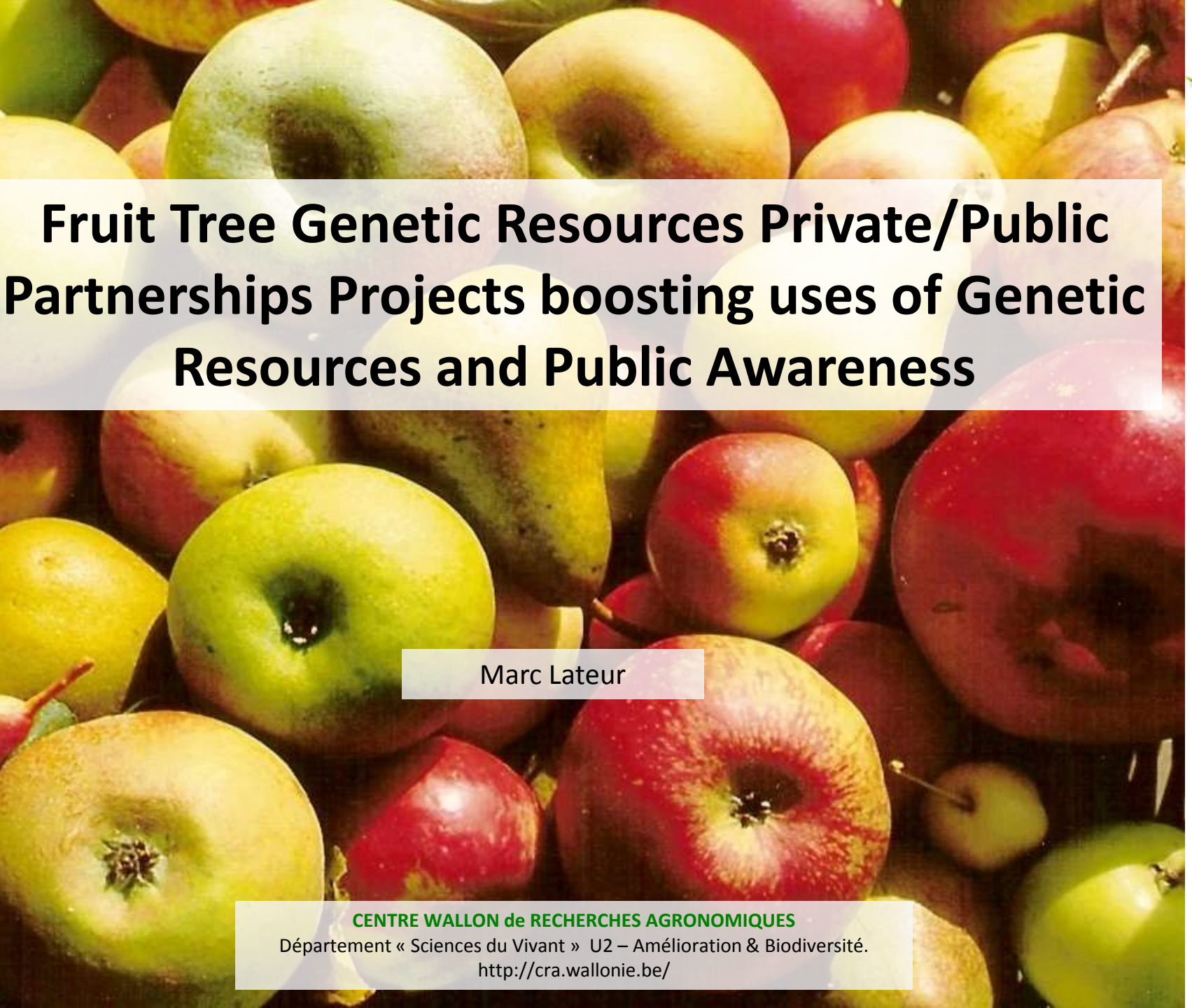


Fruit Tree Genetic Resources Private/Public Partnerships Projects boosting uses of Genetic Resources and Public Awareness

Marc Lateur

CENTRE WALLON de RECHERCHES AGRONOMIQUES
Département « Sciences du Vivant » U2 – Amélioration & Biodiversité.
http://cra.wallonie.be/

cra-w

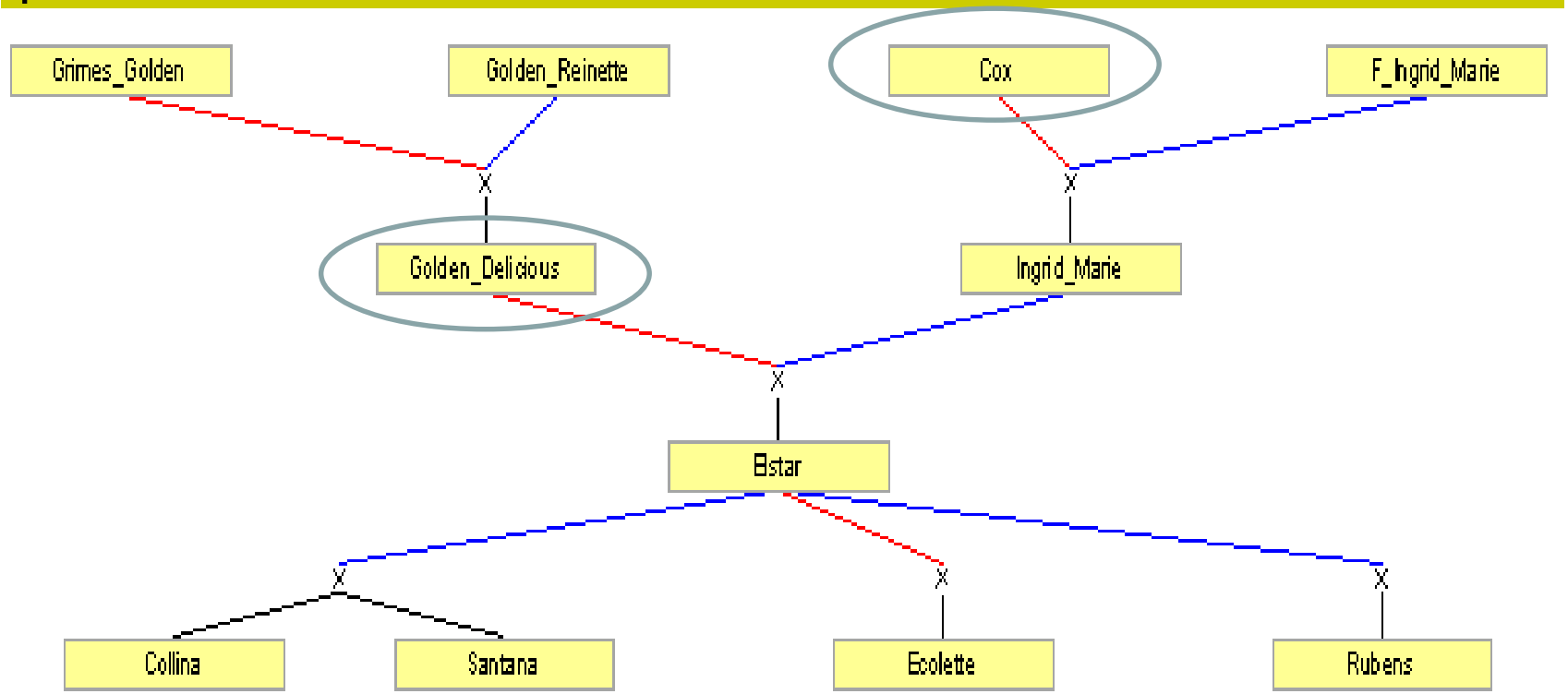
Centre wallon de Recherches agronomiques

