“Les semences paysannes”

Seed Diversity and Participatory Research for Organic Farming

Véronique Chable

September 2020, 23rd – Agrocampus Ouest

UC “The chalenges of Agroecology"

INRA SCIENCE & IMPACT

The presentation in few words,

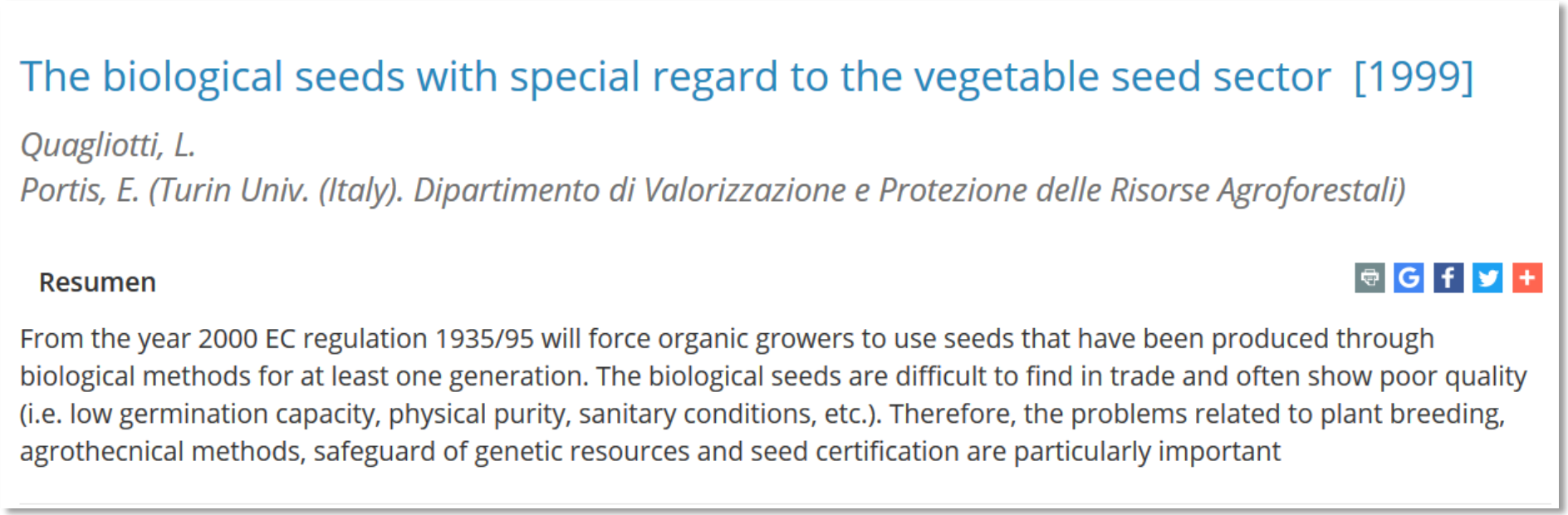
- Year 2000: Organic agriculture is looking for seed
- The conceptual foundation of organic farming
- Organic farming, health and microorganisms, the holobiont hypothesis
- Research paradigm and plant breeding, diversity is a key component of sustainability
- The revival of peasant seed, participatory research and collective organisation

Our organic context

Organic agriculture needs seed

Regulation for Organic Agriculture: CE/1935/95

Organic production with organic seeds



The biological seeds with special regard to the vegetable seed sector [1999]

Quagliotti, L.

Portis, E. (Turin Univ. (Italy). Dipartimento di Valorizzazione e Protezione delle Risorse Agroforestali)

Resumen

From the year 2000 EC regulation 1935/95 will force organic growers to use seeds that have been produced through biological methods for at least one generation. The biological seeds are difficult to find in trade and often show poor quality (i.e. low germination capacity, physical purity, sanitary conditions, etc.). Therefore, the problems related to plant breeding, agrothecnical methods, safeguard of genetic resources and seed certification are particularly important

http://agris.fao.org/agris-search/search.do;jsessionid=0844075C835B9A1E52C74DFE832D80EB?request_locale=es&recordID=IT2001060274&sourceQuery=&query=&sortField=&sortOrder=&agrovocString=&advQuery=&centerString=&enableField=

The origin of the question 20 years ago

- European regulation
- Evolution of breeding methods, more and more incompatible with organic principles
- Empowerment of farmers and collective organisation

Agroecology/organic agriculture

A first look at DIVERSITY of concepts!

From where agroecology and organic agriculture knowledge come from?

- **Agroecology**

1928 – Bensin, 'Agroecological characteristics description and classification of the local corn varieties Chorotypes'
1930 – Friederichs, ' Die Grundfragen und Gesetzmäßigkeiten der land- und forstwirtschaftlichen Zoologie'
1938 – Papadakis, 'Compendium on crop ecology'
1942 – Klages, 'Ecological crop geography'
1956 – Azzi, 'Agricultural ecology'
1965 – Tischler, 'Agrarökologie'
1979 - Cox and Atkins, 'Agricultural ecology: an analysis of world food production systems'
1983 – Altieri, 'Agroecology'
1984 – Douglass (ed.), 'Agricultural sustainability in a changing world order'
1987 – Arrignon, 'Agro-écologie des zones arides et sub-humides'
1990 – Gliessman, (ed.) 'Agroecology: researching the ecological basis for sustainable agriculture'
1991 – Caporali, 'Ecologia per l'agricoltura'
1995 – Altieri, 'Agroecology: the science of sustainable agriculture (3rd edition)'
1997 - Gliessman 'Agroecology: ecological processes in sustainable agriculture'
2007 – Gliessman, 'Agroecology: the ecology of sustainable food systems'
2007 – Warner, 'Agroecology in action: extending alternative agriculture through social networks'

- **Organic agriculture**

1924 – Rudolf Steiner's Agriculture Courses based on Anthroposophy approach

1928 : creation of Demeter

1938 – Ehrenfried Pfeiffer, 'Bio-Dynamic Farming and Gardening' and association

1940 –Sir Abert Howard, 'An agricultural testament'.

1946 : Creation of the Soil association

1930 - Organic-biological agriculture Hans Mueller and Hans Peter Rusch then, influence on Bioland creation.

1960 – « Agriculture biologique » by AFAB (French Association Française of Organic agriculture)

1964 : creation of Nature&Progrès in France

1975 – Masanobu Fukuoka, 'The One-Straw Revolution' and 'The Natural Way of Farming'

1978 – Bill Mollison and David Holmgren, 'Permaculture'

2006 - Ernst Götsch, Syntropic agriculture https://lifeinsyntropy.org/en/

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Re-thinking agriculture on the basis of ecological knowledge and re-questioning the food systems organisation

2007 – Warner, 'Agroecology in action: extending alternative agriculture through social networks'

- **Organic agriculture**

1924 – Rudolf Steiner's Agriculture Courses based on Anthroposophy approach

1928 : creation of Demeter

1938 – Ehrenfried Pfeiffer, 'Bio-Dynamic Farming and Gardening' and association

Re-thinking agriculture which renews the vision of the life

Agroecology / organic agriculture Let's Miguel Altieri explain …

- "**Those who adhere to organic agriculture have the highest degree of consciousness consistency of their thinking**.
- Their approach to the problems distinguishes them from industrial agriculture, not by the refusal of "progress", but by the rejection of a project and a particular **vision of life**, and the management designed and developed in the Western part of the World.

[12] Altieri, M.A.- Agroecology: The Science of Sustainable Agriculture, Westview Press (1995)

« Organic pionners »: life at the central place

Howard 1940
Instead of breaking up the subject into fragments and studying agriculture in piecemeal fashion by the analytical methods of science, appropriate only to the discovery of new facts, **we must adopt a synthetic approach** and look at the wheel of life as one great subject and not as if it were a patchwork of unrelated things. All **the phases of the life cycle are closely connected**; all are integral to Nature's activity; all are equally important; none can be omitted.
Sir Albert Howard (1940) An Agricultural Testament, Oxford University Press, New York and London

Biodynamics is thus **not just a holistic agricultural system but also a potent movement for new thinking and practices in all aspects of life** connected to food and agriculture.
https://www.biodynamics.com/what-is-biodynamics

Fukuoka called his agricultural philosophy shizen nōhō (自然農法?), most commonly translated into English as "natural farming". It is also referred to as "the Fukuoka Method", "the natural way of farming" or "Do-Nothing Farming". The system is based on **the recognition of the complexity of living organisms** that shape an ecosystem and deliberately exploiting it.

https://en.wikipedia.org/wiki/Masanobu_Fukuoka

From the inspiration of the pioneers to scientific evidences

An Agricultural Testament *by* Sir Albert Howard, 1943

Oxford University Press
New York and London

- It was observed in the course of these studies that the **maintenance of soil fertility is the real basis of health and of resistance to disease**.
- **The various parasites were found to be only secondary matters**: their activities resulted from the breakdown of a complex biological system -- the soil in its relation to the plant and to the animal -- ***due to improper methods of agriculture, an impoverished soil, or to a combination of both.***

AND UNSUITABLE SEED

An Agricultural Testament (1943)

- The **mycorrhizal association** therefore is the **living bridge** by which a fertile soil (one rich in humus) and the crop are directly connected and by which food materials ready for immediate use can be transferred from soil to plant. How this association influences the work of the green leaf is one of the most interesting problems science has now to investigate.
- Is the effective synthesis of carbohydrates and proteins in the green leaf dependent on the digestion products of these soil fungi? It is more than probable that this must prove to be the case. Are these digestion products at the root of disease resistance and quality? It would appear so.

If this is the case it would follow that on the efficiency of this mycorrhizal association the health and well-being of mankind must depend.

OPEN ACCESS
phytobiomesjournal.org
Phytobiomes Journal
A Transdisciplinary Journal of Sustainable Plant Productivity

RESEARCH

e-Xtra*

Tomato Seeds Preferably Transmit Plant Beneficial Endophytes

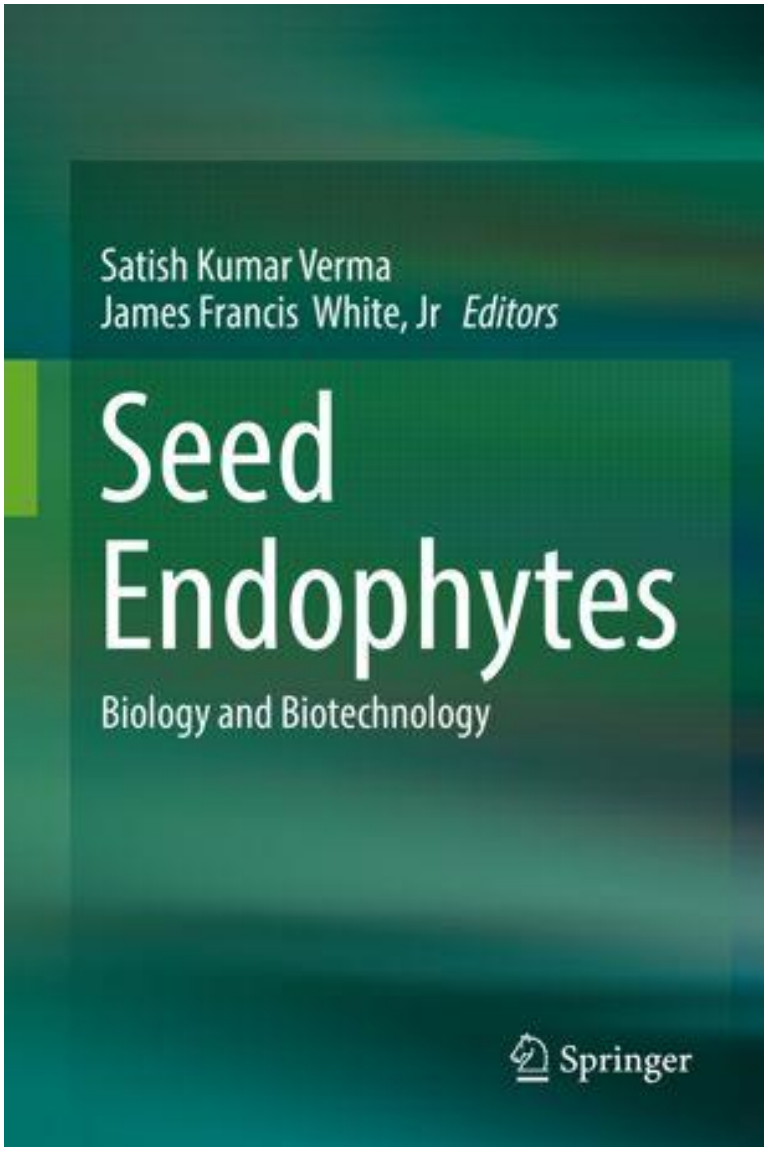
Alessandro Bergna,[1,2] Tomislav Cernava,[2,†] Manuela Rändler,[2] Rita Grosch,[3] Christin Zachow,[1] and Gabriele Berg[2]

[1]Austrian Centre of Industrial Biotechnology, Petersgasse 14, 8010 Graz, Austria; [2]Institute of Environmental Biotechnology, Graz University of Technology, Petersgasse 12, 8010 Graz, Austria; and [3]Department Plant-Microbe Systems, Leibniz Institute of Vegetable and Ornamental Crops, Theodor-Echtermeyer-Weg 1, 14979 Großbeeren, Germany

Accepted for publication 28 September 2018.

Endophytes with plant growth-promoting activity can improve the health and development of plants during all life stages. However, less is known about their stability and transmission across plant genotypes, habitats, and generations. By combining community and isolate analyses, we found that each plant habitat and genotype harbored distinct bacterial communities and plant growth-promoting bacteria (PGPB). Soil, root endosphere, and rhizosphere were the habitats with the highest bacterial diversity, while seeds hosted more selective communities. Seeds generated under field conditions showed traces of a bacterial community composition connected to the suppression of plant pathogens. In contrast, seeds of the successive generation grown in a pathogen-free and low-nutrient environment showed a predominance of bacteria that facilitate the uptake of nutrients. These modifications of the microbiome can be explained by an adaptation to prevalent environmental conditions.

Publications SEED MICROBIOME



The ISME Journal (2018) 12:1167–1170
https://doi.org/10.1038/s41396-017-0028-2

PERSPECTIVE

Saving seed microbiomes

Gabriele Berg[1] · Jos M. Raaijmakers[2]

Received: 10 May 2017 / Revised: 10 October 2017 / Accepted: 9 November 2017 / Published online: 15 January 2018

Plant Soil (2018) 422:35–49
DOI 10.1007/s11104-016-3113-9

REGULAR ARTICLE

The *Cucurbita pepo* seed microbiome: genotype-specific composition and implications for breeding

Eveline Adam · Maria Bernhart · Henry Müller · Johanna Winkler · Gabriele Berg

Rybakova et al. Microbiome (2017) 5:104
DOI 10.1186/s40168-017-0310-6

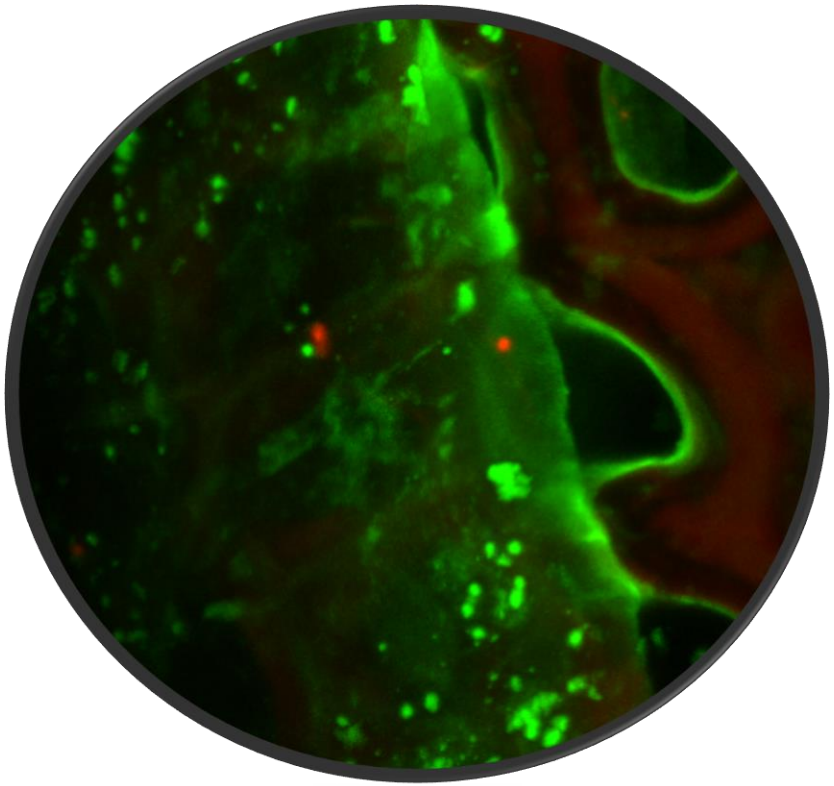
Microbiome

RESEARCH Open Access

The structure of the *Brassica napus* seed microbiome is cultivar-dependent and affects the interactions of symbionts and pathogens

Daria Rybakova[1], Riccardo Mancinelli[1,2], Mariann Wikström[3], Ann-Sofie Birch-Jensen[3], Joeke Postma[4], Ralf-Udo Ehlers[5], Simon Goertz[6] and Gabriele Berg[1*]

According to Gabriele Berg
Graz University of Technology



The seed microbiome was shaped by breeding.

