Animal &
Plant Health
Agency

United Kingdom

Molecular Techniques: Discussion on molecular techniques in DUS examination

UPOV Technical Committee, 59th Session

Geneva

Presentation by
Dr Sigurd Ramans-Harborough

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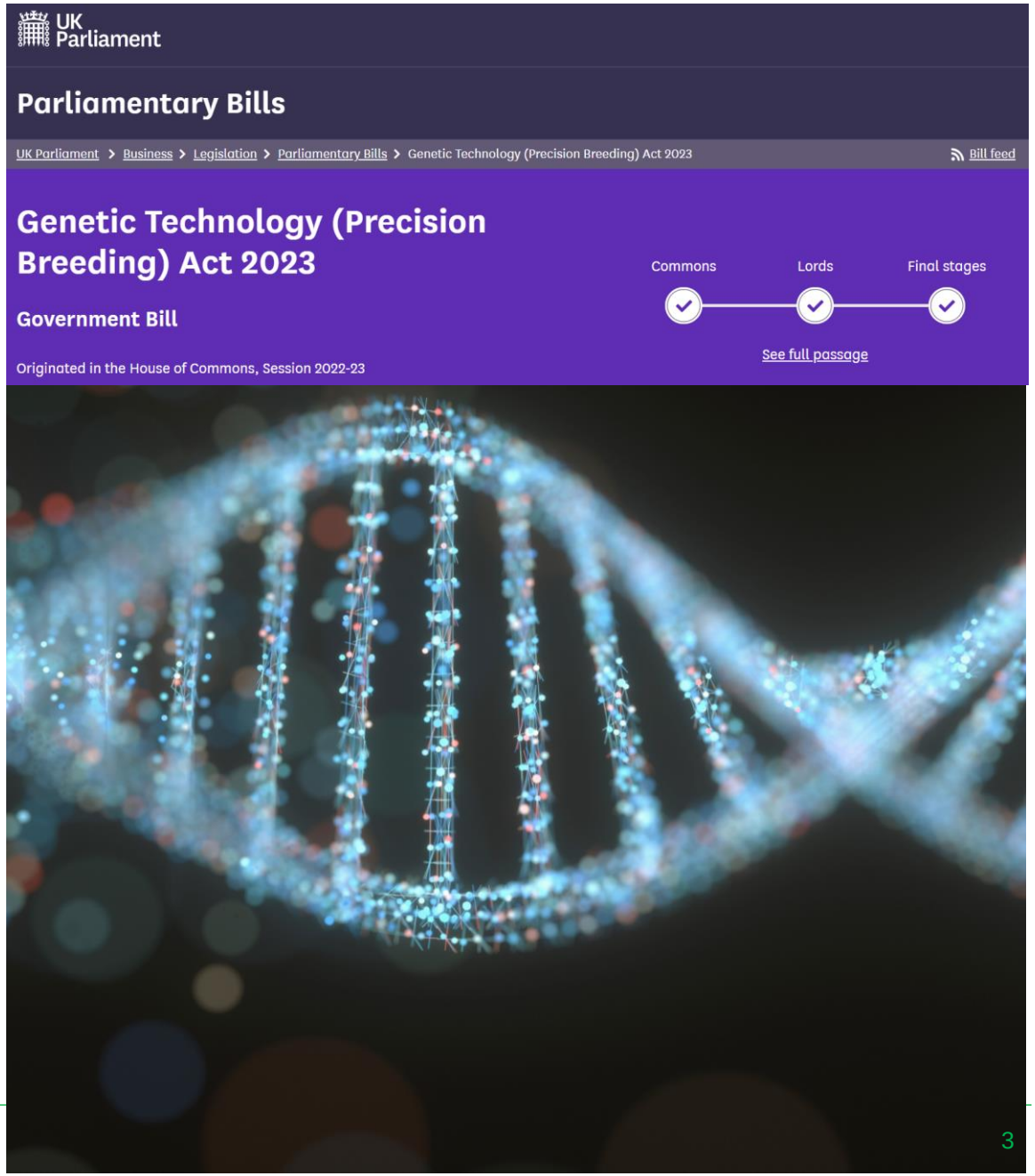
Genetic Technology Act 2023

Work is progressing for the implementation in England



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United Kingdom is Exploring approaches to support DUS testing

Image: NIAB

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Improve efficiency and quality of DUS testing in the UK

Two research and development projects are in progress, led by the Department for Environment, Food and Rural Affairs (Defra) in the UK in collaboration with the Animal and Plant Health Agency (APHA) and NIAB

Defra funded

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Concept

Exploring new approaches

Genotyping

Analysis of genomic markers by Artificial Intelligence (AI)

Growing Trial

Defra funded projects

The aim

is to use marker data to inform the selection of similar varieties before the first cycle of the growing trial.

The ambition

is to remove the need for an additional test year through better trial design

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Concept

Genotyping

Analysis of genomic markers by Artificial Intelligence (AI)

Growing Trial

New Project: DUS Molecular Markers in Barley

Aim:
To determine the most appropriate varieties for the growing trial.

