



ISTA
Seed Quality Assurance

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Activity report of the International Seed Testing Association (ISTA) Committees 2023

This yearly Activity Report was prepared by the Technical Committees (TCOMs), the Executive Committee (ECOM), and the Secretariat of the Association.

The document contains the reports of the Executive Committee, the Technical Committees and of the Secretary General and includes the financial statements of the International Seed Testing Association for 2023, the budget for 2023 and preliminary budget for 2024.

This document is submitted to all ISTA Designated Authorities, ISTA Members and ISTA Observer Organisations for information two months prior to the ISTA Ordinary General Meeting 2024.

The Activity Report was endorsed by the Executive Committee for submission to the ISTA Ordinary General Meeting 2024, to be held on July 04, 2024, for acceptance by the nominated ISTA Designated Members voting on behalf of their respective Governments.

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A. Report of the Executive Committee (ECOM) 2023

1. Composition of the Executive Committee

This report has been prepared by members of the Executive Committee (ECOM), with specific input from Chairs of the ECOM Working Groups (WGs) for the period 1 January 2023 to 31 December 2023. Details from the February 2024 ECOM meeting are not included but will be reported on at the 2024 annual ISTA meeting.

The Executive Committee 2022-2023 was composed of:

Officers:

| | |
|--------------------------------|--------------------------|
| Keshavulu Kunusoth (President) | India |
| Ernest Allen (Vice-President) | United States of America |

Members-at-large:

| | |
|--|-------------|
| Steve Jones (Immediate Past President) | Canada |
| Ignacio Aranciaga | Argentina |
| Craig McGill | New Zealand |
| Sylvie Ducournau | France |
| Ruel Gesmundo | Philippines |
| Berta Killermann | Germany |
| Claid Mujaju | Zimbabwe |
| Sergio Pasquini | Italy |
| Vanessa Sosa | Uruguay |

Ex-Officio member: Attilio Lovato (ISTA Honorary President), Italy (deceased 14 January 2024)

This is the report for the Executive Committee, covering the period from 1 January to 31 December 2023.

The work of the Executive Committee was guided until 11 May 2022 by the 2019-2022 ISTA Strategy reviewed and voted on by the membership at the 32nd ISTA Congress Hyderabad, India. It is now guided by the 2022-2025 Strategy reviewed and voted on by the membership at the 33rd ISTA Congress in Cairo, Egypt. Implementation of the strategy is a key goal of the Association and within the Executive Committee implementation is achieved through ECOM Working Groups (WG). The role of the working groups is to propose solutions on specific topics and where appropriate develop policy for discussion and decision by the Executive Committee, and for some topics the ISTA Membership through its Designated Voting Members.

The working groups for the 2022-2025 Triennium are (working group Chair in brackets): Accreditation (Sylvie Ducournau), the Articles of the Association (Ernest Allen), Finance (Ernest Allen), International

Relations and Designated Authorities (Steve Jones), Events (Berta Killermann), Marketing and Publications (Ignacio Aranciaga), Science and Technology Working Group (Ernest Allen), Seed Health (Craig McGill), Technical Committees (Craig McGill), Vegetable Seeds Industry (Berta Killermann). Executive Committee working groups have been meeting online when required and as needed during the ISTA Executive Committee Meetings in February and May-June. See sections A.3.1 to A.3.11 for reports from the Working Groups.

2. Meetings of the Executive Committee

The February 2023 Executive Committee meeting was held in Washington DC from 13-17 February at the United States Department of Agriculture (USDA) Offices. The meeting was facilitated by Ernest Allen and hosted by the USDA. Prior to the Executive Committee meeting members of the Executive Committee working on expanding the use of new technologies in seed testing including into the ISTA Rules visited the Bayer Seed Testing Laboratory (9 February) in Waterman, Illinois and the Corteva Seed Testing Laboratory (10 February) in Tipton, Indiana. The purpose of these visits was to observe the use of new technologies, including automation, in ISTA-accredited laboratories to identify how these match ISTA-accreditation requirements and, more generally, how the laboratory manages the many processes and programmes needed to maintain both the high quality needed and meet the large testing demands.

The Chairs of the Executive Committee Working Groups meet on 12 February for final preparation of the Executive Committee Meeting beginning the next day. Key items discussed were (i) the 2023 budget and proposed budget for 2024 focussing on responding to increased costs coming from inflation pressures in Zurich, and (ii) a proposal from the Accreditation Working Group to require non-substantial non-conformities identified in an audit to be addressed within a reduced timeframe.

During the Executive Committee Meeting, the Executive Committee discussed final preparations for the 2023 Annual Meeting in Verona Italy, including finalising the 2022 Activity Report of the ISTA Committees, the Ordinary General Meeting programme, the Rules proposals for the 2024 ISTA Rules, the 2023 budget, draft budget for 2024, and proposals for the 2024 membership fees. In addition, the Executive Committee discussed and agreed proposing raising the fee of the ISTA paper certificate from 3.25 to 4.00 CHF effective from 1 January 2024.

On Wednesday 15 February a meeting was held with North American seed organisations: America Seed Trade Association, Canadian Food Inspection Agency, Canadian Seed Growers Association, Seeds Canada, Association of Official Seed Analysts, Society of Commercial Seed Technologists, USDA - Agricultural Marketing Service, USDA - Forest Service, Association of Official Seed Certifying Agencies, and Association of American Seed Control Officials to discuss areas of mutual interest. These areas were Rules harmonisation between ISTA and AOSA, where ISTA and AOSA / SCST could work together through their respective technical committees for method development including, tropical and sub-tropical species and seed health methods. Outcomes were:

- (i) Agreement that development of seed health methods where no method is currently available is a critical need.
- (ii) Opportunities for collaboration between ISTA and AOSA / SCST on new technologies will be explored.
- (iii) Harmonisation of ISTA and AOSA Rules will be ongoing for both current rules and for the introduction of new rules.

The second series of Executive Committee Meetings were held before and after the 2023 ISTA Annual Meeting in Verona (27-28 May and 2 June) and a meeting with the Chairs of the ISTA Technical Committees (28 May). The ISTA Executive Committee meetings discussed the expansion of tropical and sub-tropical species in the ISTA Rules to facilitate movement of these species in trade in support of increased food security globally. The success of the Young@ISTA programme was reviewed with the outcome that the Executive Committee agreed that the programme will continue and means to expand will be investigated. The Executive Committee also finalised the policy for inclusion of new technologies equivalent to the human

analysts into the ISTA rules. A joint webinar series between ISTA and FAO on new technologies for seed quality assurance was developed during the meeting. Progress on achieving the ISTA Strategy was also reviewed.

The Executive-Technical Committee Chair meeting discussed the new technologies policy, inclusion of new species in the Rules, the review of the CHF 100 000 special projects and harmonisation of ISTA and Association of Official Seed Analysts (AOSA) testing methods.

A meeting between the Executive Committee and the ISTA Designated Voting Members was held during the Annual Meeting (on 30 May). Items discussed were celebrating 100 years of ISTA with proposals to have a joint ISF-ISTA forum, centenary dinner and forum with the designated authorities presented, updates on the e-Certificate project, further explanation, and discussion on the proposal to increase the cost of the ISTA Certificates from CHF3.25 to CHF 4.00, an update on the Seed Health initiative was given and Young@ISTA.

3. Activities of the Executive Committee Working Groups

The Executive Committee working groups have worked on the following:

3.1 Accreditation Working Group

Members: Sylvie Ducournau (Chair), Berta Killermann, Vanessa Sosa, Steve Jones, Sergio Pasquini, Florina Palada.

As consolidated over time, the main task of the ECOM Accreditation Working Group (AWG) is to assist and support the ISTA Accreditation and Technical Department (ATD) in the accreditation related issues.

ISTA auditors

At the ISTA Secretariat the Accreditation Department is composed of four staff. The audits were performed by 22 ISTA contracted auditors and three ISTA Secretariat auditors and the audits administration, coordinated by the Head of Accreditation and Technical Department.

One technical auditor, one system auditor, one technical expert for GMO and Variety testing and one GMO expert were approved in 2023. Two technical auditors decided to discontinue performing ISTA audits. Four more candidates to be contracted ISTA auditors are in different steps of the approval process (two technical auditors, one system auditor, one Seed Health expert).

Overview - ISTA audits

In 2023 the audits, 46 in total, were performed with on-site assessment apart from one audit performed partially remote and one audit performed completely remotely due to the difficulties of the assigned auditors to travel internationally.

For both audits performed remotely or partially remotely, the approval of the Accreditation Working Group was required.

This year were audited first time two laboratories with sampling units in the scope. The process is now adjusted according to the practice and the related quality documentation implemented.

Case studies on ISTA accreditation status

The AWG collaborated in the evaluation of specific cases e.g., suspension of a laboratory due to poor PT results, extension of the scope, starting of the accreditation process.

Reviewing or strengthening the quality documentation

Reviewing and updating documents is a continuous ongoing process. In 2023 there was an intense discussion within the AWG and ATD aimed at the revision of the ISTA Accreditation Standard for Seed Testing and Seed Sampling, and a draft of a new revision was proposed for approval to the full ECOM. The final format was ready for ECOM approval during the Annual Meeting organised in Verona.

Cooperation with the ISTA Technical Committees

The AWG and ATD often contact the ISTA Technical Committees to clarify specific issues arising during audits or for clarifications relating to the ISTA Rules. A specific collaboration exists with the Proficiency Test (PT) Committee for the development and improvement of the PT programme.

On the other hand, ATD and AWG have been contacted by TCOMs for matters related to the accreditation standard, or revision of some chapters of the ISTA Rules.

Challenges

One of the most important challenges of 2023 was the change of the policy regarding the due dates to address the non-conformities identified during the ISTA audits. The implementation of the ECOM decision taken in February 2023 was implemented for all laboratories audited in 2023.

The new revised ISTA Accreditation Standard brings new aspects to be considered by the ISTA auditors and the audited laboratories such as machineries replacing the human analysts and risk assessment aspects.

The design of the Accreditation Certificate and Certificate of appointment for the contracted auditors was changed considering the ISTA corporate identity.

Accreditation documents to be used in 2024 were revised for the changes in the ISTA Accreditation Standard and prepared with the new ISTA Logo for celebration of 100 years of ISTA.

The ISTA crop groups were revised to add *Penisetum glaucum* under Cereals crop group as well (change valid from June 2023) and *Ricinus* in Other agricultural crop group (change valid from January 2024)

Special projects

The interactive learning tool on how to complete ISTA Certificates is maintained and updated after each revision of the ISTA Rules.

One Quality Assurance Workshops for beginners was organised in October in Hyderabad India.

In the same month, the HoAT has been one of the lecturers providing in Bangladesh a Basic Course In Seed Production, Certification, Sampling and Testing for Seed Quality Assurances.

The preparation of a Quality Assurance Workshop for advanced level participants is planned for January 2024 in South Africa and is almost finalised.

One webinar on how to address non-conformities identified during an ISTA audit was provided in October 2023 and two more webinars related to staff monitoring are in preparation for 2024.

The Auditors workshop organised this year in December in Poznan gave the opportunity to the ISTA auditors to discuss several aspects such as changes of the ISTA Rules, revision of the ISTA Accreditation Standard and policy regarding non-conformities identified during an ISTA audits. Several actions to be taken were decided at the end the workshop and some started to be implemented.

The PT coordinator in collaboration with the GMO Committee and after discussion with the ISTA Accreditation Department, developed a List of Standardised Terms in GMO Testing. In addition, it was decided to adopt a new format of the Scope of Accreditation for these tests to be published on the ISTA website. The objectives were to make more uniform and transparent the "Scope of accreditation" of laboratories published on the ISTA website, allowing a better understanding by customers, to be of guidance to auditors in evaluating applications and assessing data supporting accreditation (e.g.

validation/verification, PDE, etc.) and also to facilitate uniformity in the issuing of ISTA certificates with GMO testing results.

3.2 Articles of the Association Working Group

Members: Ernest Allen (Chair), Craig McGill, Ignacio Aranciaga, Keshavulu Kunsoth, Andreas Wais. There were no Article change proposals to vote on at the OGM in 2023.

There were no proposals for Article changes for the working group to progress during 2023 for voting on during the OGM 2024.

3.3 International Relations and Designated Authorities Working Group

Members: Steve Jones (Chair), Craig McGill, Ruel Gesmundo, Olga Stöckli, Keshavulu Kunsoth, Andreas Wais.

The focus of the working group is on strengthening interaction between ISTA and its Designated Authorities (DAs) as well as fostering relationships with other international organisations. The DA & IR WG plans and holds meetings with the 83 current ISTA DAs, develops the international relations policies, coordinates the representation of ISTA in international fora and meetings during Annual Meetings and Congresses, ready for discussion and approval by the whole ISTA Executive Committee (ECOM). In addition, the ECOM members and Secretary General meet with the DAs individually when visiting countries, which have or would like to have, an ISTA DA. Meetings may be physical, virtual or both.

ISTA DAs and ISTA Designated Voting Members play crucial roles to formulate the ISTA Strategy, assess the functioning of seed testing laboratories, and the use of the International Rules for Seed testing (ISTA Rules) in their respective countries and distinct economies. Any proposals for change to the ISTA strategy or ISTA Rules are voted on at the ISTA OGM by the Designated Voting Members.

Meetings with ISTA DAs

During the 2023 ISTA Congress in Verona the ECOM members and DAs met and discussed the following topics:

1. Update on plans for ISTA eCertificates.

There was considerable interest in eCertificates and how these will be utilised by the various agencies/organisations requiring access. eCertificates were beta-tested during 2022 and 2023 with the aim of making them available for use in 2023. An online session was organised for the ISTA DAs after the initial beta testing results in 2023 to enable DAs to see how the e-Certificates will operate and raise any questions/concerns.

2. The 100th year ISTA annual meeting will take place in Cambridge, UK in 2024. The ECOM asked the Designated Voting Members present for feedback on plans for the meeting. A good exchange of ideas was had.

3. Young@ISTA Project. An overview of this successful initiative was given and it was planned to continue this in the coming years. A LinkedIn forum is already established and now there are about 400 followers. It is also the hope that Young@ISTA professionals from countries/economies/regions, where ISTA is currently underrepresented, will be an integral part of ISTA's strategy to develop in those areas

4. Seed Health Strategy Development. An overview of plans to facilitate seed disease testing within ISTA was discussed. The creation and aims of an ECOM Seed Health WG were outlined.

5. The ECOM motion to increase the cost of blank ISTA paper certificates. During this discussion, a rationale to increase the blank certificates was given and questions about membership fees were answered. One DA suggested increasing the membership fees as an option to raise ISTA income, the ECOM was not in favour of this option at that time.

The ISTA ECOM also met on-line with about 45 ISTA DAs in December 2023.

The recording of the meeting is available at [ISTA Designated Authorities' Meeting 2023 \(youtube.com\)](https://www.youtube.com/watch?v=...)

