Valais
- ~ 5000 ha (33% of the Swiss vine growing area)
- mean size plot: 440 m²
- mean surface run by a grower: 3800 m²
- 3.8% of the winegrowers own more than 1 ha
### Viticulture of diversity

15’000 ha: 90 varieties (>1ha), in total 200 varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chasselas</td>
<td>3’995 ha</td>
</tr>
<tr>
<td>Müller-Thurgau</td>
<td>481 ha</td>
</tr>
<tr>
<td>Sylvaner (Johannisberg)</td>
<td></td>
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<tr>
<td>Chardonnay</td>
<td></td>
</tr>
<tr>
<td>Marsanne (Ermitage)</td>
<td></td>
</tr>
<tr>
<td>Pinot gris</td>
<td></td>
</tr>
<tr>
<td>Pinot blanc</td>
<td></td>
</tr>
<tr>
<td>Sauvignon blanc</td>
<td></td>
</tr>
<tr>
<td>Savagnin blanc</td>
<td></td>
</tr>
<tr>
<td>(=Païen oder Heida)</td>
<td></td>
</tr>
<tr>
<td>Rèze</td>
<td></td>
</tr>
<tr>
<td>Humagne blanc</td>
<td></td>
</tr>
<tr>
<td>Petite Arvine</td>
<td></td>
</tr>
<tr>
<td>Amigne</td>
<td></td>
</tr>
<tr>
<td>Charmont</td>
<td></td>
</tr>
<tr>
<td>Doral</td>
<td></td>
</tr>
<tr>
<td>Pinot noir</td>
<td>4’330 ha</td>
</tr>
<tr>
<td>Gamay</td>
<td>1’470 ha</td>
</tr>
<tr>
<td>Merlot</td>
<td>1’068 ha</td>
</tr>
<tr>
<td>Cabernet franc</td>
<td></td>
</tr>
<tr>
<td>Cabernet Sauvignon</td>
<td></td>
</tr>
<tr>
<td>Syrah</td>
<td></td>
</tr>
<tr>
<td>Bondola</td>
<td></td>
</tr>
<tr>
<td>Humagne rouge</td>
<td></td>
</tr>
<tr>
<td>Cornalin</td>
<td></td>
</tr>
<tr>
<td>Gamaret</td>
<td>404 ha</td>
</tr>
<tr>
<td>Garanoir</td>
<td>215 ha</td>
</tr>
<tr>
<td>Diolinoir</td>
<td>116 ha</td>
</tr>
<tr>
<td>Carminoir</td>
<td>(Pinot noir x Cab. Sauv.)</td>
</tr>
<tr>
<td>Galotta</td>
<td>(Ancellotta x Gamay)</td>
</tr>
<tr>
<td>Mara</td>
<td></td>
</tr>
<tr>
<td>Divico</td>
<td>(Gamaret x Bronner) ...</td>
</tr>
</tbody>
</table>

...
Viticulture of diversity

>1 ha: >90 varieties,
>10 ha: 48 varieties,
>100 ha: 17 varieties
>500 ha: 4 varieties (Pinot noir, Chasselas, Gamay, Merlot)
>1000 ha: 4 varieties (Pinot noir, Chasselas, Gamay, Merlot)
Main varieties of Switzerland

Source: l’année viticole 2012, rapport OFAG
White specialities

80 white specialities

- Pinot gris
- Arvine (petit)
- Sauvignon blanc
- Savagnin blanc
- Pinot blanc
- Gewürztraminer
- Marsanne bl
- Muscat blanc
- Amigne
- Viognier
- Doral
- Humagne blanc
- Aligoté
- Rauschling
- Kerner

Source: l’année viticole 2012, rapport OFAG
Red specialities

120 red specialities

Source: l'année viticole 2012, rapport OFAG
Wine consume in Switzerland and competition

