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Economic issues and perspectives on innovation in new resistant grapevine varieties

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INRA
SCIENCE & IMPACT

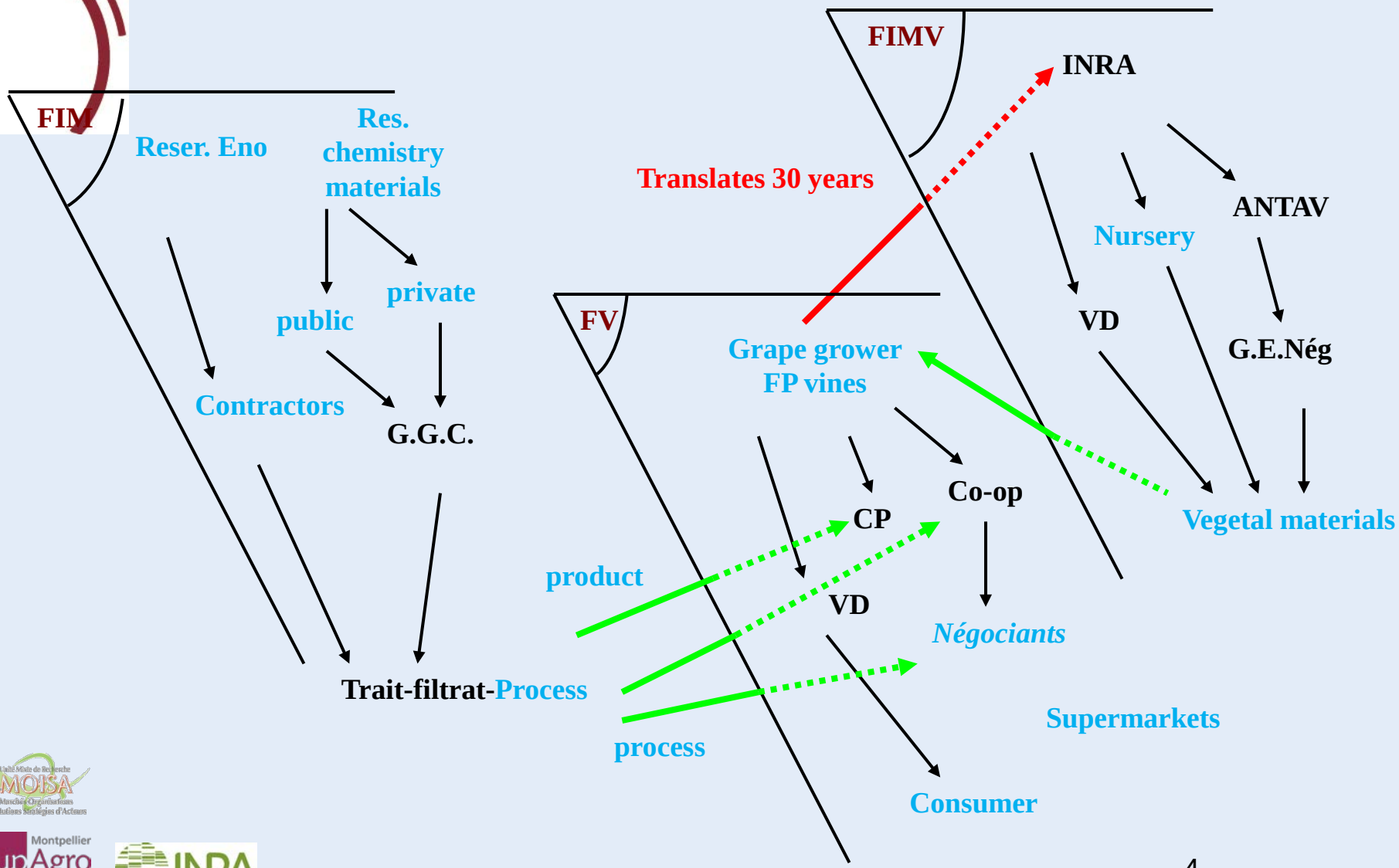
Problem statement

- *Does technological innovation matter in the wine chain?*
- *What's at stake with new vine resistant varieties ?*
- *What can an economic analysis bring to technological change ?*
- *How to assess the challenges ?*

New vine varieties context

1. Change of paradigm
   - Higher yields, sugar content
2. Scientific controversies
   - monogenics and polygenics
3. New interfaces of genetic selection, biotechnologies and new cultural techniques
4. A social demand: (ecophyto plan 2018)
   - Reduced costs of fungicides treatments (powdery mildew and mildew/70% of global vineyard treatments).
   - Reducing the use of pesticides -50% during 2008-2018?