The topics covered were the publication of the FAO-ISTA Handbook, an update on progress with eCertificates, plans for voting on the cost of eCertificates at the 2024 OGM, plans for the OGM 2024 and a progress report from the ECOM WG on Seed Health Strategy.

International Relations

ISTA's interactions with other international associations/organisations fall into five groups:

1. Regulatory organisations: including at the national level, the DA of member countries and international organisations such as the OECD, FAO, UPOV, IPPC. ISTA has regular contact with FAO and OECD. ISTA participates at OECD Meetings as an observer organisation on a regular basis. The joint FAO-ISTA handbook on "Guidelines for the establishment and management of seed testing laboratories" was published in 2023 and will be available in French and Spanish during 2024. Download at [Guidelines for the establishment and management of seed testing laboratories - Handbooks - International Seed Testing Association](https://www.ista-international.org/guidelines-for-the-establishment-and-management-of-seed-testing-laboratories)
2. Organisations related to ISTA accreditation: such as the International Laboratory Accreditation Cooperation (ILAC). As an ILAC stakeholder, ISTA usually participates in the annual meetings organised by ILAC. In 2023, Florina Palada attended the ILAC meeting in Belfast and found some useful updates on topics of common interest to ISTA and ILAC such as remote audits, revision of the standards to consider new technologies and monitoring staff competence. ISTA is continuing to publish information on ISTA activities in ILAC's news bulletin.
3. Scientific fora and collaboration with other associations: such as the International Seed Science Society (ISSS). A joint ISSS/ISTA webinar series was started in 2021 and a summary report provided for STI 166, October 2023, p13-14. Two joint webinars took place in 2023 the most recent webinar reaching an audience of 393 people. The webinars are popular and the feedback positive. It is planned to continue the series in 2024. For the two 2023 webinars see the recorded sessions on the ISTA YouTube channel: [Seed dormancy \(youtube.com\)](https://www.youtube.com/watch?v=...) and [Webinar - Seed priming \(youtube.com\)](https://www.youtube.com/watch?v=...)
4. Technical collaboration with other organisations to harmonise seed testing methods worldwide: such as with AOSA/SCST in the United States. ISTA usually attends the AOSA/SCST Annual Meeting in the USA and the ABRATES Congress in Brazil. The ISTA President Keshavulu Kunusoth represented ISTA at the AOSA/SCST Annual Meeting in Saskatoon, Canada in 2023. ISTA also regularly meets with ISF and in addition there is an ECOM Working Group on the technical aspects of vegetable seed sampling and testing.
5. Collaboration and exchange of information with the seed trade and seed industry. At the international level this is ISF and at the regional level it is with organisations such as AFSTA, APSA, ASTA, Euroseeds and SAA. Florina Palada (ISTA Secretariat) and Claid Mujaju (ECOM member) attended a very interesting AFSTA annual congress in Dakar, Senegal along with about 280 other participants. Sergio Pasquini (ECOM member) attended the Euroseed Congress in Malta in October 2023, attended by more than 1100 participants, where discussion on a number of interesting topics for EU members took place. The ISTA President, Craig McGill (ECOM member) and Olga Stöckli (ISTA Secretariat) attended the APSA meeting in New Zealand in 2023 and continued the important collaborative work with APSA. The ISTA Secretary General, Andreas Wais attended the ISF Congress in South Africa, and the 10th session of the governing body of the International Treaty on Plant Genetic Resources for Food and Agriculture

at FAO in Rome. Andreas along with the ISTA Vice-President, Ernest Allen and Claid Mujaju (ECOM member) also attended the 1st Seed Congress of the Rwandan Seed Association held in Rwanda. The ISTA President attended the ASTA Field Crops Seed Convention, America's second-largest seed industry event at its new location in Orlando, Florida. In addition, the ISTA Vice-President attended the NAPPO meeting in Mexico. Detailed reports of many of these meetings can be found in Seed Testing International.

Another international activity is the World Seed Partnership, a collaboration between ISF, ISTA, OECD, UPOV and WFO. This activity is used as an information platform to distribute key information on seeds and the role of each organisation as partners within the seed sector. The overall aim of the World Seed Partnership is the improvement of sustainability and security of seed supply worldwide.

3.4 Events Working Group

Members: Berta Killermann (Chair), Sergio Pasquini, Keshavulu Kunusoth, Craig McGill, Olga Stöckli, Andreas Wais, Manuela Nagel (for Seed Symposium).

The Events Working Group develops the events policy for the Association for discussion and approval by the Executive Committee and supports the Secretariat in the organisation of ISTA events, in particular Annual Meetings and Congresses.

In 2023 the working group was involved in the organisation of

1. The ISTA Annual Meeting 2023 in Verona, Italy including the elaboration of a common programme and the seminar on "From Biodiversity to Diversification: resources, tools and technologies to meet new challenges".
2. The ISTA Annual Meeting 2024 in Cambridge, UK including the seminar "Seed quality assurance a critical component of food and nutritional security", the ISTA/ISF Forum "Quality seed production for resilient and sustainable agricultural" and the ministerial session "The Role and Future of ISTA in Seed Quality Assurance in the Face of Climate Change".
3. The 34th ISTA Congress 2025 in Christchurch, New Zealand including the scientific seed symposium.

3.5 Marketing and Publication Working Group

Members: Ignacio Aranciaga (Chair), Berta Killermann, Andreas Wais, Olga Stöckli, Yoana Uzunova and Karen de la Rosa.

The Marketing and Publication Working Group aims to develop the marketing and publication policy in the Association for discussion and approval by the Executive Committee. It also supports and assists the Secretariat with marketing initiatives.

In 2023 a diverse range of digital marketing initiatives were undertaken via ISTA social media channels LinkedIn, YouTube and Twitter as well as via the ISTA website, newsletter. The LinkedIn and Twitter activities have continued with regular posts. The Newsletter is sent once a week. On X (Twitter) ISTA has more than 2500 and on LinkedIn > 11292 followers with an increased level of engagement. Finally, on YouTube, ISTA has over 1690 subscribers. Also, 4 webinars was developed (two of which ISSS-ISTA) and participated as invited in the IICA webinar.

With the aim to promote the use of the ISTA Rules worldwide and to attract more people to participate in ISTA the Marketing and Publication Working Group has worked with the Rules Committee to ensure the 2023 International Rules for Seed Testing in 4 languages (English, French, German and Spanish). Soon, the ISTA Seedling Evaluation Handbook will be available in Spanish.

The implementation of the weekly newsletter gave the possibility to increase the contact with the members and with other organization/colleagues around the world and to permit more fluid information of several topics of the Association. In 2023 ISTA reach 1,384 subscribers.

Finally, It is important to mention that all the above communications channels are growing yearly, strengthening and establishing the ISTA presence worldwide.

3.6 Science and Technology Working Group

Members: Ernest Allen (Chair), Sylvie Ducournau, Vanessa Sosa, Steve Jones, Keshavulu Kunosoth, Andreas Wais.

The purpose of the Science and Technology Working Group is to develop policy and oversee science and technology within the Association. The aim is based in ISTA strategy Goal 4: Strengthen the Science and Technology underpinning ISTA, to develop innovative research to make the link between scientific developments and applications in seed sampling and testing, and to allow the requirements of the seed sector to be met.

As needed, ECOM Members of the Working Group meet to discuss needs within ISTA for documents and rules to explain the use of new technologies like machine vision, artificial intelligence etc.. ECOM Working Group Members also meet to discuss ideas with Technical Committee and Accreditation Working Groups to develop statements and guidance to be provided to the membership.

There were no topics to discuss with the TCOM sub-group members during this period.

3.7 Technical Committee Working Group

Members: Craig McGill (Chair), Ruel Gesmundo, Claid Mujaju, Nadine Ettl, Andreea Militaru, Andreas Wais, Keshavulu Kunosoth.

The Technical Committee Working Group develops Technical Committee policy for discussion and approval by the Executive Committee and works closely with the ISTA Secretariat in discussing and implementing the policy. This group is also responsible for initial evaluation of applications for the 100 000 CHF special project fund and providing a recommendation to the ECOM on a decision. One project was approved in 2023 on Collection of Seed Images for Seed Health.

A key activity for 2023 was to review the CHF 100 000 projects to determine if the objectives of the funding had been achieved. Specifically, advancing the ISTA Strategy, increasing collaboration across Technical Committees and attracting co-funding. The review included a questionnaire to the technical committees and discussion during the Executive Committee – Technical Committee Meeting in Verona. The review outcomes will be finalised at the 2024 Annual Meeting.

The working group worked with the Secretariat to organise the Executive Committee - Technical Committee Meeting in conjunction with the Annual Meeting in Verona. In addition to the to review of the CHF 100 000 projects, topics discussed included TCOM-D-01-TCOM Responsibilities of ISTA TCOMs which the working has been reviewing, the policy for Introducing New Technologies Equivalent to the Human Analyst for Seed Analysis, preparing Rules proposals and introduction of more sub-tropical and tropical species into the Rules. The TCOM Responsibilities Document will be finalised in 2024.

3.8 Finance WG Working Group

The membership fees remained unchanged and the provision of 10% discounts for early payments, i.e. on or before 31 December 2023 were maintained.

As a reminder, in 2022, the ECOM decided to merge the Membership Fees Working Group with the Finance Working Group to facilitate discussion on all financial topics in one ECOM working group.

3.9 Young@ISTA Project

Members: Keshavulu Kunusoth (Chair), Craig McGill, Berta Killermann, Sylvie Ducournau, Andreas Wais, Steve Jones, Olga Stoeckli, Fiona Hay (for SST).

The programme was officially launched during the ISTA seed symposium-2022 held in Athens, Greece in November 2022 in the presence of a good number of younger seed professionals who were presenting their work.

In the year 2023, ISTA supported a total of 16 applicants [6 for workshops, 1 for the annual meeting, 2 application for lab-to-lab training and 6 application for SST publication assistance] coming from all continents. Some of them also recently joined ISTA Technical Committees (TCOMs) or applied to participate actively in them. As well as financial support from ISTA in 2023 the Bayer Crop Science, St Louis (USA) generously supported this programme with a donation of 5 000 USD. Sponsorship opportunities like this are open to other organisations to help support to young seed professionals under this programme.

A Young@ISTA exist in LinkedIn and is very active with 380 members, several of who were supported in 2023 and posted their thanks for the opportunity to travel to ISTA events.

3.10 ISTA – ISF Seed Health Working Group

Members: Craig McGill (Chair), Ernest Allan, Keshavulu Kunusoth, Andreas Wais, Florina Palada, Valerie Cockerell.

The role of the Seed Health Working Group is to (i) assess ISTA's current and future role in seed health and (ii) develop policy proposals, including resources needed, for discussion and voting by the ISTA Executive Committee. The Seed Health Working Group closely collaborates with the Seed Health Committee. The working group met online with the Seed Health Committee to discuss how the working group could help facilitate progress in seed health method development. On behalf of the Seed Health working group Valerie Cockerell met with the Seed Health Committee during the Annual Meeting in Verona. A capacity building Seed Health workshop will be held in 2024. A joint ISTA-ISF seminar on "Addressing the Importance of Seed Quality and Testing in Global Agriculture For Seed Health" is also in planning for 2024.

3.11 Vegetable Seed Industry Working Group

Members: Berta Killermann (Chair), Merel Langens (Vice-Chair), colleagues from the Vegetable Seed Industry, ISF and ISTA.

The Vegetable Seed Industry Working Group has members from the Seed Industry, ISF, ECOM, Technical Committees and ISTA Secretariat. The Rules proposal to increase the number of sub-lots for *Solanum lycopersicum* (tomato) at the Annual Meeting 2023 was voted on. The sub-lot experiment will continue. The possibility to reduce the weight of the working sample for the other seed determination for fruity crops is also under consideration.

3.12 Expansion of Seed Testing Worldwide Working Group

Members: Keshavulu Kunusoth, Vanessa Sosa, Ruel Gesmundo, Claid Mujaju, Sergio Pasquini, Craig McGill and Ignacio Aranciaga (Chair).

ISTA was founded in 1924 with a mission to ensure uniformity in seed quality evaluation worldwide. Since then, it has been developing, adopting, and publishing internationally agreed standard rules for seed sampling and testing and promoting uniform application of these rules to facilitate seed trade nationally and internationally, thereby supporting agriculture and food security globally.

ISTA has grown over the last 99 years to reach 83 countries and distinct economies currently, and over 400 competent and energetic seed scientists and analysts, in member laboratories and sampling entities, and individually as personal members, and associate members. Furthermore, numerous new species have been added to the ISTA Rules over time in response to requests from the seed industry, ISTA Designated Authorities and the membership. This was partly driven by the fact that the seed species traded changed over the last century in between ISTA member countries/distinct economies. ISTA is continuing its work of developing standard seed testing methods to facilitate the seed trade and make a valuable contribution to food security worldwide.

However, ISTA's presence needs to be expanded in new regions and countries where it is not yet present or is underrepresented. In addition, it is also important to further add new species to the seed testing rules, like tropical and sub-tropical species, that are moving into international trade and/or may become more important as climate becomes warmer and drier.

The ISTA Executive Committee established an ECOM Working Group to develop policies that will facilitate and provide a framework for expansion of seed testing into areas where ISTA is not yet present or underrepresented. The intention is not to limit expansion in all areas of the world but recognises that there are some areas of the world where focussed effort will be required for ISTA to expand its reach into those areas.

The aims of the working group are:

Facilitating the expansion of the involvement of ISTA into new regions and countries where it is not yet present or is underrepresented

Encouraging (membership) participation from new regions and countries where ISTA is not yet present or is underrepresented also to attract members

Facilitating the inclusion of new species, especially tropical and sub-tropical species, into the ISTA Rules

Improving presence through partnerships and collaborations with international organisations like FAO, OECD, ISF, regional seed associations, etc. and the seed industry to build seed capacity and capabilities

Facilitating the development of tests and methods, especially for "basic" tests of purity, other seed determination, moisture, germination, and viability of tropical and sub-tropical species through TCOMs to subsequently introduce to the ISTA Rules

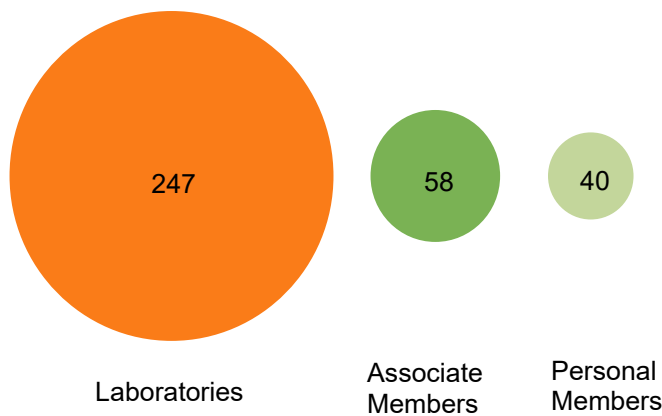
Actually we are working in different validation process in order to achieve our goals, and different kinds of activities was developed in order to increase the ISTA presence in a worldwide.

