



A Presentation of CORESTA

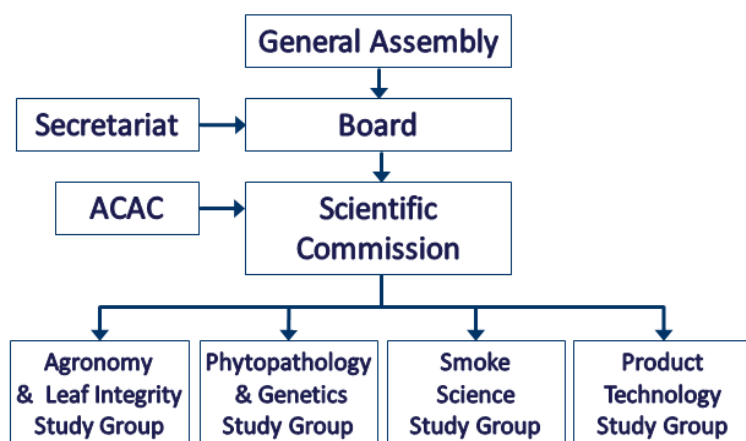
Introduction

CORESTA is an association founded in 1956, headquartered in Paris, and is governed by French law. The name CORESTA is derived from its historic full title of the "Cooperation Centre for Scientific Research Relative to Tobacco", a name that reflects the founding purpose of the association, notably to respond and where practicable resolve the non-competitive issues associated with tobacco production, tobacco product manufacture, control and use. The Full Members of CORESTA are organisations of all sizes, from independent experts to global manufacturers, from academic and research institutes to laboratories and suppliers of the industry that have an R&D interest in these areas, whether they be independent or governmental.

CORESTA membership grew from its original membership of 24 at its inception to 176 at the end of the 57th Financial Year on 31 March 2013. A membership restructuring exercise classifying members into Independents or Groups with Sub-Member organisations was approved at the 2012 CORESTA General Assembly. Upon implementation on 1 April 2013, membership stood at 132 member organisations, with a number of former members having been assimilated into their respective Group members. Currently membership stands at 154 organisations.

Structure of CORESTA

The structure of CORESTA is detailed in the Statutes and Internal Rules of the association, developed at the time of its inception and amended on several occasions since. The main bodies of the association are the General Assembly, as represented by its membership, and the elected bodies being the Board and the Scientific Commission. The CORESTA Board comprises senior executives of 14 member-organisations (*see Annex 1*). The role of the Board is to provide policy guidance and set scientific direction for the Scientific Commission and to review its progress and output. The Board also ensures that the legal requirements of the association are met under French law.



There are four Study Groups each being led by five elected members who collectively form the Scientific Commission. The four Study Groups are Agronomy & Leaf Integrity, Phytopathology & Genetics, Smoke Science and Product Technology. All the scientific work undertaken by the Study Groups is carried out by the scientists of the member companies at their own cost, through a range of Sub-Groups and Task Forces. The research activity of the Study Groups is under the direction of the Scientific Commission.

One specific scientific group that reports directly to the Scientific Commission is the Agro Chemicals Advisory Committee (ACAC), which was formed due to the highly specialised work it covers.

CORESTA has a General Secretariat consisting of three permanent employees, based in Paris, who are responsible for the administrative functioning of the association and its documentation.

CORESTA Meetings

Scientific research and exchange of scientific views and information is the primary purpose of the association and consequently numerous formal and informal scientific meetings are enshrined in the operation of CORESTA.

Formal meetings of the Smoke Science and Product Technology Study Groups on the one hand and the Agronomy & Leaf Integrity and Phytopathology & Genetics Study Groups on the other hand, are conducted every year. These meetings include active research review and discussion on key scientific issues facing CORESTA members and the global tobacco industry.

Delegates, whether they are CORESTA members or not, who attend these meetings receive presentations on the progress and status of all Task Forces, Sub-Groups and special working committees which provide them with a full working knowledge of the mission and deliverables of CORESTA.

These meetings are critically important to CORESTA members by providing the opportunity to discuss and exchange recent scientific findings and publications and to present research papers and posters. The subjects covered are wide ranging but some examples include field and consumed tobacco chemistry, methods of analysis, mainstream, sidestream and environmental smoke/vapour collection methods, user behaviour methodology, in vitro toxicology protocols, physical test methods, manufacturing and environmental issues, agricultural chemicals, pest management, plant biotechnology, agricultural practices, crop sustainability and many others. The formal CORESTA meetings include technical sessions where invited speakers address timely issues in a highly regulated context.