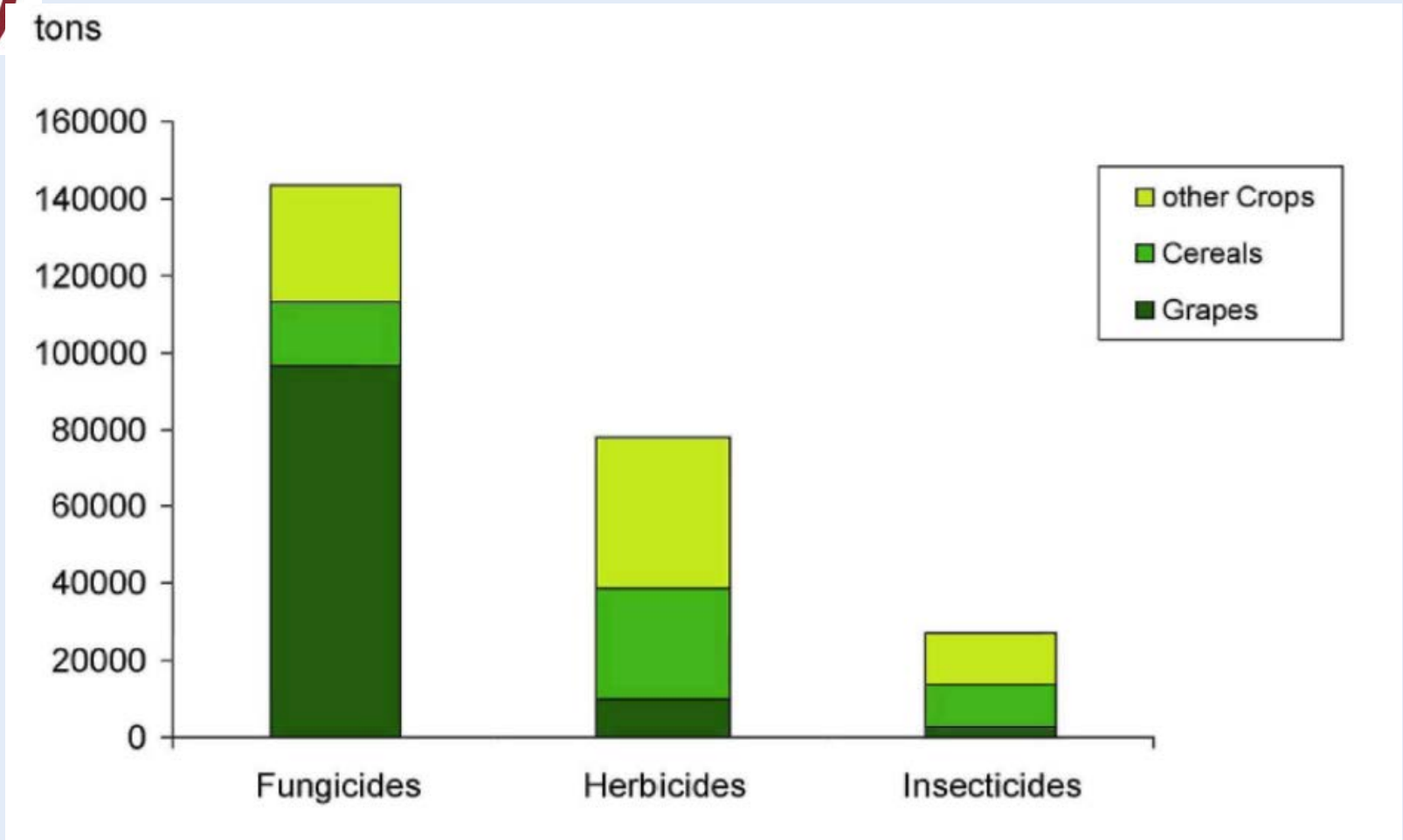
Filières d'innovation
Innovation chains



Outline

1. Introduction
   1. New vine varieties context
   2. Filières d'innovation
2. Societal demand
3. Delays & gaps : Marselan & co, examples
4. Existing varieties & programs : French & Foreign
5. Concluding remarks

Application of Plant Production Products in EU 15 (1992-1996)



SOURCE . – COMMISSION OF THE EUROPEAN COMMUNITIES, 2003, P. 6

Esca : grapevine trunk disease.

Risks & Phytosanitary treatments