B. Reports of the Secretary General, Proficiency Test Committee, Rules Committee, Editorial Board and Seed Science Advisory Group

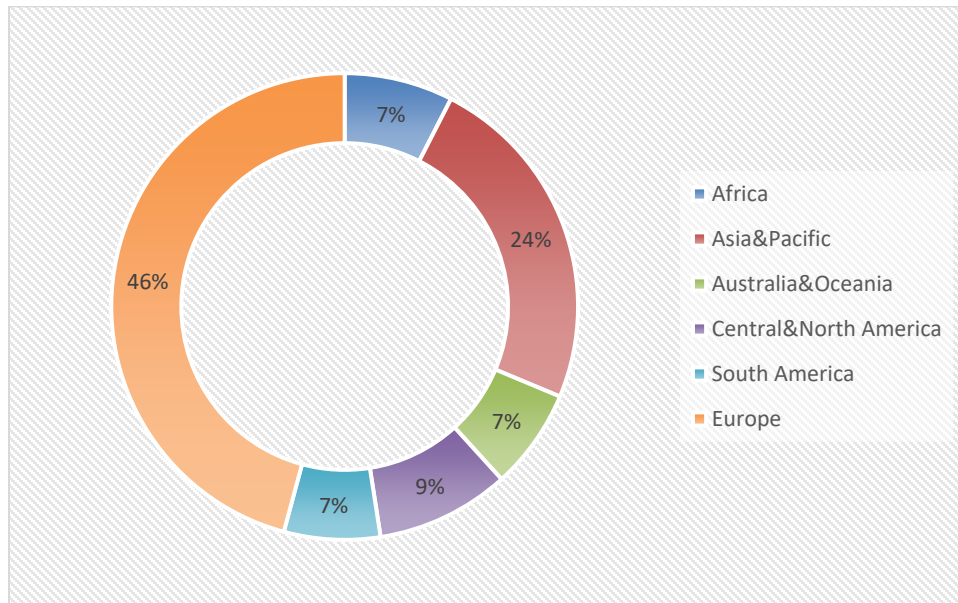
1. ISTA Membership



ISTA Membership 2023

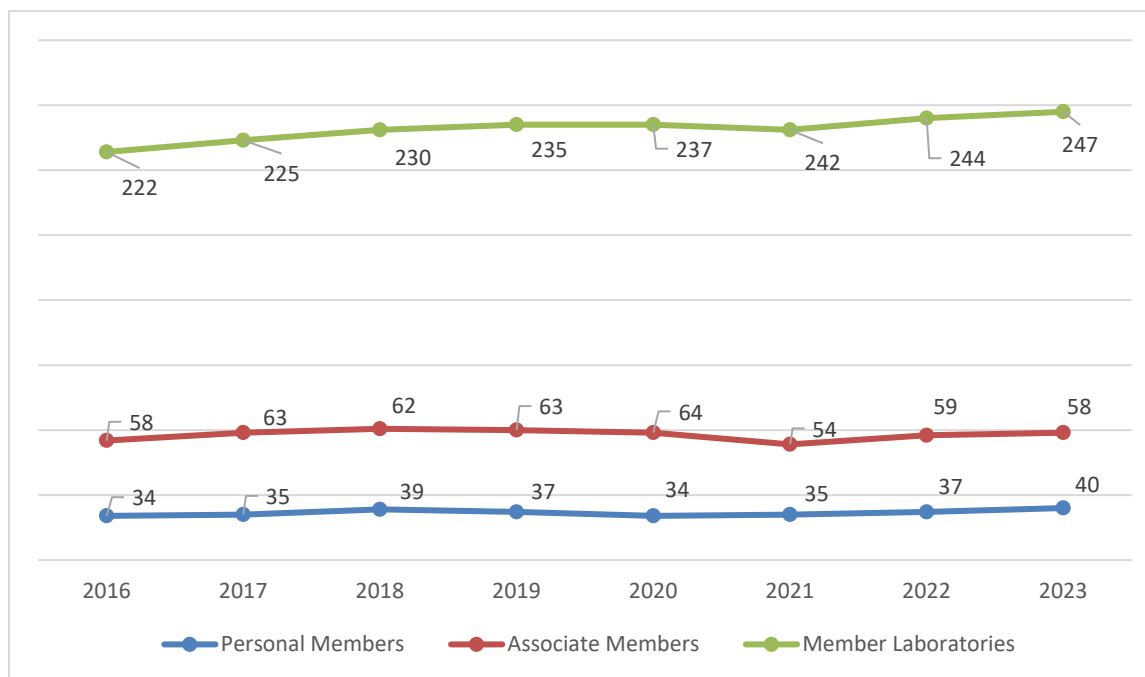


ISTA has at least one member in 81 countries





ISTA Members 2016 – 2023



Honorary Members

According to section III., Article 4 (h) of the Articles of the ISTA:

“An Honorary Life Member is a person who in the opinion of the Association has made an outstanding contribution to the Association, and has been honoured by election to the status.”

The elected Honorary Life Members as of 2023 are:

Joël Léchappé (2019)

Grethe Tarp (2016)

Alison A. Powell (2013)

Ronald Don (2008)

Norbert Leist (2007)

Rita Zecchinelli (2022)

Furthermore, Attilio Lovato was elected Honorary President at the Congress 2001.

2. Activity Report of the Rules Committee

The ISTA Rules Committee is composed of the Honorary President, all the Chairpersons of the Technical Committees (TCOMs), the Chief Editor of SST, the AOSA Rules Committee Chair and the SCST Co-Chair. As part of joint initiatives with AOSA, the AOSA/SCST Rules Chairs are ex officio members of the ISTA Rules Committee and the ISTA Rules Chair is an ex officio member of the AOSA Rules Committee. The Chair and Vice-Chair of the ISTA Rules Committee are appointed by the ISTA Executive Committee (ECOM).

The following is a list of the current ISTA Rules Committee members:

Chair: Ernest Allen United States

Vice-Chair: Susan Alvarez United States

Observer: Florina Palada (ISTA Secretariat)

ECOM liaison officer: Ignacio Aranciaga

Members:

Ruojing Wang (PUR) Canada

Didier Demilly (PTC) France

Gillian Musgrove (GER) United Kingdom

Corinne Guimier (BSC) France

Elisa Vieira (FTS) Brazil

Ruud Barnhoorn (SHC) Netherlands

Fiona Hay (EDI) Denmark

Sergio Pasquini (TEZ) Italy

Kirk Remund (STA) United States

Enrico Noli (GMO) Italy

Axel Goeritz (MOI) Germany

Alison A. Powell (VIG) United Kingdom

Jayanthi Nadarajan (STO) New Zealand

Bert van Duijn (ATC) Netherlands

Ana Laura Vicario (VAR) Argentina

Melanie Schori (NOM) United States

Sarah Dammen (FSC) United States

Brigitte Hamman (SSAG) South Africa

Gil Waibel (WSWG) United States

Ex-officio: Todd Erickson (AOSA) United States

Desirae Jones (SCST) United States

Attilio Lovato (Honorary President) Italy

Activities

The ISTA Rules Committee is responsible for reviewing the annual Rules proposals and ensuring that the proposals are technically consistent between the different chapters. Rules proposals can come from anyone but usually originate in one of the TCOMs or are referred to the relevant TCOM by the ISTA Accreditation Department. The procedures for submitting proposals and adding new species and methods to the ISTA Rules are outlined in the Introduction to the Rules. The Rules Chair, assisted by the Vice Chair, is responsible for editing the Rules and presenting the proposals for amending and voting at the Ordinary Meeting on behalf of the ECOM and the Rules Committee.

After the final drafts of the rule documents are completed, the Rules Chair forwards the documents to the ISTA Secretariat. The Secretariat collates the Rules proposals, validation studies, and other supporting documents into official documents that will be voted on by the membership at the Ordinary General Meeting (OGM). Following the results of the voting at the OGM, the amended Rules are edited, translated, published, and distributed to the membership as the revised International Rules for Seed Testing.

This year the ISTA Rules Session was conducted prior to the OGM via virtual meeting on 08 May 2023. Voting was conducted in person at the OGM held on 01 June 2023 in Verona, Italy.

The revised electronic version of the 2024 ISTA Rules was made available to the membership for download before 31st December 2023. This was made possible by the dedicated teamwork of the Rules Committee, the TCOMs and the ECOM, and the ISTA Secretariat. Also, special thanks goes to Vanessa Sutcliffe (HeartWood Editorial) for editing and publishing as well as Ignacio Aranciaga, Clotilde Polderman-Roussille and Elke Nitschke for translating the current rules into Spanish, French, and German.

The effective date for the 2025 ISTA Rules is 1st January 2025. For details on how to download the electronic version, see the Publications section of the ISTA website. While the ISTA Rules are available in French, German, and Spanish, the official reference version of the ISTA Rules is the English version.

Rules sales figures / downloads

Sales of online ISTA Rules for 2021-2023

| Item | | 2021 | 2022 | | 2023 | | |
|--|---|------------|----------------------|------------|----------------------|-----------|----------------------|
| | | Sold | Income (CHF) | Sold | Income (CHF) | Sold | Income (CHF) |
| Royalties from direct download sales (remitted in USD) | Full Rules issues | 22 | CHF 9'357.60 | 16 | CHF 6'774.67 | 9 | CHF 3'675.48 |
| | Single chapters | 70 | CHF 3'427.00 | 30 | CHF 2'820.51 | 14 | CHF 1'251.26 |
| Sales via Secretariat (CHF) | Multiple-user access (non-member labs) | 18 | CHF 25'200.00 | 13 | CHF 18'059.68 | 9 | CHF 12'599.86 |
| | Single-user access (Associate Members, non members) | 40 | CHF 10'854.00 | 64 | CHF 16'977.55 | 67 | CHF 24'274.06 |
| Total | | 150 | CHF 48'838.60 | 123 | CHF 44'632.41 | 99 | CHF 41'800.66 |

Overview of Rules change proposals approved in June 2023

Changes to the 2024 Edition of the ISTA Rules approved at the Ordinary General Meeting in June 2023 can be found on the ISTA website at: <https://www.seedtest.org/api/rm/35T6F556FRKANC7/ogm22-05-rules-proposals-for-ista-2023-edition-1.pdf>

The supporting validation reports are also available at: <https://www.seedtest.org/api/rm/66RR664YTY5B77Z/ogm22-06-ista-method-validation-reports-2023-3-1.pdf>

Selected Summary of Changes to the ISTA Rules for 2024

Introduction to the ISTA Rules

Form 1 revised is to improve the procedures and guidance for proposing a new taxon to Table 2C.

Chapter 1

1.3, 2.2.2: Revised the maximum subplot size allowed for *Solanum lycopersicum* L. A lot of this species may now contain 20 sublots. Each subplot must contain no less than 5% of the weight of the original seed lot.

Chapter 2

2.5.2.1: Added a Calculator to the ISTA website that will assist in standardizing how working weights for Table 2C are determined.

Chapter 3

3.5.2.4: Clarification of when to use the procedures in 3.5.2.4 to classify and report indistinguishable species.

Chapter 4

4.7: Clarification to specify the number of decimal places needed for other seeds determinations.

Chapter 5

5.6.3.1, 5.6.5.3: Revised to allow testing laboratories the option of not reporting original germination results when an optional second test using dormancy breaking procedures is conducted.

Chapter 6

Table 6A Part 2: Added a tetrazolium test method for *Ulmus* spp. L.

Chapter 9

9.2.5.7: Revised oven temperatures and tolerances to reduce variation during moisture testing.

18.8: Defined special cases where it is possible to report the moisture content of seed mixtures.

Table 9A (and several sections throughout Chapter 9): Merged Parts 1 and 2 of Table 9A due to changes in crop groupings.

Chapter 11

Changes made throughout Chapter 11: Chapter 11 required several updates to remain current with new advancements.

Chapter 13

13.7: Added a requirement to report, under “Other determinations,” the number of normal seedlings in the total weight of seed tested.

Chapter 14

Changes made throughout Chapter 14: Chapter 14 required several updates to remain current with new advancements

3. Accreditation Programme

Report of the Proficiency Test Committee and standard PT coordinator

This is an overview of the standard proficiency test program; the activity related to the seed health proficiency test and to the GMO Proficiency Test is presented under the related Committee chapters.

3.1 Proficiency tests 2023 preparation and dispatch

In 2023 we started the new triennium program 2023-2025. As expected, the three PT leaders prepared 3100 samples, performed 12 heterogeneity tests, and added 24060 seeds in the samples for the OSD test. Also 200 mixture seed sample were prepared by the Purity Committee for training purposes without rating and included in the PT 23-2 *Raphanus sativus* (see Table B.3.1). As usual, the ISTA secretariat received the samples prepared by the PT leaders and forwarded them to the participating laboratories, securing the shipments and complying with the customs and phytosanitary requirements of the recipient countries.

Table B.3.1. List of species and test types for 2023

| Round | Species | Test round scope | Test leader | Sample number | Number of participants |
|-------|----------------------|------------------|-------------------|---------------|------------------------|
| 23-1 | <i>Vicia villosa</i> | P, OSD, G | Monika Holubicova | 3 x 220 | 184 |

| | | | | | |
|-------------|---------------------------|--|------------------|---------|-----|
| | | | | | |
| 23-2 | <i>Raphanus sativus</i> | P, OSD, G, M, VIG (CT), OIC completion | Gillian Musgrove | 3 x 250 | 209 |
| | MIX for training | Purity Committee | | 200 | |
| 23-3 | <i>Trifolium hybridum</i> | P, OSD, G, TSW | Susanne Andersen | 3 x 230 | 181 |

P-purity, OSD-other seeds determination, G-germination, M-moisture determination, TZ-tetrazolium test, V-vigor

OIC-reporting on an ISTA Certificate, MIX-mixture of other seeds for seed identification, TSW-Thousand seed weight test

We thank Vilmorin Sakata and DLF Trifolium companies for providing *Raphanus sativus* and *Trifolium hybridum* seeds free of charge for the preparation of the PTs.

3.2 Reporting of Proficiency test results

In 2023, the statistical analysis and reports was done by the ISTA Secretariat for three PTs PT 22-3 *Lolium perenne*, PT 23-1 *Vicia villosa* and PT 23-2 *Raphanus sativus*, representing 2321 preliminary and final reports.

The PT round 23-3 *Trifolium hybridum*, will be evaluated in March 2024.

Summary reports, heterogeneity test and seed pictures were published and are available on the ISTA website: <https://www.seedtest.org/en/proficiency-tests/standard-pt-results.html>.

The statistical analysis of the Electroconductivity test (vigour test) in PT 23-2 *Raphanus sativus* did not seem reliable and was not immediately validated.

