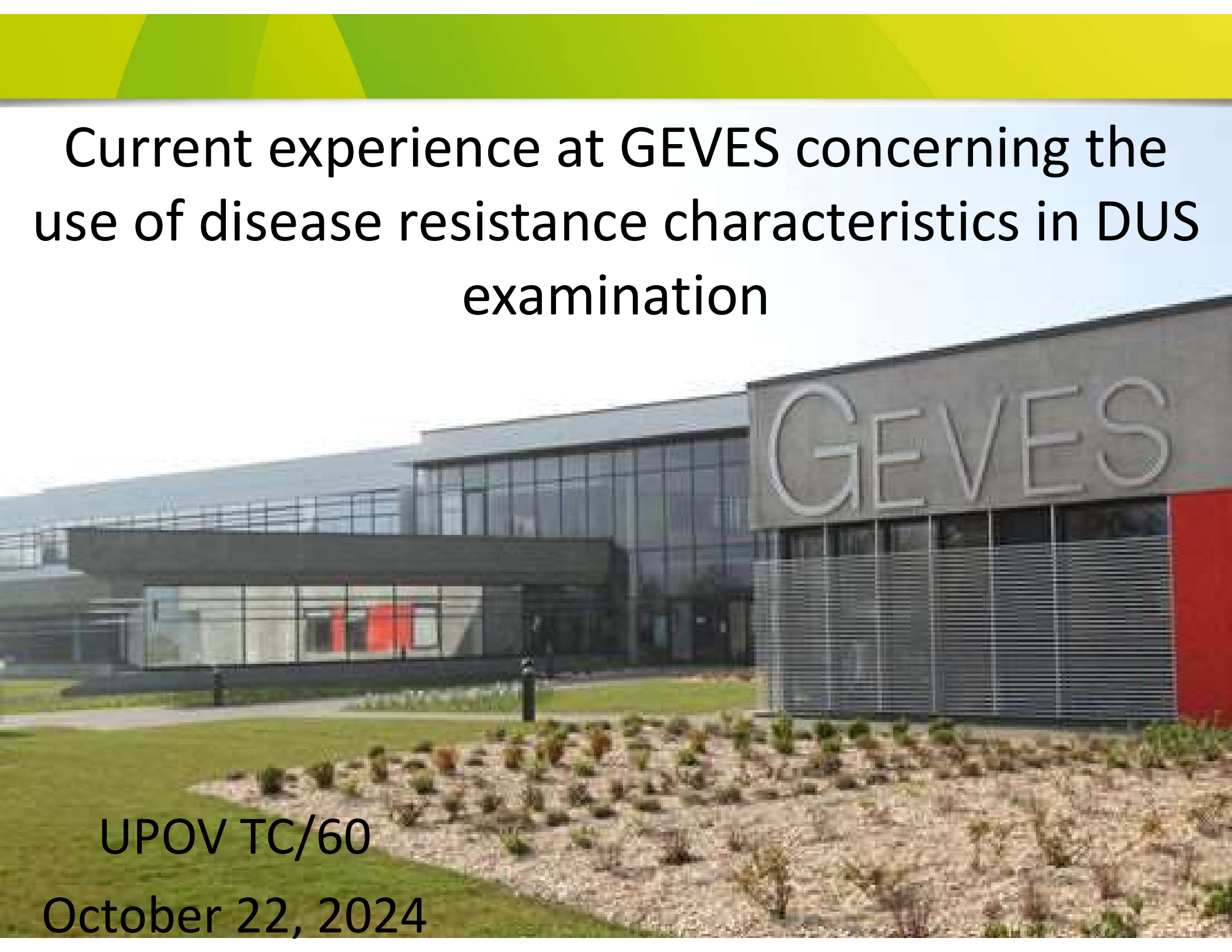
Current experience at GEVES concerning the use of disease resistance characteristics in DUS examination



UPOV TC/60

October 22, 2024

GEVES: Group of Control and Study of Varieties and Seeds

A **public interest group** founded in 1989
(created within INRA in 1971) **associating:**

INRAE

MINISTÈRE DE L'AGRICULTURE ET DE LA SOUVERAINETÉ ALIMENTAIRE
Liberté Égalité Fraternité

semae
Toutes les semences pour demain

A **unique official body** in France with official **regulatory missions** of expertise on varieties and seeds on all cultivated species in the framework of :

