Participatory research for organic agriculture:
the case of Brassica plant breeding in Brittany

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INRAE

30 November 2020

Online Postgraduate course

Participatory Plant Breeding & Resilient Seed Systems:

Options for Stakeholder Engagement and Benefit Sharing

30 November – 4 December 2020

DYNAVERSITY

This project received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement n. 773814

Content

1. General context and objectives
2. One example: creation of the « bricoli »
3. Evolution of the collective organisation, emergence of the Community Seed banks of Kaol kozh
4. Activities of Kaol kozh, the seed association which had emerged from participatory researches

Some words about Brittany in France

- North of Brittany, specialized in vegetable production and mainly cauliflowers.
- The oceanic climate allows cauliflower/cabbage production in autumn, winter and spring.
- Since the end of the 19th century, Brittany has developed this production
  - which increased mainly since 1960
  - and then, at the end of the eighties, when the F1 hybrid types were generalized.

Brittany and organic farming

- Even if Brittany underwent a great intensification of its agriculture in the second half of the 20th century, this region of France was involved in organic agriculture very early.
- With 2,730 farms involved in organic production, **8% of Breton farms are organic**
- Main activity of Breton organic farms (on 01.01.18): dairy cattle: 771 (28%), **vegetables: 655 (24%)**

The beginnings in the years 2000

In Europe, when the EU Regulation 1452/2003 requiring the use of organic seed for planting went into force, organic seed professionals were not ready to fulfil the demand.

- In Brittany, a group of organic farmers and their organisations started to meet with researchers and to build Participatory Plant Breeding projects.
- for the Brassica species, most modern varieties did not fit to the principles of Organic Agriculture.

Modern Brassica varieties: for uniformity and stability

- Most seed companies have based the creation of F1 hybrid varieties of Brassicas (cauliflower, cabbage, broccoli…)
- The seed companies are mostly using the cytoplasmic male sterility (CMS) obtained from Ogura radish.

The recent selection of cauliflowers in Brittany

Before 1980

Step 1 "Population improvement"

- mass selection and on farm seed production

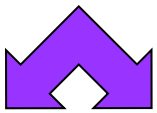
After 1980

Step 2 "Creation of homogeneous varieties"

- creation of F1 hybrid varieties

21st century

Step 3 : two opposite trends



« modern varieties with biotechnologies »	« open pollinated populations »
Professional selection - mostly large international groups	Farmer and professional selection - local or independent structures

Genetic resources evaluation

Breton Brassica landraces stored in 1983 at INRA, thanks to an European program supported by ECP-GR (*European Cooperative Program for Crop Genetic and Resources Networks).*

Evaluation of landraces of autumn and winter cauliflowers, and some local cabbages

- from Genebanks INRA Rennes
- from HRI Wellesbourne (UK), CGN Wageningen (NL), GEVES (France), and breeders

2000 – 2020 : All Brassica actions

White breton cauliflower

Cabbage of Lorient

Evaluation of local genetic resources

- Re-Discovering of our patrimony
- Exploring other forms/landraces of Brassica

Di Jesi Cauliflower

Selection and adaption of landraces from genebanks

- Modifying few characters (colors, size, earliness, homogeneity)

Cape broccoli

Creation of new types

- The “bricoli” of Kaol kozh

Bricoli

The “bricoli”

The idea: a good broccoli easily recognizable for organic farmers and consumers

Should associate:

- ✓Good taste of sprouting broccoli
- ✓Easy to harvest
- ✓Good local adaptation
- ✓And specific color

Ten years selection

Begun with SOLIBAM (EU project)

And was finalized by one farmer of Kaol kozh during DIVERSIFOOD

LES PARENTS

Brocoli à jets
'Di Cicco'

