

Breeding for late blight resistance in Belgium

A. Soete

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- Introduction
- Objectives
- Breeding scheme
- Results
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Introduction

- Breeding in Belgium
 - No belgian breeders → main multiplication:
free varieties

Introduction

- Breeding at the CRA-W
 - First breeding programme during last century (1940-1980)

Lots of varieties released to the national registration list, one is still used: **Gasoré**



Introduction



- Breeding at the CRA-W
 - Second breeding programme started in 2005
 - To answer the current European legislation (sustainable use of pesticides)
 - To support the Belgian sector of seed potato production

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Objectives



- To obtain improved varieties with a better late blight (*Phytophthora infestans* (Mont.) de Bary) resistance
- To release new varieties to the national registration list

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Breeding scheme

Year 0: crossings

Between varieties

Showing interesting
quality traits

X

Showing good
resistance to late blight



Breeding scheme

Year 0: crossings

Year of hybridization	Number of crossings	Number of clones	Number of clones in 2014
2005	4	1000	2
2007	7	1750	2
2008	15	3750	4
2009	16	4500	4
2010	17	8500	14
2011	21	12000	26
2012	5	4300	25
2013	22	12000	1300

Table 1: number of clones assessed since 2005

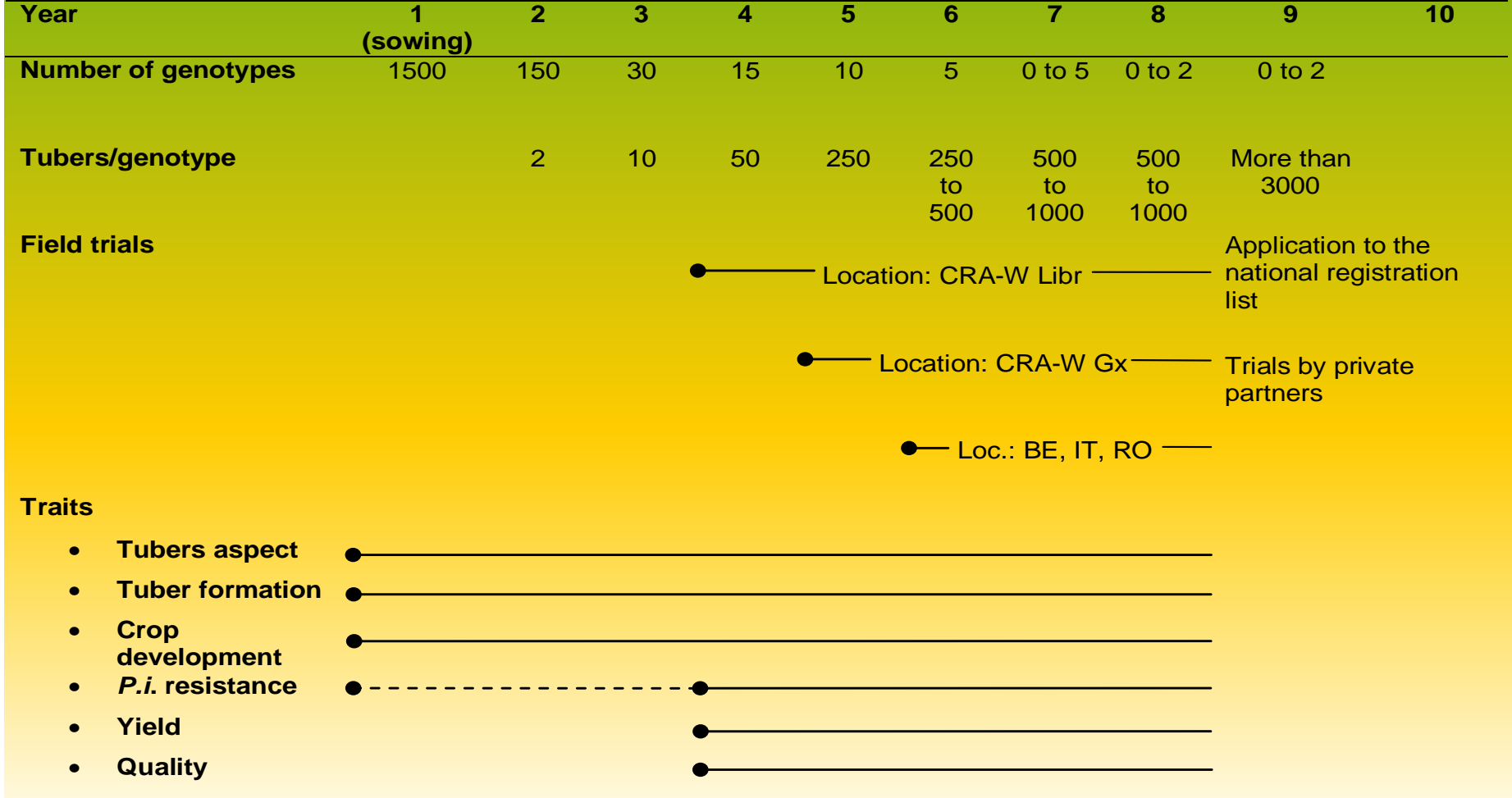
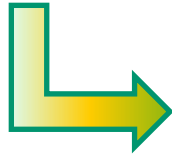