Wallonie

1. General context

Commercial apple growing reachs its limits

Commercial cvs have a very narrow genetic base : 5 commercial cultivars → more than 50% of the world apple production

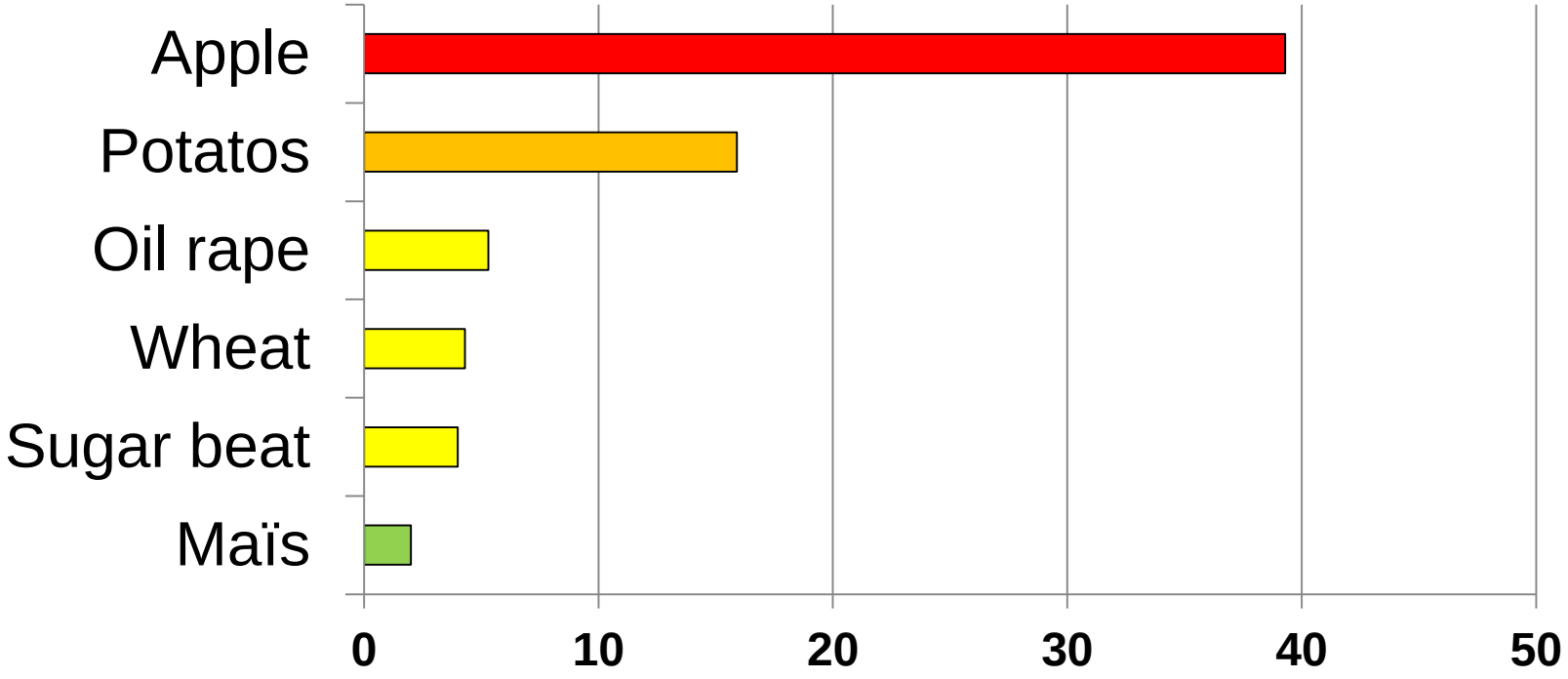


1. General context

Commercial apple growing reachs its limits

Apple growing has one of the highest pesticides input level!

Mean Treatment Frequence Index (Fungicides, Insecticides, Herbicides, Growth regulators) -Sauphanor *et al.* 2009.



