ISTA: Historical Progress and Vision for the Future

By Keshavulu Kunusoth, ISTA President 2022 - 2025

The start of seed testing

In the latter half of the 19th century, as agricultural practices progressed across Europe and the rest of the world, the sale and trade of seeds became more established. However, there were no standardised methods to assess seed quality and purity. Recognising the issue of poor-quality seeds being sold to farmers, Prof. Friedrich Nobbe, at the agricultural college in Tharandt, Saxony, developed germination and purity tests (Handbuch der Samenkunde, Berlin 1876). His work laid the foundation for modern seed testing, initiating systematic sampling and testing to determine the quality of seed. As a result, by the end of the 19th century, seed testing stations were established globally, with Copenhagen, Zurich, and Wageningen emerging as key centres in the early 20th century. However, these non-internationally coordinated efforts resulted in regional methods, lacking uniformity and reliability between different countries.

This variability in seed quality assessment, coupled with some unethical practices in the seed trade during the 19th century, highlighted the need for an organisation that could develop standardised sampling and testing methodologies to ensure uniform test results, and reliability of seed lot quality. This need paved the way for the establishment of the International Seed Testing Association (ISTA) in 1924 at the 4th Seed Testing Conference in Cambridge, UK. There were 26 countries participating (24 from Europe, two from the Americas: Argentina and Canada, and one from Africa: Egypt).

The start of ISTA

Mr. Knud Dorph-Petersen from Denmark was the first ISTA President in 1924. From the very beginning ISTA's objectives included comparative testing and research aimed at achieving more accurate and uniform results. This led to the formulation of uniform methods and terms in the analysis of seeds in the international seed trade. Since its formation ISTA has worked with a vision to ensure ‘uniformity in seed quality evaluation worldwide,’ through its mission: to develop, adopt and publish standard procedures for seed sampling and testing; to promote the uniform application of these procedures; and to advance research in all areas of seed science and technology. Over the past century, ISTA's role and priorities have evolved significantly to adapt to the changing needs and challenges of the global seed industry, as well as developments in the worldwide agriculture sector.

During the early years of ISTA, from 1924 to 1940, the primary focus was on developing basic methods for seed sampling and testing, specifically germination and purity tests. However, significant challenges persisted, including the lack of uniformity between laboratories, standardisation, and a coordinated approach to seed testing practices globally. Despite these challenges, at the request of the Fédération Internationale du Commerce des Semences (FIS), ISTA made significant strides by adopting the 'International Rules of Seed Testing (ISTA

Rules)' and establishing the ISTA Certificate Scheme in 1931. These initiatives aimed to set standardised guidelines and ensure consistency in seed testing methodologies and the reporting of results across member countries and laboratories.

The ISTA Rules continued to evolve

Over the years, ISTA has continually developed the ISTA Rules to encompass a broader scope of seed testing practices. In 1954, tree and shrub species were incorporated into the ISTA Rules. In 2002, ISTA made a significant advancement by adding the Vigour chapter to its rules. The year 2012 saw another crucial update with the inclusion of the Seed Mixtures Analysis chapter in the ISTA Rules. In response to advancements in agricultural biotechnology, the ISTA Rules were updated again in 2014 to include testing for seeds of genetically modified organisms (GMOs). Today the ISTA Rules are available electronically and accessible in four languages: English, French, German, and Spanish. Members can easily access the latest guidelines and resources for seed testing from ISTA's website.

ISTA's scientific journal

Other changes during the late 20th century came in 1973, when ISTA renamed its proceedings Seed Science and Technology (SST), broadening its scope to encompass a wider range of seed-related disciplines and research. Changes that reflected the ISTA strategy to help advance seed science and technology. The 50th volume of SST was published in 2022.

ISTA accreditation for laboratories and sampling entities

In 1978, ISTA's Secretariat moved to what became a permanent home in Switzerland, and later grew in size to provide administrative functions with enhanced international coordination among member countries, fostering greater efficiency and support to the Technical and Executive Committees of ISTA. In 1989, ISTA introduced its Accreditation Protocol to enhance competency and uniformity, setting a rigorous quality management system for member laboratories, ensuring quality assurance and reliability in seed testing methodologies worldwide. In 1995, during the ISTA Congress in Copenhagen, ISTA opened its membership to private laboratories and seed companies, promoting inclusivity and enhanced industry collaboration, enriching the organisation's knowledge base and outreach. ISTA launched its Quality Assurance Programme in 1996 to harmonise seed testing practices globally through accreditation of laboratories, with the aim to further enhance uniformity and reliability in seed testing results globally.