A healthy seed microbiome is:

- ✓ **Highly diverse, rich and evenly structured**
- ✓ **Contain bacteria, archaea & fungi**
- ✓ **Contain microorganisms known for beneficial as well as for pathogenic interaction**
- ✓ **cultivar specific**

Difference according to the origin of the cultivars, **modern *vs* ancient**

- The filtration of OTUs likely to be pathogens, is more effective in wheat populations. In addition, modern varieties when mixed cropping are more colonized by pathogens than when grown alone.
- Population varieties appear to promote bacterial and fungal microbiota providing more benefits than modern varieties.
- It would therefore be important to consider the history of cultivars and its consequences on the performance of the cultivated varieties.

ECOBIO Rennes

Submitted

Effet du type de variété de blé sur son microbiote racinaire

Solene Mauger*[1], Claire Ricono*[1], Marine Biget[1], Cendrine Mony[1], Philippe Vandenkoornhuyse[1] & Véronique Chable[2]
* les deux auteurs ont eu la même contribution, [1] Université de Rennes 1, ECOBIO, campus Beaulieu Avenue Général Leclerc 35042 Rennes (France), [2] INRA Centre Bretagne-Normandie, UMR BAGAP 35653 Le Rheu Cedex (France)

Crop strength through diversity

Martin S. Wolfe

In conventional farming, single varieties of crop plants are grown alone. But mixing varieties may be a better option: several rice strains, planted together on a large scale, are more resistant to a major fungal disease.

Nature, 2000

Breeding for organic farming

Considering in the field

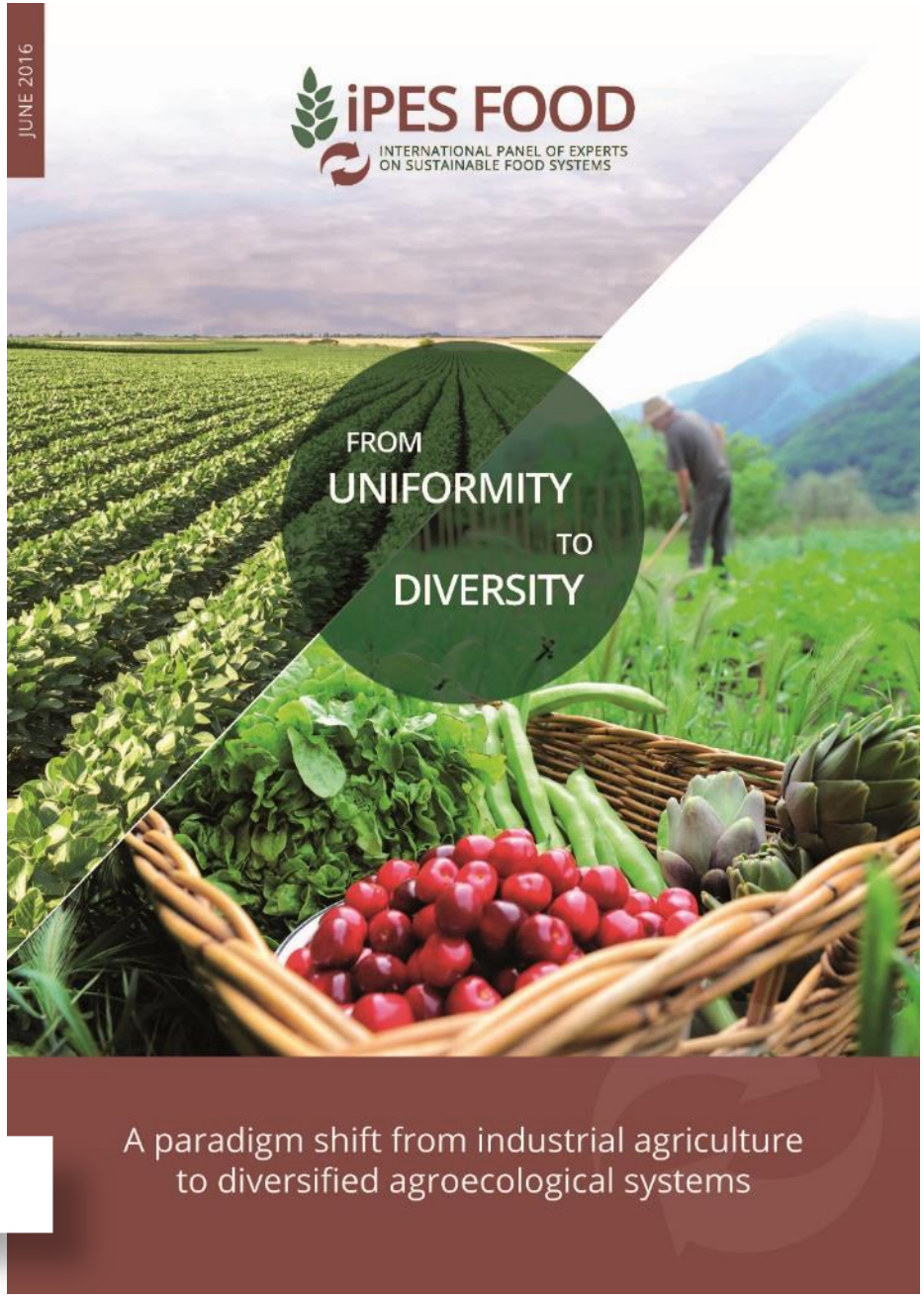
- The strong relationship between soil and plants
- The strong need of diversity

Cultivated varieties? What is the choice?

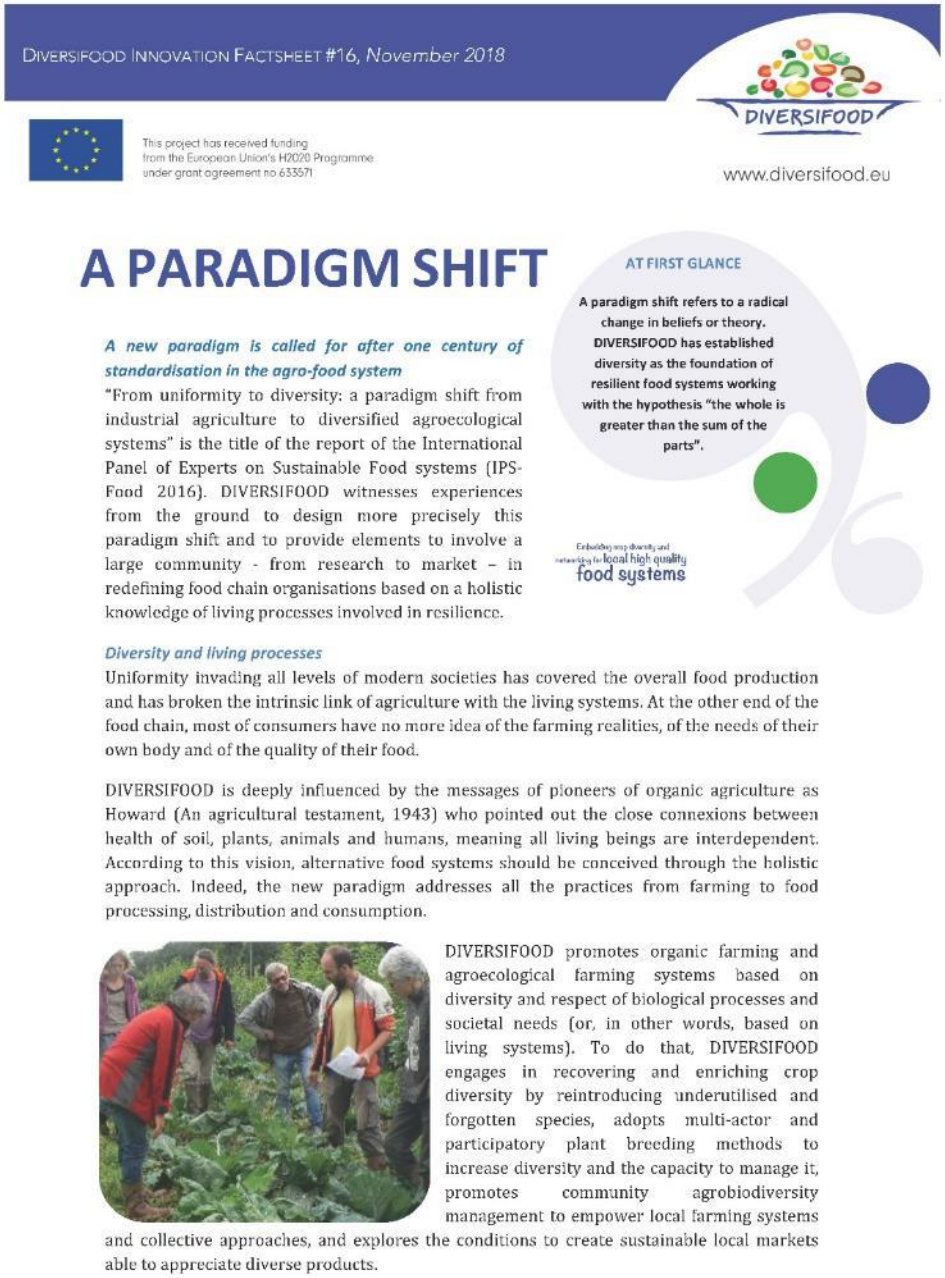
Two paradigms coexist

Their foundation and history …

From uniformity to diversity



2016



DIVERSIFOOD INNOVATION FACTSHEET #16, November 2018

DIVERSIFOOD

This project has received funding from the European Union's H2020 Programme under grant agreement no 633571

www.diversifood.eu

A PARADIGM SHIFT

AT FIRST GLANCE

A paradigm shift refers to a radical change in beliefs or theory. DIVERSIFOOD has established diversity as the foundation of resilient food systems working with the hypothesis "the whole is greater than the sum of the parts".

Embedding crop diversity and networking for local high quality food systems

A new paradigm is called for after one century of standardisation in the agro-food system

"From uniformity to diversity: a paradigm shift from industrial agriculture to diversified agroecological systems" is the title of the report of the International Panel of Experts on Sustainable Food systems (IPS-Food 2016). DIVERSIFOOD witnesses experiences from the ground to design more precisely this paradigm shift and to provide elements to involve a large community - from research to market – in redefining food chain organisations based on a holistic knowledge of living processes involved in resilience.

Diversity and living processes

Uniformity invading all levels of modern societies has covered the overall food production and has broken the intrinsic link of agriculture with the living systems. At the other end of the food chain, most of consumers have no more idea of the farming realities, of the needs of their own body and of the quality of their food.

DIVERSIFOOD is deeply influenced by the messages of pioneers of organic agriculture as Howard (An agricultural testament, 1943) who pointed out the close connexions between health of soil, plants, animals and humans, meaning all living beings are interdependent. According to this vision, alternative food systems should be conceived through the holistic approach. Indeed, the new paradigm addresses all the practices from farming to food processing, distribution and consumption.

DIVERSIFOOD promotes organic farming and agroecological farming systems based on diversity and respect of biological processes and societal needs (or, in other words, based on living systems). To do that, DIVERSIFOOD engages in recovering and enriching crop diversity by reintroducing underutilised and forgotten species, adopts multi-actor and participatory plant breeding methods to increase diversity and the capacity to manage it, promotes community agrobiodiversity management to empower local farming systems and collective approaches, and explores the conditions to create sustainable local markets able to appreciate diverse products.

From a market-oriented approach to a life-oriented approach

http://www.diversifood.eu/wp-content/uploads/2018/05/Diversifood_IF16_Paradigm_shift-1.pdf

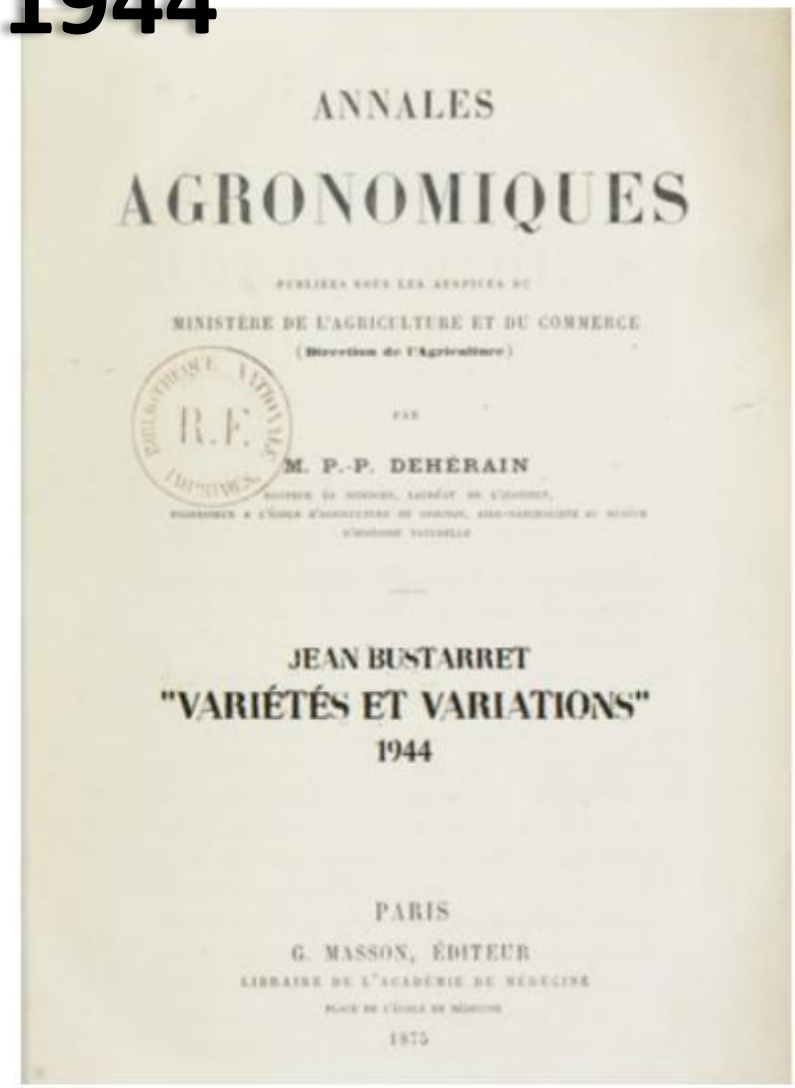
1908: F1 hybrids appeared in agriculture … The foundation of market-oriented paradigm

- "When hybrid maize was invented and presented to US farmers in the first decades of the twentieth century, it was based on two new operations, one biological and the other socio-economic.
- First, **strange manipulations** (forced inbreeding and controlled hybridization) produced biological products that had never before existed in nature.
- Second, **farmers gave up their time-honoured practice** of saving their own varieties of seed in favour of annual purchases of hybrid maize seed.

Duvick D.N. **(2001) Biotechnology in the 1930s: the development of hybrid maize**. Nature Reviews (2):69:74

MOTS-CLÉS : AMELIORATION DES PLANTES - LIGNEE - VARIETE - 70 ANS - BUSTARRET

1944


ANNALES

AGRONOMIQUES

PUBLIÉES SOUS LES AUSPICES DU

MINISTÈRE DE L'AGRICULTURE ET DU COMMERCE

(Direction de l'Agriculture)

PAR

M. P.-P. DEHÉRAIN

JEAN BUSTARRET

"VARIÉTÉS ET VARIATIONS"

1944

PARIS

G. MASSON, ÉDITEUR

LIBRAIRE DE L'ACADÉMIE DE MÉDECINE

1875

© Inra, Montage de Guillaume Bourrioux

Une variété doit être stable et homogène pour être évaluée

Dans sa publication déterminante de 1944 (1), Jean Bustarret distingue trois types de variétés : « la variété-lignée pure (2), la variété clone (3) et la variété population (4) ». Dans les deux premiers types de variétés, tous les individus sont génétiquement identiques et homozygotes pour tous leurs caractères, alors que les variétés populations, dites aussi « de pays » sont des mélanges d'individus, susceptibles d'évoluer dans l'espace et le temps. Jean Bustarret voit en la variété-lignée pure « la forme la plus « parfaite » de la variété, car elle est prévisible et possède des caractères stables qui permettent d'établir sa valeur agronomique. Il introduit les notions d'« homogénéité », de « stabilité » et de « caractères distinctifs ». Ces normes, dites DHS – distinction, homogénéité, stabilité – seront exigées par le CTPS pour l'inscription de toute nouvelle variété sur le Catalogue officiel et pour sa mise sur le marché (5), excluant alors les variétés de pays.