Its analysis required a great deal of reactivity and additional investigations. The ISTA secretariat quickly investigated the analysis method used by the participating laboratories, The statistical committee, the vigour chair, the PT leader, the PTC chair and vice chair, the ECOM liaison officer and the ISTA secretariat gave convergent opinions on the methods used, the results obtained or the statistical analysis and by common agreement they cancelled this PT. The detailed reasons for this cancellation are explained in the summary report of the PT. A second set of samples are sent to the laboratories for a second testing. The Statistical Committee will use all data to develop a more suitable statistical test for electroconductivity.

We received and answered 17 questions, request of explanation or complains from participants, mainly according hardseedednes for PT 23-1 *Vicia villosa* and presence of pregerminated seeds in *Raphanus sativus* lot1.

The following diagrams represent the trend in performance of accredited laboratories versus non-accredited for the four PTs published in 2023. It is noticeable that voluntary participants have less A ratings and more C and BMP ratings in comparison with accredited laboratories.

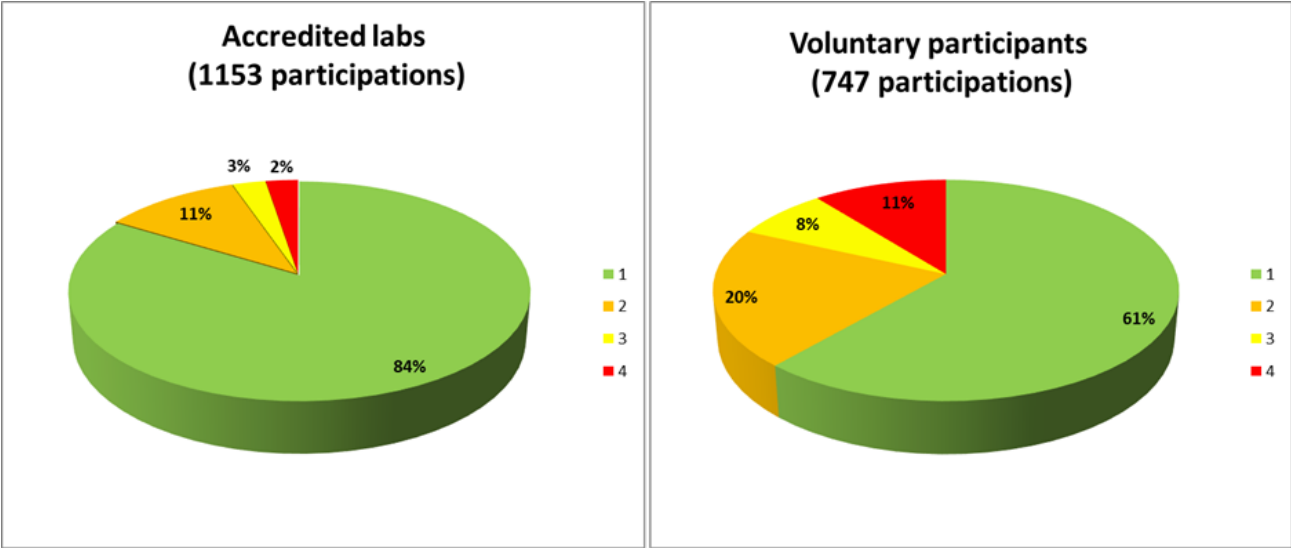


Figure 1: Laboratories rating for the year 2023 for all tests and all participants on PT22-3, PT23-1, PT23-2. Comparison between accredited and voluntary participating laboratories.

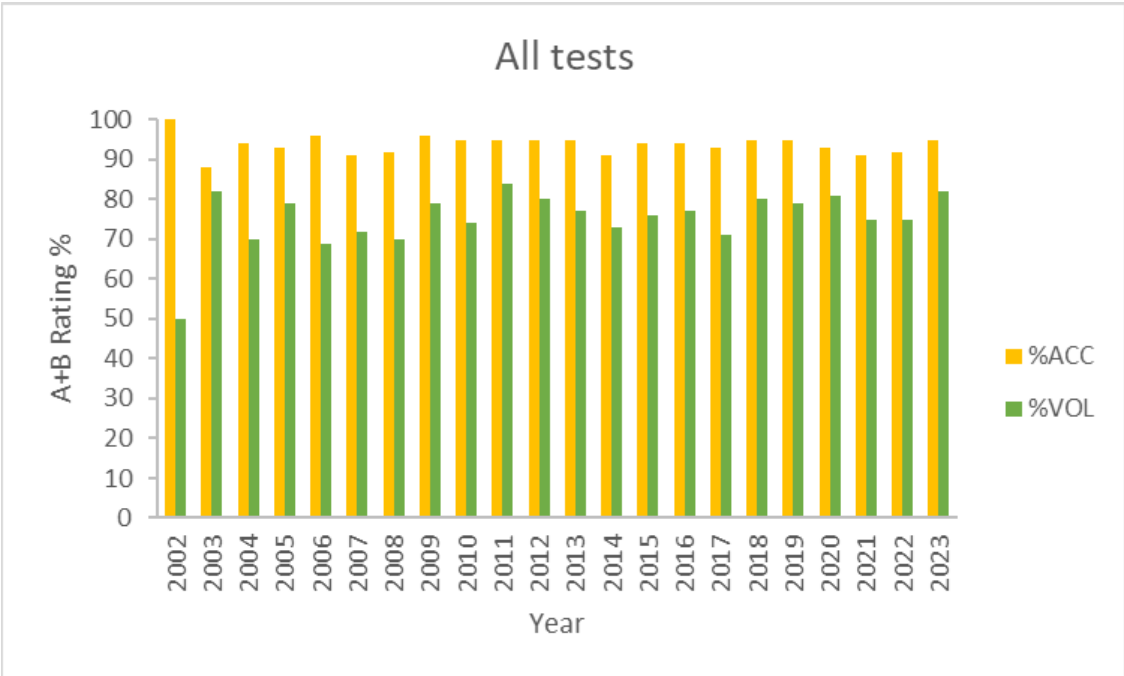


Figure 2: A and B ratings trend for accredited and non-accredited laboratories

The figure 2 shows that rating A and B is always higher for accredited compared to volunteers' laboratories. The percentage of A and B ratings for accredited laboratories since 2004 is quite stable and always higher than 90%. This shows the high proficiency of accredited laboratories. This gives confidence in the test results of accredited laboratories. In 2023, rating was also better both for accredited and non-accredited laboratories compare to 2022.

3.3 Goals and objectives

The main goal of PT Committee and PT Coordinator is to prepare and distribute the PT samples to participants in good time and good condition, as well as to timely analyze the laboratories test results. The program contributes strongly to the uniformity and to the proficiency in seed testing. It also serves as monitoring tool for the performance of ISTA accredited laboratories. These tasks require manpower and specific skills. Two PTC members have left the committee: Christian Boehm from Denmark, member from 2017 and Zita Ripka from Hungary member from 2008 and we are pleased to welcome Adrienn Abos from Hungary as a new member. The selection of seed lots for the preparation of PTs is becoming increasingly difficult because it has to meet precise multi-criteria requirements. Nevertheless, the distribution of samples remains problematic for some countries or laboratories due to customs or phytosanitary difficulties as already mentioned last year. This is despite all the efforts made by the ISTA secretariat to apply the regulations.

The three PT rounds for 2024 are already under preparation. We expect a preparation of the samples and distribution in good conditions as well as issuing final reports and archiving and keeping data secure in the database.

As in previous years, we expect all accredited laboratories to participate in the 2024 PT rounds and to achieve an A and B ratings of over 90% on all tests. And we also aim to increase the performance of non-accredited laboratories.

3.4 Audit programme

In 2023 were performed 40 re-accreditation audits, and six accreditation audits. For first time, this year, at the re-accreditation audits two laboratories included also sampling units in the scope. For 44 audits out of 46, the audit was performed with on-site assessment, one audit was performed completely remote and one partially remote.

The procedure on how to perform remote/partially remote audits approved by ECOM in 2020 was applied for both audits with the approval of the ECOM-Accreditation Working Group.

For all nine audits performed remote or partially remote, the approval of the Accreditation Working Group was required.

The Auditors workshop postponed from 2021 was organised this year in December in Poznan. The organisation was a hybrid (physical participation and on-line) and the auditors to had the opportunity to discuss several aspects such as changes of the ISTA Rules, revision of the ISTA Accreditation standard and policy regarding non-conformities identified during an ISTA audits.

As outcomes of the workshops were identified 25 actions to be taken and for some of them the implementation is already started.

3.5 Accreditation under the Performance- Based Approach

By the end of 2022, a number of 12 laboratories were accredited under the principles of the Performance-Based Approach:

Table B.3.16 Laboratories accredited under the principles of Performance-Based Approach

| Country/Distinct economy | ISTA laboratory code |
|---------------------------------|-----------------------------|
| ARGENTINA | AR01 |
| AUSTRIA | AT03 |
| DENMARK | DK08 |
| FRANCE | FR03 |
| HUNGARY | HU01 |
| ITALY | IT01 and IT03 |
| JAPAN | JP03 and JP07 |
| SERBIA | RS02 |
| URUGUAY | UY02 |
| UNITED STATES OF AMERICA | US11 |

The Standard PT coordinator in collaboration with the GMO Committee and after discussion with the ISTA Accreditation Department, developed a List of Standardized Terms in GMO Testing.

A new format of the Scope of Accreditation for these tests is in process to be established with the aim to be published on the ISTA website. The objective of this change is to make more uniform and transparent the “Scope of accreditation” of laboratories published on the ISTA website, allowing a better understanding by customers, to be of guidance to Auditors in evaluating applications and assessing data supporting accreditation (e.g. validation/verification, PDE, etc) and also to facilitate uniformity in the issuing of ISTA certificates with GMO testing results.

3.6 Accreditation administration

The Accreditation and Technical Departments is formed by four staff at ISTA Secretariat and supported by 22 contracted auditors.

At ISTA Secretariat the staff is formed by Florina Palada – Head of the Accreditation and technical Department, System and Technical auditor, Branislava Opra – System auditor, Standard PT coordinator and Quality Manager, Stella Marcu – System auditor and Standard PT administrator.

Until end September Neelam Ok supported the team as Audits and Standard PT administrator, and she during the maternity leave she is replaced by a new team colleague Beata Hübnerova.

Contracted auditors in 2023: 2 System & Technical auditor, 5 System auditors, 12 Technical auditors, 2 Variety and GMO Experts, 1 GMO Expert and 1 SH Expert.

From the actual total number of auditors, in 2023 were approved 1 system auditor, 1 technical auditor and a GMO Expert and also two technical auditors decided to stop performing audits for ISTA.

The Accreditation and Technical Department has continued to recruit new contracted system and technical auditors to perform ISTA audits. Four candidates (1 System auditor, 2 Technical auditor and 1 SH Experts) were in different steps of the process.

3.7 Document updates

The revision of the ISTA Accreditation standard was finalised and the final draft was presented to ECOM during the February Meeting. The final format was approved in June, during the ECOM Meeting in Verona. The new revised ISTA Accreditation standard brings new aspects to be considered by the ISTA auditors and the audited laboratories such as machineries replacing the human analysts and risk assessment aspects.

All related documents of the Accreditation Department were revised to reflect the new policy approved by ECOM in February, for the Substantial and Non-substantial non-conformities identified during an ISTA audit. The implementation of the revised policy was implemented by all audited laboratories audited in 2023.

The Accreditation and Technical Department documents were revised for the changes in the ISTA Accreditation standard and prepared with the new ISTA Logo for celebration of 100 years of ISTA (to be used in 2024).

The ISTA crop groups were revised to add *Penisetum glaucum* under Cereals crop group as well (change valid from June 2023) and *Ricinus* in Other agricultural crop group (change valid from January 2024).

The design of the Accreditation Certificate and Certificate of appointment for the contracted auditors was changed considering the corporate identity.

3.8 Accreditation figures

A complete list of accredited ISTA laboratories is shown in Table B.3.18. The regional distribution of the accredited laboratories is given in Figures B.3.19 .

Table B.3.18 List of accredited laboratories – 2023

| Country/Distinct Economy | ISTA Laboratory code |
|--------------------------|------------------------------------|
| Argentina | AR01 |
| Austria | AT03, AT04 |
| Australia | AU01, AU02, AU06, AU07, AU09, AU13 |
| Bangladesh | BD03 |
| Belgium | BE02, BE03 |
| Bulgaria | BG01 |
| Bolivia | BO01 |

| | |
|----------------|--|
| Brazil | BR07, BR08 |
| Canada | CA04, CA08, CA10, CA12 |
| Switzerland | CH01 |
| Chile | CL02 |
| China | CN01, CN04 |
| Czech Republic | CZ03 |
| Germany | DE03, DE04, DE05, DE06, DE07, DE09, DE10, DE13, DE15, DE16, DE17, DE18, DE19, DE23 |
| Denmark | DK03, DK04, DK06, DK08, DK09, DK11 |
| Estonia | EE01 |
| Egypt | EG01 |
| Spain | ES01 |
| Finland | FI01 |
| France | FR02, FR03, FR07, FR08, FR09, FR11 |
| United Kingdom | GB01, GB04, GB06 |
| Greece | GR01, GR02 |
| Croatia | HR03 |
| Hungary | HU01, HU02 |
| Indonesia | ID01, ID02, ID03 |
| Ireland | IE01 |
| Israel | IL01 |
| India | IN05, IN06, IN07, IN12, IN14, IN16, IN39 IN45 |
| Iran | IR01 |
| Italy | IT01, IT03, IT06, IT07, IT09, IT10 |
| Japan | JP01, JP03, JP05, JP06, JP07 |
| Kenya | KE01 |
| South Korea | KR02, KR03 |
| Lithuania | LT01 |
| Luxemburg | LU01 |
| Latvia | LV01 |
| Moldova | MD01 |
| Malawi | MW01 |
| Mexico | MX01 |
| Netherlands | NL02, NL03, NL05, NL11 |
| Norway | NO01 |
| New Zealand | NZ01, NZ03, NZ05 |
| Philippines | PH03 |
| Pakistan | PK01 |
| Poland | PL05, PL07 |
| Portugal | PT01 |

| | |
|--|--|
| Romania | RO05, RO06, RO08 |
| Serbia | RS01, RS02, RS03 |
| Russian Federation | RU01, RU03, RU04, RU05, RU06, RU07 |
| Sweden | SE02, SE07, SE09 |
| Slovenia | SI01 |
| Slovakia | SK01, SK02 |
| Senegal | SN01 |
| Thailand | TH03, TH04, TH05 |
| Türkiye | TR01 |
| SCT of Taiwan, Penghu, Kinmen and Matsu | TW01 |
| Tanzania | TZ02 |
| Ukraine | UA01 |
| Uganda | UG02 |
| United States of America | US01, US03, US05, US06, US07, US10, US11 |
| Uruguay | UY02 |
| South Africa | ZA03, ZA04, ZA05, ZA06 |
| Zambia | ZM01 |
| Zimbabwe | ZW01 |
| Total number of accredited laboratories | 151 |

There were 64 countries/distinct economies with at least one ISTA-accredited laboratory.

