



NEW PLANT BREEDING TECHNIQUES (NPBT)

REPORT OF THE WORKSHOP 2015



New Plant Breeding Techniques

- *Working Group on Harmonisation of Regulatory Oversight in Biotechnology*
- Emerging issues in harmonization
- Discussion of new products and techniques used to produce them
 - New traits – abiotic stress tolerance and industrial
 - New breeding techniques
 - Transportability of data
 - Consensus documents might result



NPBTs

- No definition, no definitive list
- Used to describe a diverse range of techniques
- Different from “classical” modern biotechnology

NPBT after Lusser et al. (2011)

Agro-infiltration	Genetic material, so-called T-DNA, is inserted in a plant to express transiently by vector such as <i>A. tumefaciens</i> .
Cisgenesis/Intragenesis	Genes derived from cross-compatible species are inserted into a plant genome.
Grafting on GM rootstock on wild-type Scion	GM rootstock is grafted to non-GM scion without possessing transgenic elements in the leaves or fruits.
Oligonucleotide Directed Mutagenesis (ODM)	Specific mutation is introduced in a defined place in a plant genome by introducing synthetic oligonucleotides as a target to homologous genes.
Reverse Breeding	Homozygous parental plant is generated from selected heterozygous plant by the suppression of meiotic recombination by RNA interference.
RNA-directed DNA methylation (RdDM)	Methylation of promoter region is induced by the introduction of RNA fragments, which results in silencing of the downstream gene.
Site Directed Nucleases (SDN)	Targeted mutagenesis of genes or targeted insertions/deletions of genetic material are achieved by some protein complexes.



Workshop

- To gathering information on NPBT and country experience
- Planning Group established for workshop
- Questionnaire circulated to gather country information
 - Six questions
 - 21 responses



Responses

- Argentina
- Austria
- Australia
- Bangladesh
- Belgium
- Canada
- Czech Republic
- Finland
- Germany
- Ireland
- Japan
- Mexico
- Netherlands
- Norway
- South Africa
- Switzerland
- Turkey
- United Kingdom
- United States
- European Commission
- Business Industry Advisory Committee



Products developed

Is your country seeing any plants developed by NPBT in the private or public sector?

- **Most mentioned techniques:**

- Cisgenesis/Intragenesis
- ODM
- SDN applications

Potato with blight resistance by cisgenesis

- **Most mentioned crops:**

- Apple
- Potato
- Maize

Apple with scab resistance by cisgenesis

- **Most mentioned traits:**

- Fungal resistance
- Herbicide tolerance

Herbicide tolerance oilseed rape developed by ODM

- **Most developments are still in research phase.**



Experiences with ERA

Does your country have any practical experience in performing an ER/SA on plants developed from NPBT?

- **Most countries do not have practical experience**
 - Scientific committees investigate potential new issues and formulate recommendations.
Examples: Switzerland, Germany, Austria
- **A few countries indicated to have practical experience**
 - They indicate that no new issues are identified
Examples: the Netherlands, Ireland, Belgium, Australia
- **Many countries refer to EFSA opinions**
 - EFSA opinion on Zinc Finger Nuclease-3/ SDN-3 applications
 - EFSA opinion on Cisgenesis/Intragenesis



(Conclusion remarks)

Key Message

Experience to date indicates that current guidance and tools for ER/SA of transgenic plants are applicable to plants developed using NPBT, where ER/SA of such plants is required.