Cette vision de la variété devient très vite la vitrine de l'école de sélection française. Sous l'action des experts français, elle s'étend à l'Europe et sous-tend le catalogue communautaire des espèces et variétés de plantes cultivées.

Une vision de la variété insérée dans le modèle de développement des trente glorieuses

Cette vision de la variété correspond au modèle de développement de l'après-guerre, basé sur la productivité et l'efficacité,

http://www.inra.fr/Chercheurs-etudiants/Systemes-agricoles/Toutes-les-actualites/70-ans-La-notion-de-variete-en-1944

A variety must be stable and homogeneous to be evaluated

In his landmark publication of 1944, Jean Bustarret distinguishes three types of varieties: "**the pure variety-line, the clone variety and the population variety**".

- In the first two types of varieties, all individuals are genetically identical and homozygous for all their characters,
- whereas the so-called landraces varieties are mixtures of individuals that can evolve in space and time.

Jean Bustarret has seen in the **pure variety-line "the most perfect form**" of the variety, because it is predictable and possesses stable characters which make it possible to establish its agronomic value.
It introduces the notions of "homogeneity", "stability" and "distinctive characters". **These standards, known as DUS - distinction, uniformity, stability** - will be required by the CTPS for the registration of any new variety on the Official Catalogue and market, excluding then landraces

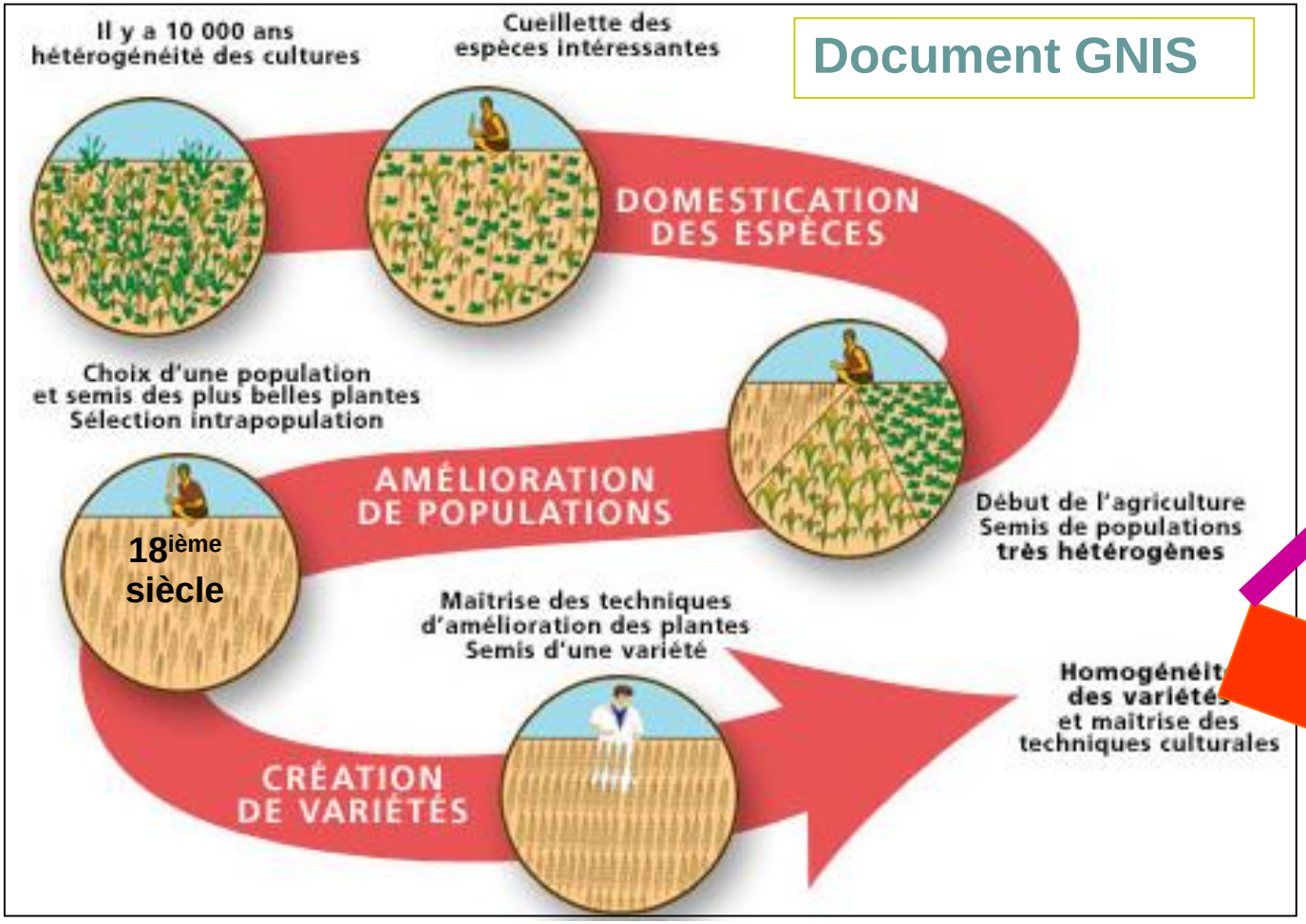
Under the action of the French experts, this vison has been extended in Europe with the Community catalogue of species and varieties of cultivated plants.

The modern variety is a stantardizable product

- Distinct
- Uniform
- Stable

http://www.gnis-pedagogie.org

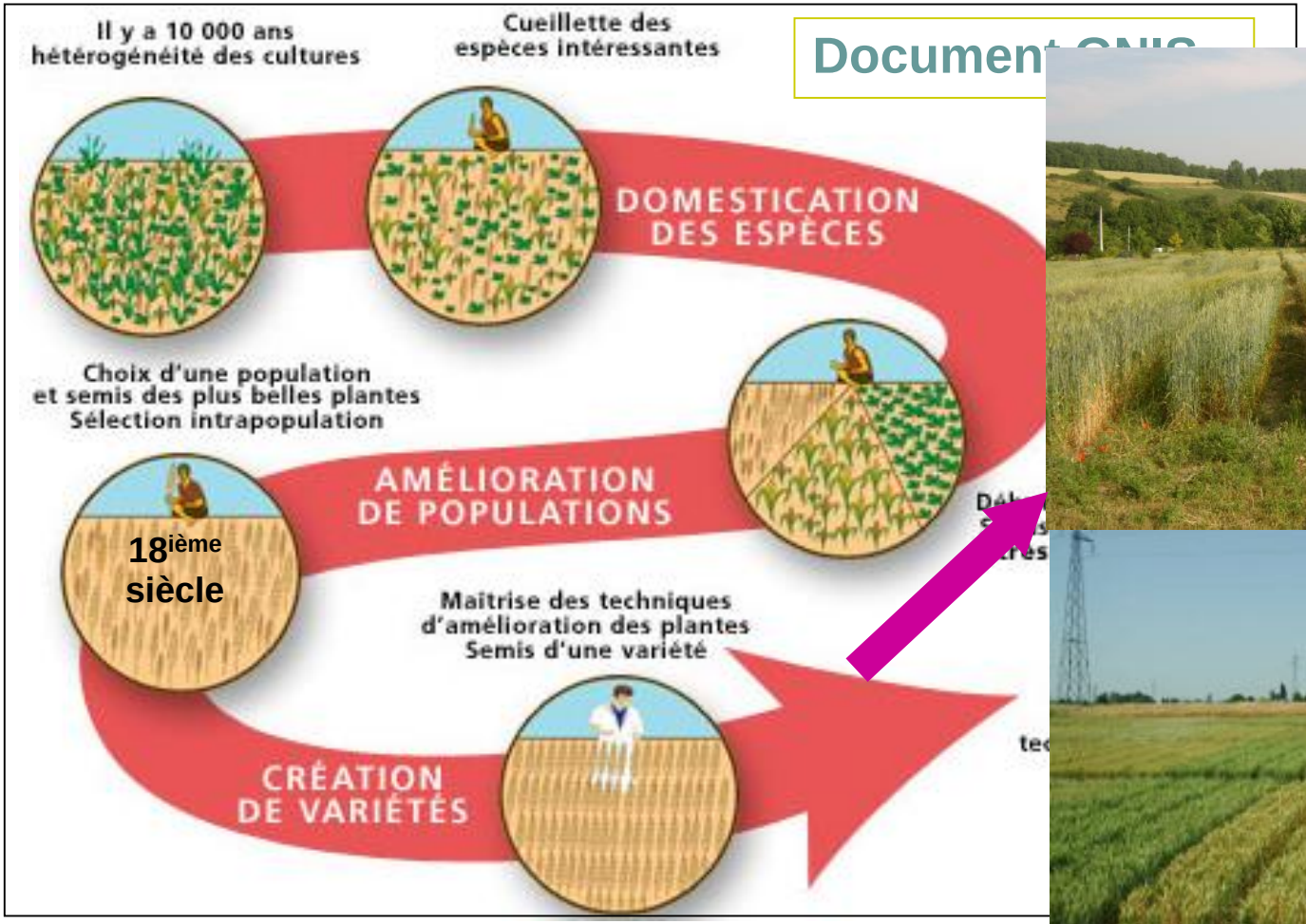
History of plant breeding according to GNIS
(Groupement National Interprofessionnel des Semences)



The variety finds again its place, in a mode of agricultural development respecting the man and his environment

Variety remains a technological product, designed by seed professionals, for industrial and artificial agriculture

History of plant breeding according to GNIS



Document GNIS

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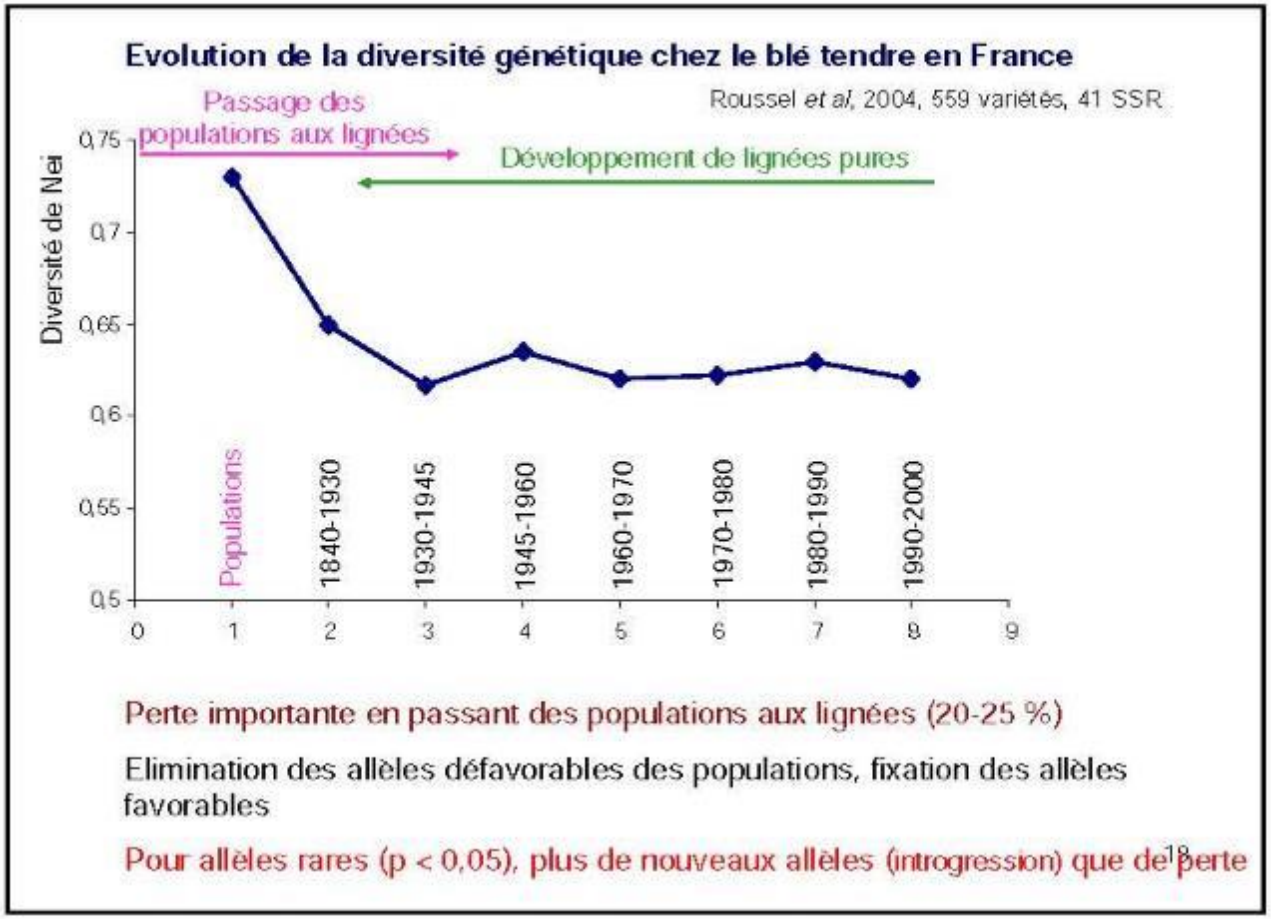
Genetic uniformisation of agricultural landscapes

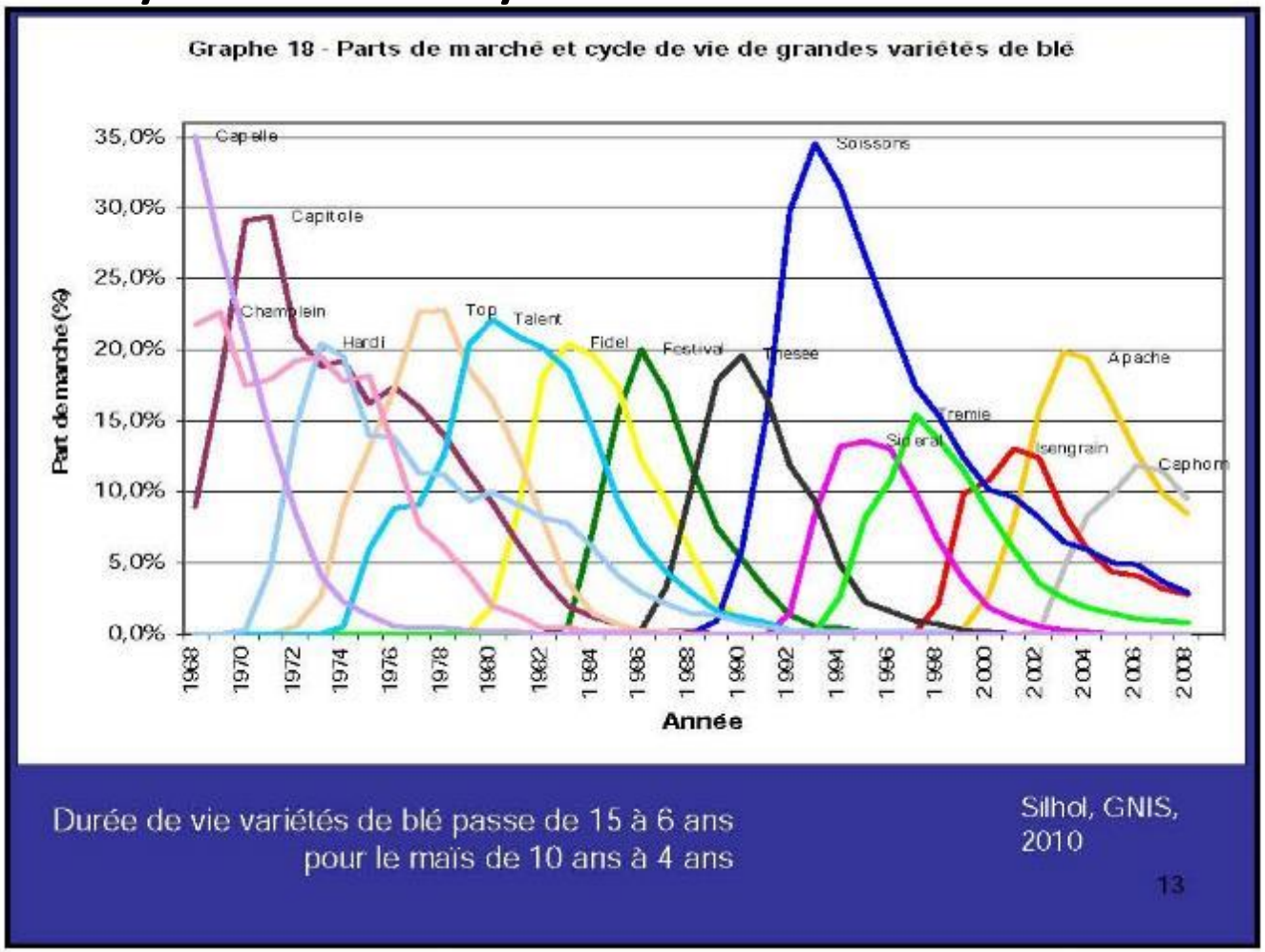
- ‘Modern’ breeding (20-21th c.) led to a drastic decrease in the cultivated crop diversity => standardization among species, and within and among varieties

Modern plant breeding and loss of diversity: ancient varieties are more diverse



Académie d'Agriculture de France – 2013. Séance du 23 janvier 2013.
André Gallais : **ÉVOLUTION DE LA DIVERSITÉ GÉNÉTIQUE DES VARIÉTÉS DE PLANTES CULTIVÉES**

Modern plant breeding and loss of diversity: variety « life » is reducing



Académie d'Agriculture de France – 2013. Séance du 23 janvier 2013.
André Gallais : **ÉVOLUTION DE LA DIVERSITÉ GÉNÉTIQUE DES VARIÉTÉS DE PLANTES CULTIVÉES**

Breeding for organic farming

Considering the farming systems

- The strong relationship between plant breeding activity and socio-economic organisation
- The strong relationship between plant breeding science and cultural vision of life

The world of agricultural research has established the break with nature.

