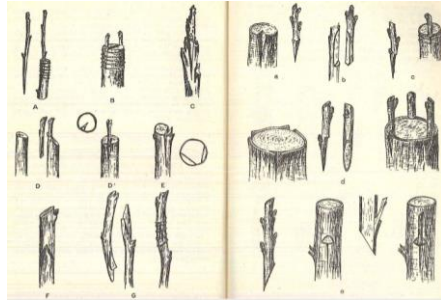
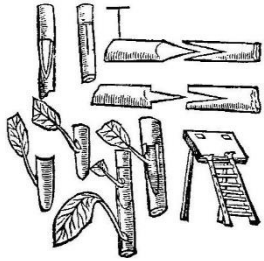


Fruit Tree Genetic Resources: from maintaining to sharing material through Europe – issues with quarantine and ‘non quarantine regulated organisms’

Marc Lateur, Matthew Ordidge, Daniela Giovannini

1. Specific aspects of management fruit tree genetic resources (FTGR) – Apple & Peach as examples

1.1. Fruit trees are woody perennial crops mainly **vegetatively propagated** by grafting scions on rootstocks



Rind grafting of established fruit trees as stocks. Mascall, 1575.



M 9



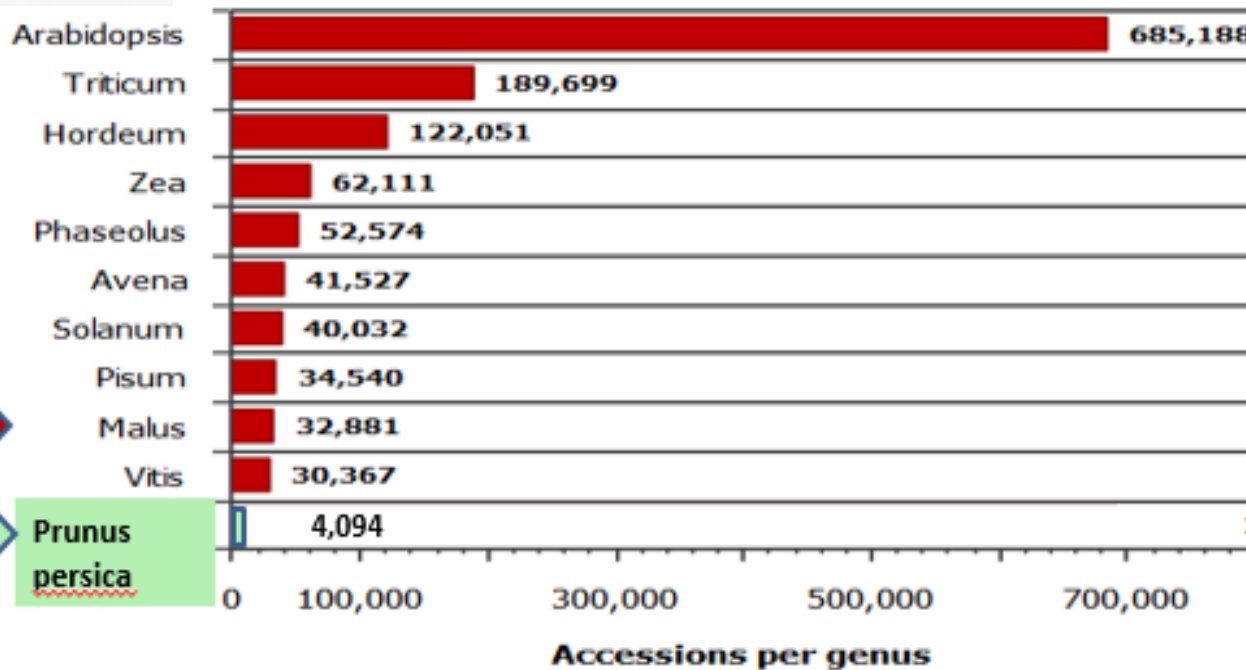
M 26



MM 106

1. Specific aspects of management fruit tree genetic resources – Apple & Peach as examples

1.2. There are many (1) **actors**; (2) **kind of actors** (Genebanks, Research Institutes, NGO's,...);(3) **collections**; (4) **accessions**; (5) difficulties to point out **unique material**?



<40% unique??

~70% unique ?