For the good taste

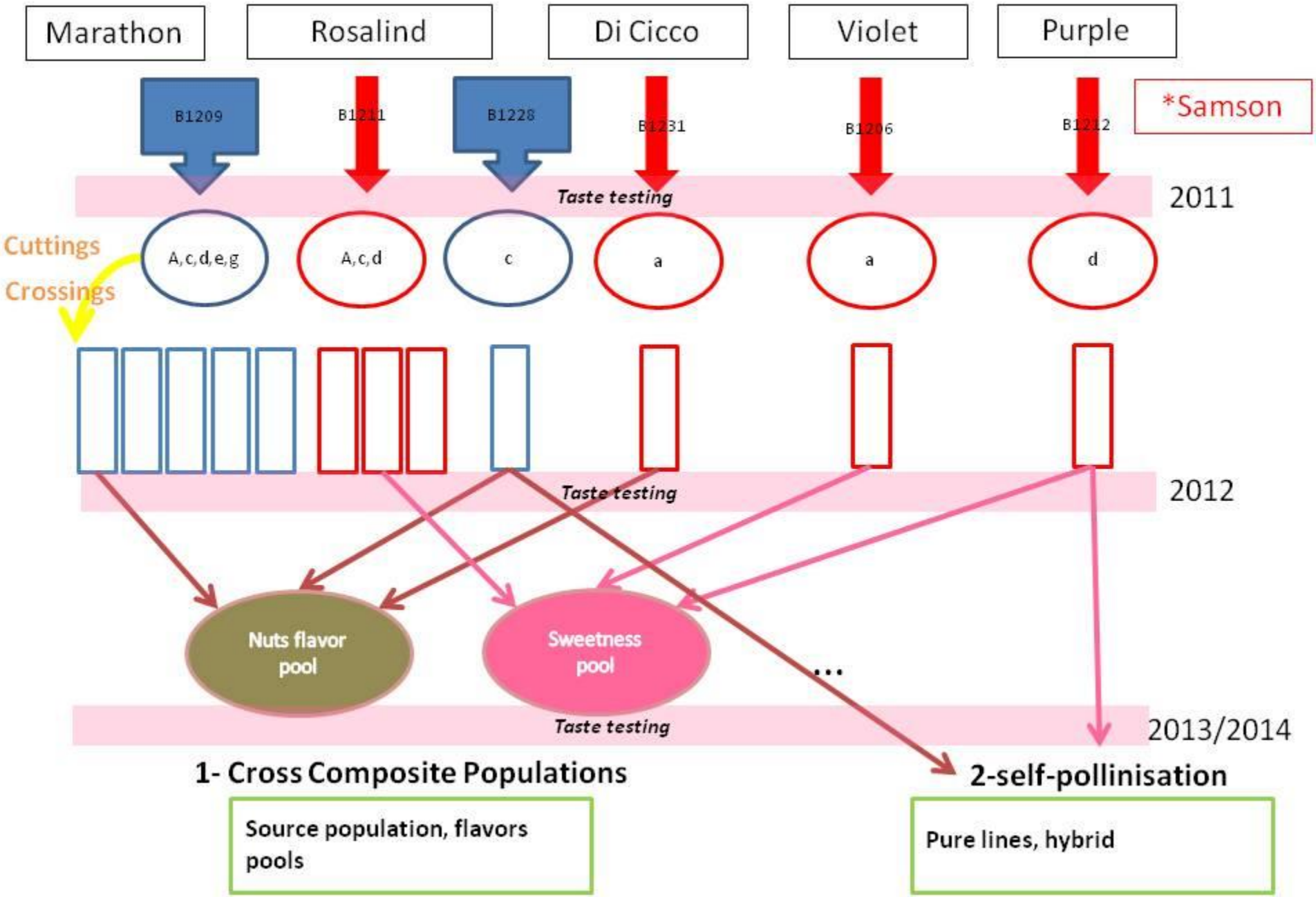
Pomme ronde et verte
'Marathon'
'Samson'

For the shape

Pomme ronde et violette
'Purple cape'
'Rosalind'
'Viola'