Reality of a viticulture under alpine conditions

<table>
<thead>
<tr>
<th>2012 (millions hl)</th>
<th>Red</th>
<th>White</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(% compared to 2011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total consume wine in Switzerland</td>
<td>1.8 (-1.9%)</td>
<td>0.8 (-2.8%)</td>
<td>2.6 (-2.2%)</td>
</tr>
<tr>
<td>Consume of Swiss wines</td>
<td>0.5 (-4.3%)</td>
<td>0.46 (-2.5%)</td>
<td>0.97 (-3.5%)</td>
</tr>
<tr>
<td>Consume of foreign wines</td>
<td>1.33 (-1%)</td>
<td>0.37 (-3.2%)</td>
<td>1.7 (-1.5%)</td>
</tr>
<tr>
<td>Inland production</td>
<td>0.5 (-13.4%)</td>
<td>0.49 (-7.1%)</td>
<td>1.0 (-10.4%)</td>
</tr>
<tr>
<td>Market part of Swiss wines</td>
<td>27.6 %</td>
<td>56%</td>
<td>37.3%</td>
</tr>
</tbody>
</table>

Source: l’année viticole 2012, rapport OFAG
Swiss wine production (hl)

Source: l’année viticole 2012, rapport OFAG
Wine consume in Switzerland (hl)

Source: l’année viticole 2012, rapport OFAG

IOBC-WPRS Meeting | Integrated protection and production in viticulture
Olivier Viret, Ascona, 14-17 October 2013
## Competition and production costs

<table>
<thead>
<tr>
<th>Pruning, trellising system</th>
<th>Hours / ha</th>
<th>SFr. / ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>«Gobelet» not mechanised</td>
<td>1180</td>
<td>&gt;50’000.</td>
</tr>
<tr>
<td>Narrow rows, weak mechanisation</td>
<td>840</td>
<td>&gt;40’000.-</td>
</tr>
<tr>
<td>Terraces, weak mechanisation</td>
<td>690</td>
<td>37’000</td>
</tr>
<tr>
<td>Terraces, tractor</td>
<td>639</td>
<td>34’000</td>
</tr>
<tr>
<td>Trellised vine, highly mechanised</td>
<td>434</td>
<td>30’000</td>
</tr>
<tr>
<td>California, Australia, Chili, Argentina, South Africa...</td>
<td>100-200</td>
<td>5000 - 10’000</td>
</tr>
</tbody>
</table>

*Source: Frais de production en viticulture, résultats technico-économiques 2010, Agridea*
Competition and production costs

Source: www.diapo.ch (R. Colombo)
Competition and production costs
RESEARCH – Agroscope centers

Pully
Viticulture
(breeding, national grape collection, micro-vinification)

Changins
Field crops
Plant protection
Viticulture and enology

Leytron & Chamoson
Viticulture

Stäfa
Viticulture

Wädenswil
Vegetable Fruits
Viticulture, enology

Gudo
Viticulture

Cugnasco
Viticulture

IOBC-WPRS Meeting | Integrated protection and production in viticulture
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Climate

Reference mean values 1981-2010 (MétéoSuisse)

- **Changins (Nyon):**
  - Temperature: 10.2°C
  - Precipitation: 998 mm
  - Hours: 1844 h

- **Sion:**
  - Temperature: 10.1°C
  - Precipitation: 603 mm
  - Hours: 2093 h

- **Wädenswil:**
  - Temperature: 9.5°C
  - Precipitation: 1390 mm
  - Hours: 1595 h

- **Cadenazzo:**
  - Temperature: 11.4°C
  - Precipitation: 1832 mm
  - Hours: 2102 h
INTEGRATED PRODUCTION

- Since the 70th in Switzerland pioneer country for integrate production leaded by Agroscope
- 1993: creation of a national IP organisation (Vitiswiss) for grape production and of the label “Vinatura” (www.vinatura.ch)
- Since 1993: financial support by the State government “requested ecological contributions” for the environment
- High technical requirements for the growers in accordance with the IOBC guidelines (1993 / 2004)
- Technical commission updates the requirements based on the recent scientific knowledge
- Since 2003, certification of Vitiswiss
- 2013: Integrated Production applied on >85% grape growing area

Vinatura, a label for the environment and for high quality wines
Vitiswiss
Federation of the vine-growing areas