The 40th anniversary of the Plant Breeding division at INRA: part of the introductory speech of a former director

- *Ce processus d'amélioration des plantes a instauré et diffusé dans le corps social* ***une culture scientifique marquée par une sorte de distanciation, d'éloignement et même de rupture vis-à-vis de la nature*** *; ceci afin de la connaître, la transformer et l'utiliser. Il s'agit là d'un processus banal, inhérent à toute démarche scientifique. La particularité de l'amélioration des plantes est que ce phénomène s'est heurté à une vision de la nature héritée des sociétés paysannes*. (Hervieu B, 2004)

This process of plant breeding has introduced and disseminated in the social body a scientific culture marked by a kind of distancing**, separation and even break vis-à-vis nature**, in order to understand it, to transform and to exploit it. This is a trivial process, inherent in any scientific approach. The specificity of plant breeding is its incompatibility with the common vision of nature inherited **from peasant societies**.

Hervieu B (2004) L'amélioration des plantes, un domaine emblématique pour l'INRA : histoire, identité, horizons. Actes du colloque « L'Amélioration des Plantes, continuités et ruptures ». Pierre Boistard, Claire Sabbagh et Isabelle Savini, éditeurs. Montpellier 17-18 Octobre 2002

The revival of peasant seed

A multi-actor and trandisciplinariry research to sustain the development of cultivated diversity for the organic and peasant agricultures

http://www.inra.fr/Chercheurs-etudiants/Systemes-agricoles/Toutes-les-actualites/70-ans-La-notion-de-variete-en-1944

Une vision de la variété insérée dans le modèle de développement des trente glorieuses

- Cette vision de la variété correspond au modèle de développement de l'après-guerre, basé sur la productivité et l'efficacité, dans l'objectif de couvrir les besoins alimentaires de la France. Les facteurs de production doivent être standardisés pour se prêter à la mécanisation comme à la transformation industrielle.
- **La variété fixée (lignée pure, clone ou hybride F1) devient elle-même un facteur de production isolable et standardisé, un « input » dans une agriculture pensée comme un système industriel de production** (6).

Evolutions, sinon révolutions…

- Les normes DHS, complétée par la norme de de « Valeur agronomique et technologique » (norme VAT) et par un dispositif d'évaluation expérimentale des variétés (Geves) constituent l'instrument national de pilotage du « progrès génétique », axé pendant longtemps sur le rendement.
- Néanmoins, **le contexte a depuis considérablement évolué, avec un progressif retour vers la diversité.** L'Inra participe à cette évolution. L'Institut a œuvré en particulier pour l'adoption par le CTPS d'une procédure originale d'évaluation adaptée à l'agriculture biologique et a inscrit en 2011 les deux premières variétés de blé spécifiquement sélectionnées pour l'agriculture biologique. Lire l'article.
- D'autre part, d'autres modèles d'innovation variétale ont émergé dans les années 80 : **sélection participative par des réseaux de paysans,** retour des variétés populations dans les négociations réglementaires (lire l'article) ou, à une autre extrémité du spectre, « modèle d'innovation intégré » des firmes internationales, avec le développement des biotechnologies.

http://www.inra.fr/Chercheurs-etudiants/Systemes-agricoles/Toutes-les-actualites/70-ans-La-notion-de-variete-en-1944

A vision of the variety embedded within the model of development of the “trente glorieuses”

This vision of variety corresponds to the post-war development model, based on productivity and efficiency, with the aim of covering France's food needs. The factors of production must be standardized to lend themselves to mechanization as to industrial transformation.

- **The fixed variety (pure line, clone or hybrid F1) itself becomes a factor of production isolable and standardized, an "input" in an agriculture thought as an industrial system of production**(6).

Evolutions, or even more, revolutions…

- The DHS standards, supplemented by the standard of " Value for Cultivation, Use and Sustainability (VCUS) " and by an experimental variety evaluation system (GEVES), constitute the national instrument for steering "genetic progress", which has for a long time focused on the yield.
- Nevertheless, the context has since changed considerably, with a gradual return to diversity. INRA participates in this evolution. In particular, the Institute worked on the adoption by the CTPS of an original evaluation procedure adapted to organic farming and in 2011 included the first two wheat varieties specifically selected for organic farming.
- On the other hand, other models of varietal innovation emerged in the 1980s: **participatory selection by farmers' networks,** the return of population varieties in regulatory negotiations or, at another end of the spectrum , "Integrated innovation model" of international firms, with the development of biotechnologies.

https://philhoward.net/2018/12/31/global-seed-industry-changes-since-2013/

Seed Industry Structure 1996 - 2013

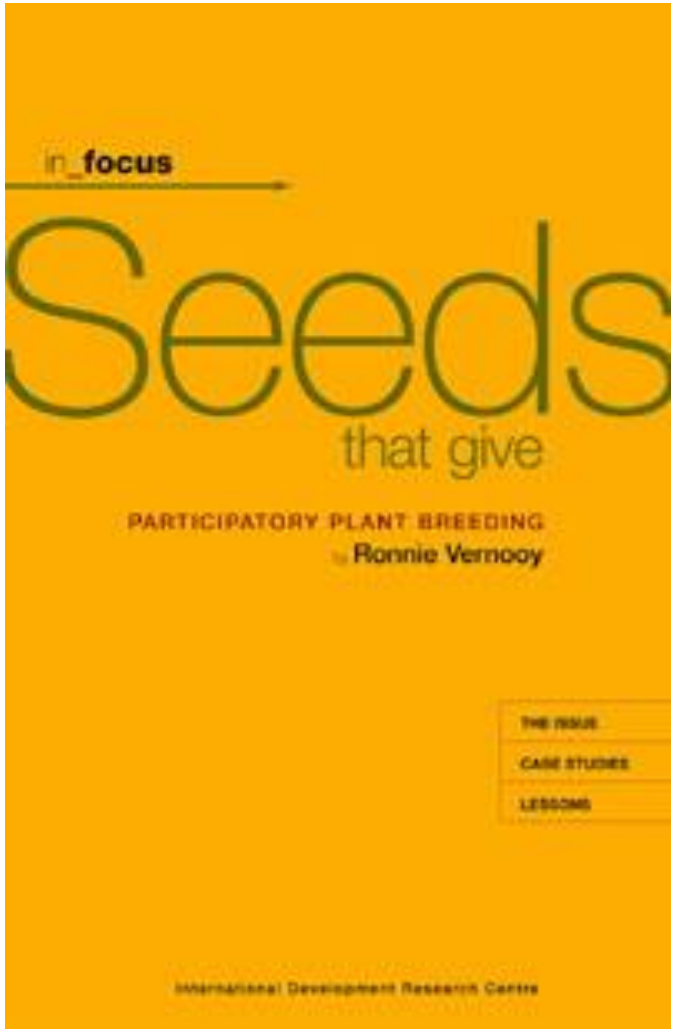
Monsanto
Syngenta
DuPont
Limagrain -Winsrin
Buyer
KWS
Land O'Lakes
Dow
ASI
RAGT

Seed Companies
Chemical Companies
Other Companies
Full Ownership
Partial Ownership

Size proportional to global seed market share

Phil Howard, Associate Professor, Michigan State University
http://www.msu.edu/~howardp

Peasant seed changes values …

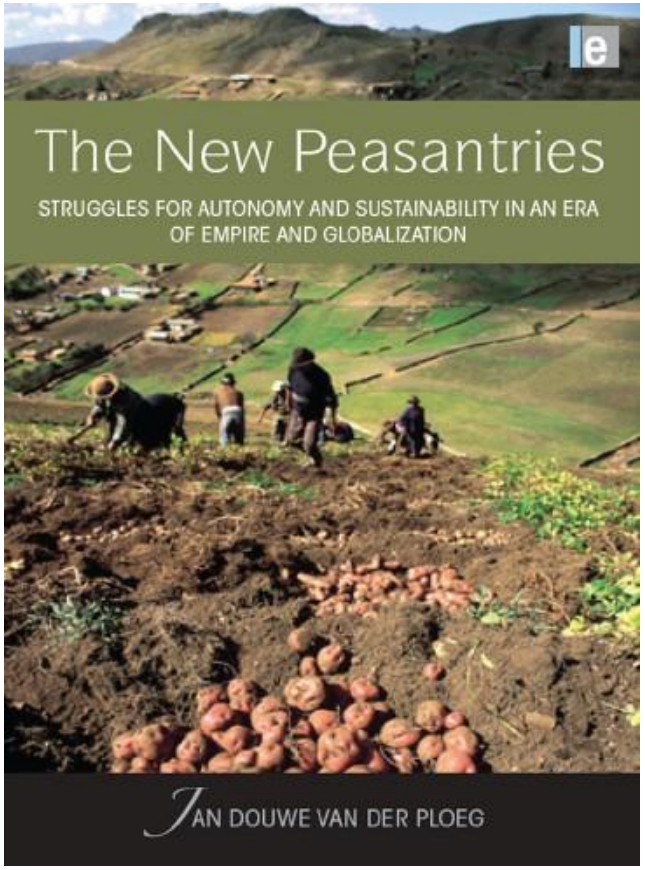


http://www.idrc.ca/openebooks/014-4/

The story of a reconnexion of men and nature

- A new organisation for science
- A new economy to be invented

Peasant communities supports a renewal of agricultural practices

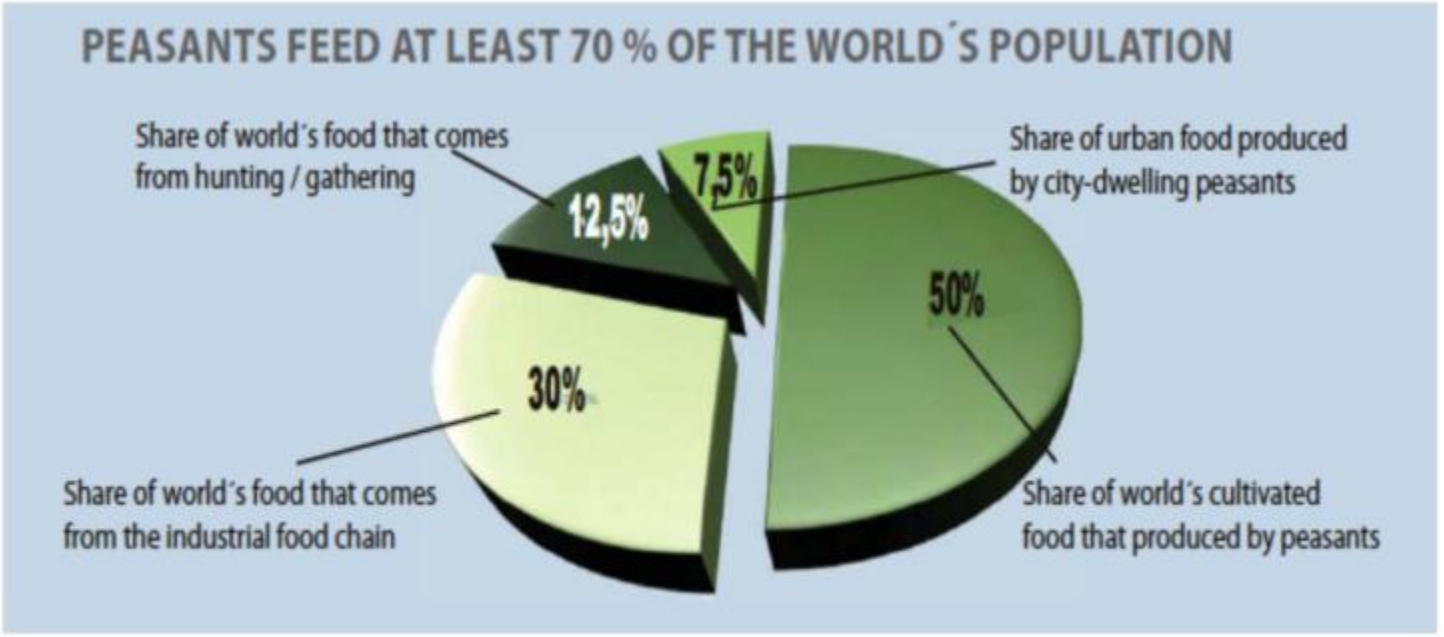


Empowerment of peasants' networks or organisations

Small Scale Farmers Produce 70% of the Worlds Food

The only practical way to feed the world is to grow the food locally where it is needed by small holder farmers

It is important to increase the resilience of small holders at local level to ensure adequate food security for the world



UNITING THE ORGANIC WORLD

Beginning of 2000's : organic seed were missing

The creation of
Réseau Semences Paysannes
in France

Peasant seeds

Definitions established by Réseau Semences Paysannes

- selected and reproduced by farmers on farms and gardens in conditions of organic farming or biodynamic farming
- Diversified and evolutionary populations, resulting from natural methods of selection and conservation, without biotechnologies
- reproducible and not appropriated by intellectual property right,
- adaptable, exchangeable between farmers and gardeners in respect of the rights of use defined by the collectives that have selected and conserved them

Peasant seed

- sélectionnées et reproduites par les paysans dans les fermes et les jardins menées en agriculture paysanne biolog
- populations diversifiées et évolutives, issues de méthodes naturelles de sélection et de renou e des paysans
- reproductibles et non appropriables par un droit de propr it de
- adaptables, échangeables entre paysans et jardiniers dans l s collectifs qui les ont sélectionnées et conservées

Bred where the plant will produce

Diverse, evolutive, natural

Free, no property right

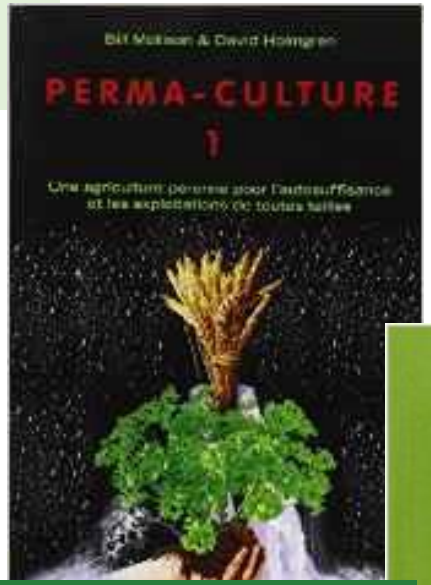
Can be exchanged within communities

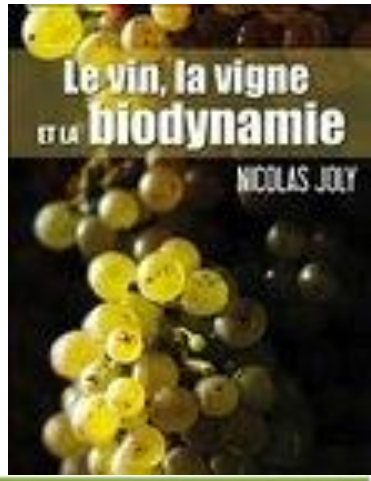
The issue of
Seed and organic agriculture

and the connexion with peasant seeds

Organic agriculture is diversified

Various forms of agriculture based on natural processes have emerged for a century





An International federation

120 countries – 800 movements

IFOAM ORGANICS INTERNATIONAL | CULTIVATING CHANGE.