For the nice colour

SOLIBAM Breeding stategy: Brocoli



PhD Camille Vindras

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Sous le label de l'Université Européenne de Bretagne

pour obtenir le diplôme de :

DOCTEUR DE L'INSTITUT SUPERIEUR DES SCIENCES AGRONOMIQUES, AGRO-ALIMENTAIRES, HORTICOLES ET DU PAYSAGE

Spécialité : « Nom de la spécialité »

Ecole Doctorale : « VIE AGRO SANTE»

présentée par :

« CAMILLE VINDRAS-FOUILLET »

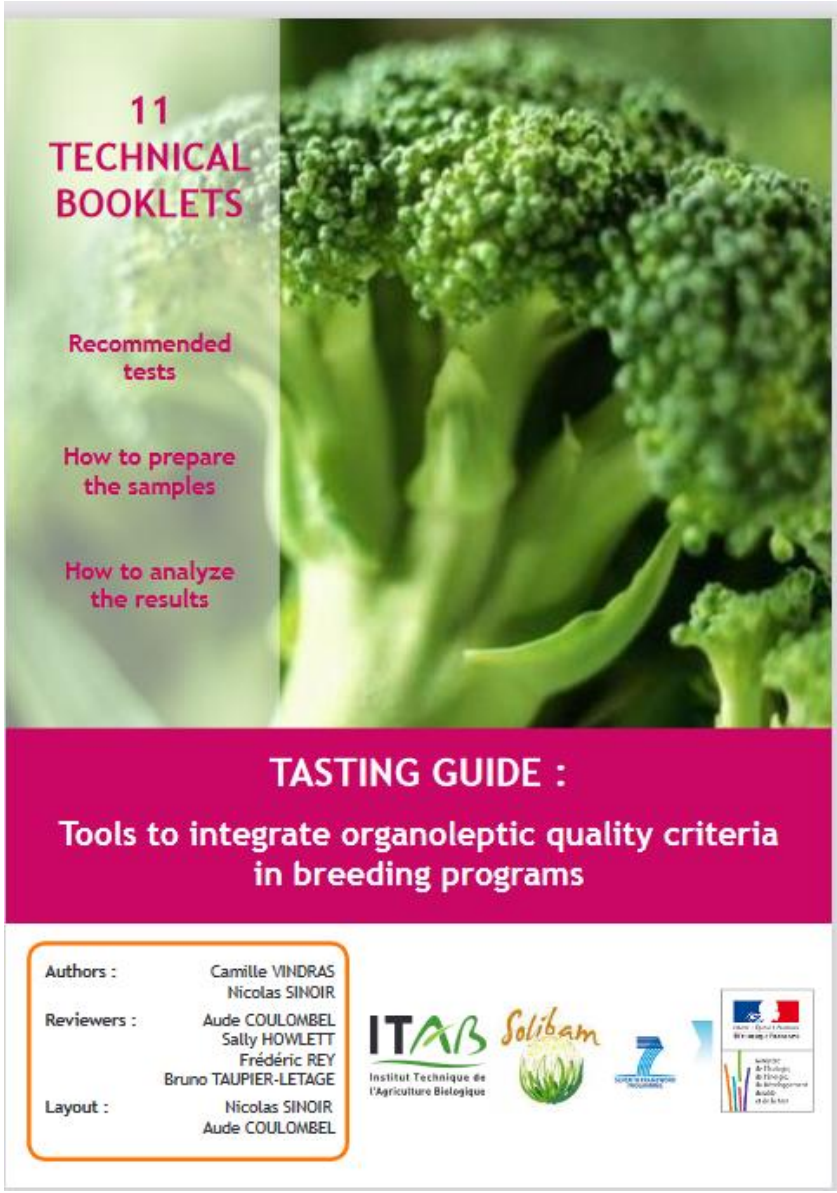
EVALUATION DE LA QUALITE SENSORIELLE DE PRODUITS POUR LA SELECTION PARTICIPATIVE EN AGRICULTURE BIOLOGIQUE : CAS DU BLE ET DU BROCOLI

soutenue le 17 décembre 2014 devant la commission d'Examen

Composition du jury :