Table 2: Potato breeding scheme from the progeny of one crossing

Breeding scheme

Year 1: sowing

Visual assessment



Shape, colour,
depth of the
eyes,...



Breeding scheme

Year 1: sowing

Assessment by tests on detached leaves



With P.i. strains collected in Belgium

13 A2

6 A1

1 A1

Progeny: Monalisa x Carolus



Breeding scheme

Year 1: sowing

Assessment by tests on detached leaves



On the **progeny** of our
crossings



On varieties used as
genitors



Breeding scheme

Years 2, 3 : multiplication

Visual assessment in the field



Shape, colour, tuber uniformity,
depth of the eyes, size of
tubers, ...



PVY susceptibility



Observations in the field



Breeding scheme

Year 4: agronomical trial



- Comparison with **control varieties**
- 3 replicates
- Dry matter content **monitoring**

Breeding scheme

Year 4: agronomical trial

Observations

Relative yield (control variety)	Skin colour, skin diseases
Maturity	Dry matter content
Foliage development	Cooking type
Number of tubers	Flesh colour
Tuber size repartition	Aptitude to processing
Tuber shape, uniformity	Aptitude to storage

Table 3: list of observations of the agronomical trial

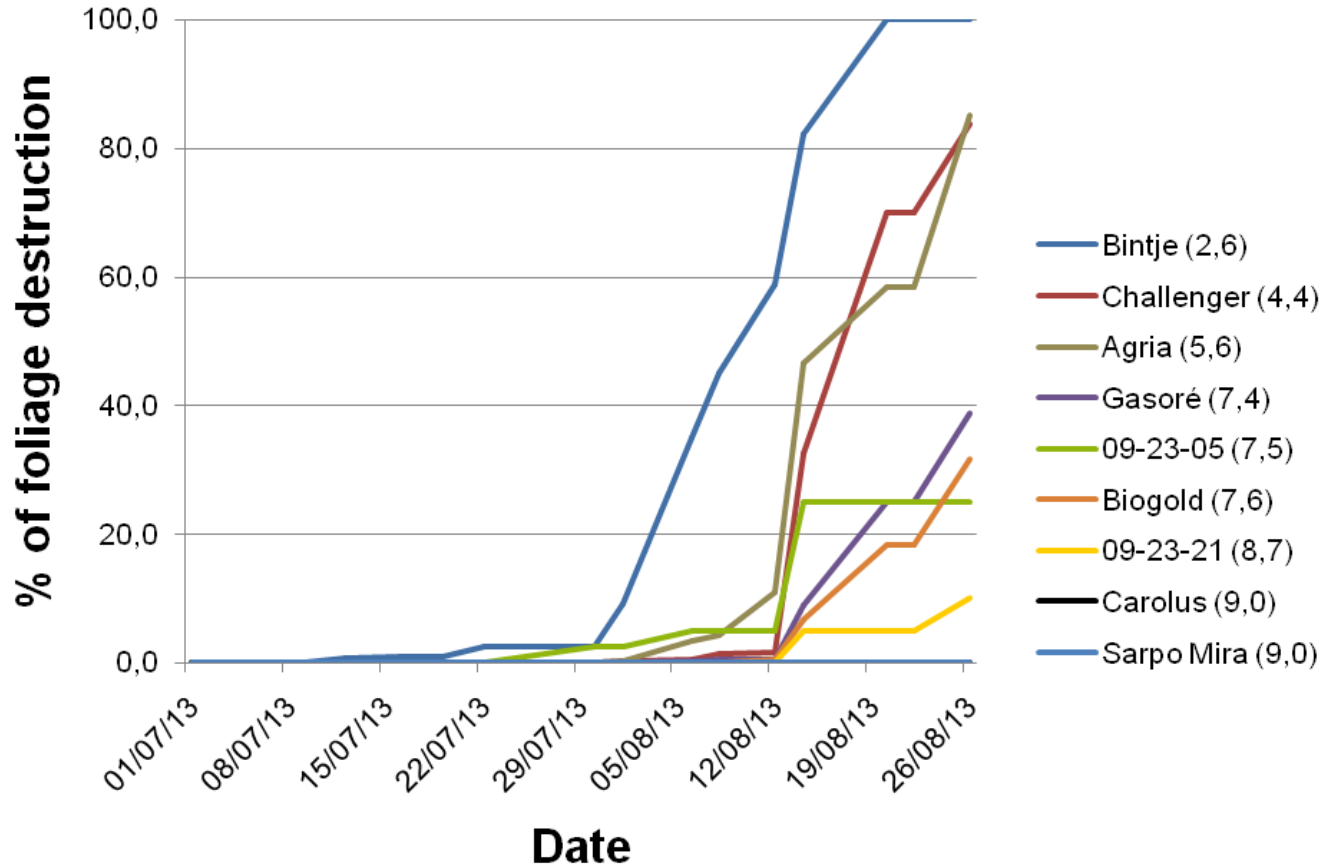
Breeding scheme

Year 4: late blight trial



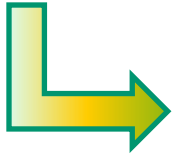
- ↳ Comparison with **control varieties**
- ↳ Without fungicide protection
- ↳ Foliage destruction monitoring
- ↳ Foliage blight score (1-9)

Disease progress curve 2013 trial



Breeding scheme

Years 5 to 8: trials replicates



Multiplication, agronomical and late blight trials



