



# **Tobacco Biotechnology and ‘Omics’ (TBO) Task Force Annual Report**

**2020 Online CORESTA Congress**

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**TBO TF was proposed by Dongmei Xu and Marcos Lusso (Altria) in early 2017**

- 1. Describe and summarize the publicly-available literature regarding the use of biotechnology and ‘omics’ techniques and the nomenclature commonly used in agriculture in different countries.**
- 2. Prepare clear and concise definitions of the biotechnology and ‘omics’ nomenclature and techniques.**
- 3. Application of biotechnology and ‘omics’ technologies to tobacco**



# AP2017 Objectives

- 1. Invite/recruit CORESTA members to participate in the TBO Task Force.**
- 2. Discuss potential subject areas to be covered**
- 3. Present a basic outline for the Technical Report that will be written and presented in Kunming in 2018**

## ❖ **TBO-151 Task Force Members**

- **Dave Zaitlin & Orlando Chambers (UK KTRDC)**
- **Christelle Bonnet (JT International, Geneva)**
- **Jennifer Bromley & Louise Jones (BAT Cambridge)**
- **Ramsey Lewis (NCSU)**
- **Emilie Julio (Imperial Tobacco Group)**
- **Peijian Cao (CNTC)**
- **Chengalrayan Kudithipudi, Donmei Xu, & Marcos Lusso (Altria Client Services)**



## Expected Outcomes

- ❖ **Produce a descriptive document on crop biotechnology that is accessible to both technical and lay audiences that includes a detailed glossary of technical terms used**
- ❖ **The Technical Report will explain the benefits, risks, and negative outcomes of biotech crops since their adoption in 1996**
- ❖ **The TR will examine the benefits of applying the various technologies, including gene editing (CRISPR/Cas9), to traits that will reduce the risk of using tobacco products and that will satisfy regulators in the light of current governmental regulations.**



# Original Milestones for TBO-151 TF

- ❖ The objectives and subject areas to be covered and the format will be set and prioritized by consensus to produce the final outline (late 2017), and section assignments will be made in early 2018
- ❖ The draft Technical Report will be reviewed by the TF members and the CORESTA Scientific Commission (mid-2018)
- ❖ The TR will be published on the CORESTA website in December 2018, after which the TF will be disbanded



# Proposed Outline for TBO

- 1. The Introduction will describe the early efforts to develop transgenic plants and the history of biotech crops. It will stress the importance of tobacco to this early research**
  - a. We will also discuss the impact of genomics and other “-omics” technologies (proteomics, transcriptomics, and metabolomics) on modern crop breeding and development**
- 2. We will then summarize the benefits, risks, and negative outcomes that have resulted from biotech crops. Farmer and consumer benefits and adoption rates in the US, EU, and some other countries will be included.**



# Topics to be Covered

- ❖ **Economic impacts**
- ❖ **Benefits/risks of 1<sup>st</sup> & 2<sup>nd</sup> generation transgenic crops**
- ❖ **Ethical considerations**
- ❖ **Sustainability/environmental effects**
- ❖ **Negative aspects and public perceptions of GMO crops**
- ❖ **Regulations, EU and USA**
- ❖ **Developing countries/Africa**





## ❖ Tobacco:

1. Potential benefits of transgenic tobacco to growers, consumers, and the environment
2. Transgenic tobacco
3. Conventional mutagenesis
4. Gene editing technologies
5. Targets for gene editing
6. Use of *FT* plants in breeding
7. Harm reduction
8. Regulation



# Summary of Progress (1)

- ❖ **D. Zaitlin, E. Julio, C. Bonnet, and Louise Jones/P. Cao contributed sections to the TR (TBO-151-1)**
- ❖ **Writing was essentially completed in early 2019; I did the final assembly and editing for TBO-151-1**
- ❖ **At the request of the SC, a second document entitled “Genome Editing and Plant Breeding” was added to the TF for the benefit of plant breeders (TBO-151-2)**
  - **TBO-151-2 was written by D.Z. and completed in mid-2020.**
  - **Covers the CRISPR system in detail, describing its function, diversity, and how it was adapted for use in plant genome editing.**
  - **Also covered are plant breeding applications and use of CRISPR in tobacco, as well as IP issues and how gene editing is regulated**

## Summary of Progress (2)

- ❖ **TBO-151-1 and 151-2 were sent Eeva Marignac for layout and corrections and then to the SC for review starting in June 2020.**
- ❖ **SC members reviewed them and made recommendations for changes and corrections.**
- ❖ **Appropriate changes were incorporated. TBO-151-1 was reviewed once and then returned to the SC, while TBO-151-2 has been through 2 rounds of SC review as of October 2020**
- ❖ **I anticipate that both TRs will be approved by the SC in late 2020 and then published on the CORESTA website**



## Tobacco Biotechnology and Omics

### Task Force

## Technical Report

June 2020

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**Tobacco Biotechnology and Omics  
Task Force**

**Technical Report**

**Genome editing and Plant Breeding**

September 2020

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**Thanks also go to Eeva Marignac and the members of the CORESTA Scientific Commission who apparently read all 70+ pages of the Technical Reports. Their useful criticism and suggestions for additions and changes improved both documents and were much appreciated.**