1.3. Fruit tree genetic resources collections are **LIVING** collections – **FIELD** collections (*ex situ*, ‘on farm’, ‘on garden’) which have very important roles in (1) **public awareness** = visiting “vitrines” by large public showing, testing historical cvs and the richness of diversity; (2) **long term EVALUATION** process; (3) availability and easiness of **propagation material**.



1.4. Fruit tree genetic resources collections could play an active role in multiple **DIRECT** uses of PGR and involving many stakeholders: (1) **nurseries** dedicated to **amateur growers**; (2) **farmers** – orchard meadows; (3) **agro-foresters**; (4) living archive **museum**,...



Welsh Apple Trees

Specialist Mail Order Fruit Tree Nursery



Keepers Nursery
The website for fruit trees



1.5. Fruit tree genetic resources collections could be infected by pests & diseases (P & D) of : (1) **Quality** – most common P & D; (2) **Quarantine P & D**; (3) **Regulated Non Quarantine Pests** – RNQP's (= P & D) which are present in EU and where 'quarantine' status is no longer considered to be justified = "deregulated" – with either LATENT or VISIBLE symptoms.

In «Regulated Non-Quarantine Pest» (EU Reg. 2016/2031)

>> Mostly transmitted by (1) **vegetative propagation material**; (2) pruning tools; (3) insects; (4) nematodes (some cases) ; (5) pollen and/or seeds (some *Prunus* sp. diseases); (6) roots grafting;....

1.6. Fruit tree genetic resources collections could be infected by pests & diseases (P & D) and are Considered as "High Risk Plants"

REGULATION (EU) 2016/2031 OF THE EUROPEAN PARLIAMENT OF THE COUNCIL

of 26 October 2016

on protective measures against pests of plants, amending Regulations (EU) No 228/2013, (EU) No 652/2014 and (EU) No 1143/2014 of the European Parliament and of the Council and repealing Council Directives 69/464/EEC, 74/647/EEC, 93/85/EEC, 98/57/EC, 2000/29/EC, 2006/91/EC and 2007/33/EC

COMMISSION IMPLEMENTING REGULATION (EU) 2018/2019

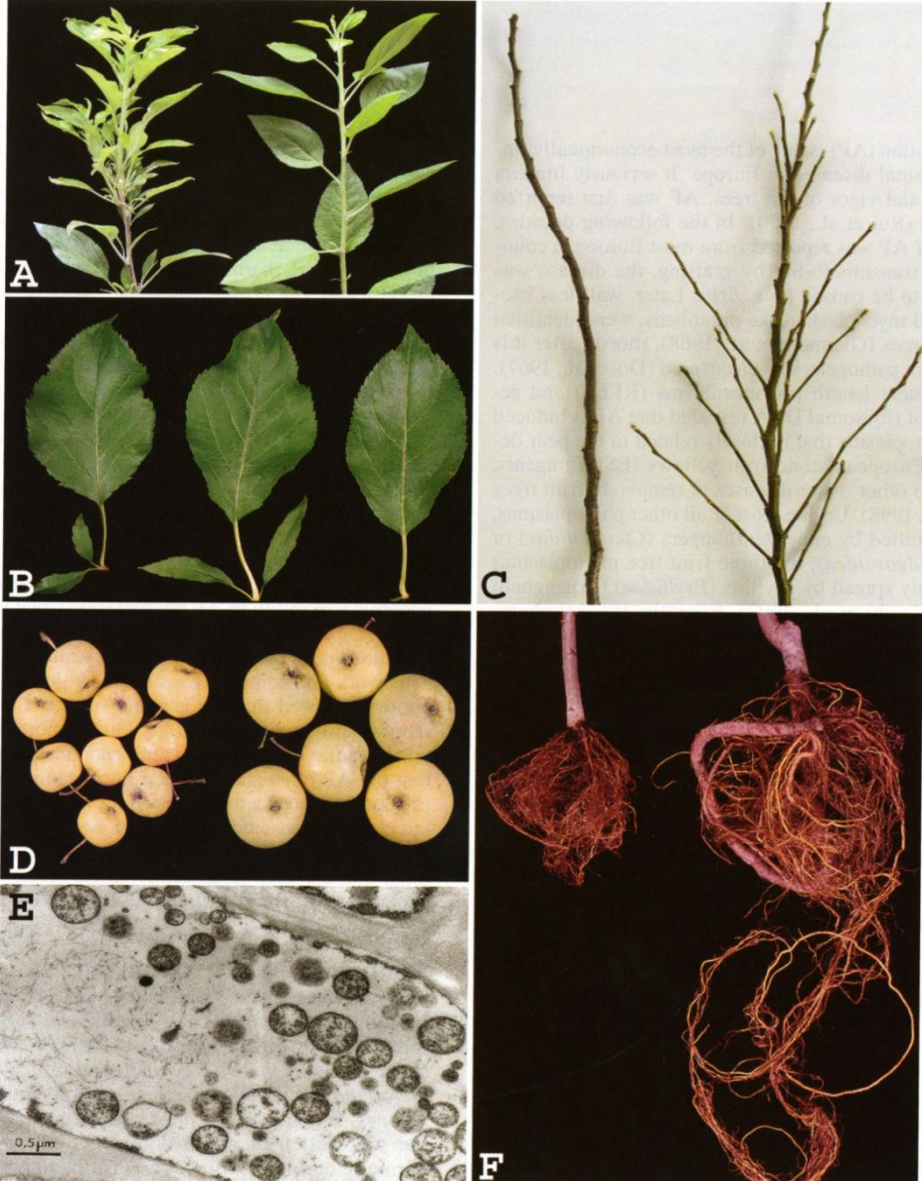
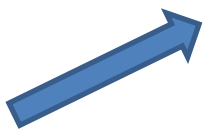
of 18 December 2018