cra-w

Centre wallon de Recherches agronomiques

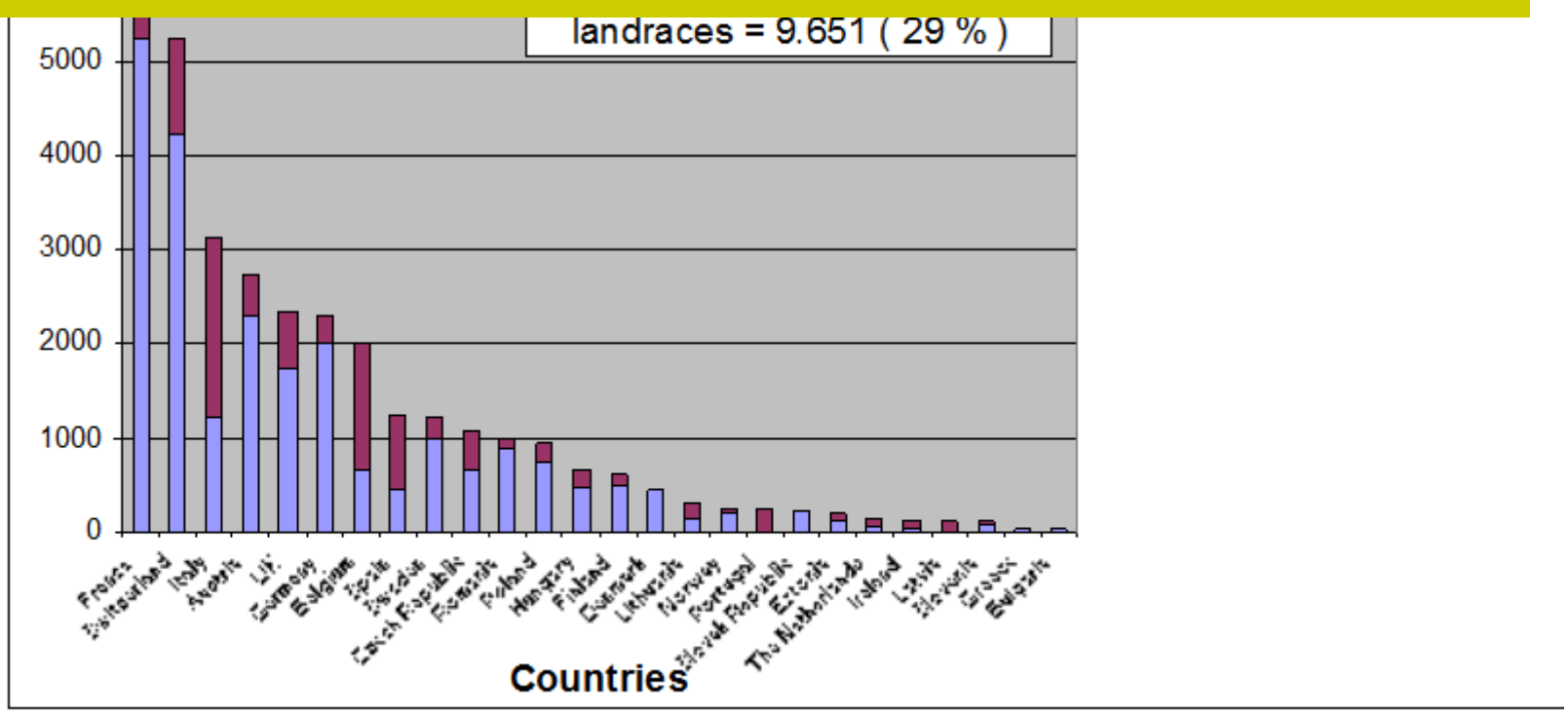
Wallonie

1. General context

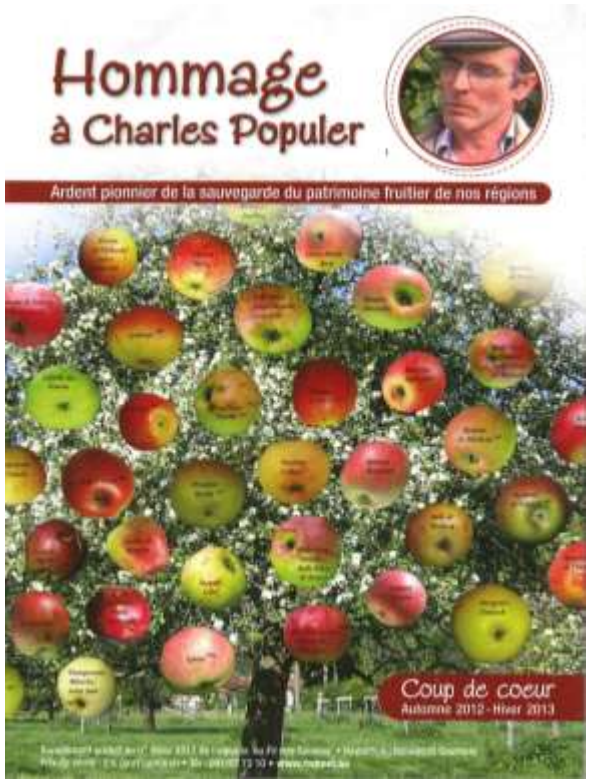
Apple Genetic Resources in Europe : estimation of original accessions - old cvs & 'landraces'

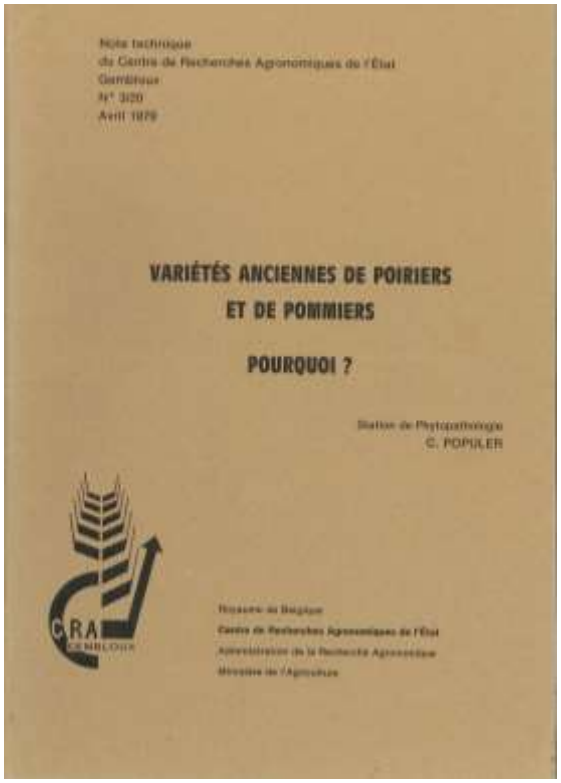
➢ 9651 accessions

Many accessions in Europe – how many are effectively used???



2. Saveguarding Fruit Tree Genetic Resources





Start of a programme for saveguarding Fruit tree Genetic Resources at CRA-W since **1975** :

- Prospections in collections and countryside private orchards.

Evaluation of disease tolerance and agronomic traits in NON SPRAYED evaluation orchards (since 1979!)