On odd years, these meetings are held separately. On even years, they are held together at the occasion of the CORESTA Congress. The Congress provides a forum for delegates from around the world to meet informally to discuss research, topical issues and potentially new directions for science and meeting the needs of its members. It also provides an opportunity for the members to hold a General Assembly to address the association's administrative issues and elect the Board and Scientific Commission representatives. In addition, prizes are awarded to scientists that have made a substantial contribution to tobacco research and study grants may be awarded to fund specific research projects by young tobacco scientists.

The activities of CORESTA

Through the work of the Sub-Groups and Task Forces CORESTA has developed over 70 methods for the measurement of tobacco parameters and components, smoke chemistry analysis, tobacco products sampling and handling. Many of these have been adopted or used as the basis of International Standards (ISO). The development of standard methods is critically important in ensuring consistency and comparability of data reported by the association members and as part of regulatory reporting of data. Guidelines and reports are also published on a regular basis. All CORESTA documentation is available from its website at www.coresta.org.

The current activities and work of the Study Groups can be summarised as follows:

1. Agronomy & Leaf Integrity Study Group

The Agronomy and Leaf Integrity Study Group involves the broad and all-encompassing role agronomy, and agronomists, play in modern tobacco production and in meeting the expectations of stakeholders. It covers the scientific study of the production of all types of tobacco leaf, embracing all crop management practices including propagation, cultivation, harvesting and curing, storage, and environmental factors that influence yield and usability. It further incorporates the principles of Good Agricultural Practices (GAP) that lead to efficient, sustainable tobacco production and leaf supply. The current Sub-Groups and Task Forces include:

- ✓ Sub-Group Agrochemicals Analysis (AA) (inception: 1972)
- ✓ Sub-Group Pest and Sanitation Management in Stored Tobacco (PSMST) (inception: 1993)
- ✓ Sub-Group Proficiency Testing for Detection of Transgenic Tobacco (GMO) (inception: 2004)

- ✓ Sub-Group TSNA in Air-Cured and Fire-Cured Tobacco (TSNA) (inception: 2006)
- ✓ Sub-Group Agrochemical Field Residue Trials (RFT) (inception: 2012)

The Study Group has published a number of comprehensive reports, and has recently released documents on Controlled Atmosphere Parameters for the Control of Cigarette Beetle and Guidance for Sampling the Tobacco Leaf Supply Chain respectively published as CORESTA Guides N° 12 and 13. The **TSNA Sub-Group** released its final report on the analysis of variability in curing conditions and TSNA within dark air-cured tobacco barns (a study sponsored by a CORESTA Grant). The **Sustainability in Leaf Tobacco Production (SUST) Task Force** (now disbanded) published the CORESTA Guide N° 17, a complementary document to Guide N° 3 on Good Agricultural Practice. The **AA Sub-Group** published its reports on joint experiments test studies (JETS) on maleic hydrazide and dithiocarbamates. The **RFT Sub-Group** recently completed a report on its first 3-year round of agrochemical residue field trials.

2. *Phytopathology & Genetics Study Group*

The Phytopathology & Genetics Study Group is concerned with the study of pests and diseases that adversely affect tobacco (fungi, bacteria, viruses, parasitic plants, nematodes and insects), as well as genetics and breeding. It promotes investigations and the exchange of data on the occurrence and spread of pests and diseases, prevention and treatment techniques, and the development of resistant or otherwise improved genotypes using traditional breeding programmes and biotechnology. Genetic mapping, molecular markers and genetic diversity of tobacco also fall under this Study Group. Its activities play an important role in the reduced use of agrochemicals, both through resistance breeding and through the dissemination of information on Integrated Pest Management. Cooperation with international research organisations provides access to web-based tobacco diagnostic tools and information. In 2017, two new Task Forces were formed to obtain information on tobacco alkaloid genetics and to undertake a literature review of tobacco biotechnology and omics and compile a nomenclature definition. The current Sub-Groups and Task Forces include:

- ✓ Sub-Group Virus Diseases (VIR) (inception: 2007)
- ✓ Sub-Group Integrated Pest Management (IPM) (inception: 2005)
- ✓ Task Force Agro-Phyto Information Collection (APIC) (inception: 2012)
- ✓ Sub-Group Extended Diagnostic Expert System (XDES) (inception: 2013)
- ✓ Sub-Group Collaborative Study Black Shank (BKS) (inception: 2015)
- ✓ Sub-Group Efficacy of Biological and Eco-Friendly CPAs (BIO) (inception: 2015)
- ✓ Task Force Tobacco Alkaloid Genetics (TAG) (inception: 2017)
- ✓ Task Force Tobacco Biotechnology and Omics (TBO) (inception: 2017)