A Website of IFOAM - Organics International & Its Action Group

WHAT WE DO GET INVOLVED OUR LIBRARY

Welcome » IFOAM » What We Do » Organic Landmarks » Principles of Organic

PRINCIPLES OF ORGANIC AGRICULTURE

Principle of Health

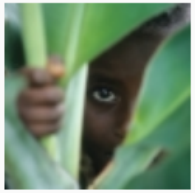
Healthy soil, plants, animals, humans = a healthy planet.

Principle of Ecology

Emulating and sustaining natural systems.

Principle of Fairness

Equity, respect and justice for all living things.



Principle of Care

For the generations to come.

Organic agriculture/peasant seeds

- **Principle of Health**

Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.

Peasant seed enhance local adaptation and health

- **Principle of Ecology**

Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

On farm plant breeding favours natural processes

- **Principle of fairness**

Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

On farm breeding stimulates collective organizations of seeds exchanges without intellectual property

- **Principle of care**

Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the environment

On farm plant breeding avoids all forms of biotechnologies

Our first experience

On cauliflowers in Brittany

Since 2001

A favourable context ...

- Cabbage and cauliflowers: urgent need of organic varieties
- Professionals were organised
- Genetic resources were available
- A scientific project INRA-CIAB

Dès 2005, la valorisation…

Le brocoli « violet du Cap », est ce que l'on peut appeler une variété originale. Il fait partie de ces légumes oubliés, qui aujourd'hui, grâce au travail des paysans, se retrouve sur les étals. On parle ici de sélection participative, une collaboration étroite entre paysans et chercheurs qui mettent à profit leurs compétences afin d'étudier et de développer des variétés de légumes répondant aux critères et surtout à l'éthique de l'AB. Le brocoli « violet du Cap » est ainsi issu de semences fermières, c'est à dire des variétés sélectionnées et multipliées dans les fermes ; le producteur reproduit lui-même ses semences d'une année sur l'autre, elle est dite « variété de population » contrairement aux hybrides F1 qu'il faut racheter tous les ans.

http://www.biobreizh.org/

Today, the message: vegetable without any biotechnology (CMS)

http://kaolkozh5.blogspot.com/

Kaol Kozh gère depuis 2017 l'attribution de la mention "Légume issu de Semence Paysanne". Il s'agit d'une démarche pour identifier les légumes issus de semences paysannes auprès du consommateur, aussi bien sur les marchés, dans les magasins bios et les grandes surfaces. Les maraîchers candidats doivent suivre un cahier des charges technique qui définit les règles à respecter pour prétendre à la mention. Il faut notamment pratiquer la sélection et la multiplication de semences sur sa ferme et ne pas utiliser de biotechnologies comme les CMS.
Le contrôle s'effectue sur le principe d'un SPG (Système Participatif de Garantie) inspiré de ce qui se fait chez Nature et Progrès. Un groupe de producteurs se déplace chez le candidat et effectue le contrôle.

2019, la creation du “Bricoli” de Kaol Kozh)

Publié le 22 novembre 2019 à 11h13 Modifié le 22 novembre 2019 à 19h16

Le bricoli Kaol Kozh récolté actuellement est un brocoli issu des semences paysannes.

À la ferme de René et Malou Léa, on récolte, pour la première année, le « bricoli Kaol Kozh ». Issu de semences paysannes, sa période de récolte et son goût, plaisent à plusieurs restaurants.

« À cuire à la vapeur et à déguster al dente ! » c'est la recommandation culinaire de Malou et René Léa, en pleine récolte de leur première production de bricoli Kaol Kozh, un brocoli nouvellement sélectionné.

The organization of the seed networks

In France (Maison des semences paysannes/associations semences)

and in Europe (Community Seed Banks/seed savers)

Creation of Réseau Semences Paysannes in 2003

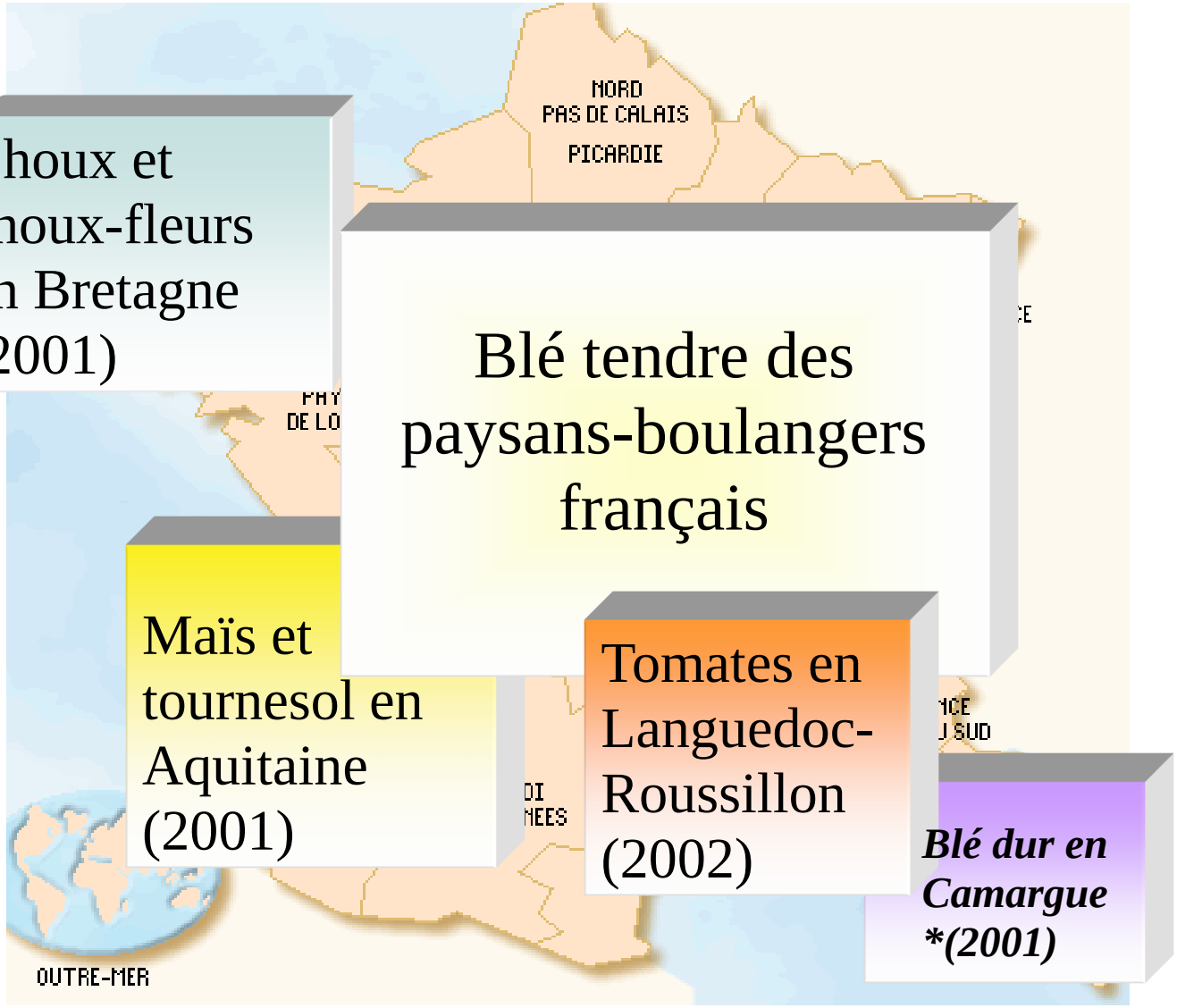
With the French associations

About 90 in 2020

Participat

The Beginnings

2001-2002



The breton seed associations

Triptolème

Réunir les acteurs d'une Agri-Culture riche de sens participante à la santé de la terre et des hommes pour :
partager co-naissance et patrimoine
s'accompagner dans la mise en œuvre de nos expérimentations et recherches en matière de biodiversité, d'agronomie, de transmission.
Créée en 2006

Kaol Kozh

Pour le développement de la Biodiversité en Bretagne

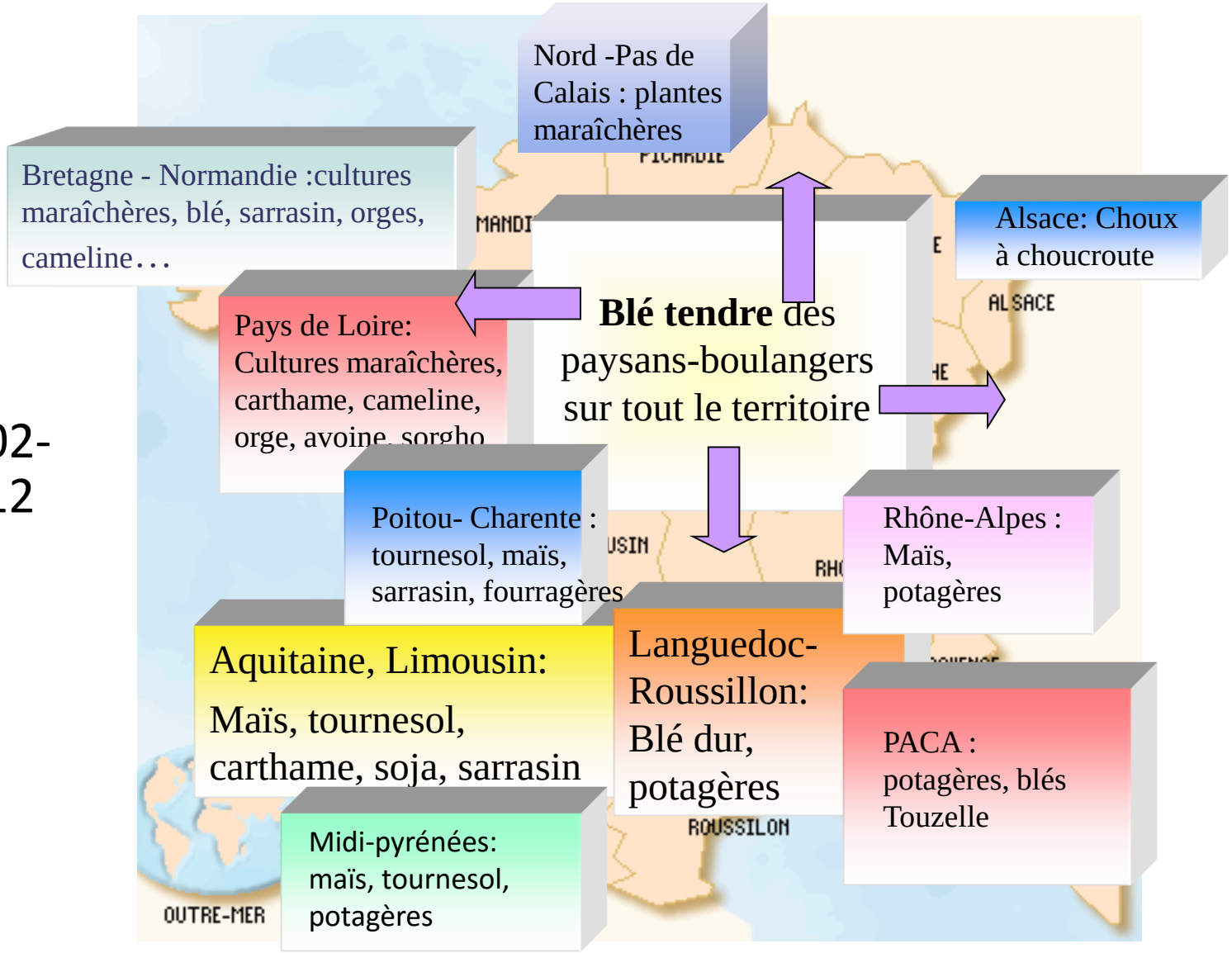
Sélection participative, Multiplication, et Mise en commun des semences bio

Créée en 2007

La sélection participative et/ou paysanne

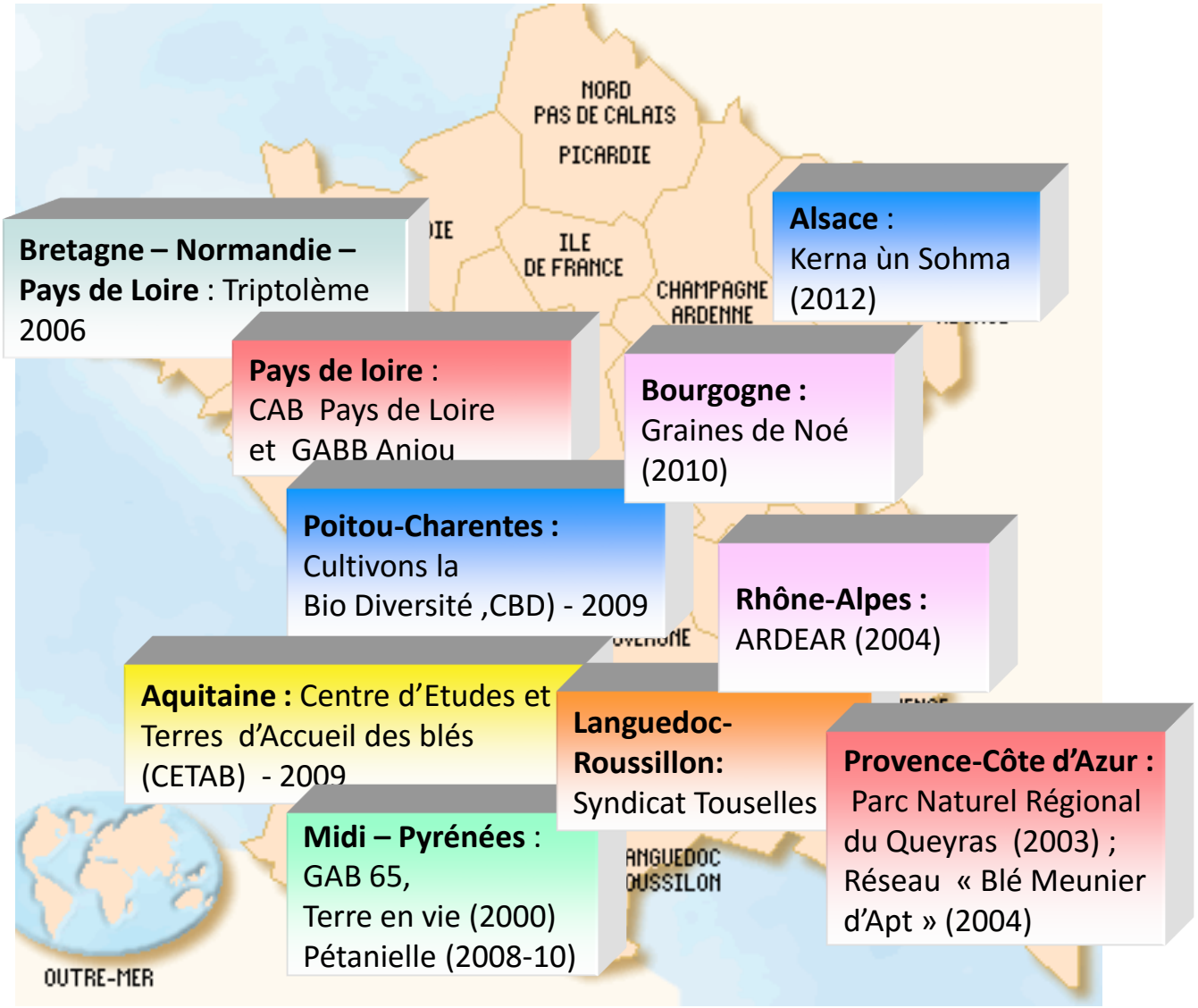
Participatory Plant Breeding/ on farm breeding