Six candidates for accreditation with the ISTA audit performed this year are in different steps of the accreditation process.

Figure B.3.19 Regional distribution of the 150 ISTA accredited laboratories

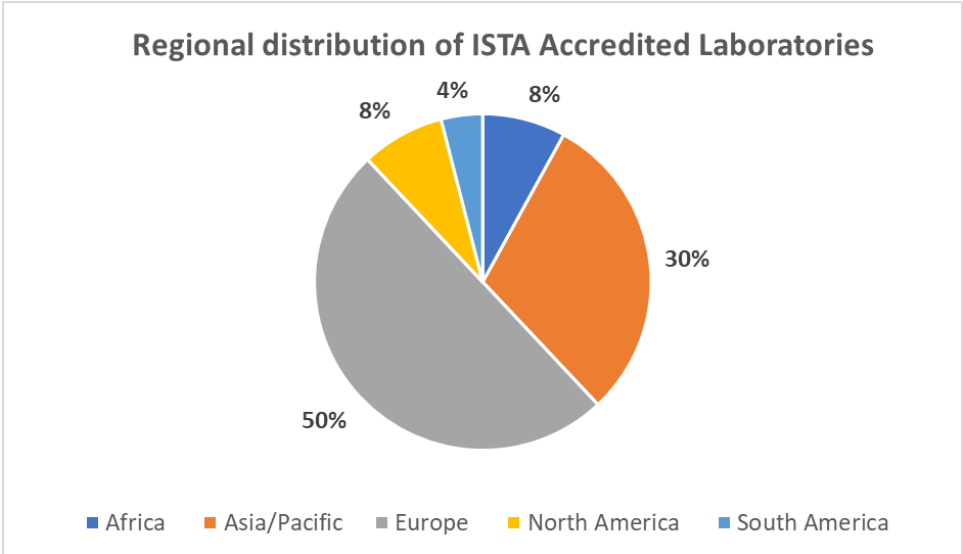


Figure B.3.20 Number of ISTA accredited laboratories since 2002

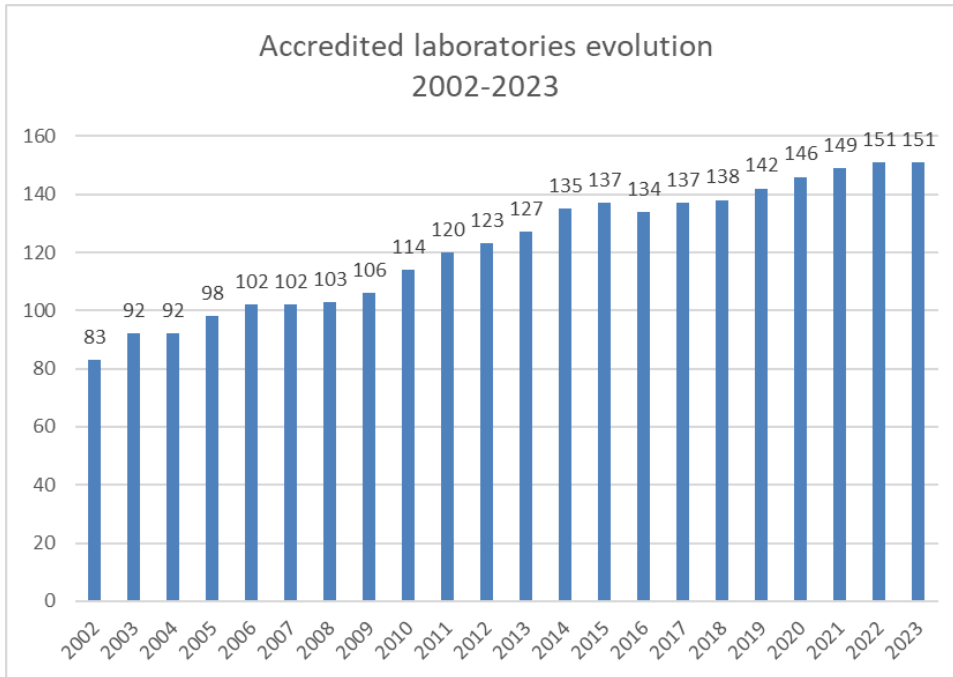
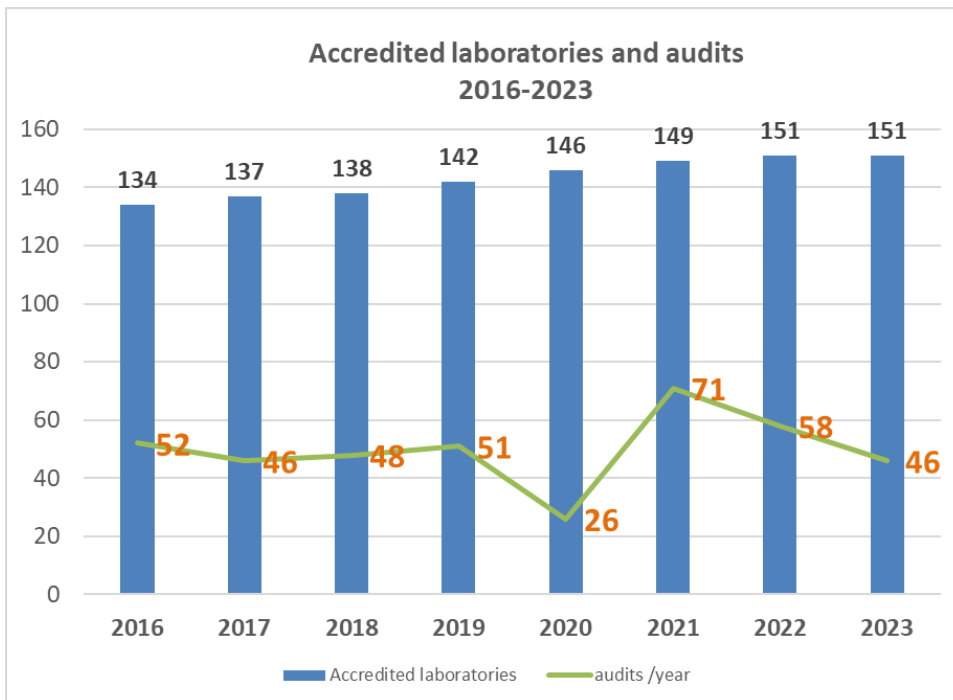


Figure B.3.21 Number of ISTA accredited laboratories and ISTA audits since 2016



Contribution of Accreditation Department team to:

- ECOM-VSI WG
- eCertificates Project
- ISTA Website update
- ISTA Secretariat QMS revision
- Certification surveillance audit
- Revision of the leaflet ISTA in Key figure 2023
- Revision of leaflet Guide to ISTA

Presence in social media:

ISTA Webinar on how to address the non-conformities identified at the ISTA audits – October 2023

International representations

- AFSTA Congress – Dakar, Senegal, participation of the Head of the Accreditation and Technical Department (HoAT) as invited speaker

Workshops

- Quality Assurance Workshops for beginners was organised in Hyderabad India – October 2023
- Basic Course In Seed Production, Certification, Sampling and Testing for Seed Quality Assurances – Dhaka, Bangladesh - the HoAT has been one of the lecturers
- The preparation of a Quality Assurance Workshop for advanced level planned for January 2024 in South Africa is almost finalised.

3.9 Sales of ISTA Certificates

A total of 211'000 certificates were sold by the end of the year (Table B.3.21).

Table B.3.21 Sales of ISTA Certificates

| Type of ISTA Certificates | 2020 | 2021 | 2021 | 2022 | 2023 |
|---|--------|--------|--------|--------|--------|
| Orange International Seed lot Certificates | 202500 | 181360 | 181360 | 189040 | 214500 |
| Blue International Seed Sample Certificates | 15400 | 18600 | 18600 | 9500 | 14100 |

4. ISTA Publications and Products

4.1 ISTA Handbooks and Proceedings

Table B.3.1. Total sales of ISTA publications 2019–2023

| Type/year | 2019 | 2020 | 2021 | 2022 | 2023 |
|--|------------|-----------|------------|------------|------------|
| Handbook on Seed Sampling | 6 | 0 | 7 | 36 | 40 |
| Handbook on Seedling Evaluation | 54 | 40 | 55 | 42 | 42 |
| Handbook on Pure Seed Definitions | 12 | 5 | 5 | 16 | 11 |
| Handbook on Moisture Determination | 11 | 4 | 7 | 9 | 24 |
| Handbook on Flower Seed Testing | 3 | 12 | 22 | 9 | 8 |
| ISTA Working Sheets on Tetrazolium Testing Vol. I | 4 | 1 | 9 | 11 | 8 |
| ISTA Working Sheets on Tetrazolium Testing Vol. II | 6 | 3 | 5 | 3 | 5 |
| Various Handbooks/Publications | 44 | 15 | 29 | 79 | 46 |
| Total Publications sold | 140 | 80 | 139 | 205 | 184 |

4.2 Calibration Samples

The Secretariat offers calibration samples of the grass species *Dactylis glomerata* (3.0 g) and *Poa pratensis* (1.0 g) for General Seed Blowers.

In 2023 2 samples of *Poa pratensis* and 5 of *Dactylis glomerata* were sold.

5. ISTA Training and Education Programmes

5.1 ISTA Workshop overview

In 2023, five physical workshops were held:

ISTA Workshop on Germination, 17 – 20 April 2023 – Chilanga, Zambia: 24 participants

ISTA Workshop on Tetrazolium Testing and Equilibrium Relative Humidity (eRH) Determination for Native Species – Peri, Italy: 24-25 May 2023: 15 participants, 26-27 May 2023: 19 participants

ISTA Workshop GMO, 2-3 June 2023 – Verona, Italy: 14 participants

ISTA Workshop on Germination, 4-7 September 2023 – Bucharest, Romania: 31 participants

ISTA Workshop on Quality Assurance 10-12 October 2023 - Dhaka, Bangladesh: 30 participants

6. Scientific Journal ‘Seed Science and Technology’: Report of the Editorial Board

Chief Editor:

Fiona R. Hay (Denmark)

Deputy Editor:

Alison A Powell (United Kingdom)

Vigour (tests, causes of etc), physiology of ageing, also molecular aspects of ageing within limits (on the whole SST papers stay within these!), priming

Associate Editors:

Irfan Afzal (Pakistan)

Christophe Bailly (France)

Dormancy, ageing, cell signalling, oxidative stress, markers of seed vigour

Laura Bowden (United Kingdom)

Seed quality, priming, storage

Ibrahim Demir (Turkey)

Steven P.C. Groot (Netherlands)

Seed vigour, storage

Fabio Gresta (Italy)

Legume germination, hard seed coat, seed dormancy and dormancy breaking, scarification, seed treatment, weed germination, temperature, light

Brigitte Hamman (South Africa)

Seed germination, seed quality, seed vigour testing, seed enhancement, chemical seed treatments, seed biochemistry and physiology, dormancy, longevity (storage)

Julio Marcos-Filho (Brazil)

Seed physiology and seed quality control, as seed vigour (relationship with seed performance; testing), germination, priming, storage

Andrea Mondoni (Italy)

Seed dormancy, germination, storage

Shyam S. Phartyal (Germany)

Sergey Rosbakh (Germany)

Uma Rani Sinniah (Malaysia)

Tropical crops germination, storage

Michael Sussman (United States)

Biomolecular techniques and principles pertaining to biotechnology and molecular biology

Alan Taylor (United States)

Seed treatment and coating technologies; Seed water activity/moisture content; Seed quality related to germination/viability

Christopher Wood (United Kingdom)

low temperature storage, dormancy and orchid/palm related papers

ECOM liaison officer

Ernest Allen

Title: Editorial Board of Seed Science and Technology; Fiona R. Hay (Chief Editor); <https://www.seedtest.org/en/tcom-edi.html>.

Brief Overview: Seed Science and Technology (SST) is ISTA's international journal featuring original papers and articles on seed quality and physiology related to seed production, harvest, processing, sampling, storage, genetic conservation, habitat regeneration, distribution and testing. The journal is a keyway in which ISTA meets its objective to actively promote research and dissemination of knowledge in seed science and technology. The Editorial Board is responsible for handling the reviewing process of papers submitted for publication and ultimately, deciding whether a paper should be published or not.

6.1 Editorial figures for 2023

Papers received: 85

Papers accepted: 38

Papers rejected: 47

Papers published (three issues): 37 + 3 editorial articles + 1 book review

Full papers in 3 issues: 6 + 6 + 6 = 18

Research Notes in 3 issues: 3 + 3 + 10 = 16

Invited review articles: 1 + 1 + 1 = 3

Editorial Articles in 3 issues: 1 + 1 + 1 = 3

Pages published in 3 issues: 139 + 138 + 210 = 487

Average number of pages per paper: 11.9

6.2 Sales of 'Seed Science and Technology' 2019– 2023

| | 2019 | 2020 | 2021 | 2022 | 2023 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|
| SST Print | 0 | 0 | 0 | 0 | 0 |
| SST Online Single | 1 | 0 | 1 | 0 | 0 |
| SST Print+ Online single | 0 | 0 | 0 | 0 | 0 |
| SST Print+ Online Multiple | 0 | 0 | 0 | 0 | 0 |
| SST OnlineMulptle | 0 | 0 | 0 | 0 | 0 |
| SST Back Issues | 1 | 0 | 0 | 0 | 0 |
| SST Dowload of Individual Chapters | 9 | 13 | 11 | 10 | 3 |
| SST Open Access Fee Full Lengh Paper | 11 | 12 | 15 | 0 | 10 |
| SST Open Access Fee Research Note | 11 | 10 | 3 | 0 | 11 |
| Total SST | 33 | 35 | 30 | 10 | 24 |

7. Seed Science Advisory Group

| MEMBERSHIP LIST | | |
|-----------------|---------------------------|--------------------------|
| 1 | CHAIR: Brigitte Hamman | South Africa |
| 2 | VICE CHAIR: Alison Powell | United Kingdom |
| 3 | Birte Boelt | Denmark |
| 4 | Francoise Corbineau | France |
| 5 | Malavika Dadlani | India |
| 6 | Joel Lechappe | France |
| 7 | Tim Loeffler | United States of America |
| 8 | Stan Matthews | United Kingdom |
| 9 | Manuela Nagel | Germany |
| 10 | Alan Taylor | United States of America |
| 11 | Jane Thomas | United Kingdom |
| 12 | Adel Zayed | United States of America |

Activities, based on Terms of Reference (TORs):

TOR 1: To provide a link between fundamental research and the use of that research to meet the needs of ISTA members.