Centre wallon de Recherches agronomiques

Wallonie

2. Saveguarding & Evaluation of Fruit Tree Genetic Resources

COLLECTING

Ethno-botany
Passeport data

PROPAGATION

CONSERVATION | **Regeneration** | **EVALUATION**

NETWORK of duplication REPOSITORY ORCHARDS

***Ex situ* REPOSITORY ORCHARDS**

Non-sprayed EVALUATION ORCHARS

FIRST & SECOND SCREENING's

EVALUATION & CHARACTERIZATION

Data Bases

Traceability
HACCP

Time
(Years)

0

1

3

9

3. Promoting USES of Fruit Tree Genetic Resources

Time
(Years)

0

1

3

9

COLLECTING

Ethno-botany
Passeport data

PROPAGATION

CONSERVATION

Regeneration

EVALUATION

EVALUATION &
CHARACTERIZATION

Data Bases

Traceability
HACCP

NETWORK of duplication
REPOSITORY ORCHARDS

Ex situ REPOSITORY
ORCHARDS

Non-sprayed
EVALUATION
ORCHARS

FIRST & SECOND SCREENING's

Budwood's
Quality management
Pest Risk Anal.

Promoting USES

Web sites
Leaflets

Nursery

Fruit growers &
farmers

Processing SME's

Juice

Cider

Syrup

Breeding

Back to the roots…many interesting traits identified in the large diversity of old cultivars through priority work of long term scientific evaluation activities.

⇒**Rusticity and tolerance to abiotic stresses**
⇒**Tolerance to pest and diseases**
⇒**Long keeping ability without sophisticated cold systems**
⇒**Large diversity of forms, colours, tastes, uses, healthy nutriments…**

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.1. Partnership with SME nurseries: « *Agronomistic attitude* »

- Screening and selection of best performing old cultivars adapted to

- Non sprayed growing conditions (gardens, standard tree orchards,…) = disease tolerance, robustness, rusticity…
- Multiple and/or specific uses;
- Enlarge the existing diversity : originality ;
- Produce healthy fruit in different pedo-climatic conditions,….

All old and cultural heritage cvs are far not well adapted to be largely promoted! They need to be SCREENED with agronomical thresholds!

- **Testing candidates for :**

- Adaptability in different pedo-climatic conditions and rootstocks
- Pollination combinations
- Uses and properties
- Tree training and keeping abilities,…….

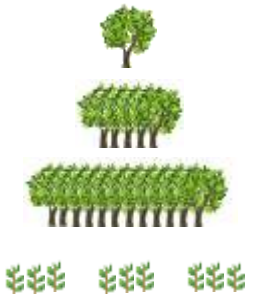
3. *Promoting USES of FTGR – **Public/Private/Partnership's***

3.1. Partnership with SME nurseries:

- Creation of a kind of label on the new concept of « selected FTGR *cvs* »:

'***RGF-Gembloux*** ' = **F**ruit **G**enetic **R**esources

- Since 1985 onward, releasing 2-3 old cvs per year, currently up to **32 *'RGF-Gembloux' cvs*** are released (apple, pear, plum, cherry,…)
- Building partnership with a network of **27** private SME nurseries.
- Agreement of propagation with a payement of a 'symbolic' yearly fee of **12 €**/ cv.
- Building a partnership for producing quality propagation plant material : budwood mother trees.
- **5000 to 7000** budwood sticks are yearly produced
- **20-25.000** '***RGF-Gembloux*** ' cvs trees are on the market.



Centre wallon de Recherches agronomiques

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.1. Partnership with SME nurseries :

- RGF-Gblx cvs are old – **very often forgotten, not known** – cvs, from the public domain but have received **an added value** because:

• They have been screened and selected by a public scientific Institution = confidence

• Most of them have been collected from private gardeners, farmers,… and this safeguarding activity is very popular in the large public and the media's…

• A well organized partnership has been build with private partners

• A chain of quality propagation material is well organized for nurserymen

• Good information and description are largely diffused and available

3. *Promoting USES of FTGR – **Public/Private/Partnership's***

3.1. Partnership with SME nurseries : *'Too many not true to type trees*

➢Next step for enhancing the quality of '*RGF-Gblx*' cvs… since 2013.

○Building on a participative approach with a group of private nurserymen a

QUALITY CHARTER that certified and promote:

- Selected robust and disease tolerant old cvs
- **Guaranteed identity** of the cvs on the market by using **TRACEABILITY** along the chain : budwood, label, unique ID / nursery;
- Quality propagation material (CAC, Virus Tested & Virus Free)
- Local handycraft family nurseries that offer **quality services** to customers

3. *Promoting USES of FTGR – **Public/Private/Partnership's***

CERTIFRUIT RGF-GEMBLOUX®

CERTIFRUIT TRAD-RGF®

CERTIFRUIT – Quality Charter for FTGR

FWH COLLÈGE des PRODUCTEURS C.E.H.W. asbl

cra-w

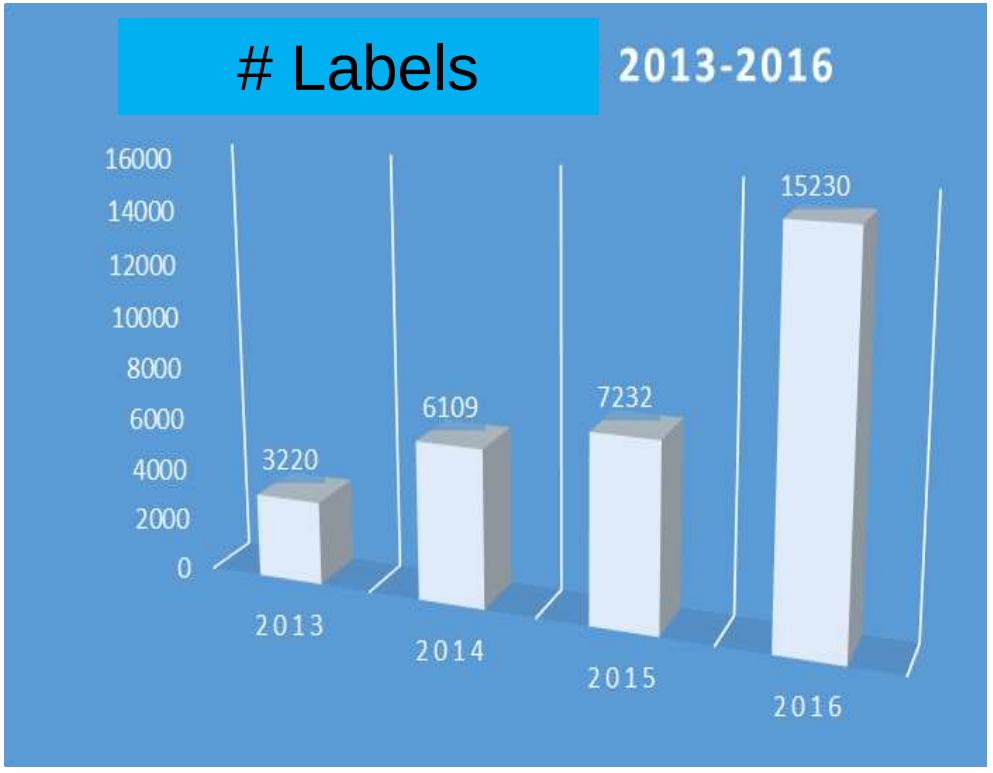
Centre wallon de Recherches agronomiques

