

GIS BV

The French Scientific PPP on Plant Biotechnologies

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➔ Overview of the GIS BV

- Rationale
- Missions
- Governance
- Members



Rationale of the GIS BV creation

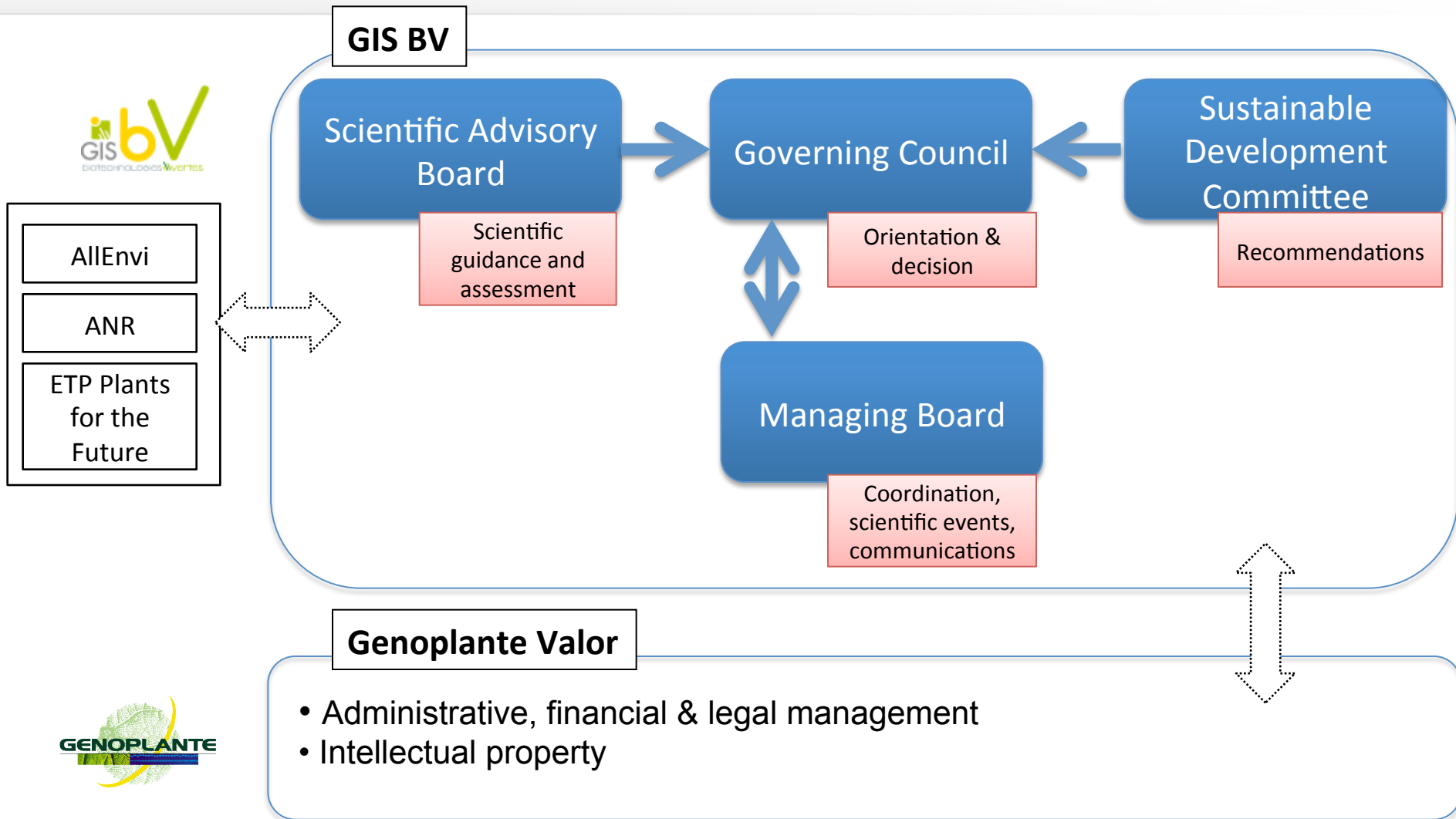
- \\ **A necessity:** to develop knowledge and innovation, and ensure the competitiveness of agriculture and food industry in France and Europe, while meeting the challenges of sustainable development.
- \\ **An opportunity:** the French Stimulus Initiative « Investments for the Future », launched in 2010.
- \\ **A common culture:** a successful collaboration for more than ten years between French public and private partners (Genoplante 1999-2010)
- \\ **Creation of the GIS BV in 2011, to strengthen the French public/private scientific community in plant biotechnologies and to promote it at a national and international level.**