establishing a provisional list of high risk plants, plant products or other objects, within the meaning of Article 42 of Regulation (EU) 2016/2031 and a list of plants for which phytosanitary certificates are not required for introduction into the Union, within the meaning of Article 73 of that Regulation

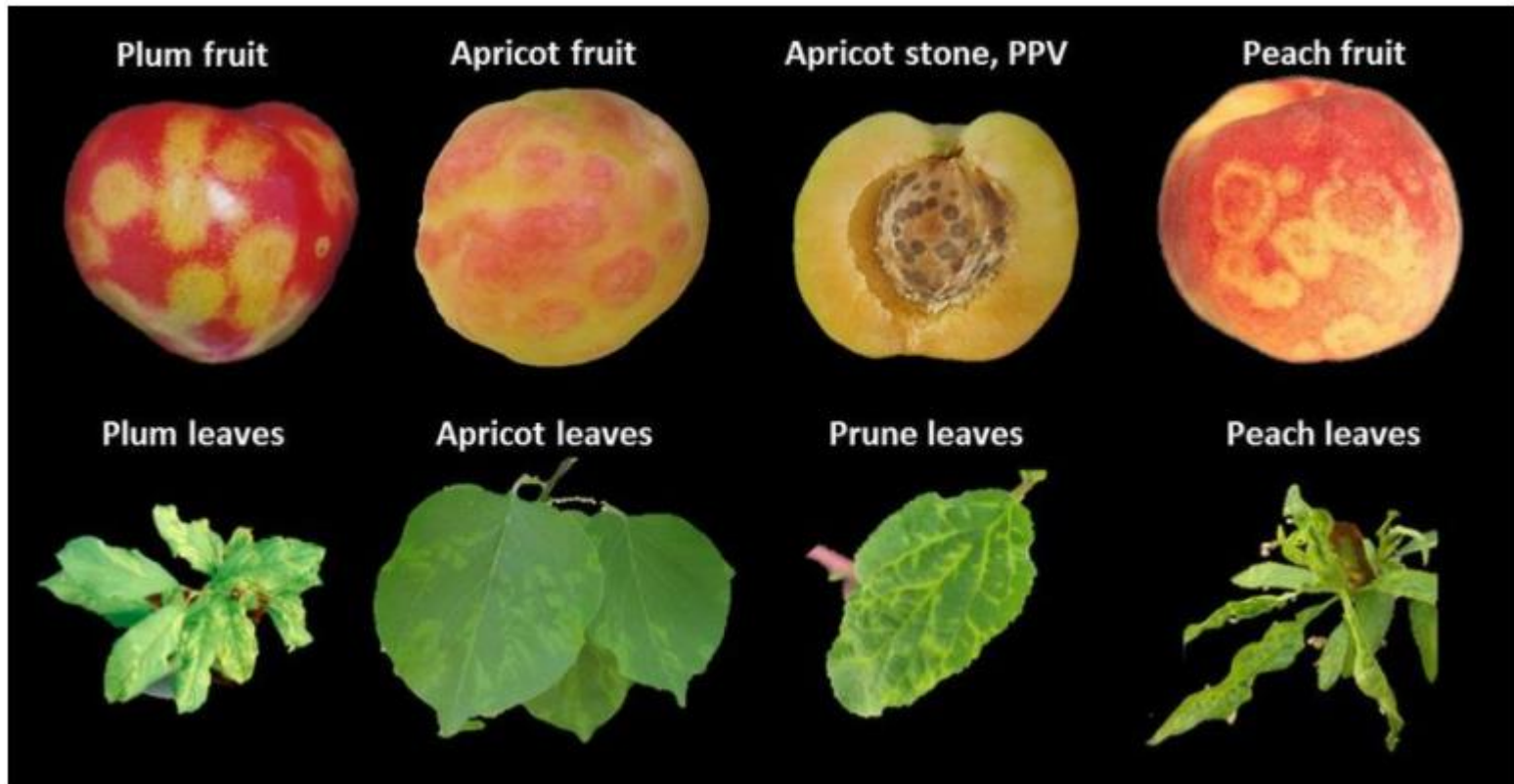
- (3) Plants for planting, other than seeds, *in vitro* material and naturally or artificially dwarfed woody plants for planting, of *Acacia* Mill., *Acer* L., *Albizia* Durazz., *Alnus* Mill., *Annona* L., *Bauhinia* L., *Berberis* L., *Betula* L., *Caesalpinia* L., *Cassia* L., *Castanea* Mill., *Cornus* L., *Corylus* L., *Crataegus* L., *Diospyros* L., *Fagus* L., *Ficus carica* L., *Fraxinus* L., *Hamamelis* L., *Jasminum* L., *Juglans* L., *Ligustrum* L., *Lonicera* L., *Malus* Mill., *Nerium* L., *Persea* Mill., *Populus* L., *Prunus* L., *Quercus* L., *Robinia* L., *Salix* L., *Sorbus* L., *Taxus* L., *Tilia* L., *Ulmus* L., and plants of *Ullucus tuberosus* Loz., are known to host commonly hosted pests known to have a major impact on plant species which are of major economic, social or environmental importance to the Union. Those plants are also known to commonly harbour pests without showing signs of infection, or to have a latent period for the expression of those signs. This reduces the possibility for detecting the presence of such pests during inspections carried out when those plants are introduced into the