- Growing awareness of the environmental needs
- Sodium arsenate prohibited 2001
- Under estimating health risks by pesticide applicator

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The 1956 French breeding program = paradigm

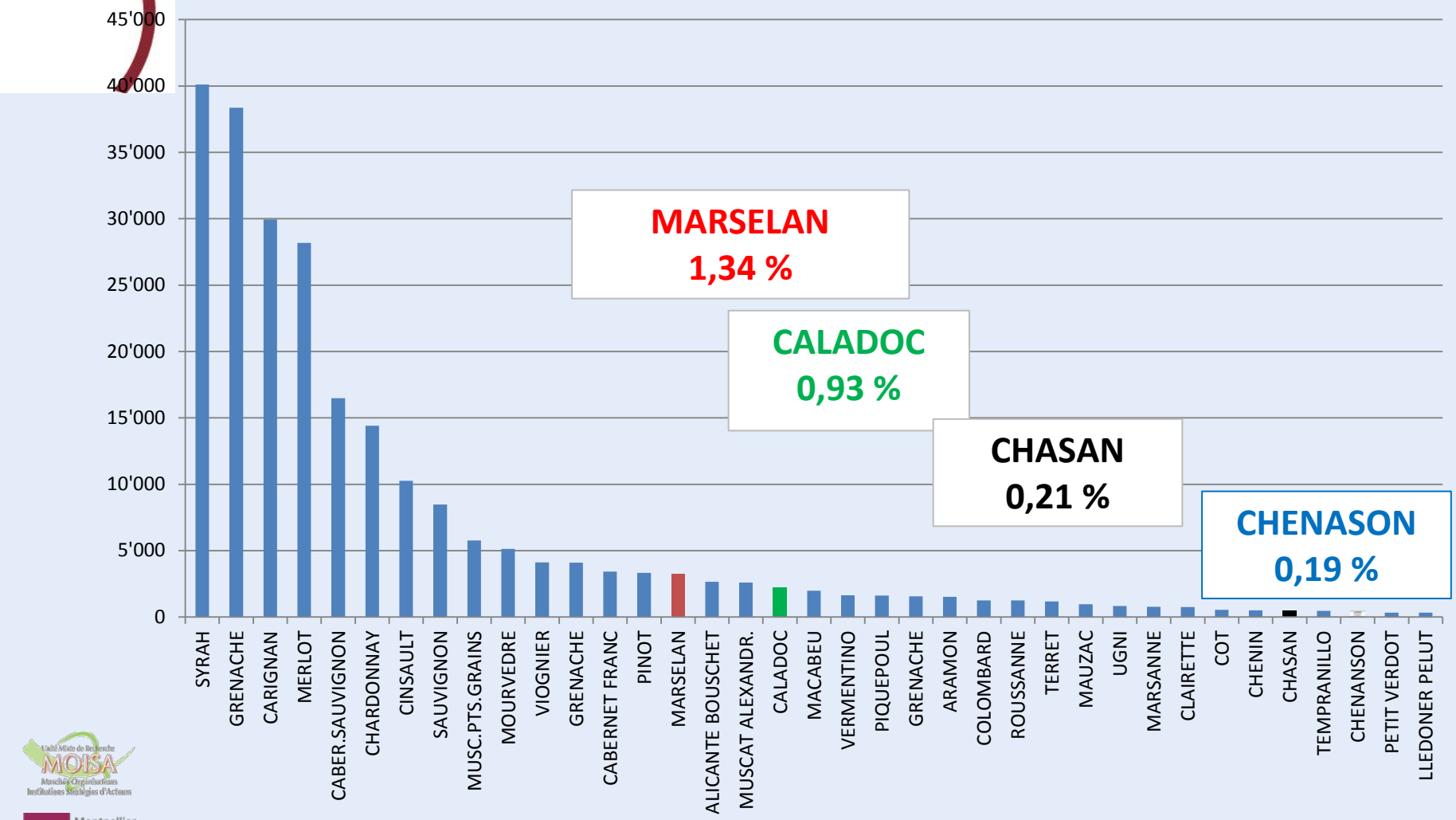
- As well as existing varieties (Carignan)
- High yields
- Upright-growing variety : goblet canopy management
- Maturity at an early stage
- + lower sensibility to diseases
- + good flavours