National Listing + PBR

(Centralized official DUS testing in France)

Certification and other official analyses

by delegation from the competent authorities

GEVES
Expertise & Performance

Groupe d'Étude et de contrôle des Variétés Et des Semences

370 Staff members

460 ha land
16 400 m²
greenhouses/tunnels
~ **3 000**m² laboratories

National coordination for the conservation of Plant Genetic Resources

National Reference Laboratory:

- NRL Seeds and seedlings
- NRL GMO detection
- NRL Plant health (seed matrix)

GEVES | Groupe d'Étude et de contrôle des Variétés Et des Semences

Evaluating resistance of varieties in controlled conditions :

a lab and a team in GEVES dedicated to Resistance tests

Resistance tests

DUS/VCU
Registration and protection

Bilateral cooperation
With EU examination offices

Support for the industry
Genetic resources, selection, evaluation prior to registration

Strain collection
Reference strains >250

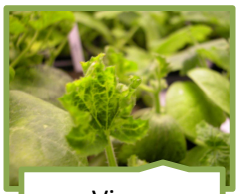
Inoculum production
Supply of homogeneous, representative inoculum

Research projects
(Coordination OCVV, H2020, ISF,…)

Epidemiological studies
(IBEB, …)


Bacteria


Fungus/Oomycetes


Virus


Aphids


Nematodes

25 species
-
Around 10000 tests per year

Vegetables 56%

Oil seeds crops 20%

Fodder plants 4%

Field crops 20%

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DUS activity

- Around 3300 DUS cycles carried out in France in 2023
  - Agricultural species
  - Vegetable species
  - Fruit species
  - Ornamental species

- More than 1800 Resistance tests carried out by GEVES in the lab for DUS tests or to update information of DUS variety collection in 2023
  - Vegetable species
  - Agricultural species

- >Resistance tests are an important part of DUS activity
- >In the lab, requests regarding resistance tests are more and more complex

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Using disease resistance characteristics in DUS examination

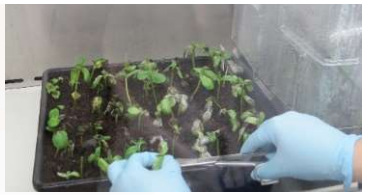
- DUS enables market authorization and PBR, thus it helps to promote varietal innovation
- Disease resistance characteristics are important for DUS:
  - As part of a harmonized protocol , use as **grouping characteristic**, to sort varieties and reduce the number of varieties to be evaluated in the field or greenhouse
  - Or use as **additional characteristic**

Example: use as (G) in lucerne

- Tolerance to *Verticillium albo-atrum*
- Tolerance to *Ditylenchus dipsaci*
- Tolerance to *Colletotrichum trifoli*

Example: use as additional characteristic in sunflower – Resistance to downy mildew race 704, 714

Type of expressi on:	Characteristic	Growth Stage	Method of observation: VG,VS,MG,MS	States of expression (at least two)	Example varieties	Note
QL	Resistance to *Plasmopara halstedii*, **race 714**		VS	Absent/present	Peredovik (susceptible) SY Nebraska, Warholl (resistant)	1 9