Several locations: BE, RO, IT



In vitro conservation



Demo plots

Breeding scheme

2014 informations

Crossings	27 parents
Sowing	16 000 seedlings
First year in the field	2000 clones
Multiplication	161 clones
Agronomical trials	94 clones in Libramont 11 clones in Gembloux
Late blight trials	45 clones in Libramont 19 clones in Gembloux

Table 4: number of clones in assessment in 2014

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Results

- In 2013, **first application** to the national registration list: clone nr 07-10-123 (Gasoré x Victoria):
 - **Yield:** 107 % Lady Rosetta (Libramont) – 123 % Lady Rosetta (Gembloux)
 - Use: **crisps**
 - Market: **processing**
 - Foliage blight : slightly susceptible (score: 6.5)

Results

- Clone nr 07-10-123 (Gasoré x Victoria)



Results



- In 2014, first call for candidature for the assessment of clones by private companies
 - 4 clones offered:
 - 05-01-08 (Gasoré x Impala): fairly firm, table
 - 07-10-96 (Gasoré x Victoria): chips, crisps, table/processing
 - 08-11-17 (Marabel x Vineta): firm, table
 - 09-23-21 (Sarpo Mira x Apolline): fairly firm, table
 - Maximum duration: 5 years
 - 3 companies applied

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Perspectives & conclusion



- “**Gerephyti**” project started in 2013
 - Refining and developing cisgenesis transformation techniques
 - Develop markers suitable for marker-assisted breeding
 - Creating a parent collection with confirmed resistance genes
 - Screening accessions with contemporary and diverse *P. infestans* isolates

Thank you