Marselan

Marselan : the delays

- Research Program 1956 - Crossing 1961
- Cabernet x Grenache = metis
- Stage 2 : 12 plants 1971
- Stage 3 : 150 plants 1974
- 1978-1982 micro-vinifications
- High level of quality
- Assessment of yields by growers : too low
- Inscription 1991
- 2013 : 3 226 ha = 1,37 % LR vineyard

Cépages du Languedoc-Roussillon



Institutional limits

- Knowledge – Extension
- World wine market competition based on well-known varieties
- New varieties excluded from PDO regulation
- Professionals in charge of PGI – Vin de Pays d'Oc - excluded Marselan from the list, estimating the label was week

1956-1986 / 2000 The gap

1956

- High yields
- Upright-growing variety : goblet canopy management
- Maturity at an early stage
- Large table wine market
- Market by degree-hectolitre
- No interspecific crossing, no hybrids

1986

- Oversupply
- Quality = low yields
- Compulsory distillation
- Mechanical harvesting
- Trellis system
- Global warming
- Market by variety & tasting wine
- Gene of resistance are out of V. Vinifera

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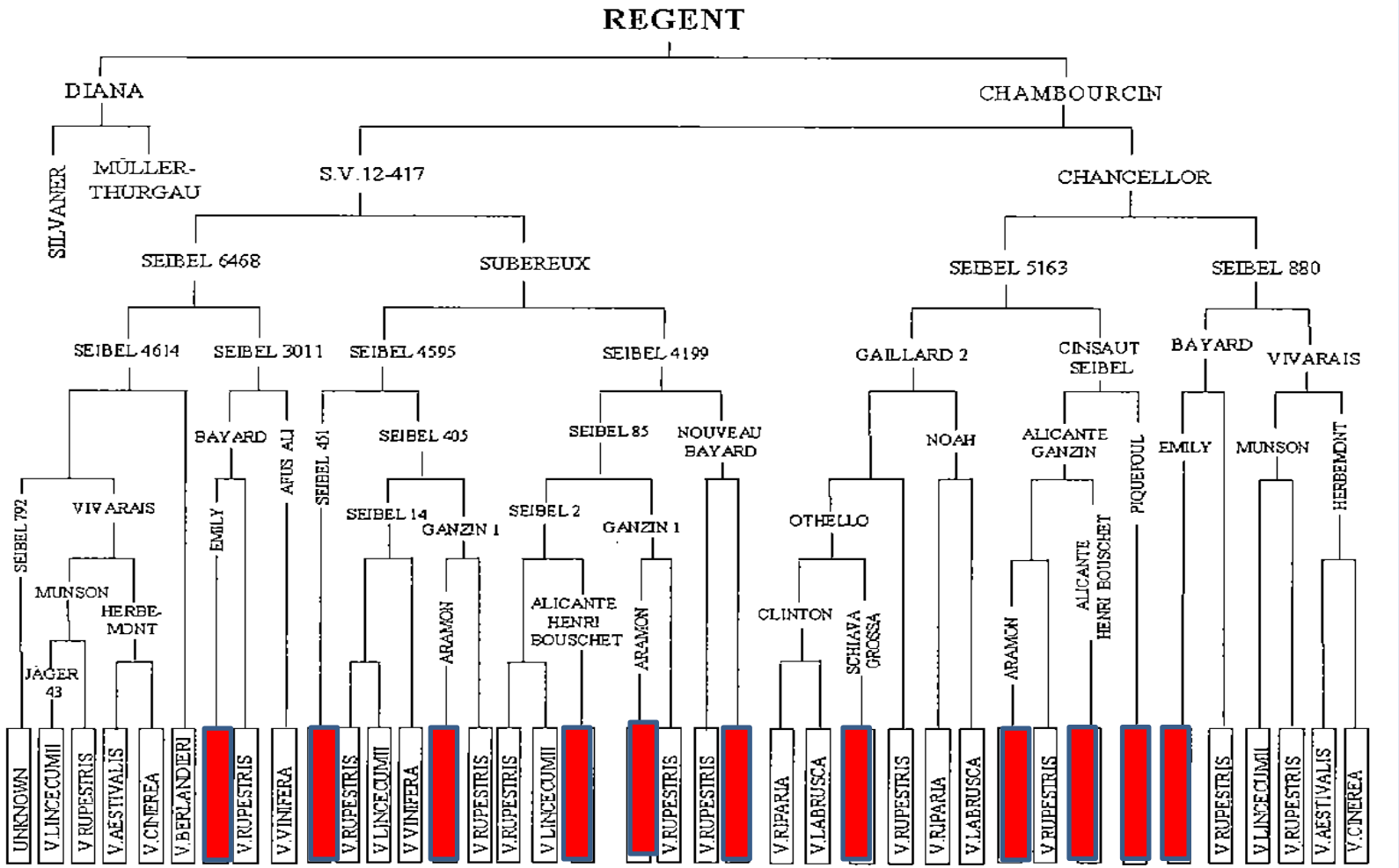
The present situation

- Developing the Bouquet program
- International competition around varieties
- European regulation competes against French regulation
- Delay for experimentation
- VATE process : agronomic & technological value (3 years)
- Scientific controversy : mono versus polygenic
- Anticipation of extension : pre-multiplication
- Nurseries strategies
- Creation of new labels : organics, low pesticide
- Innovative wine-growers

Regent genealogy : Inter-specific & long term strategy



Vinifera

SOURCE: WATERKEYN CHRISTOPHE

Pedigree of a seedling population

Becker
Zimmermann 1973

Birk 1955

Zimmermann 1954

Seyve-Villard 1930

Sebel 1886

Gallard 1885
Couderc 1882

Ganzin 1856
Jaeger ?

