Phytosanitary regulations affecting *ex situ* seed collections

Case study CGN pepper and tomato collection

24-02-2021, Willem van Dooijeweert

CGN

- Medium size genebank
- Wageningen University and Research, The Netherlands
- 12 staff
- 23000 accessions
- 30 crops
- 50% agricultural crops, 50% horticultural crops
- Focus on vegetables
- Distribution around 5000 accessions/year

Centre for Genetic Resources, The Netherlands (CGN)

Outline presentation

- General phyto sanitary policy CGN
- New EU plant health regulation
- ToBRFV tomato and pepper

Why a Phyto sanitary policy at CGN?

- CGN sends average 5000 accessions every year
  - want to provide users with healthy seeds
  - no spreading of diseases

- Obligatory for some crops/diseases

Working mode for healthy seed production at CGN

Phyto sanitary policy at CGN for all crops

- Crops regenerated at CGN are visually checked by Dutch Plant Health authorities
  - Several times during growing season
  - Focus on seed born diseases
    - When seed born disease is found
      - Continuation in consultation with authorities
        - Remove all
        - Remove part and monitor
          - Rest is considered clean

- Infected plants/accessions checked when disease unclear

Additional checks Q diseases at CGN

- Potato: plants tested at Plant Health Service
  - PCR (pospiviroid)
  - test plants (5 viruses)

- tomato, pepper: leaves sent to Plant Health Service
  - ELISA (Pepino Mosaic Virus)
  - PCR (pospiviroids)

- Onion: Seeds sent to Plant Health Service
  - counting nematodes (*Ditylenchus dipsaci)*

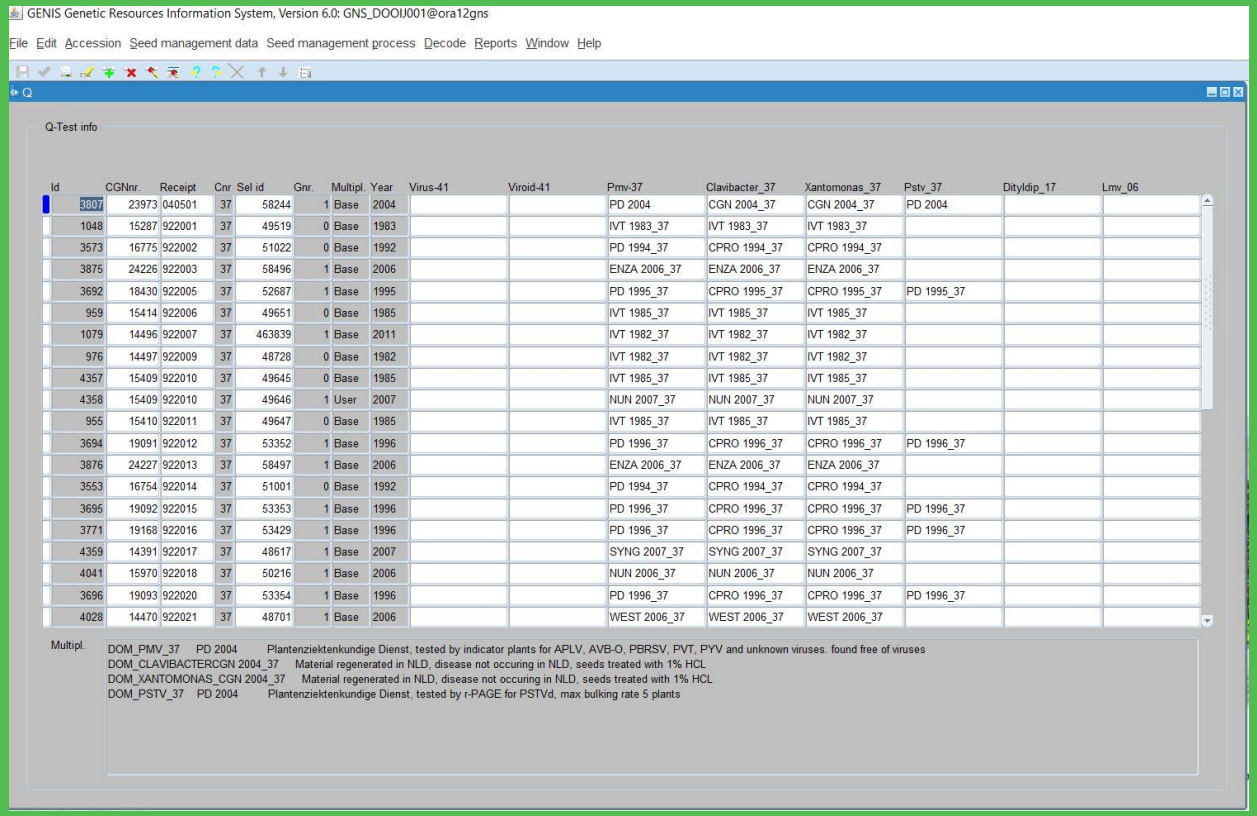
At companies

- Companies are asked to monitor the crop
  - We assume they have expertise
  - Provide documents of tests or plant passport