Directrice de thèse	Véronique CHABLE	Ingénieur de recherche (INRA)
Rapporteurs	Laurent HAZARD	Directeur de recherche (INRA)
	Giovanni DINELLI	Professeur (Université de Bologne)
Examinateurs	Maria MANZANARES-DAULEUX	Professeur (AGROCAMPUS OUEST)
	François HUSSON	Professeur (AGROCAMPUS OUEST)
	Estelle MASSON	Maître de conférences (UBO)
	Bruno TAUPIER-LETAGE	Ingénieur agronome (ITAB)

ITAB



Taste testing

2013/2014

1- Cross Composite Populations

Source population, flavors pools

2-self-pollinisation

Pure lines, hybrid

Plouescat – West Brittany

Chavagne – East Brittany

Eyragues – South of Franc

On-farm breeding

PAIS

2015 and 16

No seeds at Jean-Martial farm

2014

Gautier Semences: trials with 4 lines and 15 F1 Hybrids

No more news for the seed company

Mass selection

2019

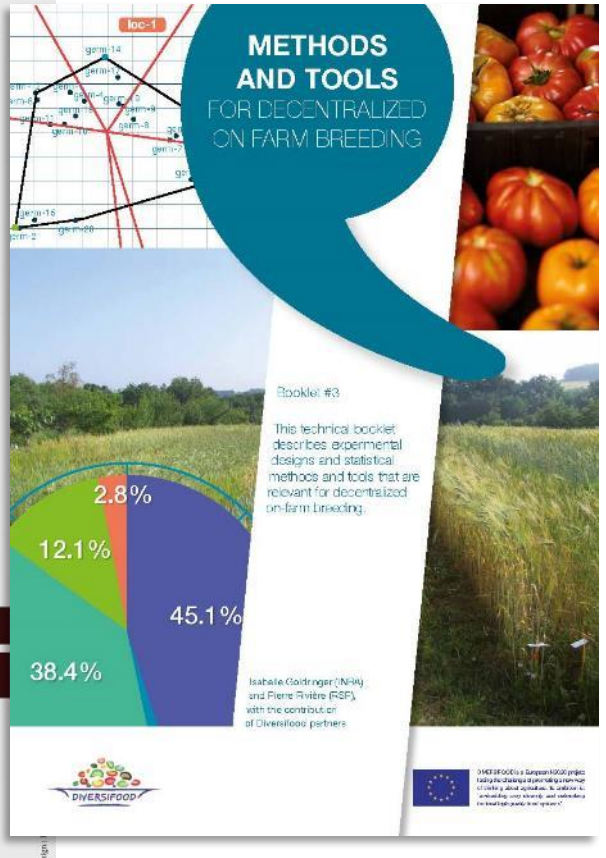
Creation of the “bricoli” at René Léa’ s farm
Sold on farm and for restaurants

DIVERSIFOOD - New approaches of plant breeding for diversified farming system

➡ Experimenting tools from fields to products

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

New approaches of plant breeding for diversity and sustainable farming system



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Collective organisation

- From the PAIS (Plateforme Agrobiologique d'Initiative Bio Bretagne à Suscinio)

- to the Maisons de Semences Paysannes (Community seed banks)

Une maison pour les semences à Roscoff

Portrait

L'association KAOL KOZH (vieux chou en breton et bien commun en russe) porte un

de légumes méconnus du grand public : choux de Lorient, de Plonjean ou Bacalan de Rennes,

véritable aubaine pour Kaol Kozh mais aussi pour la ville de Roscoff. Ainsi, en 2019, la première

The PAIS

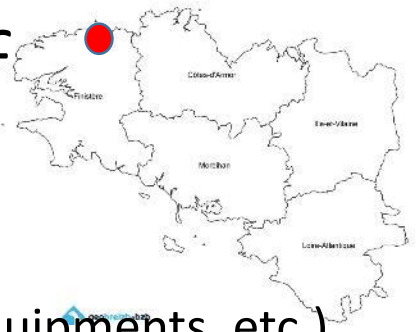
Plateforme Agrobiologique
d'Initiative Bio Bretagne à Suscinio

- Created in 2000
- First PBB program in 2001 for organic cabbages and cauliflowers in 2001.
- The aim was to include all concerned actors (farmers, processors, traders, trainers, researchers…) in defining the objectives and the means to reach them.