2002-2012



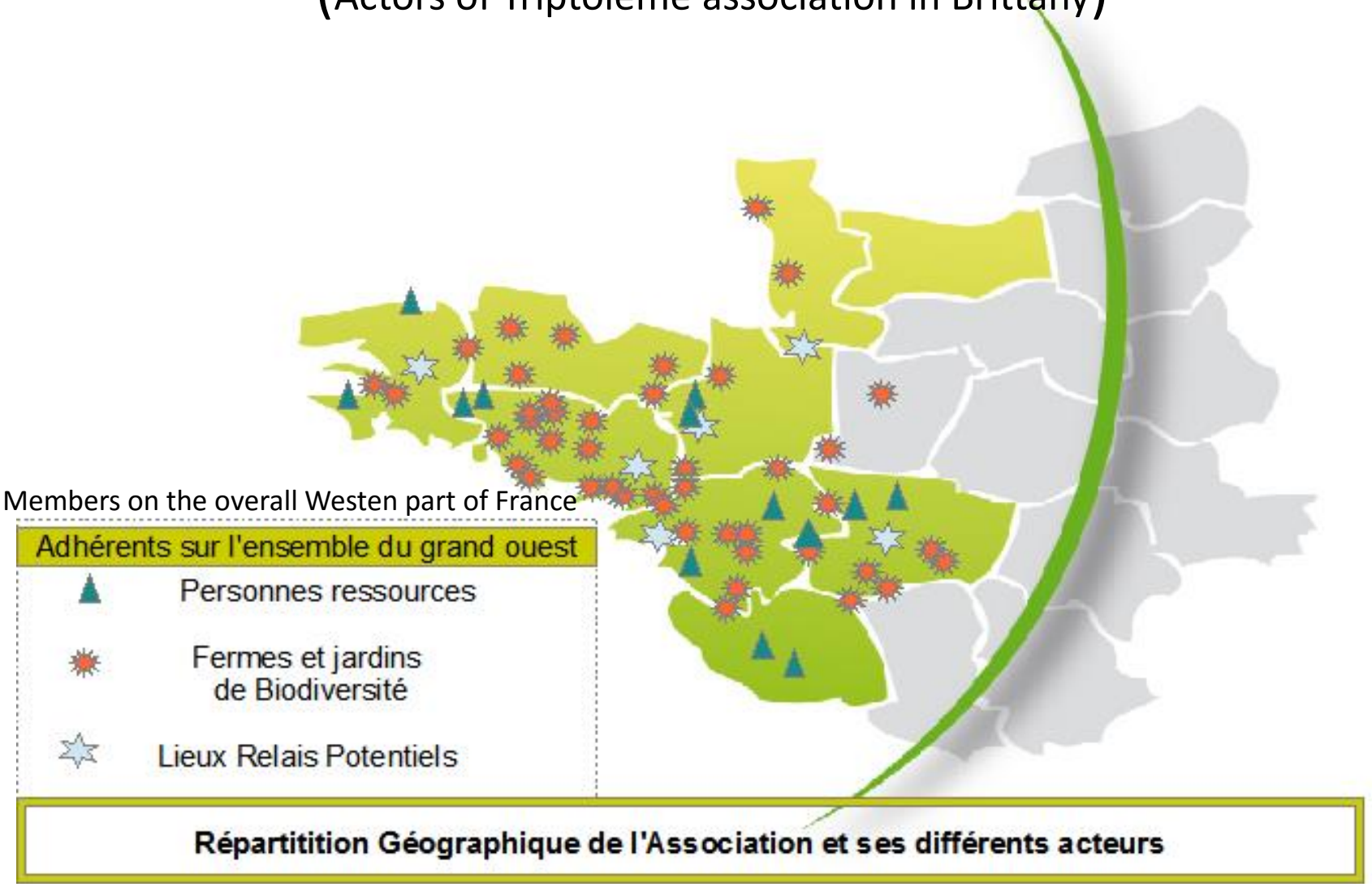
Les associations pour la sélection paysanne des blés

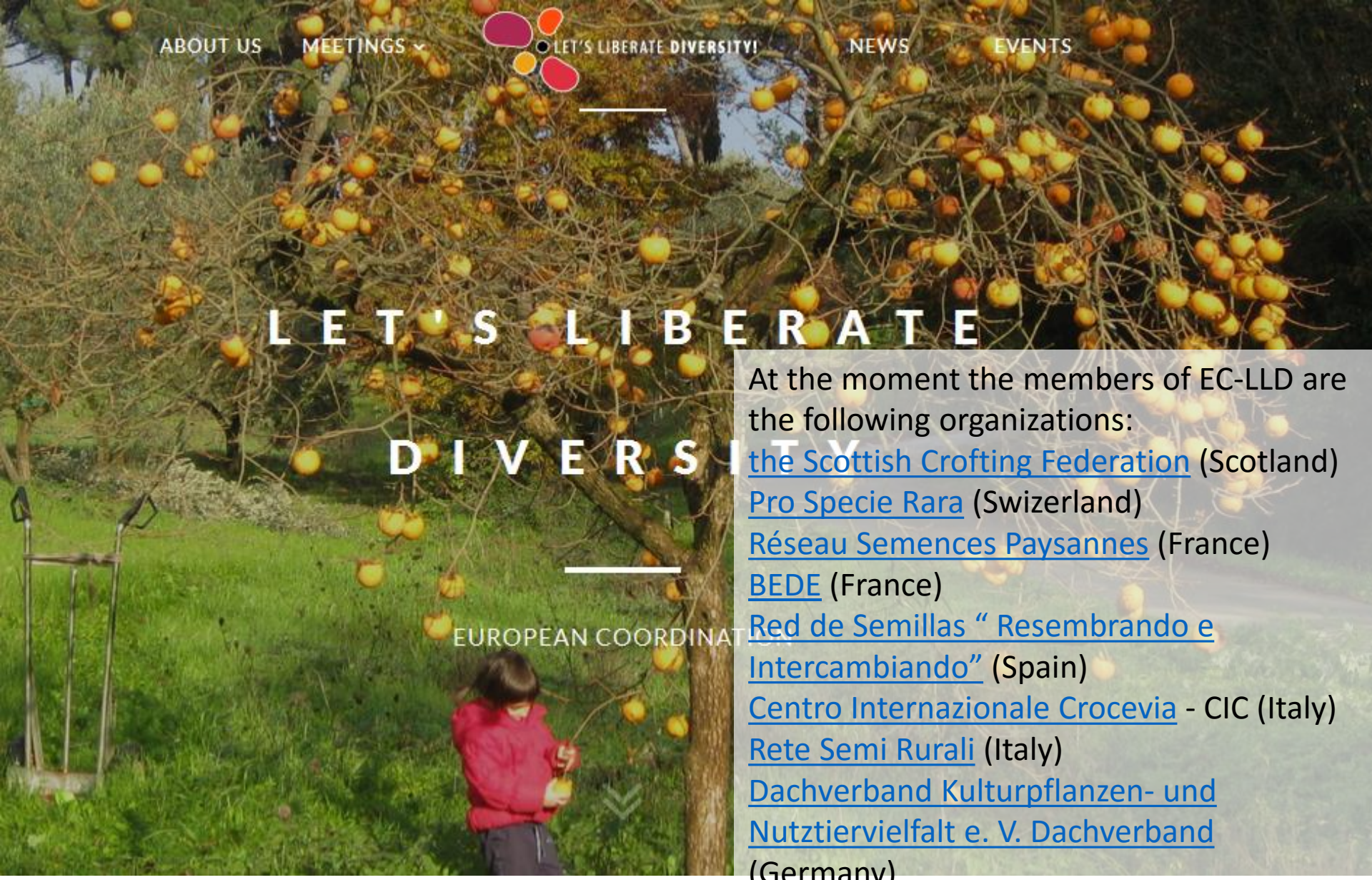
Associations involved in on-farm breeding of soft wheat



Les Acteurs de l'association Triptolème en Bretagne

(Actors of Triptolème association in Brittany)



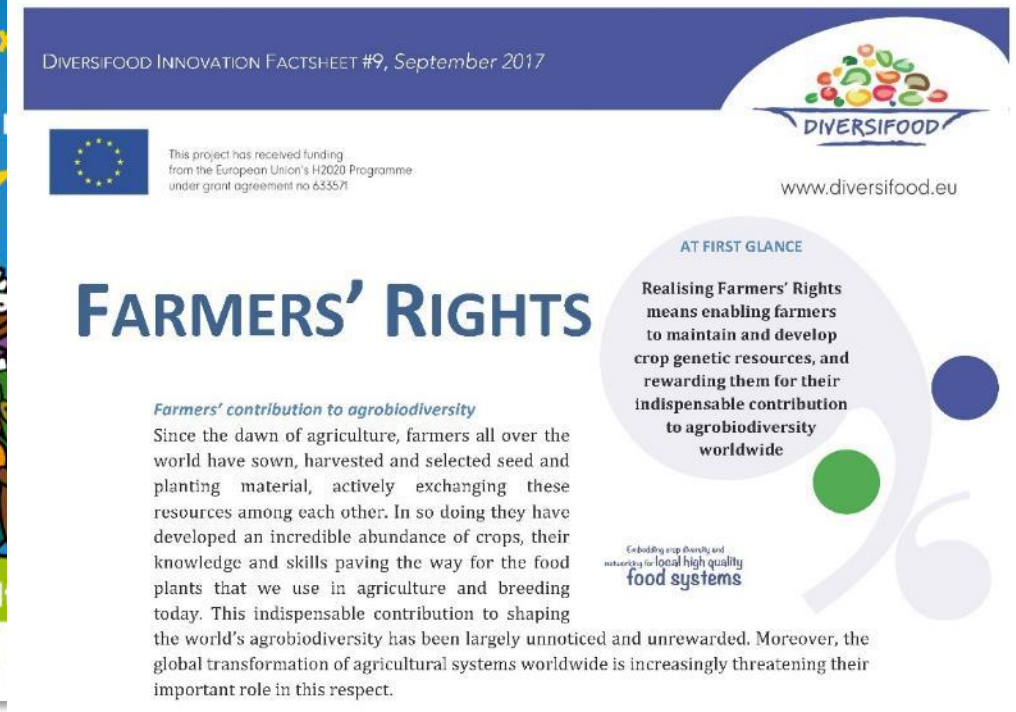


At the moment the members of EC-LLD are the following organizations:

the Scottish Crofting Federation (Scotland)
Pro Specie Rara (Swizerland)
Réseau Semences Paysannes (France)
BEDE (France)
Red de Semillas " Resembrando e Intercambiando" (Spain)
Centro Internazionale Crocevia - CIC (Italy)
Rete Semi Rurali (Italy)
Dachverband Kulturpflanzen- und Nutztiervielfalt e. V. Dachverband (Germany)
Ecoruralis (Roumanie)
Seeds (Luxembourg)

http://liberatediversity.org/index.php

Collective organisations at several levels



Peasant seed enriched by meetings

MAISONS DES SEMENCES PAYSANNES - RENCONTRES INTERNATIONALES 2012

Le journal des rencontres

Prix libre
(Coût de fabrication 3 €)

ÉDITO

Les semences en *commun*

Les semences paysannes aiment les rencontres. Elles sont bien trop précieuses pour être réduites à de vulgaires objets industriels, brevetés et à usage unique. C'est la diversité des *communautés* humaines et la richesse des échanges qui a permis de créer cette infinie diversité végétale nourricière. Mais nul doute aussi que la diversité végétale a influé sur la diversité des êtres humains et de leurs cultures. Toute la plante est dans la semence : la mémoire du passé, des gènes apparus il y a des millions d'années qui, grâce aux rencontres dans les champs et aux échanges dans les fermes, se sont rassemblés dans la graine pour s'adapter aux conditions de demain.

It is the diversity of human communities and the richness of exchanges that has made it possible to create this infinite plant diversity. **But there is no doubt that plant diversity has influenced the diversity of human beings and their cultures.**

All the memory of the plant is in the seed ... to adapt to the conditions of tomorrow

Patrick de Kochko – Réseau Semences Paysannes

Two models of Community Seed Banks Initiatives in Europe

	The dual model: Seed savers organisations in Central & North. Europe	Farmers networks in Western and Southern Europe
Foundation	"old" organisations of seed – founded before the 1980th until 1995	Founded from 1995
Role models	US- and AU-Seedsavers´ associations	Farmers' organisations - Initiatives in countries of the South?
Network vs. organisation	"Dual" structures: Members´ network AND organisational centralized structures . Often 1 to few organisations operating nationwide	"Network of organisations": Many initiatives and organisations organized in national networks
Activities	Organisations developed multiple, differentiated fields of activities – CSB being one of them, they are integrated and associated with the organisation.	Multiple activities in a shared responsibilities between member-organisations and roof-organisations
Members	large numbers of individual members. Members mainly from other professions, often active as private gardeners. Farmers are a small, important stakeholder group.	Generally smaller numbers of individual members –mainly farmers and gardeners.
Concept	"**Conservation by use**"	„**Dynamic Management**"

Community Seed Banks

ABOUT THE CSB MAP MATERIAL EVENTS CONTACT

Map of Community Seed Banks in Europe. If you want to be shown on this map with your initiative, please contact us here.

From a rough estimation, probably 130 initiatives, or more, have been established in Europe so far.

This project has received funding from the European Union's H2020 Programme under grant agreement no 633571

Organisation of the research

(mainly in the frame of organic food chains and genetic resources management)

Interactions with the agroecosystem

Crop descriptors

Production

Product quality

Multi-actor and transdisciplinary research to support the development of cultivated diversity for organic and peasant farming

Thanks to

A continuation of successive projects for 12 years in Europe

Based on

Informal interactions for 20 years between farmers, millers, bakers, SME, facilitators, … researchers

With a common objective:
more resilient and environmental friendly agriculture and high quality food

- We have learnt together
- We have created a common culture based on evolutionary concepts

Progresses through EU 3 projects

Common hypothesis : DIVERSITY

(FP6 2007-2010)

(FP7 2010-2014)

(H2020 2015-2019)

Situation Europe of « non conventional varieties »

Observation and testing diversified crop populations

On farm research

Seed regulation recommendations

Strategies for performance and quality

Working on key-concepts

Participatory reseach

Policy recommendations on seed, research and food system

Broaderning crop diversity

Multi-actor and transdisciplinarity

Social organisation

Economic impact

Culture about food

4 species

7 species

15 species

The concept of **“multi-actor approach”,** a practical translation of the interactive innovation,

Concept introduced for the first time in the Horizon 2020 work programme 2014-2015

under the Societal challenge addressing agriculture and forestry

https://ec.europa.eu/eip/agriculture/sites/agri-eip/files/eip-agri_brochure_multi-actor_projects_2017_en_web.pdf

BEFORE the project

Farmers rediscover the species, initiated the actions several years ago, and first collection

Project Activities

Scientists enhanced the research of genetic resources

They experiment together on farm new forms of diversities conceived together

Scientists adapt experimental design and analysis to on farm conditions

They organise together groups for end-use evaluation

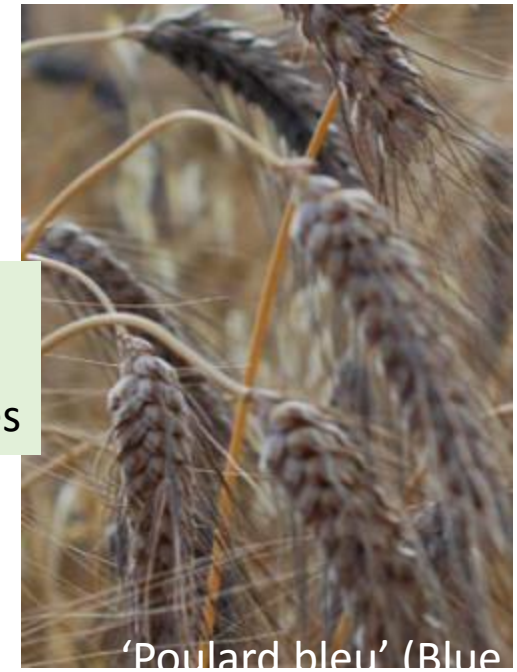
Farmers determined qualities and bottlenecks

Millers, bakers, artisans experiment new technics and recipes

A complementary roles in order to be efficient all along the food chain

Example of Rivet wheat: to re-discover, to evaluate to breed new populations, to innovate for diversified end-use qualities

From genetic resources



'Poulard bleu' (Blue

To products

Bread and pasta with Poulard wheat from Triptolème association, a farmers-bakers' association in France

SOLIBAM strategies for farmers

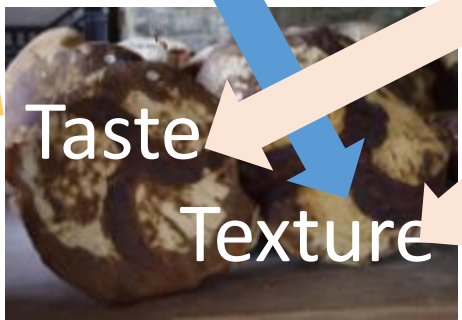
On farm strategies to manage quality of bread for farmer-baker

Variety

Practices

Environment

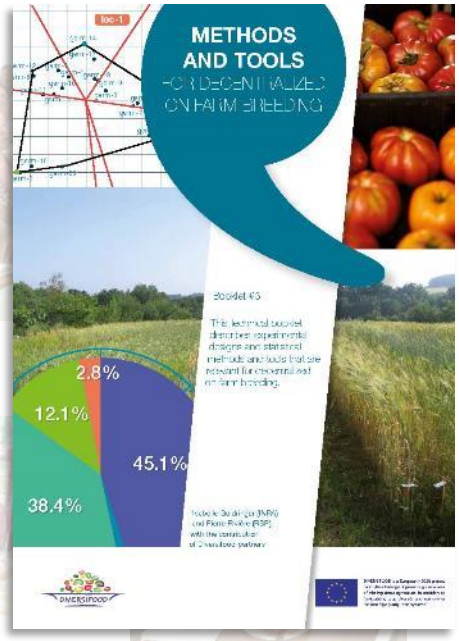
Miller – bakery



New approaches of plant breeding for diversified and high quality food

DIVERSIFOOD

New approaches of experimentation for diversity and sustainable farming system



DIVERSIFOOD

Emergence of common culture and research organisation

Similar organisations and questions for different species

generation of co-ownership of concepts

Collecting knowledge on seed conservation, collective organisation of on farm breeding, policy recommendations

cross-fertilisation of ideas between actors

Market organisations, cost studies, questions of labelling, policy recommendations

