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INTERNATIONAL UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS

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TECHNICAL WORKING PARTY FOR AGRICULTURAL CROPS

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Mexico City, Mexico, July 11 to 15, 2016

IMPACT OF ENDOPHYTES ON DUS CHARACTERISTICS IN GRASSES

Document prepared by the European Union

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The Annex to this document contains a copy of the presentation "Impact Analysis of Endophytes on the Phenotype of Varieties of *Lolium perenne* and *Festuca arundinacea*" to be made by an expert from the Community Plant Variety Office of the European Union (CPVO) at the forty-fifth session of the Technical Working Party for Agricultural Crops (TWA).

[Annex follows]

IMPACT ANALYSIS OF ENDOPHYTES ON THE PHENOTYPE OF VARIETIES OF *LOLIUM PERENNE* AND *FESTUCA ARUNDINACEA*

Presentation by Ms. Anne Weitz, Community Plant Variety Office of the European Union (CPVO)

CPVO
Community Plant Variety Office

TWA/45 Session

Impact Analysis of Endophytes on the Phenotype of Varieties of *Lolium perenne* and *Festuca arundinacea*

Mexico City, July 2016

R&D project 2013 - 2015

Impact analysis of Endophytes on the Phenotype of varieties of *L. perenne* and *F. arundinacea*

Report Team (DUS observations and analysis):

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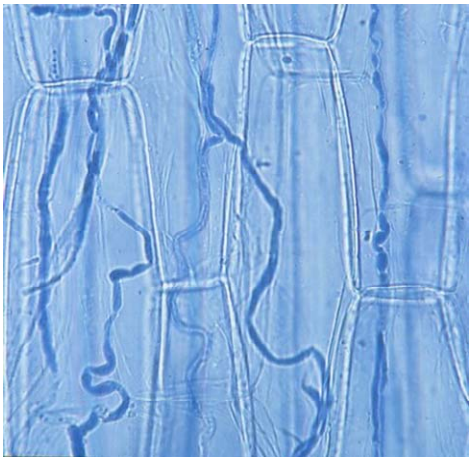
European Seed Association (Breeders)

- Niels Roulund (DLF Trifolium) + Stephane Charrier (Barenbrug)

CPVO coordinator: Anne Weitz

Funding: CPVO and ESA

Grass Endophytes



Symbiotic association between organisms

Endophytes known to infect

Lolium perenne:
- *Neotyphodium lolii* and
- *Neotyphodium occultans*

and

Festuca arundinacea
- *Neotyphodium coenophialum*

2 Endophyte varieties have a CPVR
4 applications are under test

Introduction

Setup of new CPVO-TP *L. perenne and F. arundinacea*

- Does the Endophyte have an impact on the phenotype of the infested plant and thus on the DUS test?
- Can it sufficiently modify the morphology of a variety to make it distinct from a sample containing no endophyte (circumventing protection)?
- Can this create problems in certification (ESA)?
- Must seeds for DUS be free of endophyte?

Project design

Locations:

Perennial ryegrass (all diploid, amenity):

- AFBI, GB
- Bundessortenamt, Germany

Tall fescue (probably hexaploid):

- GEVES, France

Endophytes: examined accessions

E+ = 100% Endophyte inoculated

E - = Endophyte free (0%)

DEF = Standard sample of the protected variety

Project design

Duration: 2 growing cycles (2013/2014 + 2014/2015)

Nr. of plants: 60 per variety per growing status E –
60 per variety per growing status E +
(a different 60 plants used for each growing cycle)

Varieties (coded)

Lp: Binnian, Donard, Croob, Gullion

Fa: Anorra, Divis, Trostan, Meelbeg

Technical protocols, characters observed

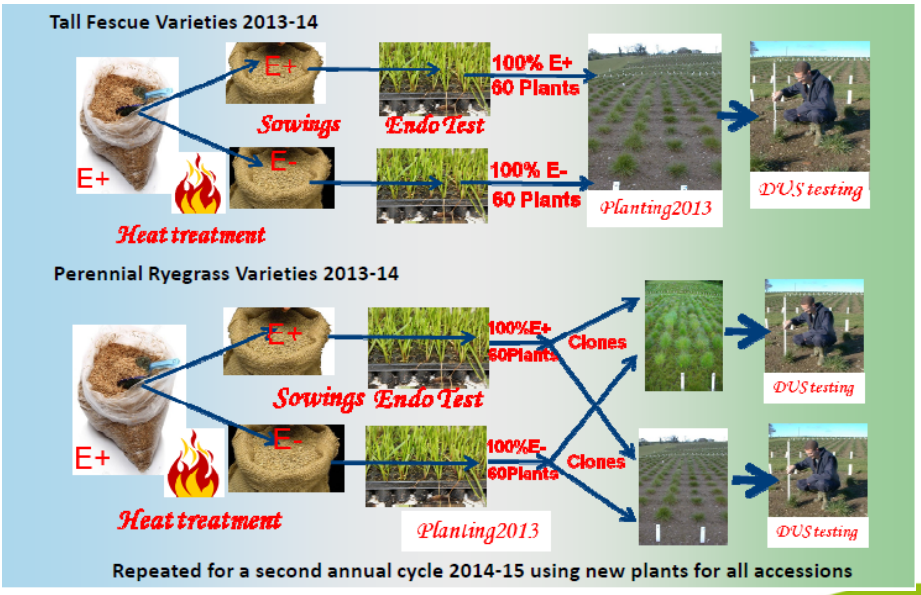
Lp: 17 standard characters = 49,960 observations

Fa: 9 standard characters = 12,960 observations

Results

132 pairwaise comparisons (4var x 3accessions x 11pairs)

Plant production and DUS testing



Results

132 pairwaise comparisons (4 var x 3 accessions x 11 pairs)
Differences tested at significance levels of 1% and 5%

Implications of E + versus E –

- No evidence that absence/presence of endophyte changes morphological identity significantly

Implications of standard sample vs E + / E –

- Occurences of sig. Differences in 3 out 4 varieties
- Cause not resolvable from evidence in existing project
- Discussion between breeders and DUS experts ongoing

Conclusions

Options to be discussed with CPVO crop experts

a.) Retain an endophyte free seed requirement

b.) Accept endophyte seed applications

c.) Require no information on endophyte presence/absence

This study refers only to DUS, its results and the potential conclusions do no consider the test on Value of agricultural use (VCU) of a variety.

THANK YOU
FOR YOUR ATTENTION

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