Union territory. Moreover, those plants for planting are usually introduced into the Union in the form of shrubs or trees and they are usually present in the Union in such form. In light of this, the existing measures governing the introduction of the plants for planting listed in Annex I to this Regulation and plants of *Ullucus tuberosus* Loz. originating from third countries are not considered to be sufficient to prevent the entry of pests. Therefore the plants for planting listed in Annex I and plants of *Ullucus tuberosus* Loz. should be listed as high risk plants within the meaning of Article 42(1) of Regulation (EU) 2016/2031, and their introduction into the Union territory should be provisionally prohibited.

Example of important NRQP phytoplasma disease – “Apple Proliferation” (*Candidatus Phytoplasma mali*)

- Secondary shoots forming **witches' broom** -> A et C)
 - Larger stipules (B)
 - **Smaller, less sweet fruits** (D)
 - Smaller roots development (F)
- Transmitted by insects, roots grafting
- & by
- **Summer propagation material!!**



Other example of important NRQP – 'PPV' = "Plum Pox Virus" = "Sharka" on *Prunus* sp.



Source: Azam Nikbakht, [Shahid Bahonar, University of Kerman · College of Agriculture](#)

Widespread in Europe. Impact on **apricot, peach, plum, almond** and other minor *Prunus* species
Symptoms: discoloration of flowers/leaves; fruit deformation, reduced internal quality, early drop;
reduced plant productivity and longevity.