Arnold 1860

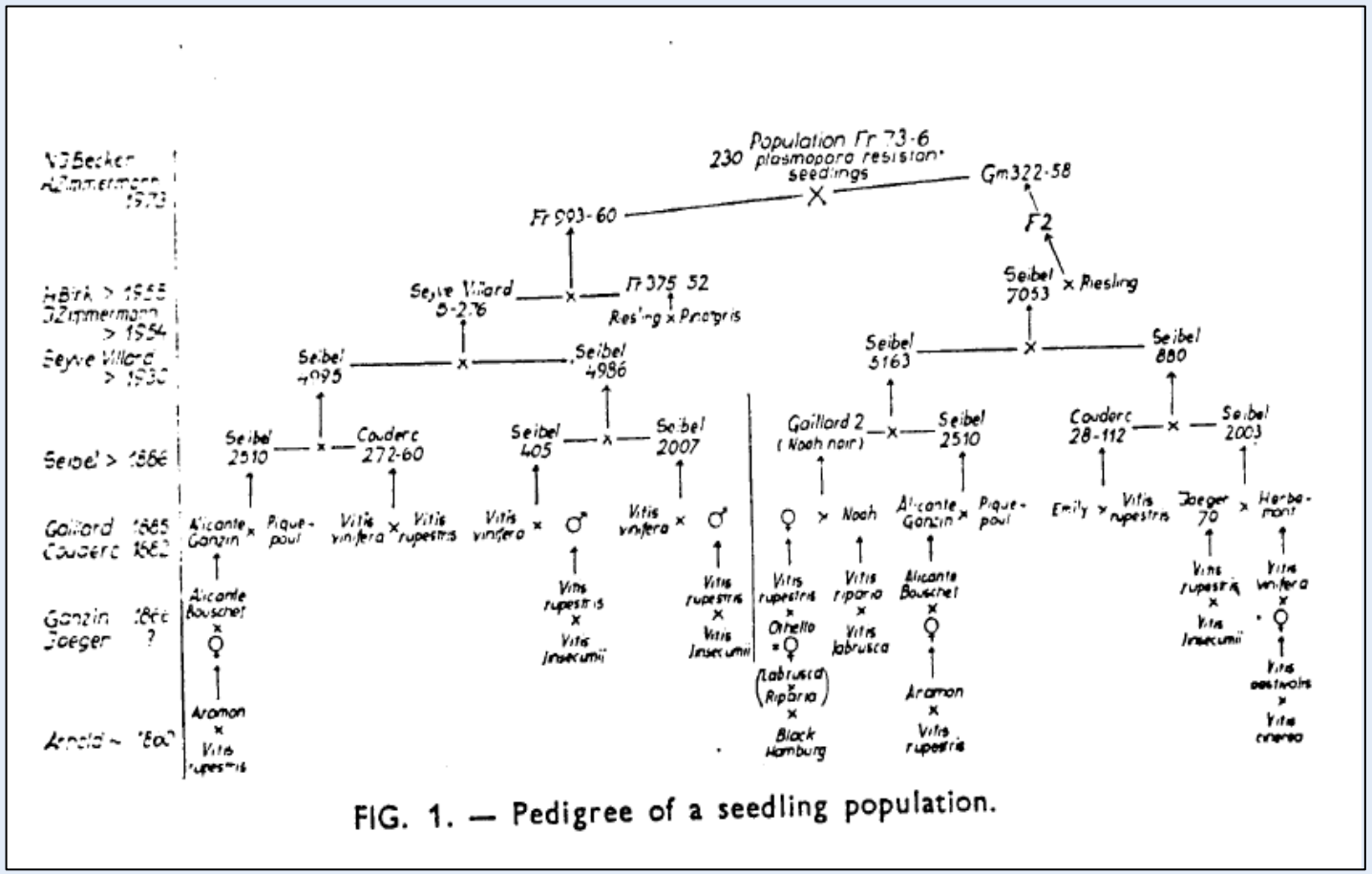