Wallonie

www.certifruit.be

Current situation:

- 83 '***RGF-Gblx'*** *& '**RGF-Trad' cvs***
- 16 Nurseries
- 21 Retailers



cra-w

Centre wallon de Recherches agronomiques

Wallonie

Diffusion of objective information for helping users in their choices…

cra-w

Centre wallon de Recherches agronomiques

Description succincte des variétés d'arbres fruitiers *RGF-Gblx, Trad-RGF & CERTIFRUIT* (M. Lateur, saison 2015)

'Président H. Van Dievoet' ('Cabarette') RGF-Gblx - CRRG **:** fruit vert de calibre moyen, virant au jaune, légère joue rose-orangé, chair très blanche, très ferme, acidulée-sucrée, **fruit d'hiver**, bonne tenue du fruit à l'arbre, très bonne conservation jusque mai-juin, arbre très productif, alternant, peu sensible à l'oïdium et moyennement à la tavelure et au chancre. *Floraison* en moyenne saison – Bon pollinisateur. *Origine* : obtenue à Poperinge en 1878, répandue en Belgique et dans le Nord Pas-de-Calais – diffusée par le CRRG sous le nom de 'Cabarette'.

'Président Roulin' RGF-Gblx : grosse pomme jaune, striée de rose, fin septembre à début décembre, très fertile, chair tendre, surtout **culinaire** – juteux-acidulé - supérieure pour compote et tartes, toutes formes, arbre très rustique, **très fertile**, peu sensible à la tavelure, à l'oïdium et au chancre, fruits très sensibles à la moniliose ; très peu sensible au puceron cendré **– très rustique**, très bonne adaptation à toutes les régions même les plus froides. *Floraison* en moyenne saison – Bon pollinisateur. *Origine* : obtenue à Gembloux en 1912.

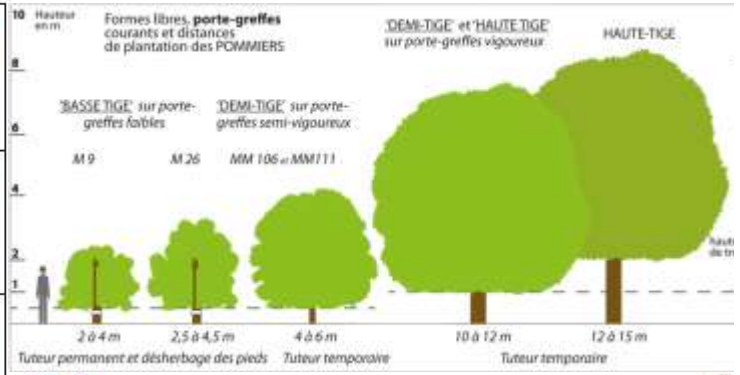
'Radoux' RGF-Gblx : pomme de calibre moyen, très colorée de rouge vif, octobre à décembre, très fertile, souvent alternante, chair blanche sucrée-acidulée, **très croquante et juteuse**, peu aromatique, à croquer jusque fin novembre puis devient farineuse ; arbre au port dressé puis devenant pleureur, bien adapté à la conduite en axe, toutes formes, peu à modérément sensible à la tavelure, moyennement à l'oïdium et au chancre suivant les endroits. *Floraison* en moyenne saison – Bon pollinisateur. *Origine* : variété ancienne du pays de Liège

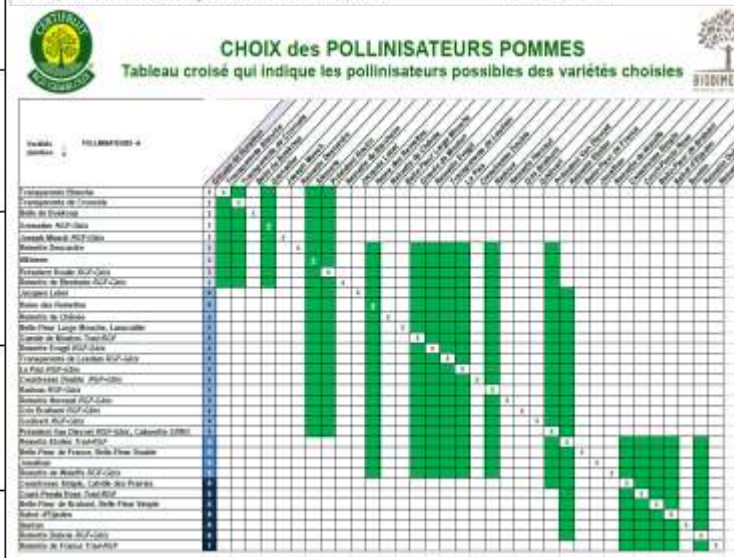
'Reinette de Blenheim' ('Blenheim Orange') RGF-Gblx : belle pomme dorée, striée de rouge-orange, octobre à début décembre, lente à se mettre à fruit mais ensuite très fertile, tendance à alterner, **fruit d'automne pour la table** – devient farineux - et excellent pour le four et les desserts; arbre vraiment très vigoureux, toutes formes, modérément à moyennement sensible à la tavelure et moyennement à l'oïdium, peut devenir plus sensible au chancre en vieillissant. *Floraison* tardive – Bon pollinisateur *Origine* : Grande-Bretagne (1740).

'Reinette de France' Trad-RGF: fruit de dessert, rugueux, beige-brun, petite joue rouge; chair assez fine, ferme, acidulé-sucré, fruit d'automne-début d'hiver. Arbre assez compact, très peu sensible à la tavelure sur fruit mais l'oïdium et le chancre sont à surveiller. *Floraison* très tardive – Mauvais pollinisateur. *Origine* : ancienne variété traditionnelle d'origine incertaine, très cultivée dans les anciens vergers hautes tiges de nos régions.