- Visit regeneration trials by CGN staff gives more information

Documentation

- Results stored in CGN database “GENIS”
- Extract data for issuing Plant Passport or Certificate



Id	CGNnr.	Receipt	Cnr	Sel id	Gnr.	Multipl.	Year	Virus-41	Viroid-41	Pmv-37	Clavibacter_37	Xantomonas_37	Pstv_37	Dityldip_17	Lmv_06
3807	23973	040501	37	58244	1	Base	2004			PD 2004	CGN 2004_37	CGN 2004_37	PD 2004		
1048	15287	922001	37	49519	0	Base	1983			IVT 1983_37	IVT 1983_37	IVT 1983_37			
3573	16775	922002	37	51022	0	Base	1992			PD 1994_37	CPRO 1994_37	CPRO 1994_37			
3875	24226	922003	37	58496	1	Base	2006			ENZA 2006_37	ENZA 2006_37	ENZA 2006_37			
3692	18430	922005	37	52687	1	Base	1995			PD 1995_37	CPRO 1995_37	CPRO 1995_37	PD 1995_37		
959	15414	922006	37	49651	0	Base	1985			IVT 1985_37	IVT 1985_37	IVT 1985_37			
1079	14496	922007	37	463839	1	Base	2011			IVT 1982_37	IVT 1982_37	IVT 1982_37			
976	14497	922009	37	48728	0	Base	1982			IVT 1982_37	IVT 1982_37	IVT 1982_37			
4357	15409	922010	37	49645	0	Base	1985			IVT 1985_37	IVT 1985_37	IVT 1985_37			
4358	15409	922010	37	49646	1	User	2007			NUN 2007_37	NUN 2007_37	NUN 2007_37			
955	15410	922011	37	49647	0	Base	1985			IVT 1985_37	IVT 1985_37	IVT 1985_37			
3694	19091	922012	37	53352	1	Base	1996			PD 1996_37	CPRO 1996_37	CPRO 1996_37	PD 1996_37		
3876	24227	922013	37	58497	1	Base	2006			ENZA 2006_37	ENZA 2006_37	ENZA 2006_37			
3553	16754	922014	37	51001	0	Base	1992			PD 1994_37	CPRO 1994_37	CPRO 1994_37			
3695	19092	922015	37	53353	1	Base	1996			PD 1996_37	CPRO 1996_37	CPRO 1996_37	PD 1996_37		
3771	19168	922016	37	53429	1	Base	1996			PD 1996_37	CPRO 1996_37	CPRO 1996_37	PD 1996_37		
4359	14391	922017	37	48617	1	Base	2007			SYNG 2007_37	SYNG 2007_37	SYNG 2007_37			
4041	15970	922018	37	50216	1	Base	2006			NUN 2006_37	NUN 2006_37	NUN 2006_37			
3696	19093	922020	37	53354	1	Base	1996			PD 1996_37	CPRO 1996_37	CPRO 1996_37	PD 1996_37		
4028	14470	922021	37	48701	1	Base	2006			WEST 2006_37	WEST 2006_37	WEST 2006_37			

Multipl.

DOM_PMV_37 PD 2004 Plantenziektenkundige Dienst, tested by indicator plants for APLV, AVB-O, PBRSV, PVT, PYV and unknown viruses. found free of viruses
DOM_CLAVIBACTERCGN 2004_37 Material regenerated in NLD, disease not occuring in NLD, seeds treated with 1% HCL
DOM_XANTOMONAS_CGN 2004_37 Material regenerated in NLD, disease not occuring in NLD, seeds treated with 1% HCL
DOM_PSTV_37 PD 2004 Plantenziektenkundige Dienst, tested by r-PAGE for PSTVd, max bulking rate 5 plants

WE THINK WE HAVE A GOOD SYSTEM IN PLACE TO PROVIDE USERS WITH HEALTHY SEEDS

- Invested lot of money for visual checks and for testing
- Adapted documention system for registration

BUT

- Regulations are changing over time

New EU Plant Health Regulation (14-12-2019) for exchange within EU

Consists of:

- Regulation (2016/2031; L317)
- Control regulation (2017/625; L95)
- Implementing regulation (2019/2072; L319)
- Delegated regulation (2019/829; L137)
- Implementing regulation (2020/1191; L26)
- Implementing regulation (2021/74; L27)

Focus on commercial plant/seed trade

Outside EU, each country has its own phyto legislation

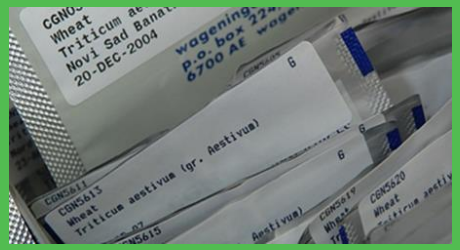
- How do we keep up with continuous changing rules as a small gene bank with limited staff?