6 hectares of open field
and 800 m² of plastic greenhouse

Creation of Kaol kozh in 2007

Maison des semences in Roscoff (Community seed banks)



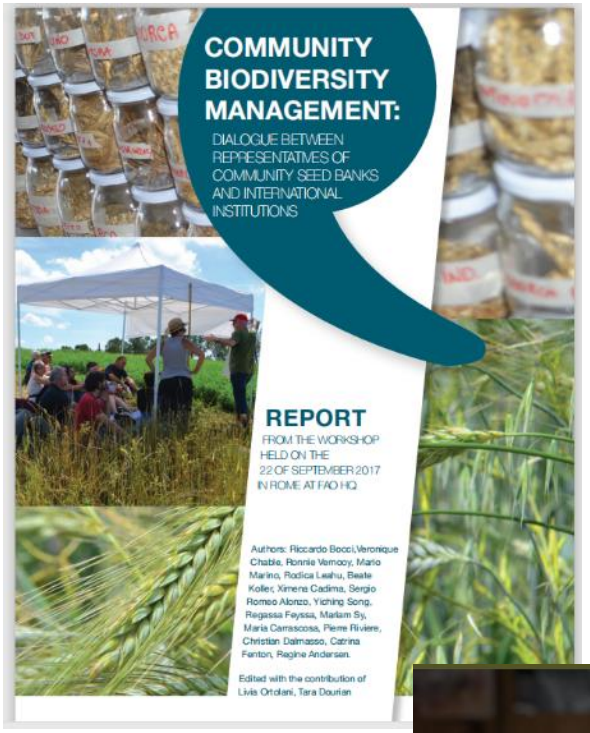
- A **professional** meeting point (access to seeds and technical equipments, etc.)
- A **training cent**er on seeds production and organic practices (for gardeners and professionals) with meeting room, practical work room, practical workshops
- A **varietal trials** and **seed production** area
- A **showcase garden** for the large public (with production of vegetables and their se aromatic plants, flowers, and sensory testing)
- A shop to buy peasant seeds for gardeners
- A **documentary center**, with access to various resources (books, DVDs, etc.) on peasant seeds
- Events throughout the year:
  - plant fair, farmers market,
  - art exhibitions,
  - open houses, seed barter,
  - Peasant Seeds festival ...
- A simple restaurant with local products from farmers' seeds

https://www.roscoff-tourisme.com/fr/a-voir-a-faire/visites-et-decouvertes/a-visiter/la-maison-des-semences-kaol-kozh/

Kaol kozh, the association that cultivates as formerly

Roscoff. Kaol Kozh, l'association qui cultive comme avant

Kaol Kozh a obtenu un emplacement à Roscoff (Finistère) en juin 2019. Depuis, le jardin s'épanouit à vue d'œil, et abrite des légumes de tous les horizons.



DIVERSIFOOD

DIVERSIFOOD and DYNAVERSITY

2020: the PAIS has been recently closed

pressreader

Se connecter

Langue et région
France (Français)

Pour Vous

Fil d'actualités

En Manchette
Conseillé
Politique
Économie
Technologie
Santé
Sport
Sciences

Résultats de recherche

Le Télégramme - Morlaix

Initiative Bio Bretagne ferme sa station de Suscinio

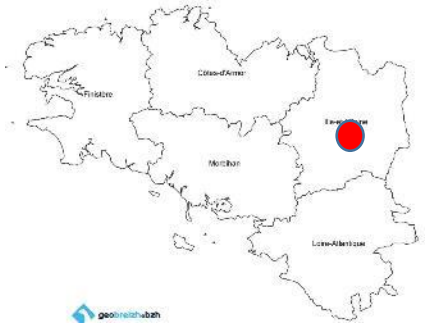
Initiative Bio Bretagne (IBB) a voté la fermeture de la plateforme agrobiologique de Suscinio au 31 décembre 2020.