No research was identified that could be taken to relevant TCOMs for further investigation.

TOR 2: Appraisal of evidence for techniques/equipment available for use in seed testing laboratories

SeedAlive:

This approach uses seed leakage plus a colorimetric analysis and claims to predict seed germination and vigour. After the SSAG raised a number of questions about this approach during their presentation at the 2022 ISTA Annual Meeting, the Seedalive developers contacted us and provided further evidence in support of their approach, stating also that they were interested in validation of their method. The members of the SSAG have evaluated this additional evidence and provided a detailed response to the Seedalive. This was reported in in the 2022 Activity Report, and since then, there has been no further contact from SeedAlive.

The SSAG was not approached by any ISTA members to highlight equipment or new developments or technologies that need evaluation from a completely independent group such as the SSAG.

8. Wild Species Working Group

| MEMBERSHIP LIST | | | |
|-----------------|----------------------------|--------------------------|--|
| 1 | CHAIR: Gil Waibel | United States of America | |
| 2 | VICE CHAIR: Ruoqing Wang | Canada | |
| 3 | Riad Z. Baalbaki | United States of America | |
| 4 | Laura Bowden | United Kingdom | |
| 5 | Ted Chapman | United States of America | |
| 6 | Rachael Davies | United Kingdom | |
| 7 | Stefanie Krämer | Germany | |
| 8 | Heidi Larson | United States of America | |
| 9 | Sergio Pasquini | Italy | |
| 10 | Alison A. Powell | United Kingdom | |
| 11 | Victor Vankus | United States of America | |
| 12 | Fabricia Cristina dos Reis | Brasil | |
| | | | |

The Wild Species Working Group is working to increase and organize the content intended to go into the web site. Additional programming is needed to present the data content efficiently and uniformly. This will help authors world-wide create new protocols for their species.

Images will appear as follows:



KEW (Millennium Seed Bank) has provided the data for germination protocols and thousand seed weights for many species that will help create the protocols. John Dickie, Racheal Davies, and Ted Chapman have supported us with this data.

The measurement bar and logo are additions to our image. While the use of our images is free for the public to use, ownership cannot be claimed by others. The logo helps show our ownership of the image. Many thanks to the Canadian lab (Taran Meyer and Roujing Wang) for photo-shopping these images for us.

Deborah Meyer has given much support and effort into aligning PSD and PSU seed unit descriptions. This was not an easy task and is now completed for all species in the priority list) which resulted from a survey sent out world-wide to assess goals for the Wild Species Working Group).

Many germination seedling descriptions (ISTA based) have been written by Sue Alvarez. Sue has also helped edit master list for matching PSU/PSDs to species and the master list for matching families/genera to seedling descriptions.

Michael Aberly has been working on the tetrazolium (TEZ) section, providing methodology and descriptions by family, explaining what constitutes viable and non-viable stained seeds.

Riad Baalbaki and Emi Kuroiwa are working on set of images of seedlings for each family showing normal and abnormal seedlings.

Laura Bowden has taken the lead on helping authors finish their methodology chapters.

Gil Waibel has taken thousands of images in over 150 families ready to be edited (copyright and web address added) and published.

Sergio Pasquini is an active member and the liaison office assigned to the Wild Species Working Group.

All of our working group members who are contributing suggestions and have attended our meetings.

It has taken many hours of effort to prepare content to help the programmers and web developers to finish our web site with an e-form to submit protocols and/or gallery images. They will need to find ways to store and manage our content to be used to help create a protocol for a species. It is expected we will be submitting protocols to the web site by our meeting in Cambridge this summer.

Submitted by: Gil Waibel (Chair) and Ruoqing Wang (Vice Chair)

9. Report of the ISTA Secretariat

9.1 Secretariat staff

This report lists the activities and changes in the Secretariat during 2023, where the Secretariat added one member of staff due to maternity leave of Neelam Ök:

On Publication (Rules, ISTA Handbooks and Website) Vanessa Sutcliffe of HeartWood Editorial assists the Secretariat with respect to proofreading and InDesign publication now as well for the STI publication.

Thus, at the end of the year 2022 the Secretariat numerates the following 14 members of staff corresponding to 10.4 full time equivalent employees:

| Role | Name | %FTE |
|--|------------------------|------|
| Secretary General (SG) | Dr. Andreas Wais | 1 |
| Head of Accreditation and Technical Department / Deputy SG | Dr. Florina Palada | 1 |
| TCOM Manager | Nadine Ettl | 0.6 |
| TCOM Administration | Andreea Nicoleta Pinar | 0.8 |

| | | |
|--|--------------------|-------------|
| System Auditor, Quality Management & Standard PT Coordinator | Branislava Opra | 1 |
| System Auditor in training | Stella Marcu | 1 |
| Accreditation, Audit and PT Administration | Neelam Lagah | 1* |
| Accreditation and Audit Administration | Beata Hübnerova | 0.6 |
| Finance, Sales and HR Management | Agnes Hegedüs | 1 |
| IT Business Solution Manager | Sejal Patel | 1 |
| Events, Membership and Documentation Manager | Olga Stöckli | 1 |
| Marketing & Communication Manager | Yoana Uzunova | 0.6 |
| Marketing & Communication Assistant | Karen de La Rosa | 0.8 |
| Cleaning | Ana Maria Ferreira | Hourly base |

*Not counted as on maternity leave

9.2 Secretariat work

The Secretariat is located in Wallisellen (Richtiring 32, postal address Richtiarkade 18). The work of the Secretariat was not affected during the past year and the employees stay permanently with the Association. No staff turnover was 0 %, which added to the stability of the Association.

In 2023 the next stage of going paperless was achieved by implementing the online version of MS Navision (bookkeeping programme).

9.3 Function

9.3.1 Administration

Lead by Secretary General. The Administration team includes Agnes Hegedüs and Olga Stöckli.

The main tasks of Agnes are the financial administration, invoicing, settling all incoming and outgoing payments, ISTA publications and products sales administration, general office, HR assistance and time recording administration, as well as membership administration on the financial aspects. She also represents the employees in the pension fund.

Olga is responsible for the Events organisation, Administration documentation and all Membership administrations as well as to organise and monitor the Young@ISTA programme. She leads the documentation and preparation of the contractual agreements needed upfront ISTA events. Olga is responsible for the registration process. ISTA events include, but are not limited to OGM, Congresses and ECOM Meetings including the PL process for the Annual Meetings and Congresses. Membership administration includes receiving and responding to membership queries; managing the membership database; handling all communication with members regarding their membership and payments and coordinating the assignment of designated authorities and voting nominations.

9.3.2 Human Resources

The Secretary General heads HR. Agnes Hegedüs took over HR Assistant tasks since 2017.

Agnes, Florina Palada and the Secretary General maintained the HR Handbook, which is updated every year. Agnes also oversees the time and holiday recording.

9.3.3 Finance

The Secretary General oversees the finances of the Association in the framework of the annual budget. Accounting is divided between Ronny Dossenbach of Buff Treuhand AG and Agnes Hegedüs. ISTA accounts are annually audited by BDO AG.

Following the Office365 initiative and implementing the online version of the bookkeeping programme (MS Navision) in 2023 all bookkeeping is now completely virtual. This does not only save paper, but also shows clear benefits during auditing, as documents were exchanged easily.

9.3.4 IT

Computing hardware, connectivity and software is outsourced to InfoPro, a company in Bern, which is also acting as a place of the ISTA virtual storage of data and host for all ISTA used programs and databases. In the area of Invoice preparations ISTA collaborates with Prisma, a company located in Zürich. The current website is hosted by MySign AG (maintenance of the website contents is done by the Secretariat staff).

A software change to Office365 (MS Teams) was completed in 2021. This process is ongoing and under the project management of Sejal Patel. Since 2021 ISTA also transferred this system as to be used by TCOMs, Special Project coordination, ECOM and other external cooperates (including auditors and audited laboratories/sampling entities) to have access to areas of ISTA document drives, where it is needed for a seamless communication. The project also allows TCOMs to increase their internal communication as well the communication with the Secretariat. A number of TCOMs make use of this by now. All special project coordination is done via Teams as well. As a non-profit organisation ISTA profits from special rates for all MS products.

ISTA uses LinkedIn learning as a tool for staff training in the Secretariat. LinkedIn learning is also under special rates for non-profit organisation.

In 2023 the move of MS Navision to a complete on-line version was completed.

9.3.5 Marketing

Social media and digital marketing

The ISTA YouTube channel has more than 1'720 subscribers, which is an increase of 32 % compared to last year. All relevant information are now posted here, and it became the main host for all ISTA video information as well as for posting the webinars. Further ISTA continued to use its X (formerly Twitter) account, which is used for quick information to the stakeholders and interested parties. ISTA has now about 2'550 followers on X, which is an increase of 28 % compared to last year. At the end of 2023, the ISTA LinkedIn profile counted nearly 11'400 followers, which is an increase of 11 % compared to last year. Posting on LinkedIn is done up to three times a week. The posts mainly include news about the association. LinkedIn allows more in-depth information as it is not limited to the number of signs, like X. The LinkedIn Young@ISTA forum has now 460 followers, which is an increase of 31 % compared to last year.

ISTA is also to be found on Wikipedia, which is giving information on all relevant topics (https://en.wikipedia.org/wiki/International_Seed_Testing_Association). This is maintained and updated frequently.

Newsletters to inform the membership are released every week (mostly on Wednesdays).

World Seed Partnership

The World Seed Partnership (WSP) is a joint initiative by now five international organisations:

- International Seed Testing Association (ISTA)
- International Seed Federation (ISF)
- Organization for Economic Co-operation and Development (OECD)
- International Union for the Protection of New Varieties of Plants (UPOV)
- World Farmer Organisation (WFO)

The mission of the World Seed Partnership is to provide a focal point for information on internationally harmonised seed systems and to communicate their role in supporting sustainable agriculture.

Regular web conferences took place in 2023 in order to move this project forward.

9.3.6 Representation

During 2023, ISTA was represented by the Officers, other ECOM Members, the Secretary General, other Secretariat staff or other ISTA members at all major events of partner organisations, international seed trade associations, scientific and other international organisations in the area of seed science and politics. This resulted in closer cooperation with the African Union, AOSA/SCST, OECD, FAO, IPPC, ITPGRFA, NAPPPO, APSA, AFSTA, Euroseeds, UPOV and ASTA. There were also contacts with several DAs. The Secretary General is also member of the African Union Working group on seed quality and certification. Reports can be found in STI.

9.3.7 Event organisation

Decision was made by the ECOM to have the Annual Meeting in Verona, Italy, which allowed participation from a great number of ISTA member countries and distinct economies to participate in person.

9.3.8 Publications

ISTA Rules

The updating, formatting, coordination and integration of the different translations and other required maintenance of the source files performed by Vanessa Sutcliffe with support of the Secretary General, Nadine, Andreea, Karen with support from the Rules TCOM. The rules were published December 01, 2023, to enable laboratories to access the changes on time.

Seed Testing International (STI)

An editorial team of STI consisted of Andreas, Florina and Sejal (as the responsible person for STI).

Mailing lists and distribution was organised by Agnes.

The two scheduled issues of STI (no.165 and no. 166) were successfully and timely produced and distributed due to the leadership of Sejal.

Seed Science and Technology (SST)

The Editorial Board headed by Fiona Hay edits SST.

Uploading of Fast-track and the final articles and amending the DOI registrations is implemented by SST typesetter Lucie Eng.

Current Website

Only the Marketing & Communication group at the Secretariat maintains the website upon request on Secretariat staff information depending on their relevant role.

The project towards the redesign and construction of the new ISTA website was completed by Yoana and Karen with the help of MySign.

Newsletters

Newsletters are prepared weekly by the Marketing & Communication group. Different members of the Secretariat staff depending on the subject contribute to these Newsletters.

9.3.9 TCOM

Nadine Ettl manages the TCOM work with the help of Andreea Pinar, this includes:

The on-going coordination and management of the TCOMs annual cycle including all reports and studies, information updating of the TCOM part of the ISTA website.

Coordination and administration of the Method Validation Programme.

Set-up and coordination of the 100K-project as well as the SH-project (Reference Pest List), which is coordinated by GEVES.

Leading the organisation of the DNA, GMO and SH Proficiency Test rounds and communication with laboratories, data entry and management.

Andreea is coordinating the workshops organisation, registration and management, TCOM Members and handling TCOM Membership Applications, updating TCOM website. In person workshops were started again in 2022. These may in future be combined by online workshops, where appropriate.

Training and maintenance of the TCOM area in Office365 is done by Nadine and Andreea.

9.3.10 Accreditation

Florina Palada manages the accreditation as Head of the Accreditation and Technical Department.

Auditing

Organised, arranged and partly performed by Florina, Branislava and Stella with support of Neelam and Beata, as well as a team of contracted system and technical auditors around the world with ISTA auditors also originating from areas, where is was not present before.

Activities include:

- Pre-accreditation and pre-audit activities related to the interested laboratories/sampling entities
- Initial and re-accreditation audits of applicants and existing accredited laboratories/sampling entities
- Following up of corrective actions

Neelam and Beata provide the Audits administration and Certificate shipment and administration.

Neelam and Beata are providing administrative support to the Accreditation and Technical Department; this includes coordinating with the laboratories and the auditors the Audit schedule. Assisting with materials and documentation in preparation for audits. Making travel arrangements for the Auditors.

Organising and conducting a Proficiency Test Programme as well as the Mini-Proficiency Test Programme

Standard PT is under the responsibility of Branislava, Neelam supports her.

Work includes:

- Obtaining seed for some Proficiency Test rounds
- Managing registration
- Obtaining relevant documents for shipment
- Shipment
- Data entry and analysis
- Reporting

Other activities of the Accreditation and Technical Department

- Organisation of Quality Assurance Workshops
- Training of the new system auditor at ISTA Secretariat
- Recruiting and training of contracted system and technical auditors
- Optimisation of the database

Certificates

Two projects are currently running concerning ISTA Certificates.

- eCertificates. After a feasibility project performed by Massey University, Palmerstone North (NZ) and approval of the Budget by the 2020 Ordinary General Meeting. A project was started with MySign to realise the use of electronic Certificates. The Website will play a major role in this project. A beta testing is currently performed by 6 ISTA accredited laboratories. The system should be available to be used after the 2024 Annual Meeting as approved by the Ordinary General Meeting. The project is led by the Secretary General.
- Interactive Certificates: This project, which enables ISTA laboratories to learn more about ISTA Certificates and their use (how to fill where and what). It is also be used for trainings within ISTA laboratories. The project was completed early 2020 with the help of Branislava and Florina and is continuously updated.

10. Finances of the Association

In January 2024, the ISTA accounts were audited by financial auditors BDO AG, who found them to be in well order. The report of the financial auditors is included after the presentation of the key financial figures.