Analysis, synthesis and actions

Creation of new diverse populations

(heterogeneous and evolving)

Our sources of diversity

Seed from genetic resources centres

Seeds of gardeners

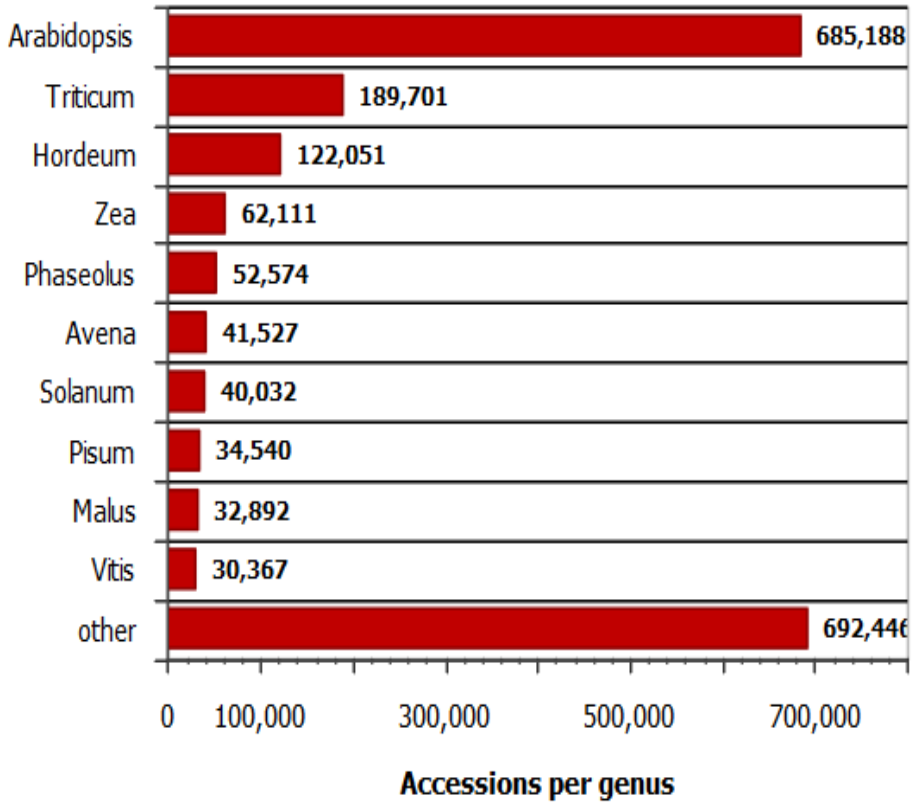
Forgotten varieties come back to field and creation of new one

Seed from peasants

Looking for diversity and evaluation: a continuous process

Genetic resources have been stored from about 1970 in Europe

eurisco
Finding seeds for the future



Community seed banks

On-farm plant breeding and seed multiplication

Learning together

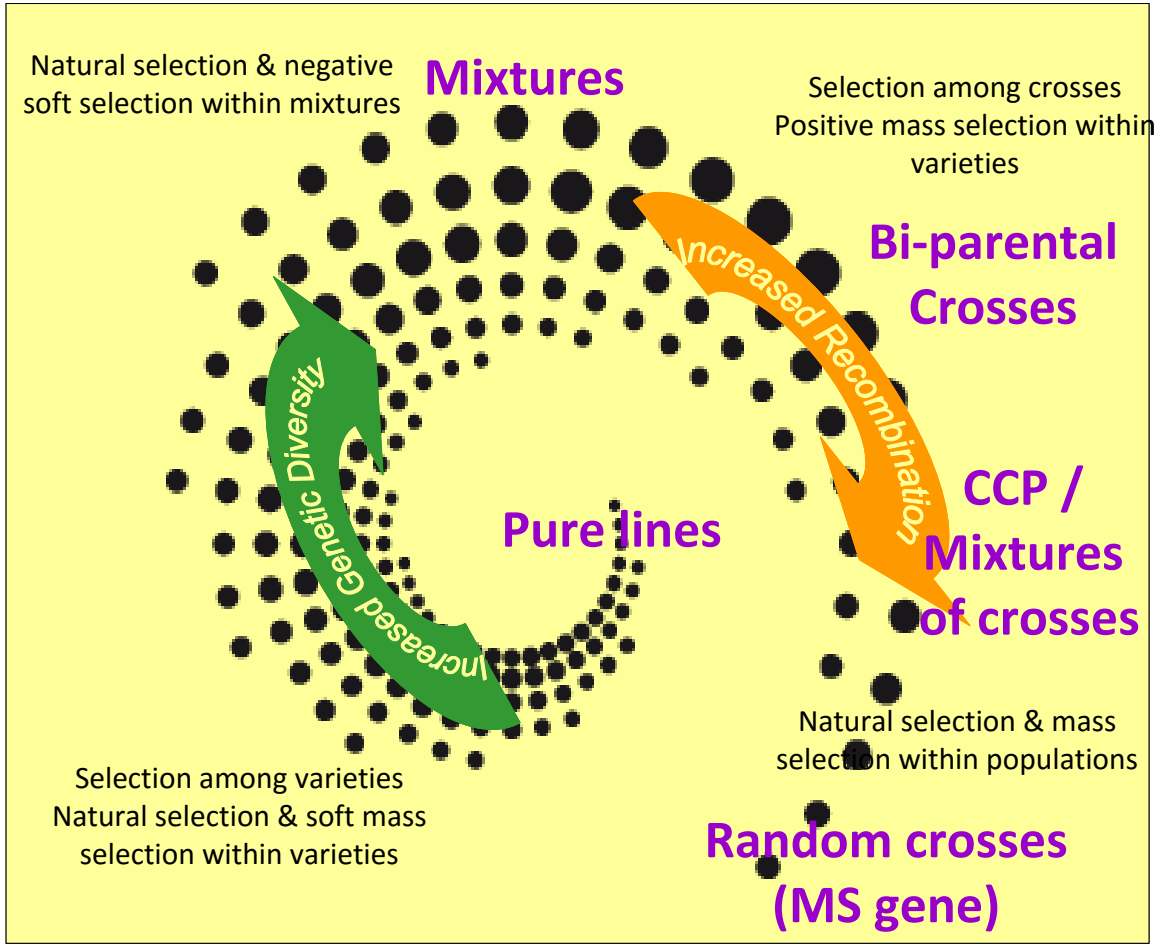
Jean-Martial Morel ‘s farm
Chavagne-France
15 September 2020
Kaol Kozh meeting

Carrots collection

September 15th 2020

Chavagne
France

Farmers and breeders grow / breed a range of populations / heterogeneous « varieties »



(E Serpolay)

=> a range of management approaches has been developed including those based on social organisation

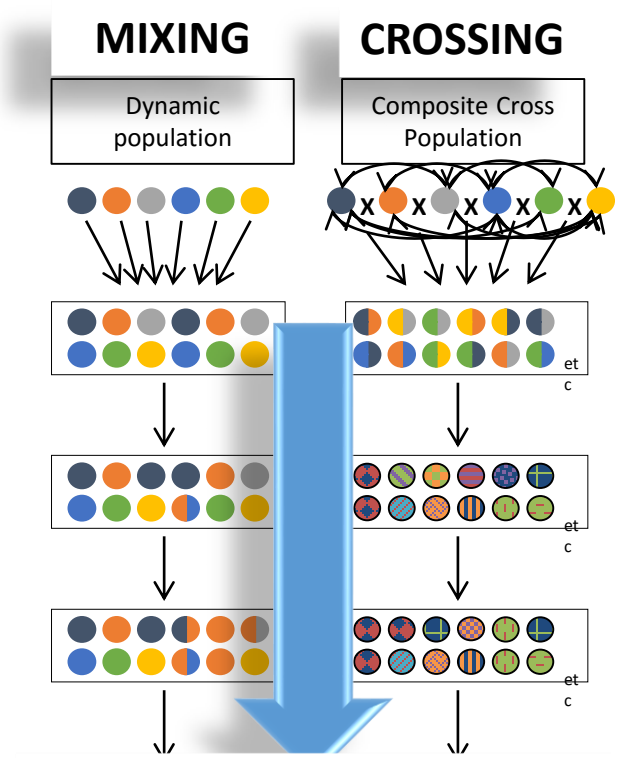
Solibam

Exploring collectively new methods to recover diversity

2 examples

DIVERSIFOOD

COBRA Coordinating Organic Plant Breeding Activities for Diversity



Creating new populations on farm

Solibam

DIVERSIFOOD

Actors of maize groups

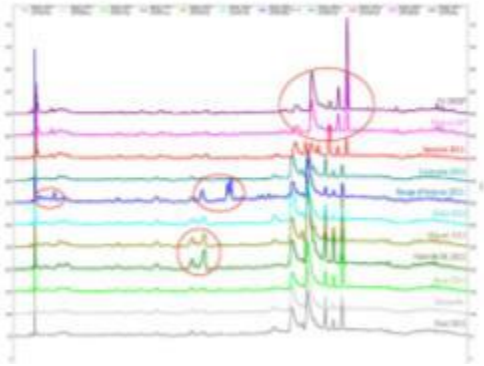
Bakers, caterers, chefs, peasants, researchers, consumers…

Quelles qualités ?

Transformation
- mouture
- préparation en cuisine

Organoleptique
- tests de dégustations avec des consommateurs

Nutritionnelle
- protéine
- antioxydants
- polyphénols...



Examples with 3 varieties

Agurtzan (French)

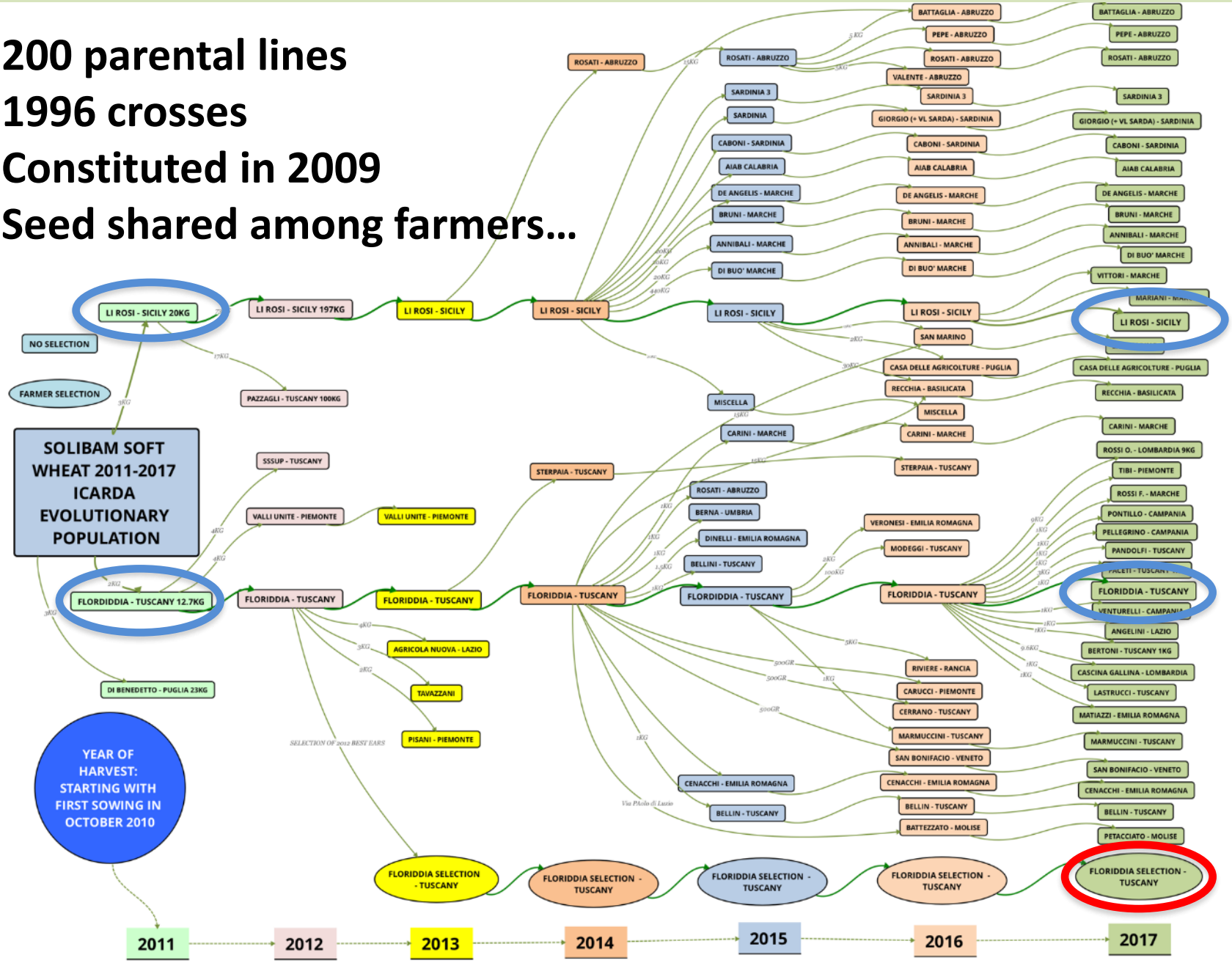
Sponcio (Italy)

From on-farm research to new seed law for organic agriculture

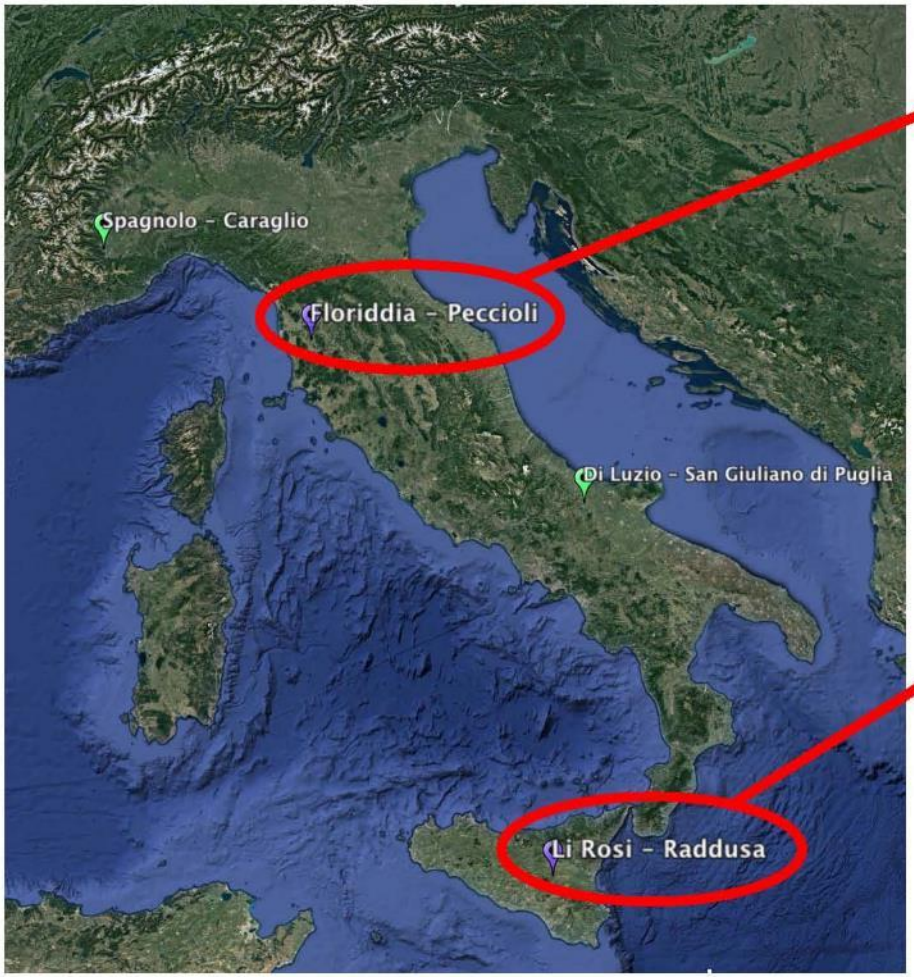
The recognition of the need for diversity