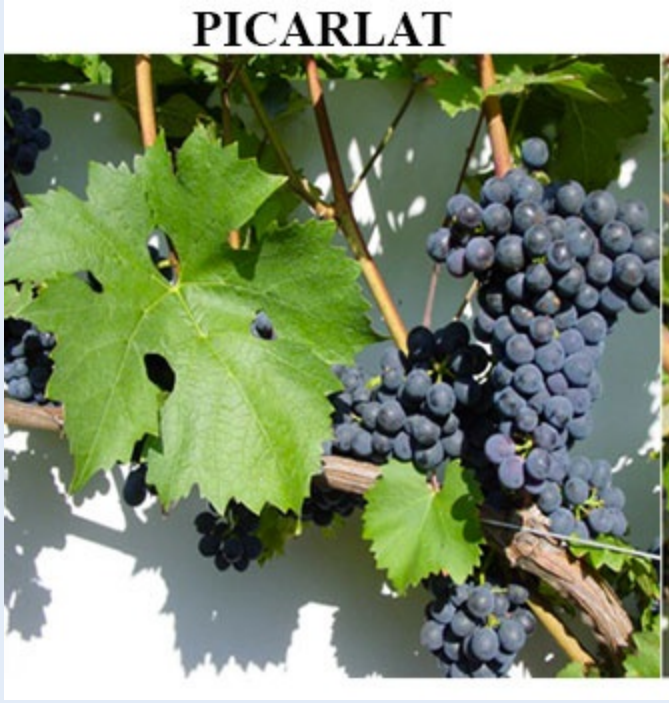
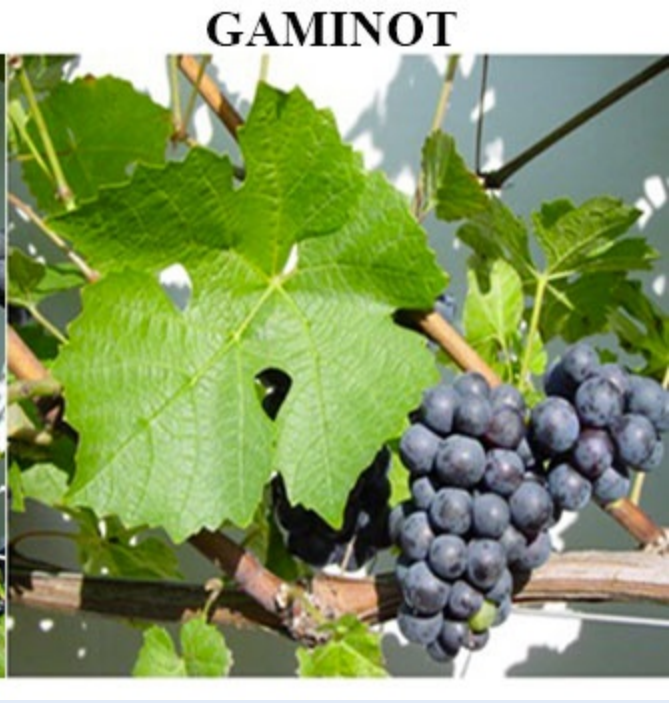