The total turnover was higher than compared to previous year (+199'689 CHF). The income on Accreditation audits increased due to the number of audits performed in 2023 as well as due to the fact of more member laboratories being audited for the first time. This resulted in a higher income of 26'429 CHF. The commission of Certificates increased over the year, which is a result of the increase of commission price to 4 from 1 January 2024. The increase resulted in 113'100 CHF in 2023. The turnover increased to a total of 3'039'201 CHF for 2023, which is significantly higher than the 2023 budget (2'989'456 CHF), mainly for the reason of more Certificates being commissioned. The financial result shown for the year 2023 is negative. The balance of 1'821 CHF could only be reached by taking 270'000 CHF from the reserves, which is significantly lower than budgeted (445'000 CHF), and mainly due to foreign currency exchange rates at the End of 2023, where the CHF got massively stronger to other currencies, which therefore effected the ISTA funds of the reserves.

Some areas to highlight include:

Membership subscription: The increase of 4'125 CHF compared to previous year was mainly due to fluctuations and a less used option of the 10 % discount on on-time payments. This increase was 14'246 CHF higher than budgeted.

ISTA Annual Meeting & Congresses: The ISTA Annual Meeting was held in Verona, Italy. This resulted in income of 105'416 CHF and expenditure of 142'465 CHF. The expenditure was 10'917 CHF higher than the budget, whereas, the income was 22'034 CHF below budget, even including a sponsorship from CREA of 10'000€. The difference is reflecting that ISTA is covering the registration fees for TCOM Chairs and ECOM members.

ISTA Rules sales: Sales decreased marginally by 5'284 CHF compared to previous year, but stays stable around 50'000 CHF.

Accreditation: The reason for the higher income on audits of 26'429 CHF is mainly due to more new ISTA member laboratories were audited for the first time than budgeted. Expenditures did raise by 17'469 CHF, which is due to an auditor workshop being performed in December 2023. The expenditure was 66'299 CHF above budget, where the income was even 72'421 CHF above budget. The effect is described above.

Seed Science and Technology subscriptions: The income from sales and publication fees increased again as compared to previous year, where due to special promotions for publication no real income was generated in 2022. For 2023 we moved back to the similar income as in the past years (19'699 CHF).

For 2024 a balanced Zero budget is presented with using 134'574 CHF from the reserves, which is mainly due for eCertificates investment, which was approved by the OGM 2020 to be financed from the reserves, but will partly come from the cash flow as well.

The reserves decreased at end of 2023 by 270'000 CHF to be at 3'715'000 CHF, which is mainly due to foreign currency exchange rates at the End of 2023. This means that the 2023 budget could to a great extent be financed from the cash flow, which will be similar for 2024.

| ISTA draft Budget 2024 | 2022 | 2023 | Budget 2024 | Proposed 2025 |
|--|---------------------|---------------------|---------------------|---------------------|
| INCOME | | | | |
| <i>Subscriptions</i> | | | | |
| Annual Membership Subscription | 1'249'610.80 | 1'253'735.68 | 1'258'414.58 | 1'265'000.00 |
| Accreditation Subscription | 170'136.00 | 171'861.31 | 179'144.64 | 180'000.00 |
| Annual Meetings | 66'638.85 | 105'416.23 | 164'700.00 | 145'000.00 |
| Technical Committees WS | 32'860.78 | 52'491.60 | 75'000.00 | 75'000.00 |
| STI Advertisement | 0.00 | 0.00 | 1'500.00 | 1'500.00 |
| | 1'519'246.43 | 1'583'504.82 | 1'678'759.22 | 1'666'500.00 |
| <i>Service Centres</i> | | | | |
| ISTA Rules | 49'172.85 | 43'888.91 | 55'000.00 | 55'000.00 |
| Accreditation Audits | 614'704.00 | 641'132.95 | 665'008.10 | 665'000.00 |
| Proficiency Test incl. GMO | 12'000.00 | 7'000.00 | 16'000.00 | 15'000.00 |
| QA Workshops | 0.00 | 0.00 | 8'000.00 | 5'000.00 |
| Seed Science and Technology | 237.28 | 19'699.43 | 15'000.00 | 15'000.00 |
| Technical Publications and calibration samples | 50'725.04 | 33'720.53 | 30'000.00 | 30'000.00 |
| Certificates | 629'850.00 | 742'950.00 | 800'000.00 | 800'000.00 |
| Website | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1'356'689.17 | 1'488'391.82 | 1'589'008.10 | 1'585'000.00 |
| Losses in receivables | -36'424.00 | -32'695.68 | -15'642.00 | -15'000.00 |
| Total Income | 2'839'511.60 | 3'039'200.96 | 3'252'125.32 | 3'236'500.00 |

| ISTA draft Budget 2024 | 2022 | 2023 | Budget 2024 | Proposed 2025 |
|--|----------------------|----------------------|----------------------|----------------------|
| EXPENDITURE | | | | |
| <i>Direct Costs</i> | | | | |
| Annual Meetings & Congresses | -129'644.28 | -142'464.69 | -190'875.00 | -190'000.00 |
| Executive Committee+President | -15'773.48 | -64'408.68 | -45'000.00 | -45'000.00 |
| Technical Committees WS and 3K grants | -114'500.03 | -153'324.97 | -206'500.00 | -200'000.00 |
| Seed Testing International | -30'520.57 | -34'239.98 | -33'000.00 | -35'000.00 |
| | -290'438.36 | -394'438.32 | -475'375.00 | -470'000.00 |
| <i>Service Centres</i> | | | | |
| ISTA Rules | -6'602.96 | -7'472.89 | -13'000.00 | -15'000.00 |
| Accreditation Audits | -387'723.18 | -370'253.97 | -441'792.45 | -400'000.00 |
| Proficiency Test incl. GMO | -39'547.22 | -67'694.10 | -36'700.00 | -40'000.00 |
| QA Workshops | -2'335.97 | -1'134.81 | -8'000.00 | -10'000.00 |
| Seed Science and Technology | -60'410.47 | -57'222.76 | -60'000.00 | -57'500.00 |
| Technical Publications and calibration samples | -39'599.33 | -13'972.11 | -25'000.00 | -25'000.00 |
| Certificates | -229'136.75 | -274'088.60 | -70'000.00 | -130'000.00 |
| Provisions for fluctuations | 585'000.00 | 270'000.00 | 134'574.41 | 96'000.00 |
| | -180'355.88 | -521'839.24 | -519'918.04 | -581'500.00 |
| <i>Personnel expenses</i> | | | | |
| Salaries | -1'215'118.25 | -1'270'986.25 | -1'282'178.67 | -1'350'000.00 |
| Social Security and insurances | -311'427.85 | -334'416.20 | -384'653.60 | -405'000.00 |
| Other personel expenses incl. Recruitments | -8'485.52 | -7'841.60 | -5'000.00 | -5'000.00 |
| Staff Training | -18'168.98 | -29'601.87 | -35'000.00 | -35'000.00 |
| Secretary General Cost | 0.00 | 0.00 | 0.00 | 0.00 |
| | -1'553'200.60 | -1'642'845.92 | -1'706'832.27 | -1'795'000.00 |
| <i>Operating Costs</i> | | | | |
| Office Costs | -245'001.12 | -307'805.77 | -270'000.00 | -270'000.00 |
| Travel Costs (International Representation) | -41'028.35 | -41'381.66 | -45'000.00 | -45'000.00 |
| Sponsoring Projects (Young@ISTA) | -21'188.11 | -20'620.36 | -25'000.00 | -25'000.00 |
| Marketing Costs | -3'802.96 | -4'250.46 | -25'000.00 | -10'000.00 |
| Website | -88'364.28 | -70'488.53 | -40'000.00 | -40'000.00 |
| Projects | 0.00 | 0.00 | -170'000.00 | -20'000.00 |
| | -399'384.82 | -444'546.78 | -575'000.00 | -410'000.00 |
| Depreciation of tangible fixed assets | -15'900.00 | -12'024.09 | -10'000.00 | -10'000.00 |
| Financial costs | -541'505.80 | -325'719.54 | -55'000.00 | -60'000.00 |
| Financial income | 75'836.79 | 215'313.42 | 90'000.00 | 90'000.00 |
| Prior-period costs | -34'233.18 | -24'179.46 | 0.00 | 0.00 |
| Prior-period income | 104'885.67 | 112'899.86 | 0.00 | 0.00 |
| Total Expenses | -2'834'296.18 | -3'037'380.07 | -3'252'125.32 | -3'236'500.00 |
| Result | 5'215.42 | 1'820.90 | 0.00 | 0.00 |

| 2023 YEAR END CLOSING | ACCOUNT 2021 | ACCOUNT 2022 | ACCOUNT 2023 |
|--|---------------------|---------------------|---------------------|
| ASSETS | | | |
| <i>Currents Assets</i> | | | |
| <i>Cash</i> | | | |
| Petty Cash (Accounts 1000,1001,1002) | 4'905.58 | 10'377.85 | 7'329.79 |
| Postal account (Accounts 1010,1011,1015,1016) | 53'137.55 | 47'157.62 | 102'829.49 |
| Zürcher Kantonalbank, current account (Account 1020) | 2'524'680.23 | 2'500'758.02 | 1'627'475.44 |
| Zürcher Kantonalbank, deposit account (Account 1021) | 499'105.71 | 219'008.94 | 19'487.58 |
| Zürcher Kantonalbank, USD account (Account 1025) | 248'035.63 | 216'326.02 | 132'171.15 |
| Zürcher Kantonalbank, EUR account (Account 1026) | 860'674.29 | 648'794.96 | 606'457.82 |
| Zürcher Kantonalbank, EUR account (Account 1030) | 0.00 | 0.00 | 0.00 |
| Zürcher Kantonalbank, GBP account (Account 1031) | 52'909.40 | 8'108.69 | 64'300.05 |
| Zürcher Kantonalbank, USD asset management account (Account 1055) | 113'998.46 | 52'521.20 | 71'968.24 |
| Money Market investments (Accounts 1405,1410) | 0.00 | 0.00 | 1'000'000.00 |
| | 4'357'446.85 | 3'703'053.30 | 3'632'019.56 |
| <i>Trade receivables</i> | | | |
| Membership subscriptions, certificates and publications (Accounts 1100,1111,1112,1113) | 56'241.66 | 25'559.80 | 112'561.97 |
| Allowance on doubtful accounts (Account 1120) | -5'600.00 | -18'000.00 | -15'200.00 |
| | 50'641.66 | 7'559.80 | 97'361.97 |
| <i>Other accounts receivable</i> | | | |
| Other accounts receivable (Account 1108,1109,1110,1135,2320) | 17'801.21 | 0.00 | 0.00 |
| Withholding tax (Account 1150) | 2'608.44 | 547.56 | 1'644.12 |
| Value added Tax (Account 1155,1156,1157,2055,2057) | 69'765.59 | 116'433.63 | 23'023.59 |
| | 90'175.24 | 116'981.19 | 24'667.71 |
| <i>Accrued income and prepaid expenses</i> | | | |
| Prepaid expenses (Accounts 1300) | 74'933.35 | 343'072.62 | 281'574.73 |
| | 74'933.35 | 343'072.62 | 281'574.73 |
| <i>Fixed assets</i> | | | |
| Financial assets (Accounts 1400,1420) | 2'852'370.51 | 2'487'490.95 | 2'421'116.62 |
| Tangible fixed assets (Accounts 1500,1520) | 63'000.00 | 47'100.00 | 36'000.00 |
| | 2'915'370.51 | 2'534'590.95 | 2'457'116.62 |
| | 7'488'567.61 | 6'705'257.86 | 6'492'740.59 |

| 2023 YEAR END CLOSING | ACCOUNT 2021 | ACCOUNT 2022 | ACCOUNT 2023 |
|--|----------------------|----------------------|----------------------|
| LIABILITIES + EQUITY | | | |
| <i>Short-term liabilities</i> | | | |
| Trade creditors (Account 2000,2001,2002,2005,2006,2007) | -224'126.00 | -110'040.86 | -144'068.54 |
| Other accounts payable (Accounts 2200,2220,2250,2260,2270,2280,2321) | -3'959.25 | -7'352.05 | -7'778.35 |
| Advance payments (Accounts 2100,2101,2102,2103,2104,2106,2107,2108,2109,2110,2112) | -1'559'493.25 | -1'536'120.71 | -1'533'784.64 |
| Accrued expenses (Accounts 2120,2121,2122,2123,2124,2125,2126,2127,2128,2129,2130,2131) | -198'982.61 | -129'522.32 | -153'066.24 |
| | -1'986'561.11 | -1'783'035.94 | -1'838'697.77 |
| <i>Long-term liabilities</i> | | | |
| Provisions (Account 2910) | -4'570'000.00 | -3'985'000.00 | -3'715'000.00 |
| | -4'570'000.00 | -3'985'000.00 | -3'715'000.00 |
| <i>Equity</i> | | | |
| Equity (Account 2800) | -926'102.66 | -932'006.50 | -937'221.92 |
| Profit/Loss (Account 2998) | -5'903.84 | -5'215.42 | -1'820.90 |
| | -932'006.50 | -937'221.92 | -939'042.82 |
| | -7'488'567.61 | -6'705'257.86 | -6'492'740.59 |



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BDO Ltd
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CH-8031 Zurich

To the Executive Committee of
ISTA International Seed Testing Association
Richtiarkade 18
8304 Wallisellen

Zurich, 9 February 2024
2110 0520/DSH/BRS

Management letter concerning the audit (Limited statutory examination) of the 2023 annual financial statements

Dear Members of the Executive Committee

On January 25, 2024 we have conducted the audit of the 2023 annual financial statements (balance sheet, profit and loss account and notes) of ISTA International Seed Testing Association at the offices of the association. At the final audit meeting, we discussed our audit findings with Dr. Andreas Wais and Mr. Ronny Dossenbach (Buff Treuhand AG).

General Audit Findings

All financial information has been made available to us in an organized and efficient manner.

Individual Audit Findings

Profitability 2023

The 2023 financial year reported earnings, changes in hidden reserves and net loss are as follows:

| | | |
|---|-----|----------|
| Reported profit of 2023 financial year (external) | CHF | 1'821 |
| Decrease in provisions | CHF | -270'000 |
| Loss 2023 financial year (internal) | CHF | -268'179 |

BDO Ltd, a limited company under Swiss law, incorporated in Zurich, forms part of the international BDO Network of independent member firms.

C. Reports of the Technical Committees

You will find on the following pages the reports of the Technical Committees for the calendar year 2023. These reports give an indication of progress towards achievement of the working programmes approved by the TCOM.