ISTA in recent decades

ISTA has become the key organisation for ensuring the quality of seeds worldwide and has been at the forefront of global seed and food security. ISTA stands as a beacon for global seed quality assurance, advocating for uniform and standardised protocols that guarantee the reliability and consistency of seed quality evaluation worldwide. The primary objectives of

ISTA are still to develop, adopt and publish standard procedures for seed sampling and testing; promote the uniform application of these procedures; and advance research in all areas of seed science and technology. ISTA has a storied history and created an enduring legacy by producing internationally agreed rules for seed sampling and testing, accrediting laboratories, promoting research, providing international seed analysis certificates and training/capacity-building programs, and disseminating knowledge in seed science and technology. ISTA's expertise is based on not-for-profit (non-profit), voluntary cooperation model from across the international community of over 400 competent and energetic seed scientists and analysts. ISTA membership is now a truly global network, consisting of 163 accredited laboratories and sampling entities out of a total of 247 member laboratories and sampling entities,37 personal members, 59 associate members, and 68 designated members from 83 countries and distinct economies around the world. This membership promotes worldwide uniform seed quality assessment, facilitating seed trade nationally and internationally, supporting global agriculture, and making a valuable contribution to food security by supporting Sustainable Development Goal (SDG) #2 of the United Nations, which aims to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture".

ISTA's outreach

In 1998, ISTA started to embrace digital transformation with the launch of its website, enhancing global accessibility to seed testing resources, publications, and information, thereby strengthening its communication and outreach efforts.

ISTA produces a diverse range of publications that serve as vital resources for the global seed industry. There are: ISTA's peer-reviewed journal Seed Science and Technology, 14 handbooks on methodology, the ISTA Reference Pest List, Seed Health Imgae Database, and the ISTA news bulletin Seed Testing International (STI) all facilitating the dissemination of seed testing knowledge. Most of these are available electronically and all can be ordered online.

Modern Social Media presence was established in the late 2010s supporting the ISTA Newsletter using platforms like LinkedIn, YouTube and X (formerly Twitter).

The organisation has also adapted to challenges like the COVID-19 pandemic by embracing virtual meetings, remote audits, and electronic certificates (eCertificates), ensuring continued support for the seed industry despite a global pandemic.

Innovation

ISTA's commitment to innovation is reflected in its recent incorporation of digital technologies and data analytics to improve seed testing processes. By leveraging digital tools and advanced imaging techniques, ISTA aims to continually enhance the accuracy and efficiency of seed quality evaluations. ISTA 100 years of innovations that changed the world

ISTA's technical committees are investigating the use of advanced technologies, such as molecular testing, imaging technologies, modelling, use of algorithms for seed id, as well as digital X-ray and 3D imaging, all aiming to improve seed quality assurance by providing more precise and reliable results as efficiently as possible.

Future needs

Seed health is an area of focus for ISTA, as it plays a critical role in global biosecurity and crop health. The ISTA Seed Health Technical Committee collaborates with organisations like the International Plant Protection Convention (IPPC) to develop methods that prevent the spread of diseases through seeds. The ISTA Reference Pest List has become an essential tool in identifying potential seed-borne pathogens, contributing to global agricultural sustainability, and the Seed Health Image Database helps in identifying pathogens, also those recently evolved

In response to increasing interest in using wild or native species for environmental restoration and landscaping, ISTA has expanded the scope of its committees to include wild species. Collaborating with institutions like the Association of Official Seed Analysts (AOSA), the Society of Commercial Seed Technologists (SCST) and the Royal Botanic Gardens, Kew, who together within an ISTA Technical Committee are working to develop new methodologies and approaches for analysing these seeds.

Ensuring seed testing continues is also about involving the next generation of people, ISTA's Young@ISTA initiative was launched to engage the next generation of seed professionals. So far it has successfully empowered young scientists and analysts to participate in ISTA technical committees and leadership roles in both ISTA and their own countries.

One of ISTA's most recent innovations is the introduction of eCertificates, which aims to make the process of communicating seed testing results more efficient as well as enhancing the security of the information in the Certificates. These digital certificates offer rapid access and verification, ensuring transparency and reducing administrative burden.

ISTA's strategic focus for the future includes continued advancements in seed testing methods, greater collaboration with regional and international organisations, and the integration of emerging technologies

In its second century ISTA will focus on strengthening seed health assessments, refining testing rules, expanding access to ISTA's guidelines, and fostering new innovations in seed science. ISTA will also prioritise increasing its reach through ISTA advocates, ensuring its impact on global food security and agricultural sustainability, as well as encouraging the next generation of people into seed science and testing.