The notable achievements of the Agronomy & Leaf Integrity and the Phytopathology & Genetics Study Groups can be summarised in brief as:

- Considerable work on growing practices, use of agrochemicals, pests and diseases, breeding of resistant varieties, transplant production and curing, leading to higher yields and returns to farmers, better leaf quality for industry and less reliance on agrochemicals, with particular attention focused on sustainability. Detailed technical reports on sustainability and tobacco viruses have been published by the **SUST Task Force** and **VIR Sub-Group**.
- Translation into English of Di@gnoplant Tobacco app, the INRA tool for the diagnosis of tobacco diseases, by the **XDES Sub-Group**. This application helps easily identify parasitic diseases and physiological disorders affecting tobacco.
- Work on post-harvest sanitation issues, with the publication of guidelines on phosphine fumigation, freezing parameters and controlled atmosphere for the control of cigarette beetle and tobacco moth (Guides N° 2, 9 and 12), with significant financial benefits for the industry. Training sessions organised worldwide and organisation of a yearly Infestation Control Conference (ICC).
- Monitoring of new biotechnologies (e.g. GMOs) and development of detection methods.
- Industry-wide promotion and adoption of Good Agricultural Practices (GAP).

3. *Smoke Science Study Group*

The Smoke Science Study Group is responsible for the scientific study of emissions from, and exposure to, tobacco and related products. This includes development of specific chemical and biological methods and investigation of means to assess exposure and use.

The work of this Study Group is primarily concerned with the development of sound science as a basis of engaging the scientific and regulatory community on these issues.

The current Sub-Group activities include:

- ✓ Sub-Group Product Use Behaviour (PUB) (formerly Smoking Behaviour (TSB)) (inception: 1996)
- ✓ Sub-Group Smoke Analytes (SMA) (formerly Special Analytes (SPA)) (inception: 1999)
- ✓ Sub-Group *In Vitro* Toxicity Testing (IVT) (inception: 2002)
- ✓ Sub-Group Biomarkers (BMK) (inception: 2009)

The **SMA Sub-Group** has produced Recommended Methods for the determination of aromatic amines, selected volatiles, carbonyls, tobacco specific nitrosamines, phenols and ammonia, and has published a journal article on updates of CORESTA Recommended Methods and analysis of Reference Cigarette smoke yield data. The **PUB Sub-Group** has published a journal article on assessing smoking behaviour and tobacco smoke exposure and a report on the results and comparison between part-filter method ring trials carried out in 2012 and 2014, which has led to the development of a new Recommended Method on the use of the part-filter method to estimate smokers' exposure to nicotine and NFDPM. It has also published the report on an inter-lab study on puffing topography. The **IVT Sub-Group** published technical reports on proficiency studies on neutral red uptake assay, *in vitro* micronucleus assay and ames assay. The **BMK Sub-Group** recently published a technical report and journal article on its interlaboratory comparison study on 3-HPMA and a guide on the requirements for the certification of analytical reference standards for biomarker studies.

4. *Product Technology Study Group*

The work of the Study Group includes the study of processes and procedures relating to tobacco processing and manufacturing of products and facilities monitoring. This includes the description of tobacco and tobacco products in terms of physical, chemical and quality properties together with the development of analytical methods for the determination of product properties as well as the monitoring of engineering techniques / developments in tobacco processing, product manufacturing and environmental protection. In 2013, CORESTA entered a new work arena with the creation of a Task Force on e-cigarettes that is working on product definitions and collating research literature and data. In 2014 another new Task Force was created to study the variability associated with measured tobacco and smoke analytes resulting from sources of variation such as product manufacturing and analytical testing.

The current Sub-Group and Task Force activities include:

- ✓ Sub-Group Routine Analytical Chemistry (RAC) (inception: 1985)
- ✓ Sub-Group Physical Test Methods (PTM) (inception: 2005)
- ✓ Sub-Group Cigar Smoking Methods (CSM) (inception: 2006)
- ✓ Sub-Group Tobacco and Tobacco Product Analytes (TTPA) (formerly Smokeless Tobacco (STS)) (inception: 2008)
- ✓ Sub-Group E-Vapour (EVAP) (formerly E-Cigarettes (ECIG)) (inception: 2013)
- ✓ Task Force Cigarette Variability (CVAR) (inception: 2014)