Serological and molecular protocols available for detection

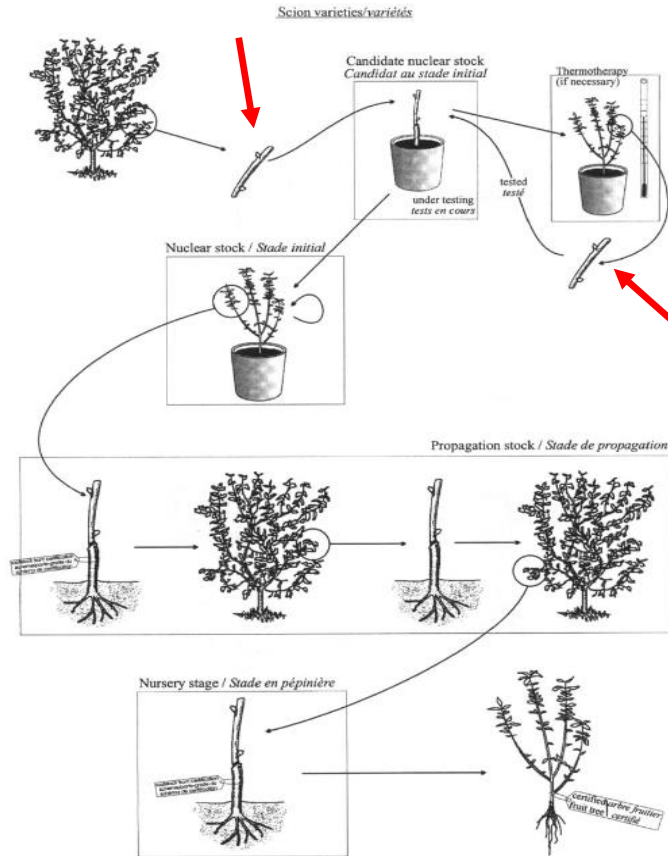
Transmitted through grafting materials, contaminated tools, aphids

2. Which actions are **outside** the capacity of average formal sector FTGR collections ?

1.1. To implement a formal certification scheme – only applicable to a very limited number of commercial cultivars

Even simply PCR testings are infeasible on so many accessions and trees:

- Very high costs
- Time consuming
- ‘Never end story’
- Mixing VF & not tested material



= Multiple steps of THERMOTHERAPY

= Virus & phytoplasma testings

= Virus & phytoplasma Monitoring & testings

= Virus & phytoplasma Monitoring & testings

Fig. 1 Diagram of the stages in the certification scheme for almond, apricot, peach and plum: scion material. Diagramme des stades du schéma de certification de l'abricotier, de l'amandier, du pêcher et des pruniers: variétés.

3. Which actions are **inside** the capacity of average formal sector FTGR collections ?

3.1. To implement and apply **prophylactic methods**

3.1.1 When picking budwood :

- Selecting the **healthiest**:
 - Trees
 - Branches
 - Twigs
- **Picking winter dormant budwood**
- **Desinfection tools & material**



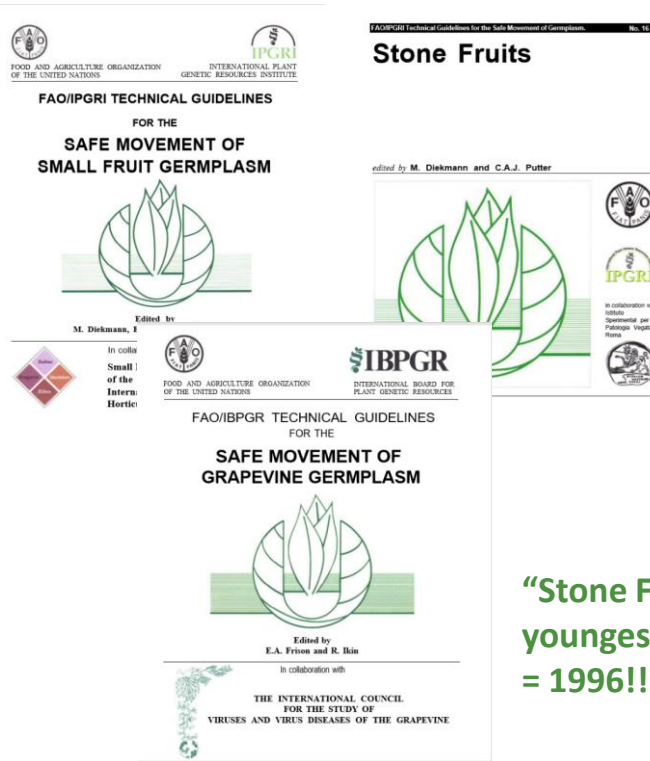
3.1.2 When budding/grafting/pruning

- **Healthiest rootstocks** phytosanitary status (Certified Virus Free)
- Desinfection tools & material
- Monitoring & protect from insects vectors of quarantine diseases

3. Which actions are **inside** the capacity of average formal sector FTGR collections ?

3.2. To implement a **quality system** for **monitoring** quality parameters and at least **visible symptoms** of most problematic P & D

But...lack of updated and adapted guidelines !