'Reinette de Waleffe' RGF-Gblx : fruit de dessert de premier choix, d'un bon calibre, mi-lisse et bicolore orange-rouge intense ; chair très blanche, très fine, ferme, **non farineuse**, très bon équilibre sucre-acide, aromatique et qui **se conserve très bien durant tout l'hiver**. Arbre **très fertile**, lente mise à fruit, peu sensible à la tavelure sur fruit mais l'oïdium et le chancre sont à surveiller : pas adapté aux zones très humides et froides. *Floraison* moyenne à tardive – Mauvais pollinisateur. *Origine* : ancienne variété de la Hesbaye liégeoise, à Vieux-Waleffe.

'Reinette Dubois' RGF-Gblx **:** véritable **fruit de dessert** de fin d'automne, épiderme lisse, coloré majoritairement de rouge brillant sur vert – virant au jaune ; chair très blanche, fine et bien ferme **– ne devient pas farineux** - sucrée-acidulée et de très bon goût; très bonne conservation jusqu'en avril. Arbre assez lent à se mettre à fruit mais ensuite productif et très régulier, bien adapté aux petits jardins, **très bonne tenue des fruits à l'arbre**; très peu sensible à la tavelure, peu à moyennement à l'oïdium, assez sensible au chancre. *Floraison* tardive à très tardive – Bon pollinisateur. *Origine* : ancienne variété belge du pays de Herve et très originale.





C.E.H.W. asbl

Wallonie

Diffusion of objective information for helping users in their choices…

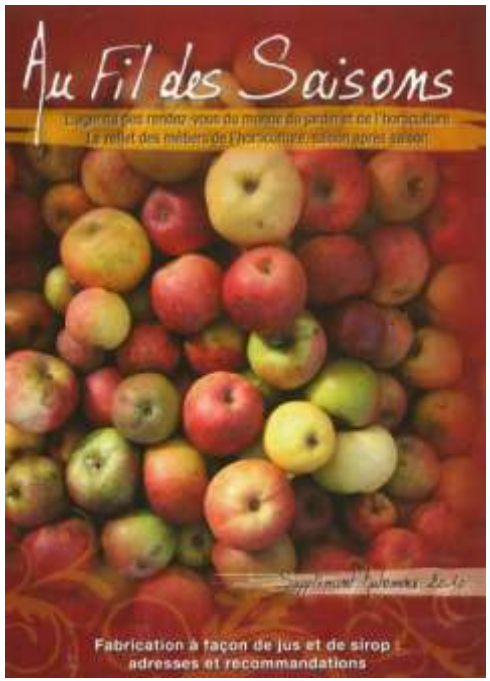
3.1. Partnership with SME nurseries :

- Creating labels with fruit pictures to be placed on trees - since 2016

3. *Promoting USES of FTGR – **Public/Private/Partnership's***

3.2. Partnership with fruit processing enterprises:

- Making an inventory and an information leaflets on ***« Where do you find enterprises that make juice or sirup with your own fruits? »***



Centre wallon de Recherches agronomiques

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.2. Partnership with fruit processing enterprises:

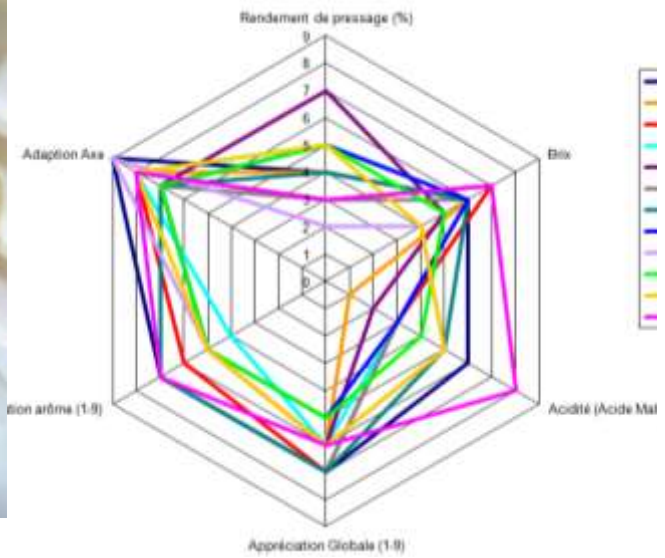
- Partnership with enterprises for screening old cvs for specific technologic properties and agronomic features (adaptation for semi-intensive industrial orchards):

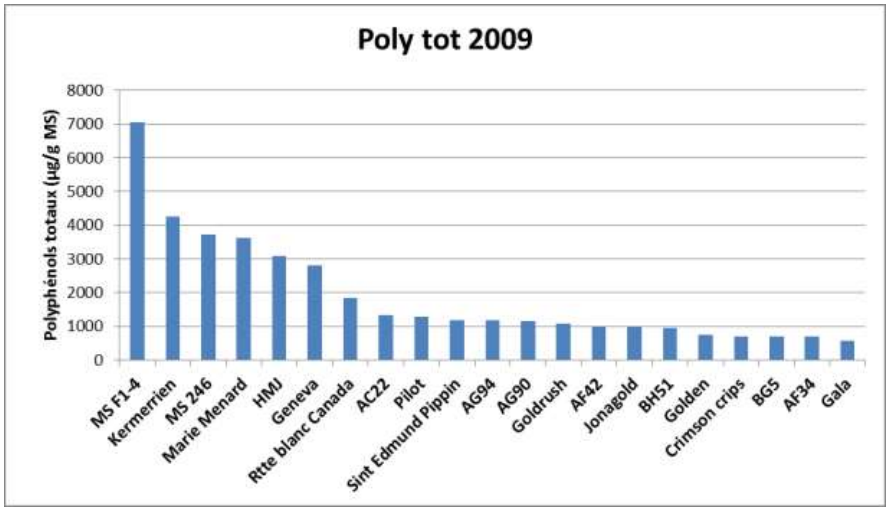
- « Payottenlander » (Organic Fruit juices)

- « STASSEN »: Cider & juice + PPP breeding project red fleshed apple

- « Cidrerie du Condroz » : Cider & Juice - Agroforestry

3. *Promoting USES of FTGR – **P/P/P's** - Processing*





Centre wallon de Recherches agronomiques

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnership***

3.2. Partnership with fruit processing enterprises:

- Practical partnership and collaboration agreements
- Plantation of experimental orchards for **testing processing cvs** in collaboration with contractual fruit growers