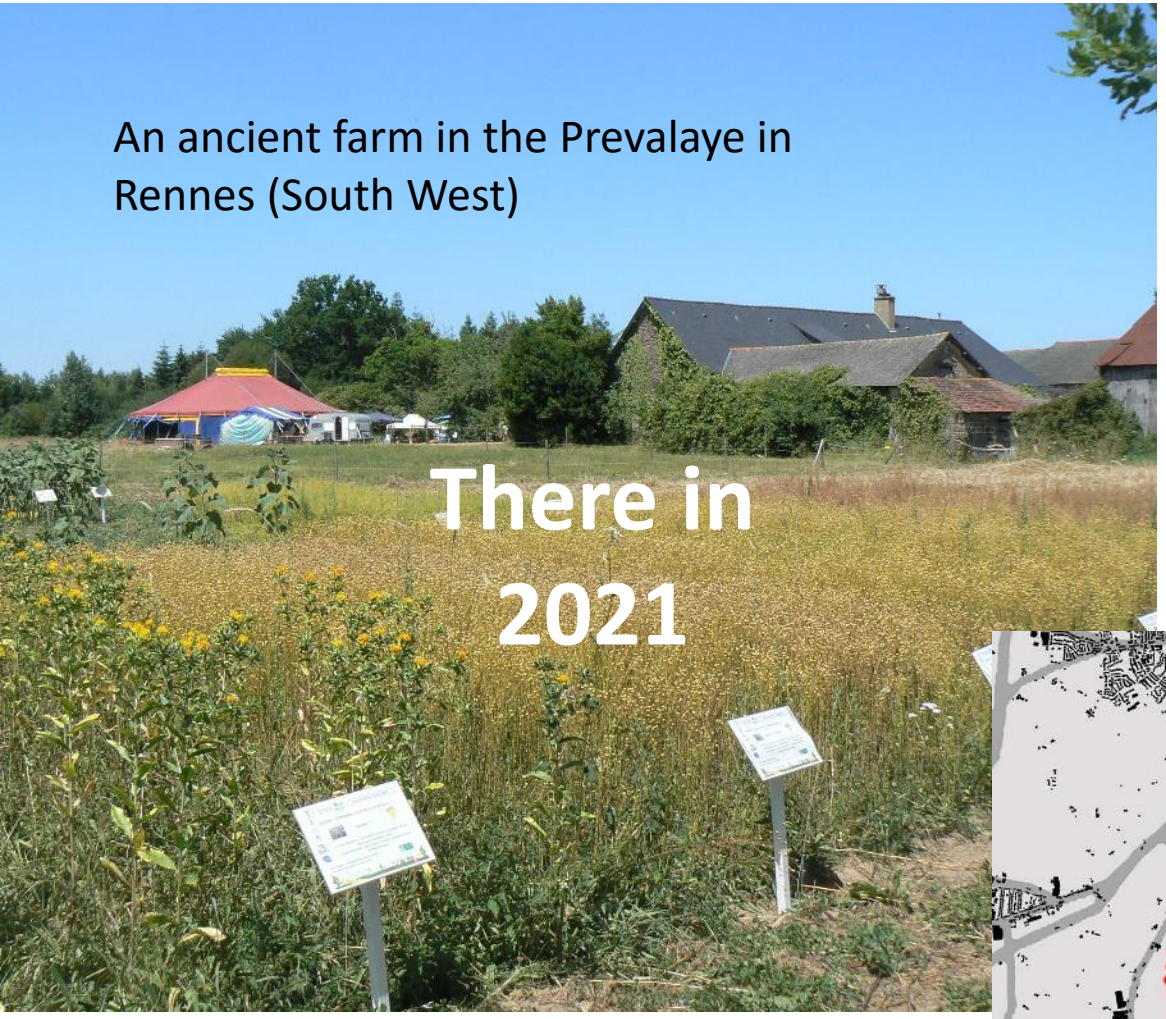
18 sept. 2020 +5 plus

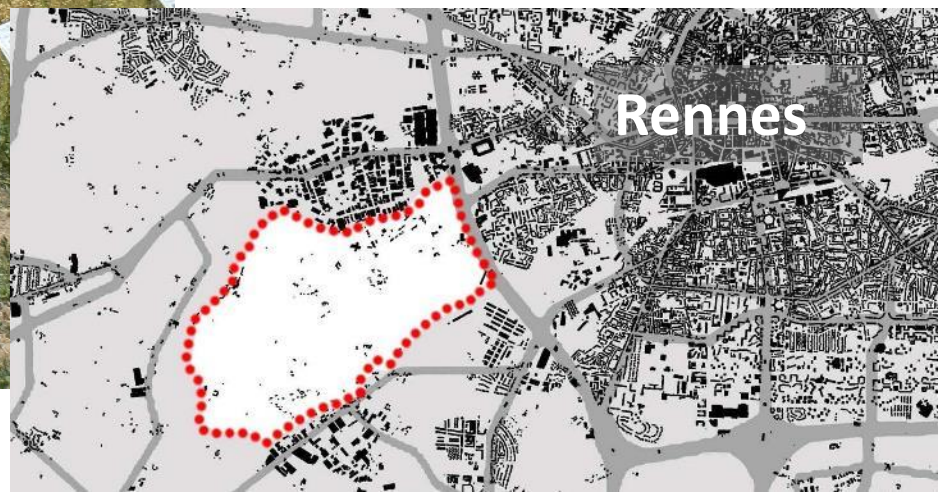
Créée il y a 20 ans, la plateforme agrobiologique d'Initiative Bio Bretagne (IBB) de Suscinio (PAIS), à Morlaix, a été initiée par la volonté politique d'indépendance des producteurs de légumes bretons en matière d'expérimentation 100 % biologique. Au fil des ans, la PAIS a été reconnue au niveau national, sans toutefois parvenir à trouver sa place technique au niveau régional. Ces deux dernières années, la fragilité de ses financements s'est