“Stone Fruits” – youngest version = 1996!!

VS

Replaces: Frison, E.A. and Feliu, E. (eds). 1989. FAO/IBPGR Technical Guidelines for the Safe Movement of Cocoa Germplasm. Food and Agriculture...

There have been 2 updated versions for “COCOA” – 2000 & 2017!!!!

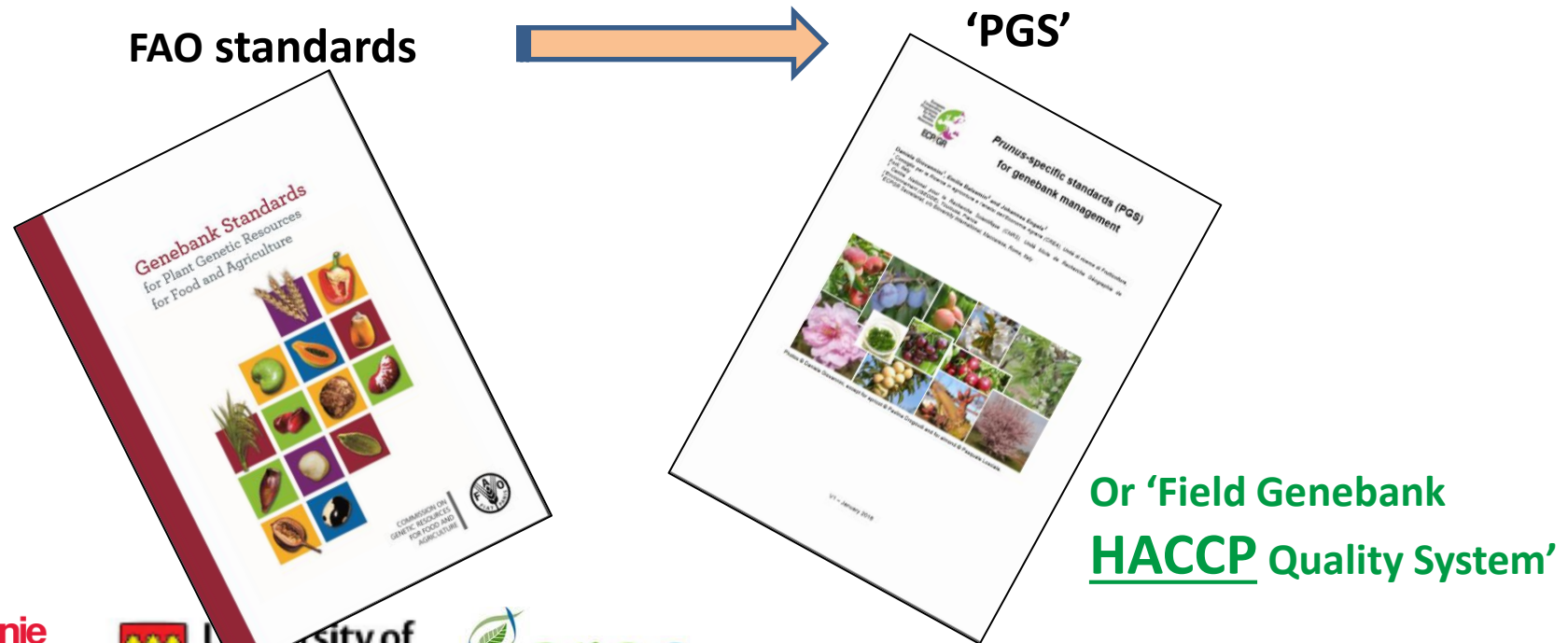
Technical Guidelines for the Safe Movement of Cocoa Germplasm
Revised from the FAO/IPGR Technical Guidelines No. 20
(Third Update, October 2017)
Michelle J End, Andrew J Daymond and Paul Hadley, editors



3. Which actions are **inside** the capacity of average formal sector FTGR collections ?


3.3. To implement a **quality system** for **monitoring** quality parameters and at least **visible symptoms** of most problematic P & D

- **Standards for Field Genebank Management (AQUAS)**
- ✓ Example of *Prunus* crop-specific standards (PGS) for genebank management (2016)



3. Which actions are **inside** the capacity of average formal sector FTGR collections ?

3.4. To implement basic **Phytosanitary Regulations** (either EU and non EU regulations – e.g. **“PLANT PASSPORT”** when material involves a commercial stakeholder.