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.3. Partnership with farmers – Modern orchard meadows and also safe duplication sites for FTGR :

Organic pigs, cows, sheeps,… farming:

<u>'On farm' conservation</u>

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.4. Partnership with farmers – AGROFORESTRY:

- Arable crops…

- Vegetables

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

3.5. Pre-breeding & Breeding using well evaluated FTGR

Définition of breeding objectives:

1. Adaptation to low input growing systems (mostly Organic)
2. Disease tolerance, robustness, resilience
3. Broadening genetic bases using local neglected FTGR
4. Quality and originality
5. Better nutritionnal quality

Selection of parents:

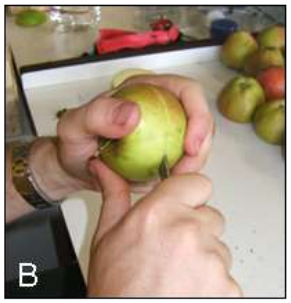
Hand-Pollinination - *Beefly*

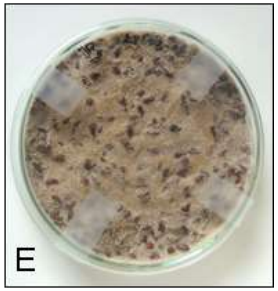
cra-w

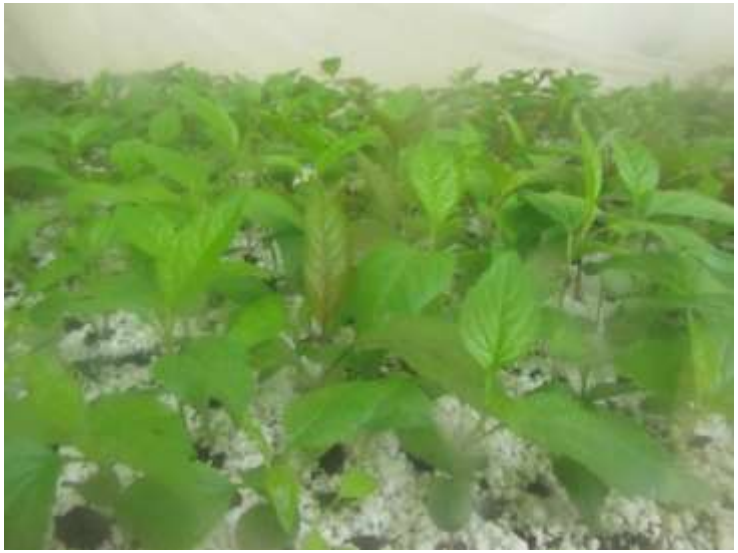
Centre wallon de Recherches agronomiques

Wallonie

Take off seeds and raising seedlings…





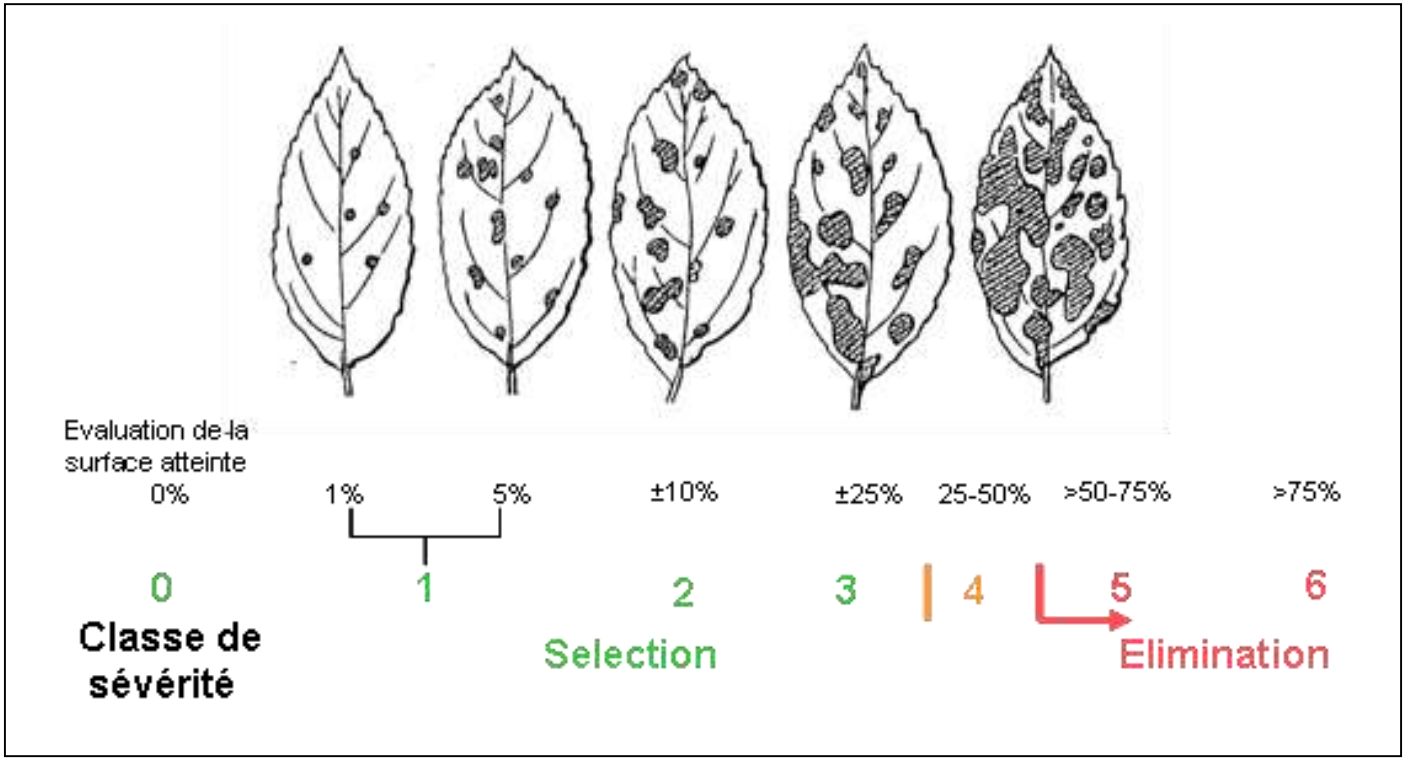


cra-w

Centre wallon de Recherches agronomiques

Wallonie

Screening for quantitative resistance



3. *Promoting USES of FTGR – **Public/Private/Partnerships***

Transborder participatory breeding programme with private growers (Organic and IPM)