GERMAN PART
ZH, SH, AG,
GR…: 2630 ha

IP 3 LAKES
BE, NE, FR:
932 ha

VITIPLUS
VD: 3810 ha

VITIPIGE
GE: 1437 ha

VITIVAL
VS: 5000 ha

FEDERVITI
TI: 1060 ha

Federation of the vine-growing areas
3 levels of requirements for the growers

- Control by expert-growers from other areas
- Supplementary ecological efforts specific to the climatic conditions of the area
- Since 2011, technical commission for enology concept for sustainable viticulture in elaboration
Benefits of integrated production

Control of major insects and mites

✓ Biological control of mites
  Result: absence of acaricides to control *P. ulmi* and *T. urticae*

✓ Mating disruption to control grape berry moths
  Result: > 60% of the growing area without insecticides
Benefits of integrated production

Control of fungal diseases

Plasmopara viticola

Erysiphe necator

Pseudopezicula tracheiphila

Phomopsis viticola

Guignardia bidwellii

Botrytis cinerea
Control of fungal diseases

- Control of fungal diseases on *Vitis vinifera* varieties: a must to produce quality grape
- Average number of sprays in Europe: 10-12 fungicide applications
- Week acceptance at the ecological, political, societal, and economical levels
Control of fungal diseases

Objective: ecologically and economically sustainable production of grape

- Reduction of inputs and high quality grapes and wines

France: “Grenelle de l’environnement” 50% reduction of the uses of pesticides

Worldwide: >95% of the growing area planted with sensitive *Vitis vinifera*

1. Precise use of fungicides:
   - Forecasting models
   - Leaf area adapted dosage
   - Choice of active ingredients
   - Calibration of the sprayers

2. Elicitors, antagonists, natural products

3. Breeding resistant cultivars

www.agrometeo.ch

cv. Chasselas
cv. Solaris
# Impact of IP on use of fungicides

<table>
<thead>
<tr>
<th>STRATEGIES</th>
<th>IMPACT</th>
<th>NUMBER OF SPRAYS (N=12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Integrated production</td>
<td>10 - 30%</td>
<td>- 2 à 4</td>
</tr>
<tr>
<td>2. Agrometeo, disease forecasting *</td>
<td>10 - 30%</td>
<td>- 1 à 4</td>
</tr>
<tr>
<td>3. Crop adapted dosage*</td>
<td>20 - 30%</td>
<td>0</td>
</tr>
<tr>
<td>4. Resistant cultivars</td>
<td>75 – 100 %</td>
<td>- 8 à 12</td>
</tr>
</tbody>
</table>

*Mean values over 10 years of field experiments Agroscope
Breeding resistant cultivars

- Use of resistance genes from other Vitaceae already transferred by cross-breeding in some V. vinifera showing high level of resistance (Bronner, Solaris, Seyval blanc…)

- Classical crossings and selection based on metabolites (phytoalexins, callose)
Resistance to Botrytis

- Gamaret registered 1980: the most planted variety in the past 6 years in Switzerland
- 2009: Gamaret adopted in the national French list of varieties
- 6 new red varieties registered (Gamaret, Garanoir, Mara, Diolinoir, Carminoir, Galotta)

- Botrytis resistance confirmed and durable

Gamaret (1970)  Gamay x Reichensteiner
Garanoir (1970)  Gamay x Reichensteiner
Galotta (1981)  Ancellotta x Gamay
Carminoir (1982)  Pinot noir x Cabernet sauvignon
Resistance to mildews

Since 1996

✓ 55 different crosses
✓ 896 individuals retained after phytoalexins profiles and field observation
✓ 33 cultivars (30 red, 3 white) at the 20 plants level for winemaking
✓ 13 cultivars in larger experimental plots
Divico first multi-resistant variety

- Resistant to downy mildew and Botrytis, weak sensitivity to powdery mildew
- High qualitative potential for blended or cultivar’s wines
- Wine type as Gamaret intensely coloured, dark violet
- Bouquet dominated by red fruits and berries, fine aromas
- Powerful, tannin-rich wine dominated by soft tannins and a complex taste

Divico (Gamaret x Bronner)
Thank you for your attention

and….enjoy Swiss wines