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Passport phytosanitaire



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 B 7802 ORMEIGNIES

Bon de livraison d'arbres fruitiers 04/02/ 2021

Plantation parc à bois 2020 - 2021	
	04-02-20
Prunier	17
Sainte Catherine	16
Wignon	15
Altesse Dorée	20
Belle de Thuin	7
Reine Claude Souffriaux	8
Reine Claude Diaphane	19
Pommier	23
Geneva	3
Alkmene	6
Grenadier 2a	4
Grís Bralbant 230	8
Reinette des Capucins Bb	9
Reinette Dubois 2 7	3
Belle-Fleur de France B	5
Gueule de Mouton B	2
Reinette Etoilée	11
Jacques Lebel A	12
Lecrenier VZ1	10
Reinette Dubois	1
Lord Lambourne	7
Belle-Fleur Simple B	6
Transparente de Lesdain D 16	8
Joseph Musch 42	5
La Paix 47	8
Cwastresse Double 166	5
Reinette Hernaut db	8
Radoux 88	3
Président Roulin	11
Reinette de Waleffe 81	5
Reinette de Blenheim 34	5
Belle D'avril	5
Total	83
Total	184

AEGIS objectives

Conserving in a collaborative way and at agreed quality standards, the genetically unique and important accessions for Europe of all crops and making them available and which meet the rules of Phytosanitary Regulations for breeding and research through SMTAs.

- In many cases phytosanitary unknown or tested status could represent one of the most important **BOTTLENECK** of AEGIS...
- Do we think feasible to find *ad hoc* funds and facilities/capacities for testing phytosanitary status of most unique and valuable “AEGIS flagged fruit material”?
- Subsequently, if badly infected material with quarantine diseases – what would be next steps??

Some final ideas that we can explore and discuss together...

Inside framework of EU 2016/2031 Regulation Directive entered into application on 2019.

Article 8

Union quarantine pests used for official testing, scientific or educational purposes, trials, varietal selections or breeding

1. By way of derogation from Article 5(1), Member States may, on application, temporarily authorise the introduction into, the movement within, and the holding and multiplication in, their territory of Union quarantine pests or pests subject to the measures adopted pursuant to Article 30(1) for official testing, scientific or educational purposes, trials, varietal selections, or breeding.

An authorisation shall be granted for the activity concerned only if adequate restrictions are imposed to ensure that the introduction, movement, holding, multiplication or use of the pest concerned does not result in its establishment or spread within the Union territory, taking into account the identity, biology and means of dispersal of the pest, the activity envisaged, the interaction with the environment and other relevant factors relating to the risk posed by that pest.

2. Authorisations granted pursuant to paragraph 1 shall include all of the following conditions:

(a) the pest is to be kept in a location and under conditions which:

- (i) the competent authorities consider to be appropriate; and
- (ii) are referred to in the authorisation;

(b) the activity involving the pest is to be carried out in a quarantine station or a confinement facility designated by the competent authority in accordance with Article 60 and referred to in the authorisation;

- About movement of germplasm material for **‘for official testing, scientific or educational purposes, trials, varietal selections or breeding’** would it be possible to integrate a derogation article especially dedicated to valuable PGRFA accessions ???
- Would it not be possible to use this article as an **exceptional regime** of phytosanitary rules adapted to safe movement of PGRFA for conservation and *bona fide* uses????

Some final ideas that we can explore and discuss together...

Other possibility ??: Inside framework of Council Directive 2008/90/EC

COUNCIL DIRECTIVE 2008/90/EC

of 29 September 2008

on the marketing of fruit plant propagating material and fruit plants intended for fruit production

(Recast version)

CHAPTER 2

REQUIREMENTS FOR PROPAGATING MATERIAL AND FRUIT
PLANTS

Article 3

General requirements for placing on the market

4. Notwithstanding paragraph 1, Member States may authorise suppliers on their own territory to place on the market appropriate quantities of propagating material and fruit plants intended:

(a) for trials or scientific purposes;

(b) for selection work; or

(c) to help preserve genetic diversity.

The conditions under which Member States may grant such authorisation may be adopted in accordance with the procedure referred to in Article 19(2).



*Thank you to all members of ECPGR
Fruit WG's & for your kind attention!*