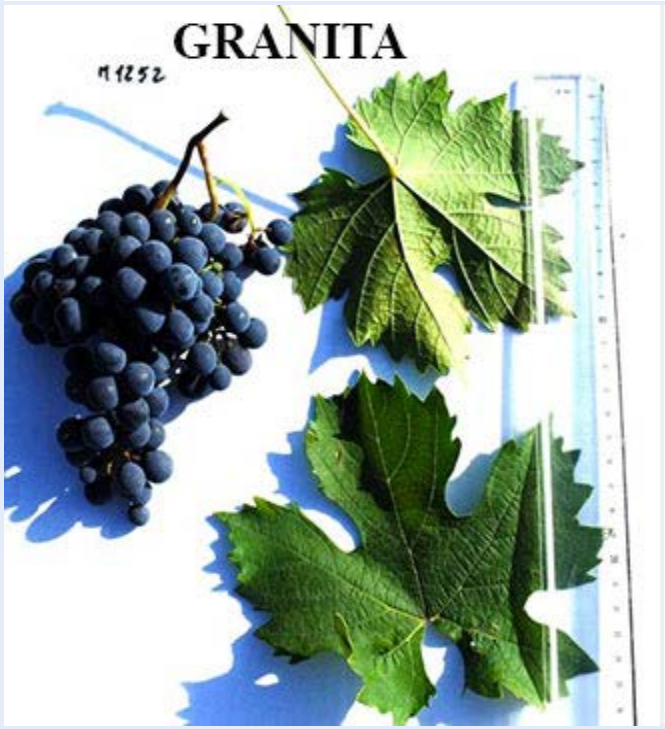
FIG. 1. — Pedigree of a seedling population.