The **PTM Sub-Group** has published a Recommended Method and a Guide on paper diffusivity and reports on tobacco moisture, water and oven volatiles, the repeatability and reproducibility of CRM 77, and the diffusion capacity of cigarette papers. It has also published a technical report on a study to evaluate a paperboard substitute for a diffusion capacity standard and reports on round robin tests on ventilation, pressure drop and air permeability calibration standards and proficiency tests on physical

parameters. Most recently, the Sub-Group published an update of CRM 6 and prepared a report for submission to ISO in the context of a future revision of ISO 2965:2009. The **CSM Sub-Group** has published the report of its 11th collaborative study on cigar smoke analysis. The **EVAP Sub-Group** has recently published a study on aerosol parameters and completed a preliminary proficiency study on e-liquids. It has also published a report and a CRM (N° 840 on the determination of glycerin, propylene glycol, water, and nicotine in the aerosol of e-cigarettes by gas chromatographic analysis. A second guide has been published on the selection of appropriate intense vaping regimes for e-vapour devices, and a report released on the results of a collaborative study on carbonyls in e-cigarette liquids. The **TTPA Sub-Group** has produced a Guide on the production and evaluation requirements of CORESTA Reference Products, technical reports on the 2010-2016 stability analyses of the reference products, Recommended Methods and technical reports concerning the analysis of moisture content (oven volatiles) and ammonia, nitrates, humectants and metals and the determination of benzo[a]pyrene and carbonyls in tobacco products. The **RAC Sub-Group** has released its 2017 collaborative study on CM8 and a report based on the CM8 results to support the review by ISO of its Standard 10362-1:1999. A recent report on the safer chemistry 2014 collaborative study led to the new CRM 85, which replaced the CRM 35, and a report on the 2017 proficiency study on menthol is preparing the way for the development of a CRM. A joint study by the group and the TTPA Sub-Group has resulted in the publication reports on methodology for testing minor alkaloids and nicotine in tobacco products and the publication of CRM 87 on nicotine determination. The **CVAR Sub-Group** published its first report on cigarette variability (short-term) – two more studies on medium-term and long-term variability studies are underway.

The notable achievements of the Smoke Science and Product Technology Study Groups can be summarised in brief as:

- Continued development of standardised methods for the handling, analysis and measurement of all types of tobacco products.
- Regular collaborative studies and proficiency trials to support laboratories' accreditations.
- Development of smoker and vaper behaviour studies to understand consumer use of products in respect of smoking and vaping.
- Establishment of *in vitro* test protocols to test tobacco smoke.
- Design and manufacture of monitor test-pieces used worldwide for the monitoring of smoke analysis and ignition propensity in laboratories. Design and manufacture of smokeless reference products.
- Regular publication of technical guidelines and reports.
- Production and update of a Glossary of Smokeless Tobacco Products definitions.
- Publication of Reference Reports on e-cigarettes.

5. The work of ACAC – Agro Chemical Advisory Committee

This committee has the objectives to gather data on agrochemical use, maintain an updated knowledge of related regulatory considerations and inform CORESTA members of emerging issues. It determines and maintains a list of Guidance Residue Levels (GRLs) that assist in the evaluation of pesticide residue results and emphasises the importance of Good Agricultural Practice. In addition the Committee is charged with the responsibility of informing members of new agrochemical techniques / procedures and emerging issues generally.

The notable achievement of ACAC is to be a global reference body when it comes to discussing agrochemical issues within the context of both industry and local requirements, including by means of workshops with the relevant authorities.

In summary

- CORESTA:
 - Brings world tobacco-related organisations and scientists together
 - Provides an exchange of information and education
- Collaboration of scientists and technologists of all CORESTA members:
 - helps to produce and promote sound scientific data and ideas
 - underpins the development of new methods and procedures for the industry
 - contributes to the long term benefits that will accrue to the industry and the member companies
- Members recognise the crucial long-term benefits of CORESTA's work, and continue to support especially those areas which they see necessary for the future of our industry in an increasingly regulated world.

Annex 1

BOARD MEMBERS (2016-2018)

Alliance One International, Inc. (USA)
Alternative Ingredients, Inc. (USA)
Borgwaldt KC GmbH (Germany)
British American Tobacco (UK)
China National Tobacco Corporation (China)
delfortgroup AG (Austria)
Imperial Tobacco Ltd. (UK)
Japan Tobacco Inc. (Japan)
KT&G Corporation (South Korea)
Reynolds American Inc. Services Co. (USA)
Swedish Match AB (Sweden)
SWM International Inc. (USA)
Universal Leaf Tobacco Company (USA)
University of Kentucky (USA)