Centre wallon de Recherches agronomiques

cra-w

espaces naturels régionaux

Centre régional de ressources génétiques NORD-PAS DE CALAIS

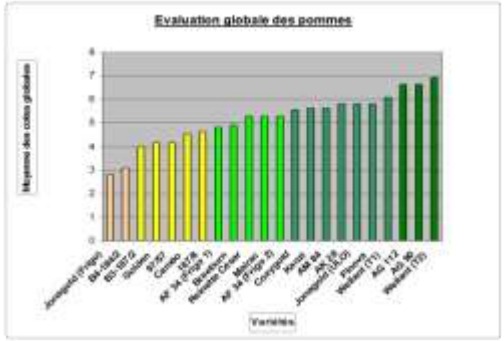
BIODIMESTICA

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

Transborder participatory breeding programme with private growers (Organic and IPM)

First released cv:
'Coxybelle'



BIODIMESTICA
Nord-Pas-de-Calais/Wallonie

cra-w

espaces naturels régionaux

Centre régional de ressources génétiques NORD-PAS DE CALAIS

Centre wallon de Recherches agronomiques

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

Transborder participatory breeding programme with private growers (Organic and IPM)

« NOVAFRUITS – Heritage & sharing innovation »

- **Transborder participatory breeding association**
- **23 organic regional growers**
- **2 public regional Institutes**
- **Collaboration Agreements**

Centre wallon de Recherches agronomiques

cra-w

espaces naturels régionaux

Centre régional de ressources génétiques NORD-PAS DE CALAIS

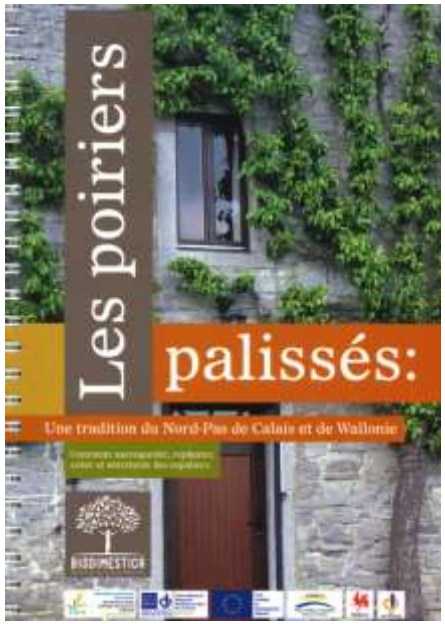
BIODIMESTICA

Wallonie

3. *Promoting USES of FTGR – **Public/Private/Partnerships***

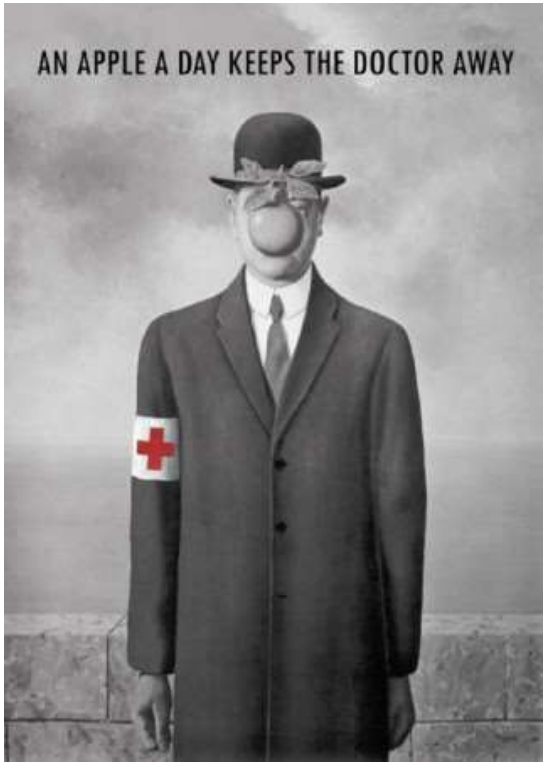
More information…

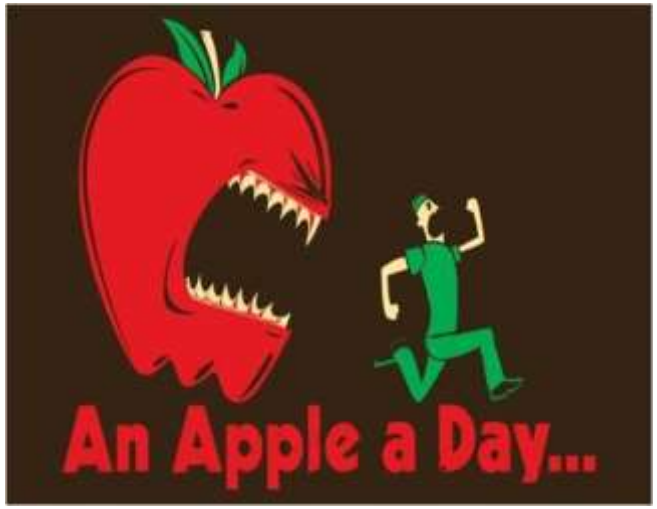
- www.biodimestica.eu : Transborder portail on FTGR with many practical information
- www.certifruit.be : Web page of « CERTIFRUIT »



4. Conclusions on PPP efficiency

- Collaboration with private partners boost efficiency : more precise and short time objectives; complementary expertises,…
- Scientific public Institutes offer confidence to citizens and is an added value for private enterprises
- One key is transparent networking with clear agreements
- Such succesful utilization of FTGR gives a demonstration of usefulness of PGR conservation for both citizens and decision makers – it boosts public awareness!
- One other key is to develop elaborated process of EVALUATION - here in long term non-sprayed orchards that offer co-evolution between host and pathogens strains
- Practical organization with private sector needs to be at a professional level – high treshold of efficiency!
- Visibility and objective scientific information is a must : logo, trademark,….
- Scientist/private partners need to speak same language: time consuming, always looking for innovation and enhancement – and with the long term objective of fair mankind.





Thank you for your attention!

cra-w

Centre wallon de Recherches agronomiques

Wallonie