accentuée, et en particulier suite au redressement judiciaire de l'Institut technique de l'agriculture biologique, partenaire pilote sur plusieurs projets. De plus, malgré les sollicitations d'IBB, les organisations de producteurs se sont éloignées de leur outil, ce qui a fini de cristalliser la situation.

Une décision unanime, prise avec « beaucoup de regrets » Lors de la journée « Goûtez la recherche en bio

Second Maison des semences in Rennes





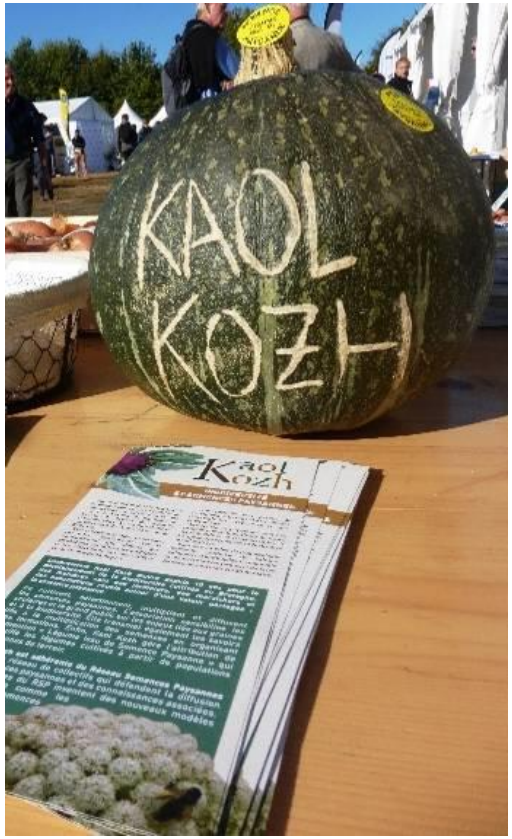


And then at the same place, a « Maison du vivant »