Main missions of GIS BV

- To encourage research projects in the field of the GIS BV and support their organization by labelling, coordinating and by sharing resources and expertise among members
- To develop collaborations at national / international levels
- To develop a common strategy on Industrial Property (including varietal innovation)
- To contribute to the training of young researchers
- To promote plant biotechnologies

Governance





- Supplies services to support the management of the GIS BV, including:
 - ✓ Administration
 - ✓ Planning of workshops and meetings
 - ✓ Provides its Enabling Technologies for the needs of the GIS BV, according to specific terms and conditions.
- Funded by membership fees of the GIS BV members.
- Holds and manages the intellectual property of projects with medium (15-50%) involvement of private partners.
- Finances its own intellectual property rights.



A large community of 29 members

Core Members

Public

CNRS, CIRAD,
INRA

Private

Arvalis Institut du Végétal,
Biogemma, Sofiprotéol, Syngenta

Associate Members

Public

CEA, IRD

Private

Agri-Obtentions, Bayer CS, Caussade
semences, CETIOM, Euralis, Florimond
Desprez, Gautier Semences,
Génoplante- Valor, Gnis, Invivo, KWS
Fr, Maisadour, Momont, RAGT,
Roquette, Secobra, Vilmorin

Competitiveness clusters

Végépolys
Céréales Vallée
Agrimip Innovation



Members rights and obligations



Core members

- Members of the Governing Council (vote).
- Preferential partnership with other core members for pre-competitive projects
- Long-term support to GIS BV projects.
- Substantial annual membership fees (cash and/or in-kind)
- Génoplate-Valor associates.



Associate members

- Designate two observers at the Governing Council (no vote).
- Occasional involvement in specific projects
- Payment of annual membership fees to the GIS BV.

➔ Projects

Types of projects

Portfolio





Types of projects

	Technology platforms	Precompetitive research projects	Applied research projects
Outputs	Facilities, methods (priority to collaborative projects with GIS BV partners)	Basic results	Results directly usable by private companies
Led by	Public members, with possible participation from private members.	Public members, with possible participation from private members.	Public-private collaborations
Private funding	No maximum/ minimum contribution rate	<15% of total project cost	<ul style="list-style-type: none">▪ 15-50%▪ >50%
Data delivery		Public, 1 yr priority for all members	According to CA
Publication control	Specific to project	2 years after end of project	5 years after end of project
IP ownership	Partners of the project	Public partners	GV or Private partners
Commercial use	Non-exclusive license agreement for duplication of platforms by core members	Non-exclusive licence on IP with 2-yr priority compared with non Members	Exclusive or co-exclusive licences for shared outcomes. No automatic license for private results



Portfolio of projects labelled by the GIS BV

Stimulus Initiative: 8 projects

- Phenome
- Genius
- Amaizing (maize)
- Breedwheat (wheat)
- Aker (sugarbeet)
- Sunrise (sunflower)
- Rapsodyn (oilseed rape)
- Biomass for the future (miscanthus)

ANR – PLANT KBBE : 37 projects

➔ Structuring the scientific community

- Thematic committee meetings
- Scientific workshops
- Conferences





Thematic committee meetings



Aims:

- Sharing results and ideas between projects labelled by the GIS BV
- Facilitating the emergence of new projects
- Identifying potential IP



Frequency:

- Once a year



Participants:

- Representatives from labelled projects



Thematic committees

- Biotic interactions
- Abiotic interactions
- Plant breeding methods
- Bioinformatics and data management
- Quality and new products



Scientific workshops

\\Aims:

- Bringing together public and private partners around an emerging priority and facilitate collaborations
- Writing position papers for dissemination to the Governing Board, the funding agencies and the ministries

\\Participants:

- Scientists specialized in the area
- Representatives from Members

\\Output

- Position paper for dissemination to funding agencies and ministries

\\Scientific Workshops 2011-2014

- Phenotyping
- Roots
- Photosynthesis
- Nitrogen fixation in cereals
- Insect control in Brassica crops
- New Breeding Techniques
- Plant genetic Resources

➔ Genomic selection in the French Stimulus Initiative projects





Several large breeding projects, one infrastructure

Name	Target	Partners	Coordi- nation	Duration (yrs)	Full cost (M€)	Grant (M€)
Amaizing	Maize	24 (9 Cies)	INRA	8	30	11
Breedwheat	Wheat	26 (11 Cies)	INRA	9	35	9
Aker	Sugarbeet	11 (1 Cie, 1 ES)	INRA	8	21	5
Peamust	Pea	18 (13 Cies)	INRA	8	18.7	5.9
Rapsodyn	Canola	10 (7 Cies)	INRA	8	22.2	6
Sunrise	Sunflower	17 (7 Cies)	INRA	8	22.5	7
Phenome	Phenotyping	3 (2 ES)	INRA	8	56	24

- Production of resources: genetic panels, genotypes, phenotypes
- Data management and analysis
- Methods (GS), platforms
- Traits targeted varying according to species



aMaizInG - Main Objectives

- Document sequence, structural and epigenetic variation, understand their evolutionary implications and their respective contributions trait variation (see below) and heterosis, link with recombination
- Understand **elaboration of phenotypes** at different scales (field <-> biochemistry), in response to environmental conditions (drought, cold, limited nitrogen supply)
- **Decipher genetic determinism of adaptive traits and implement predictive “genomic selection” for these** (expected to be highly polygenic), to be applied in breeding pools
- Fine evaluation of effects of key alleles present in “natural ” diversity and comparison with that of alleles created de novo for the same genes (evaluate effect of natural selection on diversity available)

Exploitation : Breeding and variety characterization



BreedWheat - Main Objectives



To develop tools and knowledge to help select improved bread wheat varieties that meet the breeders, growers, industrials and consumers needs thereby enabling a **competitive and sustainable wheat production in France**:

- construct a **sequence-based toolbox** for the wheat genome
- decipher **the genetic and ecophysiological basis** of key traits including abiotic and biotic stress tolerance, and quality
- expand and facilitate the **use of genetic resources** to increase allelic variability in the elite gene pool
- develop and deploy **new breeding methods**
- and **disseminate the results to the wheat community**



PeaMUST - Main Objectives

- Novel pea varieties + optimization plant-symbiotic interactions for stabilized seed yield and quality, in the context of climate change and pesticide reduction.

More specifically:

- Undertake a **program of genomic selection**, targeting low-input cropping systems
- Discover molecular determinants of disease, insect and frost partial resistance in peas for assisting breeding of durable resistances
- Investigate the potential of the manipulation of architecture and of plant-symbiont interactions for assisting breeding of durable resistances
- Provide enhanced platforms for gene validation in peas – such as diversified TILLING and Virus induced gene silencing (VIGS) and user-friendly database for the rapid integration of outputs in breeding programs



SUNRISE – main objectives

- Which new sunflower ideotypes are needed and acceptable in the frame of climate changes ?
 - Agronomy ecophysiology & social sciences
- Designing the genomes to produce such ideotypes
 - Impact of heterozygosity on the resilience of crop production
Heterosis and GxE interactions
 - **Genomic selection**
- Interdisciplinary challenge
 - Integration of genetics, genomics and ecophysiology into crop models
 - Systems biology
 - Social sciences



Phenome - Main Objectives

1. **Provide to the French plant community** a network of high-throughput platforms:
Academic and private research, breeders, technical institutes
Platforms + associated tools and methods
2. **Characterize large collections of genotypes** enabling quantitative genetics studies :
100x micro-plots - 1000x plants
Populations - cultivars - mutants – GMO
3. Create **different environmental scenarios** including the major components of global change
Water limitation, nutrient deficiency, new pests complex
in interaction with other factors: [CO₂], temperature, ...
4. **Disseminate the tools and methods towards** the plant community



**Thank you for your
attention.**