To do this:
70 % of the barley reference collection is being analysed

Methods:

- Genotyping: 50K marker array
- Barley varieties selected to cover the full trait spectrum
- Incorporation of marker data in the DUS database to use alongside phenotypic data

Defra funded

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Concept

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Growing Trial

Defra funded projects

The ambition

to efficiently analyse large complex data sets to inform the growing trial design, while not delaying the DUS test.

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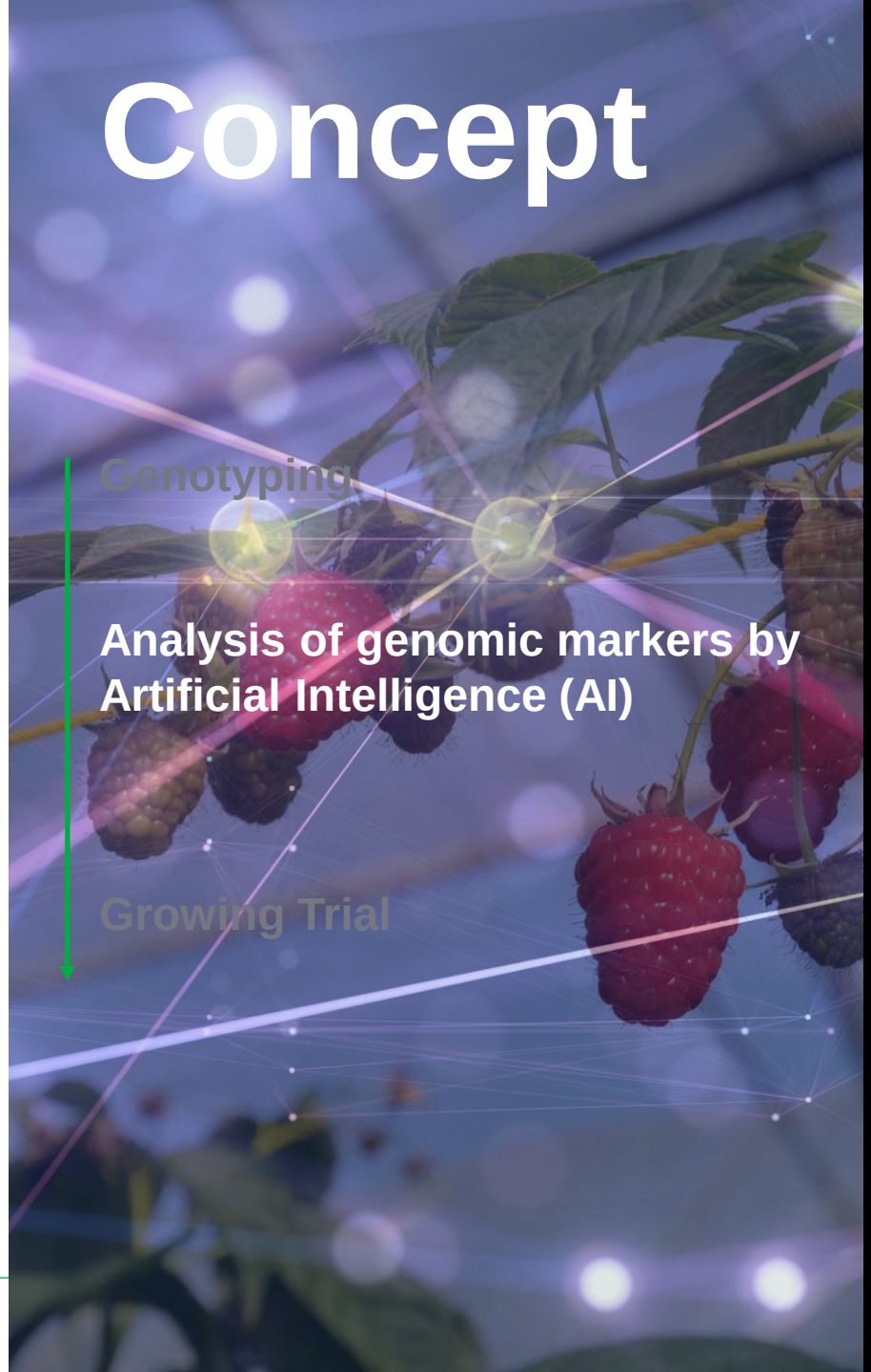
Concept



Defra funded project

New Project: AI on soft fruit

Aim: Develop an Artificial Intelligence program to identify genomic markers with the potential to distinguish between varieties of *Rubus idaeus* L.

Methods:

- Genotyping-by-sequencing (GBS)
- Whole genome sequencing
- Fully supervised machine learning, followed by unsupervised (deep) machine learning.

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Artificial Intelligence software for DUS

Open source to all

Following completion of the project and peer review of its results, Defra will produce a short summary report which will be available to all. Pending successful outcome of the project, Defra also aims to make the resulting prediction program available as open source to all.

Defra funded

Animal & Plant Health Agency

Concept

Genotyping

Analysis of genomic markers by Artificial Intelligence

Growing Trial

Improve efficiency and quality of DUS testing in the UK

Minimizing the number of DUS growing cycles

Support the selection of varieties of common knowledge in the new era of precision breeding in the UK

Defra funded

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Any enquiries regarding this publication should be sent to: pvs.helpdesk@apha.gov.uk