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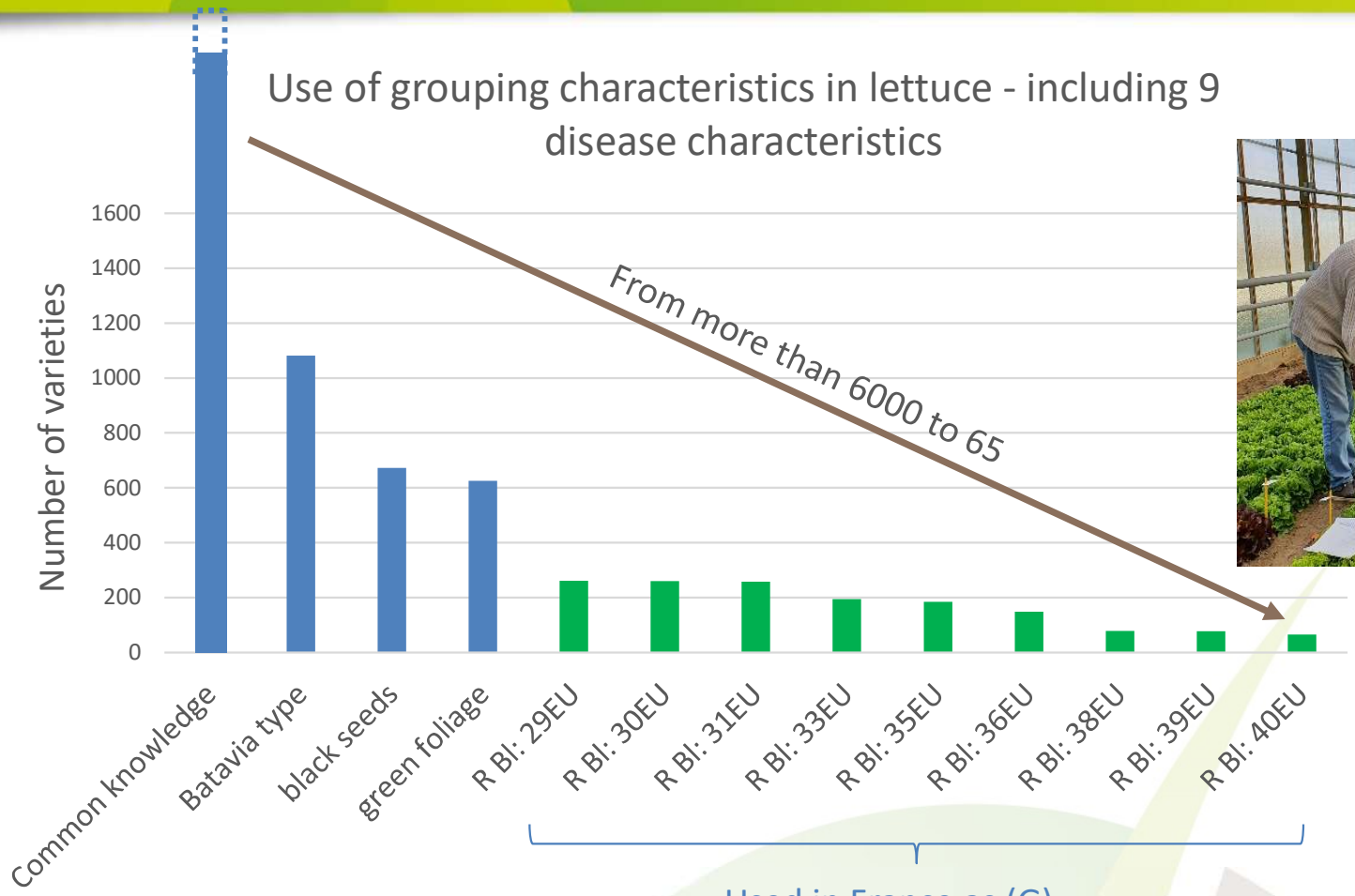
Using disease resistance characteristics in DUS examination



Use of Cultivation type, Resistance to LMV, Resistance to Nr:0 to decrease even more

And breeders already widely communicating on varieties resistant to Bl: 41EU

TG/13/11 Rev. 3
ORIGINAL: English
DATE: 2017-04-05
+ 2019-06-14 + 2021-10-26
+ 2024-08-09

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Challenges

- New diseases -> faster than official evaluation
- Which ones are needed for DUS testing?
  Only if relevant ->need to monitor innovations, to develop new biotests , via collaborative R&D programs -> need to adapt DUS protocols

- How to keep our reference collection up to date at reasonable cost -> need for more cooperation and based on harmonized protocols, no need to retest -> need for harmonized DUS protocols/guidelines at some point

Challenges

- Quantitative resistances : more complex, but possible to use for DUS, if needed

- Are take-over of reports an issue?

- Need for constant communication between DUS experts and plant pathologists, and breeders -> forum for discussion needed

- Opportunities : use of molecular markers as alternative to biotests
  -> make sure that methods are published
  -> make sure that markers are accessible
  -> make sure that all genetics are considered in DUS test

Thank you

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GEVES
Expertise & Performance