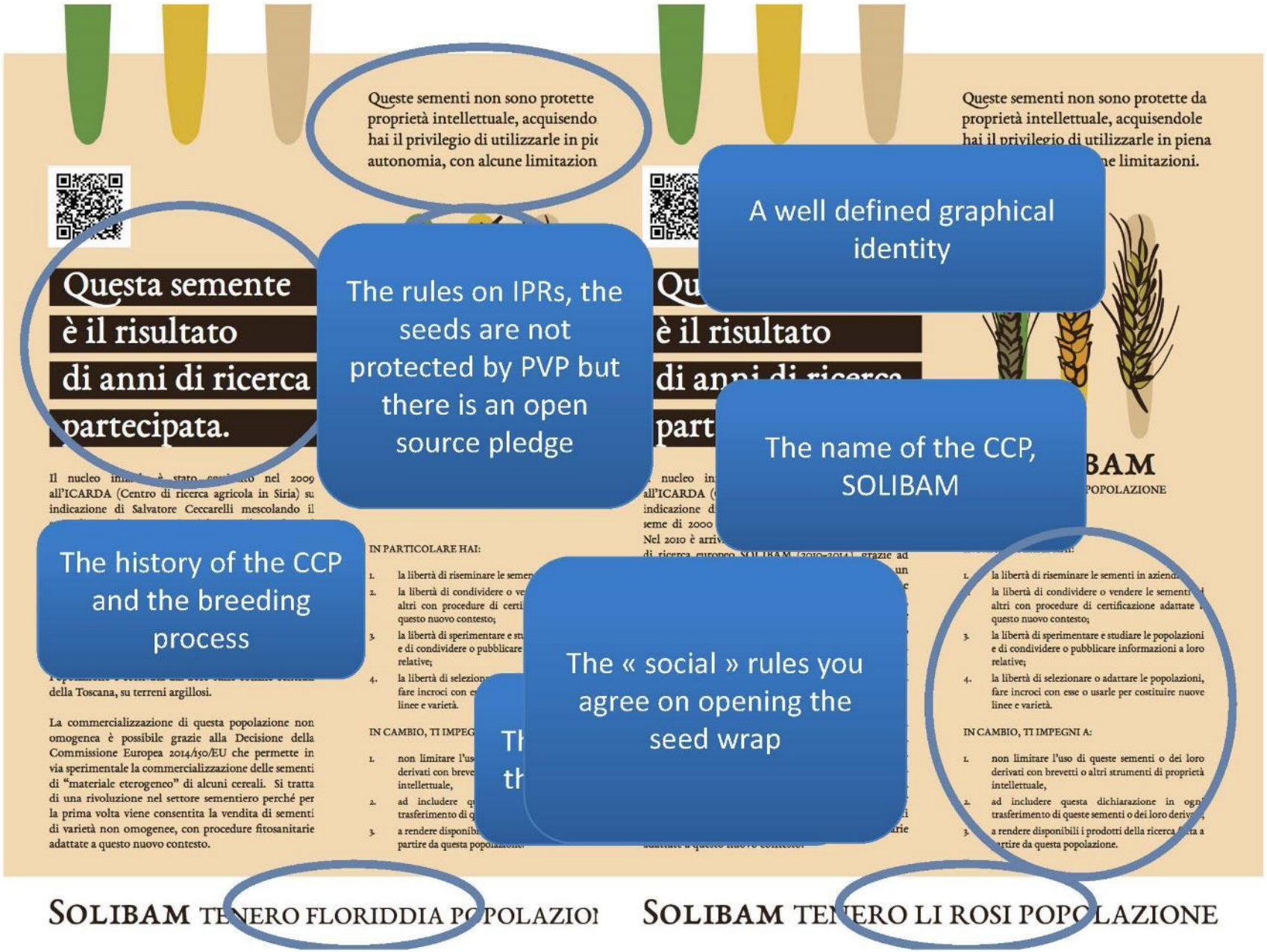
SOLIBAM Bread Wheat Evolutionary Population

- 200 parental lines
- 1996 crosses
- Constituted in 2009
- Seed shared among farmers…



Assessing adaptation of same Evolutionary Population (EP) to two different regions

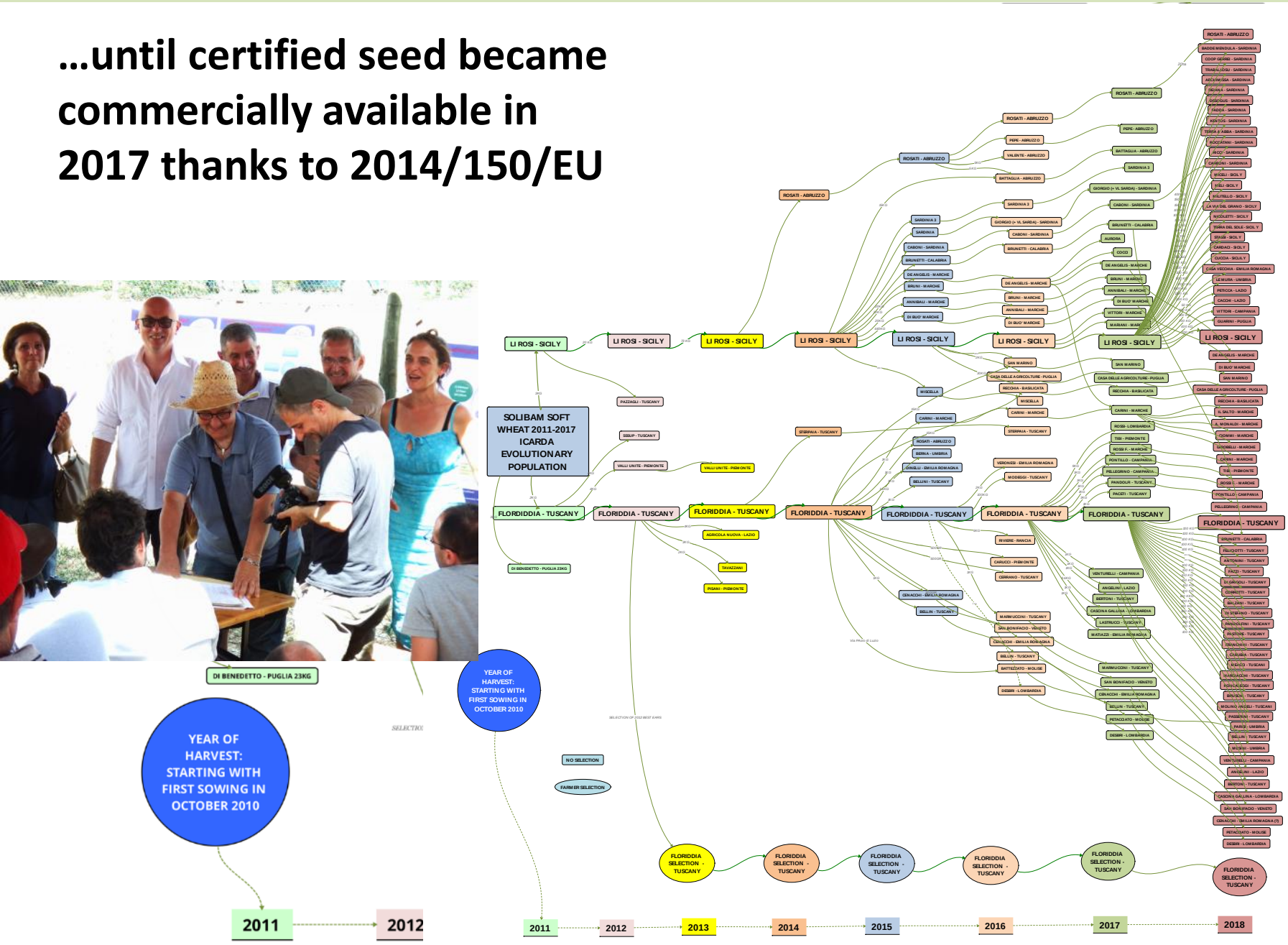



Queste sementi non sono protette
proprietà intellettuale, acquisendo
hai il privilegio di utilizzarle in pie
autonomia, con alcune limitazion
Questa semente
è il risultato
di anni di ricerca
partecipata.
Il nucleo in
all'ICARDA (Centro di ricerca agricola in Siria) su
indicazione di Salvatore Ceccarelli mescolando il
della Toscana, su terreni argillosi.
La commercializzazione di questa popolazione non
omogenea è possibile grazie alla Decisione della
Commissione Europea 2014/150/EU che permette in
via sperimentale la commercializzazione delle sementi
di "materiale eterogeneo" di alcuni cereali. Si tratta
di una rivoluzione nel settore sementiero perché per
la prima volta viene consentita la vendita di sementi
di varietà non omogenee, con procedure fitosanitarie
adattate a questo nuovo contesto.
IN PARTICOLARE HAI:
1. la libertà di riseminare le semen
2. la libertà di condividere o ve
altri con procedure di certi
questo nuovo contesto;
3. la libertà di sperimentare e st
e di condividere o pubblicare
relative;
4. la libertà di selezion
fare incroci con e
linee e varietà.
IN CAMBIO, TI IMPEG
1. non limitare l'us
derivati con breve
intellettuale,
2. ad includere q
trasferimento di q
3. a rendere disponibi
partire da questa popol
SOLIBAM TENERO FLORIDDIA PO POLAZIOI
Queste sementi non sono protette da
proprietà intellettuale, acquisendole
hai il privilegio di utilizzarle in piena
ne limitazioni.
Qu
è il risultato
di anni di ricerca
part
nucleo in
all'ICARDA (
indicazione d
seme di 2000
Nel 2010 è arriv
di ricerca europeo SOLIBAM (2010-2014), grazie ad
un
BAM
POPOLAZIONE
1. la libertà di riseminare le sementi in azien
2. la libertà di condividere o vendere le sementi
altri con procedure di certificazione adattate
questo nuovo contesto;
3. la libertà di sperimentare e studiare le popolazioni
e di condividere o pubblicare informazioni a loro
relative;
4. la libertà di selezionare o adattare le popolazioni,
fare incroci con esse o usarle per costituire nuove
linee e varietà.
IN CAMBIO, TI IMPEGNI A:
1. non limitare l'uso di queste sementi o dei loro
derivati con brevetti o altri strumenti di proprietà
intellettuale,
2. ad includere questa dichiarazione in ogn
trasferimento di queste sementi o dei loro deriv
3. a rendere disponibili i prodotti della ricerca
partire da questa popolazione.
SOLIBAM TENERO LI ROSI POPOLAZIONE
A well defined graphical identity
The rules on IPRs, the seeds are not protected by PVP but there is an open source pledge
The name of the CCP, SOLIBAM
The history of the CCP and the breeding process
The « social » rules you agree on opening the seed wrap

From seed to flour..

SOLIBAM Bread Wheat Evolutionary Population

…until certified seed became commercially available in 2017 thanks to 2014/150/EU



The new Organic Regulation (EU 848/2018) has given a place to diversity

It has recognised that

"Research in the Union on plant reproductive material that does not fulfil the variety definition as regards uniformity shows that there could be benefits of using **such diverse material**, in particular with regard to organic production,

for example to reduce the spread of diseases, to improve resilience and to increase biodiversity.

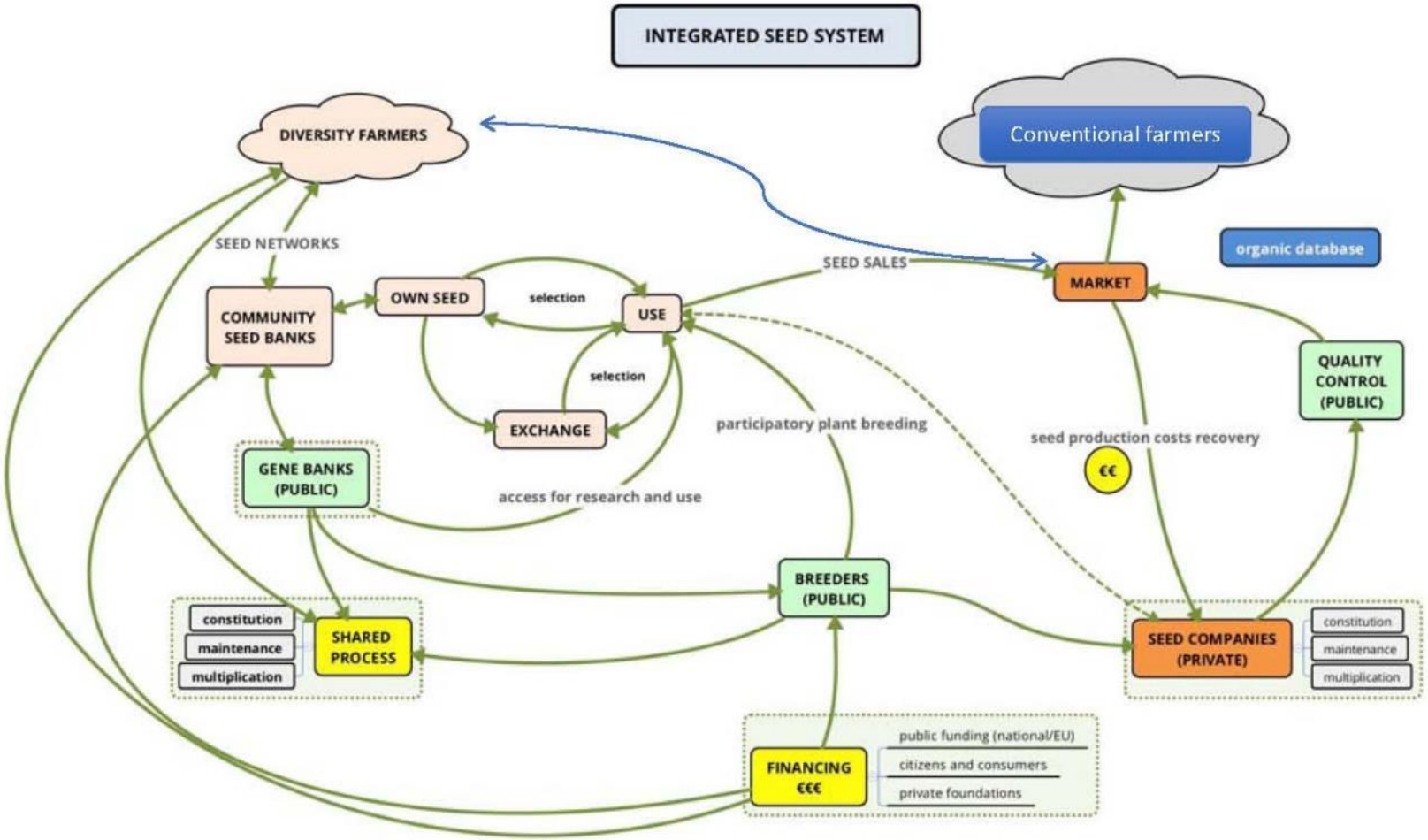
The inclusion of Organic Heterogeneous Material (OHM)

in the new Organic Regulation will however enable certification of genetically heterogeneous seeds via organic certification.

- OHM has a broader definition than that of heterogeneous populations within 2014/150/EU, with no quantitative limitations and covers all crop species.

Complex seed situation in Europe

"artisan-semenciers"



LIVESEED

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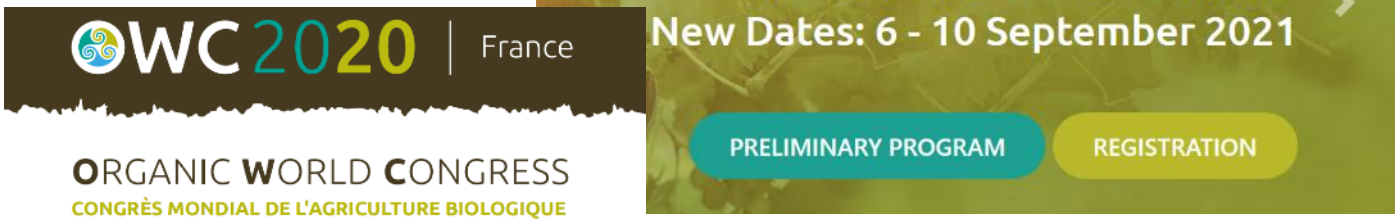

https://owc.ifoam.bio/2020/

NEW DATES!

6-10 SEPTEMBER 2021

RENNES, FRANCE

Couvent des Jacobins Congress Center

6-7 SEPT. 2021	PRE-CONFERENCES
7 SEPT. 2021	OPENING CEREMONY (IN THE EVENING)
8-10 SEPT. 2021	CONFERENCES
Date TBC	TOURS AND VISITS / GENERAL ASSEMBLY (IFOAM - ORGANICS INTERNATIONAL)

https://www.voyageenterrebio.org/le-congres/


Merci de votre attention