- **For our INRAE team** (cultivated biodiversity and participatory research)
- Local link between the projects: “Prévalaye”, Kaol kozh and other initiatives
- Actions from local to international, to support the enlargement of cultivated diversity stored in genebanks
- Scientific and cultural animation for a holistic approach to organic food systems
- An anchoring in a territory of sciences renewed by the citizens for a collective project

Brassica breeding in a network of Kaol Kozh

In Brittany (France) since 2007



Association KAOL KOZH
Un patrimoine vivant, les semences en héritage

A living patrimony,
seeds as a heritage

The members

About 200 members
All forms of marketing are represented

What are doing Kaol Kozh ?

- Management of the mention/label « Légume issu de Semence Paysanne » (*Vegetable from peasant seed*)
- Experimentation
- Multiplication and dissemination of seeds
- Looking for adapted machinery and sharing equipment
- Training and communication
- Setting of collective places for our « Community Seed Banks »

Kaol Kozh is managing a mention « Légume issu de Semence Paysanne »

Vegetable grown from peasant seed

30 candidate farms in 2020

Committee
of evaluation

Attribution of the mention
« Légume issu de Semence Paysanne »

COOP BIOBREIZH

Direct selling
CSA/Amap

Local stores

Biocoop

Organic chains

Carrefour
BioBreizh

Local marketing

Long distribution channels

Experimentation, plant breeding and seed production
on several species over whole Brittany

"ZAD" (in memory of the farmers and activists who have defended the place of Notre Dame des Landes also named ZAD (Area to defend) as the peasant seeds.

An increasing network of farms/gardens for experimentation

- 13 farmers who hosted trials in 2018
- About ten species tested
- From simple characterization to "comparative" testing
- Cabbage, beans, tomatoes, parsnip, zucchini, turnip
- 150 populations observed

Brassica, example 1: Exploring a collection at Chavagne

- From INRA genebank: a collection of best open pollinated varieties from the 70's stored in 1983
- A collection of 65 cultivars, very diverse and original

Pointed head Savoy cabbage

Chou de Pontoise

Large stalks kale (similar to chard)

Baccalan cabbage of Rennes

- Choice of original 7 cultivars adapted to local production
- Collective organization for the first multiplication before mass selection
- Multiplication based on 30 to 50 plants on 7 farms,
- Then mass selection to adapt to new environments and for quality

Early cabbages
(bacalans, douarnenez…)

Now, two exploitation channels:

- **Pontoise cabbage sold by Agrosemens, a small scale seed company (Artisan semencier)**
- **And circulation within KK members and other vegetable growers**

Brassica, example 2: Chou de Lorient (Lorient cabbage)

- Plant breeding to modify the size of a traditional cabbage “Chou de Lorient”
- formerly used to supply, in winter, the sauerkraut manufacturers of Alsace: it is a large cabbage
- some farmers succeeded to reduce its size to be sold to families to be cooked or in salads,
- it is softer and sweeter than many other cabbages on the markets.
- To reach these aims, farmers use mass selection, directly in traditional cultivars

A mass selection

- 15 to 30 plants
- Seed production in plastic greenhouses
- Re-plantation from field to greenhouse after selection OR production of cuttings on mother plants

Cuttings from the base of the roots

Distribution within Kaol kozh members or by small-scale seed companies such as Germinance, Graines del Pais

Our participatory research:

plants
farmers
and researchers together

sharing objectives, actions and making evolve our respective organisations since 2000

DYNAVERSITY