Different statuses affecting CGN crops

- crops without regulation
  - E.g. cucumber, eggplant, lettuce, spinach
- Quarantine pests (Q)
  - In potato, apple, wheat, mais
  - New pest in tomato, pepper: ToBRFV
- Regulated Non Quarantaine Pests (RNQP)
  - Some pests went from Q to RNQP
    - Lot of money spent and now not necessary anymore

Exemption for small quantities

- Used for research, education, testing, selection, breeding and exhibitions:



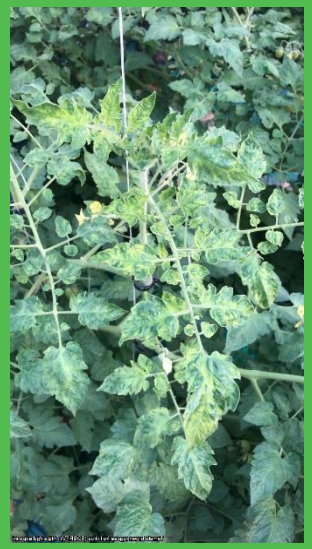
  - RNQP:
    - can be sent without testing and plant passport
  - Q:
    - also small quantities must be tested and send with plant passport!
      - Material could be sent to PEQ facility
        - Needs permit of Pl. Health service
      - Some crops have exemption for plant passport (mais, wheat)

Specific conditions of genebanks

- Material stored for long time
  - Not desirable to regenerate often to maintain integrity
  - Material stored for long time cannot be infected by new emerging diseases
- Material only available in small quantities
  - Seeds needed for disease tests often not available
- Regulation made for large commercial companies
  - Departments with phyto sanitary and legal experts

Eu policy regarding ToBRFV

- Disease probably emerged in 2014 in Israël
  - identified in April 2015 in Jordan, did not exist before
- Material regenerated before 15 augustus 2020
  - PCR seed test needed



- Material grown after 15 augustus 2020
  - leaves of mother plants PCR test
  - sample of regenerated seeds with PCR test
- Seeds can be bulked for testing (1000 seeds)

IMPLICATIONS FOR CGN PEPPER AND TOMATO COLLECTION

CGN pepper and tomato collection locked since March 2020

- Number of accessions not available
  - Pepper – 1154
  - Tomato – 1337

- Notification on CGN request page material is only available after testing

- Missed requests per year because of ToBRFV
  - Tomato: 450 accessions
  - Pepper: 500 accessions

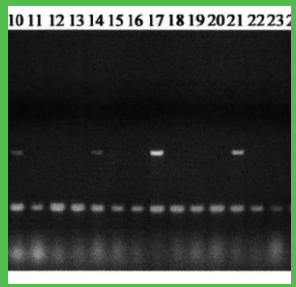
Options

- Keep collections locked until clear/adapted policy
- Test all material (funding)
  - Not enough seeds
  - Regeneration: loss of genetic variation
- Test only material requested by users which have to pay
  - Long time before seeds can be sent
  - Only rich companies can pay fee

Testing all accessions

- Labour
  - Prepare seed samples of 2500 accessions
  - Cannot be spent on other tasks

- Costs
  - PCR tests to be paid to agency > € 100000



Summary

- EU phyto regulations for commercial seed exchange
- Interpretation of rules difficult for genebanks because of limited staff
- Genebanks deal with small quantities of seeds
  - Not enough seeds for testing
  - Regeneration

Summary

- Genebanks often have old seed stocks
  - Not possible to be infected by new pests
  - No spreading of pests by distribution
- CGN cannot adapt to quick changing regulations
  - Locked collections
    - Not executing tasks to provide seeds for research and breeding
- Money spent on disease tests
  - Can become irrelevant
  - More budget needed when new Q disease emerges

Proposed changes

- EU use common sense:
  - Make exemption for small old seed lots in storage which cannot be infected by new pests
    - E.g. 5 years before occurence of new pest
- Consider research institutes and breeding companies as end-users

Conclusions

- Drowning in regulations which can change over time
- Genebanks need workable exemptions to continue seed distribution for research and breeding