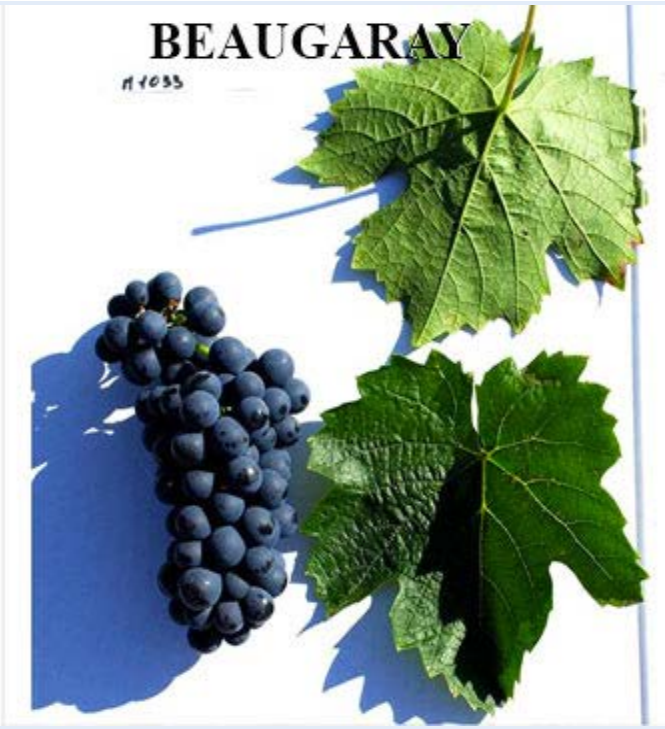
SOURCE : BECKER & ZIMMERMANN, 1978

New French metis varieties in Swiss register in 2013
INRA – SICAREX Beaujolais program 1970s









The French programs

1 - Bouquet's program

- Started 1996 in Montpellier
- Resistance Muscadinia rotundifolia
- Grape vines & rootstock
- Monogenic resistance
- VATE - agronomic, technological and environmental value assessment

The French programs

2 – ResDur program = Sustainable resistance

- Started 2000 in Colmar
- Bouquet's Resistance Muscadinia rotundifolia + German interspecific resistant varieties: Regent &t Bronner
- Polygenic resistance
- Reduced delays by molecular marker
- VATE - agronomic, technological and environmental value assessment

Foreign programs

1 – Ancient German programs

- Metis large extension: Dornfelder
- Regent: created 1967 extended 1985, protected 1993
- Classified as vinifera 1996
- Monogenic resistance
- Resistance bypassed in 2010

Foreign programs

2 – Freiburg new German programs

- The most important
- 7 red & 7 white from 1960 to 1989 registered
- New programs in relation with Colmar
- Looking for polygenic resistance
- Continuing experimentation
- 80 new crossing each year

Foreign programs

2 – Italian program

- The most important in Udine IGA
- Partnership with Colmar for research methodology
- Partnership with VCR nurseries
- 10 new varieties registered

Regulation

- National catalogue of varieties: list A1- A2 - B
- Long procedure: 5 years
- VATE - agronomic, technological and environmental value assessment
- Foreign varieties need to be assessed
- VATE process + Denomination + DHS – distinction, homogeneity et stability
- Planting right
- No subsidized + technical public control
- VSIG – WPGI wine category : wines without a protected designation of origin or geographical indication

Site VATE Hérault, CEHM, Marsillargues

Sol : alluvions, riche
Climat sub humide doux 600-800mm/an
double cordon de Royat, palissage avec releveurs
témoin Merlot et Chardonnay
6 cépages résistants étrangers.

Contact pour visite : goma-fortin@herault.chambagri.fr

The present situation

- Nurseries strategies
- Creation of new labels : organics, low pesticide,
- PIWIs Association for the promotion of fungus resistant grape varieties
- Innovative wine-growers
- The new European planting regime
- New varieties excluded of the EU financing program : renewing vineyard with these varieties is not subsidised
- The name of new varieties : petit Merlot….

AU CREUX DU NID
Blanc

Médaille d'or au concours International des PIWI

Type : Vin Blanc 2014
Vin de France –issu de vignes expérimentales
Cépages : Cal06-04 et Cabernet Blanc
Alcool : 12% vol.

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Concluding remarks

- Innovation matters
- Social demand define the technological paradigm but society change with the delay
- Delays :
  - time lag between paradigm definition and new variety available ;
  - perennial plant & renewing rate is more or less 2,5 %/year ;
  - competition between old and new varieties
  - Regulation constraints

Concluding remarks

- The response to the social demand seems easy
- Property rights matters
- Technology push or demand pull innovation in a long period ?
- How to finance innovation without property rights : public research ?

Thank you very much for your attention