Breeding programs: the new role of IFV and Geno-Vigne® as a national technical institute

Laurent Audeguin, Loïc Le Cunff

IFV, Domaine de l'Espiguette, 30240 Le Grau du Roi, France
Géno-Vigne, INRA - SupAgro, 2 place Viala, 34060 Montpellier, France
Geno-Vigne® is a technical unit
Joining together Montpellier SupAgro, INRA DAAV team and IFV

Dedicated to characterization of Genetic resources 2008 - 2013
Involved in breeding programs 2013 - 2018
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Budget: **13,5 millions €**

Head Office: **Le Grau du Roi**

+/- 20 locations

Staff: +/− **150**

**Official Technical Agricultural Institute**

Research and Development for the Wine and Nursery Industries

**IFV**: Technical Institute, R & D, « from the genes to the bottle »
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Important progress with Clonal Selection

Cabernet-Sauvignon clones
Napa Valley, CA
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But Clonal Selection is now reaching some limits...and threats!

DM on tendrils of Grenache

GWSS

Threats

Limits
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Political, Environmental and Societal Context
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**Current regulation with new plant material**

Regulation distinguishes:** possibility of marketing plant material** = **REGISTRATION**
**authorization to produce and market wine** = **CLASSIFICATION**

- ✓ **REGISTRATION in the CATALOG**
  Vine section of the CTPS (Permanent Technical Committee of Selection).

- ✓ **CLASSIFICATION**
  Admission to the wine classification can be of two types:
  
  **Temporary**
  can be planted for experimentation with limitations (ha, area...) – 10 years max

  **Definitive**
  can be marketed (wines without GI, ...)
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Anticipating tomorrow's grape varieties

`Absorption’ crossings
« something familiar »

Resistant genitor (pyramidal)

- Resistant
- Standard/ poor quality

Emblematic varieties (Vitis vinifera L.)

- Quality & typicality
- Susceptible to most diseases

New resistant varieties

- durable resistance to P. and D. mildew
- Quality et typicality adapted to wine industry

Source: Ch. Schneider
Launching of regional programs in 2013: key points

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Stage 1:
Phenotyping I + multiplication
3 to 4 years

- 2000 seeds
- 1 plant / genotype
- in greenhouse
- +/- 160 individuals selected
- 5 to 10 plants / genotype
- 0.3 ha

Stage 2:
Phenotyping II
6 years

- 20 to 25 individuals selected
- 90 plants / genotype
- 0.3 ha
- 2 locations

Stage 3:
VCU
2 site tests
6 years

+ DUS test

- 20 to 25 individuals selected

Financial support
Local wine industry

Resistance donators: Run1-Rpv1 Ren3-Rpv3 / Run1-Rpv1 Ren3.2-Rpv10 / Run1-Rpv1-Ren3-Rpv8

3 to 5 new varieties
Approx. 100,000 seeds produced, 1,500 genotypes in stage 2.
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Why choosing Cabernet franc and Petit Verdot?

- Cab franc: father of Cab-Sauv and Merlot
- No genetic links: diversity
- Both less subject to GTD?
- P Verdot: late ripening, high TA, color +++

Progeny of Cab franc, photo Claire Deschodt
Progeny of Petit Verdot, photo Claire Deschodt

Trying to anticipate and get prepared to GW?
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IFV:
Collection of resistant genotypes
Pollen donator
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Cab franc in Espiguette collection

Seeds pick up and sorting

Next January: starting germination in glasshouse
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Marker assisted selection of the offsprings:
Right parents?
QTLs of resistance?
Hermaphroditism?
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Transfer in green house
Trellising
Removal of laterals
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Maintenance during Stage 2
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Nursery field
Espiguette IFV

Planting March 2018
Stage 2 INRA
Approx 5 vines per candidate genotype

Stage 2 INRA, June 2018
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What’s next...?

**Pre-breeding** programs at EU and World Levels for PMDM

Introduction of **additional resistances** (ie black rot, ...)

Importation or/and seeking for **new sources of resistance** : .......Pierce’s Disease, GTD ?...

**Large database** (1500 candidate genotypes)

**Mutualization** (« recycling » or providing genotypes to small vineyards ?)
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Wine industry facing new challenges as never ...
(since 1863: Phylloxera era)

Thanks for your attention!

Schneider C., Merdinoglu D., This P.

Boursiquot J.M.

Bloy P., Lamblin P., Moisy C.

Photo Akbar Jahid, Afghanistan
Sayed Salahuddin, Washington Post