Activity Working Programmes arranged in alphabetical order of Committee:

| | |
|------------|---|
| ATC | Advanced Technologies Committee |
| BSC | Bulking and Sampling Committee |
| FSC | Flower Seed Committee |
| FTS | Forest Tree and Shrub Seed Committee |
| GER | Germination Committee |
| GMO | GMO Committee |
| MOI | Moisture Committee |
| NOM | Nomenclature Committee |
| PUR | Purity Committee |
| SHC | Seed Health Committee |
| STA | Statistics Committee |
| STO | Storage Committee |
| TEZ | Tetrazolium Committee |
| VAR | Variety Committee |
| VIG | Vigour Committee |

1. ATC Advanced Technologies Committee

| A. COMMITTEE MEMBERSHIP LIST | | | |
|---|---|--------------------------|---|
| | | | change comments |
| 1 | CHAIR: Bert van Duijn | Netherlands | |
| 2 | VICE-CHAIR: Francisco G. Gomes Jr. | Brazil | |
| 3 | Birte Boelt | Denmark | |
| 4 | Kent Bradford | United States of America | |
| 5 | Mailén Ariela Martínez | Argentina | |
| 6 | Henry Bruggink | Netherlands | |
| 7 | Aurélie Charrier | France | |
| 8 | Devaraja Achar | India | |
| 10 | Zhujun Zhu | China | |
| 11 | Brigitte Hamman | South Africa | |
| 12 | Tomoko Sakata | Japan | |
| 13 | Sebastian Bobber | Germany | |
| 14 | Giovanny Lopez | Netherlands | |
| 15 | Sunmeet Bhatia | New Zealand | |
| 16 | Ganesh Kumar | United States of America | |
| | Mieczyslaw Grzesik | Poland | Retired |
| B. PUBLICATIONS | | | |
| B1. Publications to accompany the Rules | | | |
| | Publication title | proposed finalisation | collaboration |
| | | | remarks |
| | | | update |
| | | | progress |
| 1 | <u>X-ray Chapter 14 of the Rules Complete update of the chapter</u> | <u>2023</u> | <u>PUR, ATC, FSC</u> |
| | | | <u>Finalised</u> |
| B3. Scientific information publications | | | |
| | Publication title | proposed finalisation | collaboration |
| | | | remarks |
| | | | update |
| | | | progress |
| 1 | ATC Web-pages | | Content to be added continuously |
| 2 | Advanced Technologies Committee (report) | | Bert van Duijn (Chair) and Francisco G. Gomes Jr (Vice-Chair) Seed Testing International No. 166, October 2023 pp. 34-35 |
| 3 | Overview of all image forming technologies and their application to seeds | Continues | Presented (partly) at different meetings. In prep for web publication. |
| 4 | ISTA's First Scientific Writing Workshop 1 November 2022, Athens. | 2023 | Sunmeet Bathia, Kalomaira Delga, Sebastian Bopper and Marie-Hélène Wagner (ATC and VIG) Seed Testing International No. 165, April 2023 pp. 51. |
| 5 | Concluding paper on Exploration of Methods | 2023 | SHC, ISTA Special project 20-1: Exploration of Methods for |

| | | | | |
|----|---|-----------|--|--|
| | for Detecting Insects in Seed Lots. | | Detecting Insects in Seed Lots. | |
| 6 | Summary and Recommendations from ISTA Special Project 19-1: Application of Marketplace Available Technologies of Computer Vision in Seed Testing | 2023 | Ruojing Wang, Liang Zhao, Bert van Duijn (PUR and ATC) | Seed Testing International No. 165, April 2023 pp. 21-24. |
| 7 | Chapter X-ray imaging in "Handbook of Tree and Shrub seed testing" | Postponed | Tree and Shrub Seed Committee | |
| 8 | Valorization of sorghum ash with digestate and biopreparations in the development biomass of plants in a closed production system of energy | 2023 | Z. Romanowska-Duda, Regina Janas, Mieczyslaw Grzesik (ATC) Bert van Duijn (ATC) | October 2023 Scientific Reports 13(1) DOI: 10.1038/s41598-023-45733-9 |
| 9 | A chemometric method for the viability analysis of spinach seeds by near infrared spectroscopy with variable selection using successive projections algorithm | 2023 | Madan Kumar Lakshmanan, Birte Boelt (ATC) and Rene Gislum | Journal of Near Infrared Spectroscopy 2023, Vol. 31(1) 24–32. DOI: 10.1177/09670335221138955 |
| 10 | Application of gas discharge visualisation technique for seeds hidden defects evaluation. | 2023 | PRIYATKIN N.S. (ATC) et al. | Theoretical and Applied Ecology. - 2023. No.3. - P. 37–48. DOI: 10.25750/1995-4301-2023-3-037-04 |
| 11 | Evaluation of heterogeneity and hidden defects of wheat (<i>Triticum aestivum</i> L.) seeds by instrumental physical methods. | 2023 | PRIYATKIN N.S (ATC) et al. | Sel'skokhozyaistvennaya Biologiya [Agricultural Biology], 2022, Vol. 57, № 5, p. 911-920. doi: 10.15389/agrobiology.2022.5.911eng |
| 12 | X-ray and Micro-CT image analysis of soybean seeds in relation to the Tetrazolium Test. | 2022 | Martinez, M.A. (ATC); Arango Perearnau, M.R.; Andretich, G.; Peralta, M.; Airaldo, G.; Gallo, C. | ISTA Seed Symposium Athens, Greece. |
| 13 | Chlorophyll retention and low oxygen consumption rates in soybean seeds produced under heat-drought stress. | 2023 | Martinez, M.A (ATC)Montechiarini, N.H.; Gosparini, C.O.; Oppedijk, B.; van Duijn, B. (ATC) | XXXIV Argentinian Meeting of Plant Physiology (RAFV 2023), Rosario, Argentina. |
| 14 | The influence of seed moisture content on the results of the Radicle Emergence test of rapeseed (<i>Brassica napus</i>) | 2023 | Bopper, S. (ATC)), Goertz, S, Zur, J. and M. Kruse | Seeds" 134th VDLUFA Congress. Page https://www.vdlufa.de/wp-content/uploads/2023/08/Kurzfassungen.pdf |

| C. WORKSHOPS AND SEMINARS | | | | |
|---|---|-----------------------|----------------------|--|
| C1. Training and education workshops | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Workshop on Imaging technologies for seed evaluation, Italy | June 2024 | Italy | To be confirmed |
| 2 | Workshop on Methods for insect detection in seeds (related to ISTA special project 20-1) | January 2024 | SHC, France | |
| 3 | Workshop Imaging in seed quality assurance workshop | November 2023 | New Zealand | Postponed |
| 4 | Workshop Imaging in seed quality assurance | Spring 2024 | Hyderabad, India | |
| C2 Seminars | | | | |
| | | | | remarks |
| | Seminar subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Seminars on advanced seed technologies | October/November 2024 | Hangzhou | |
| 2 | Seminar/interest meeting on Mathematical modelling in seed testing | May 31, 2023 | Statistics committee | At the ISTA annual meeting in Verona |
| 3 | Report lecture/discussion: Insect detection in seed | May 31, 2023 | SHC | At the ISTA annual meeting in Verona |
| 4 | Emerging trends and future outlook of modern technologies in seed quality testing. Bert van Duijn (ATC) | October 4, 2023 | FAO | Joint FAO/ISTA Webinar: New Technologies in Seed Testing |
| 5 | Seed moisture testing. Kent Bradford (ATC) | October 4, 2023 | FAO | Joint FAO/ISTA Webinar: New Technologies in Seed Testing |
| 6 | Adoption of modern seed testing technologies across the world and how to address the capacity needs and gaps in different countries. Aurelie Charrier (ATC) | October 4, 2023 | FAO | Joint FAO/ISTA Webinar: New Technologies in Seed Testing |
| 7 | ISTA technical projects – purity by number and insects. Birte Boelt (ATC) | March 6-7, 2023 | | DanSeed Symposium 2023, Kobæk Strand Conferencecenter, Denmark. |
| 8 | Electrophotography is a promising method for seed quality assessment. Nikolay Priyatkin (ATC) | October 16-19, 2023 | | The fifth international conference with tutorial day "Physics for Life Sciences", St. Petersburg, Russia |

| | | | | |
|-----------------------------|---|-------------------|---------------|---------------------------------------|
| 9 | Forum on New Technologies in Seed Testing. Francisco Gomes jr (ATC), Ganesh Kumar (ATC) | November, 2022 | | ISTA SEED SYMPOSIUM IN ATHENS, GREECE |
| 10 | Seed priming: practical commercial use and its evaluation. Tomoko Sakata (ATC) | November 29, 2023 | ISSS | ISSS-ISTA webinar for 'Seed priming' |
| | | | | |
| D. Proficiency Tests | | | | |
| | Proficiency Test Subject | proposed | collaboration | remarks update progress |
| | | finalisation | | |

1.

| | | | | |
|--------------------------------------|--|---------------|-------------------------------|---------------------------------|
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| 1. | References on Advanced Technologies | November 2023 | | Hugo Wilson, NSP FAO |
| F. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Overview of image forming technologies and their application to seeds | Continuous | | For new ISTA web pages |
| 2 | X-ray seed imaging literature data-base for ISTA web pages | 2023 | | For new ISTA web pages |
| 3 | Mathematical modelling in seed testing | 2023 | Statistics committee | Joint Working group established |
| 4 | Finding new technologies | continuous | | |
| 5 | Imaging in Tree and Shrub seed testing" | 2023 | Tree and Shrub Seed Committee | On going |
| 6 | New Technologies for Other Seeds Determination | 2022 | PUR | ISTA sponsored special project |
| 7 | Assessment on available technologies of imaging and image analysis for other seeds determination (OSD), purity analysis and germination. | 2023 | PUR, GER | ISTA sponsored special project |

| | | | | |
|---|--|------|-----|---|
| 8 | Exploration of methods for detecting insects in seed lots | 2023 | SHC | ISTA sponsored special project |
| 9 | Exploring central depository for images of Physical Purity | 2023 | STA | Initiative in partnering Ganesh Kumar (ATC Lead) Shankara Naika, Bruno Zaccomer, Kirk Remund (STA) , Birte Boelt (STA), Jens Michael Carstensen |

2. BSC Bulking and Sampling Committee

| COMMITTEE MEMBERSHIP LIST | | | | |
|--|---|--------------------------|---------------|---|
| | | | | change comments |
| 1 | Chair: Corinne Guimier | France | | |
| 2 | Vice-Chair: Eddie Goldschagg | South Africa | | |
| 3 | Ignacio Aranciaga | Argentina | | |
| 4 | Chandrashekara Bhat | India | | |
| 5 | Lotta Claesson | Sweden | | |
| 6 | Gerry Hall | United Kingdom | | |
| 7 | David Johnston | United States of America | | |
| 8 | Birte Krogh | Denmark | | |
| 9 | Michael Kruse | Germany | | |
| 10 | Bülent Öztürk | Turkey | | |
| 11 | José Maurício Pereira | Brazil | | |
| 12 | Leena Pietilä | Finland | | |
| 13 | Cza Realubit | The Philippines | | |
| 14 | Justin Salter | New Zealand | | |
| 15 | Evans Tembo | Zambia | | |
| | Steve Jones (ECOM Liaison) | Canada | | |
| A. RULES DEVELOPMENT | | | | |
| <u>A1. Introduction of New Methods</u> | | | | |
| | Method name | proposed | collaboration | remarks |
| | subject | finalisation | | update progress |
| 1 | Sampling for dust-like species | 2024 | PUR, RUL, STA | First proposal removed in 2022, further consideration – theoretical statistic study planned |
| 2 | Validation of the tube trier | | | Working group in progress |
| 3 | Sample and Lot Weight determination for new species in ISTA Rules | 2023 | PUR, STA | Rule change submitted by PUR committee – voted for ISTA Rules 2024 |
| 4 | Sampling conditions for issuing OICs when ISTA methods are described only for untreated seeds | 2025 | | First draft: list of questions, to be completed |
| <u>A2. Introduction of New Species</u> | | | | |
| | Species and test | proposed | collaboration | remarks |
| | | finalisation | | update progress |
| 1 | | | | |
| <u>A3. Introduction of Rules Changes</u> | | | | |

| | Subject | proposed finalisation | collaboration | remarks update progress |
|--|--|-----------------------|---|---|
| 1 | Number of sub-lot certificates | 2023 | ISTA WG VSI, ISF Veg WG | Rules proposal for Tomato seed lots in discussion with ECOM – voted for ISTA Rules 2024 |
| 2 | Size of submitted and working samples for vegetable seeds | | ISTA WG VSI, ISF Veg WG | |
| 3 | Merging of table 2c part1, part2, part3 in one table 2C | 2024 | MOI | Submitted for vote in 2024 |
| | Various corrections/updates in chapter 2 | 2025 | | Working group scheduled |
| B. PUBLICATIONS | | | | |
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | Publication title | proposed finalisation | collaboration | remarks update progress |
| 1 | ISTA Handbook on Seed Sampling – Spanish translation | 2022 | | Published (summer 2023) |
| 2 | | | | |
| <u>B2. Training publications on specific seed testing topics</u> | | | | |
| | Publication title | proposed finalisation | collaboration | Remarks Update Progress |
| 1 | | | | |
| <u>B3. Scientific information publications</u> | | | | |
| | Publication title | proposed finalisation | collaboration | remarks update progress |
| 1 | | | | |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | workshop subject location | proposed finalisation | collaboration | remarks update progress |
| 1 | ISTA Quality Assurance workshop – Advanced level – Sampling part | 2024 | ISTA Accreditation and Technical Department | 23-26.01.2024, Oudtshoorn, South Africa |
| 2 | Webinar about monitoring – Samplers monitoring | 2024 | ISTA Accreditation and Technical Department | Scheduled in March 2024 |
| 3 | Sampling workshop for tree species, Brazil | 2025? | FTC | according to the needs of FTC |
| D. Proficiency Tests | | | | |
| | Proficiency Test Subject | proposed finalisation | collaboration | remarks update progress |
| | | | | |

| | | | | |
|--------------------------------------|---|--------------|--------------------|--|
| 1. | | | | |
| E. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Further development of training videos | Ongoing | | In progress: definition of priority topics |
| 2 | Further development of the sampling calculator, further translations | Ongoing | | According to the needs |
| 3 | Contribution to the new working group on tropical species | | PUR, GER, TEZ, FTC | Participation to the first meeting on 21.12.2023 |
| F. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| | | | | country |
| 1 | use of sampling tools | | | Bangladesh |
| 2 | typing error in Handbook (5.2.2) | | | Japan |
| 3 | presentation: relation the seed lot / sample taken / result on ISTA Certificate | | | Switzerland |
| 4 | calculation for 20 000 packets of 30g compared to sampling calculator | | | United States of America |
| 5 | disinfection of Nobbe triers | | | Czech Republic |
| 6 | check of dividers; pooling of samples from different lots for seed health test | | | Switzerland |
| 7 | seed lot size expressed only by number of seeds - on OIC and BIC | | | Argentina |
| 8 | return seeds after testing, except 25 | | | Accreditation Dept |
| 9 | repacking of seed lot from a container to bags | | | France |
| 10 | rules proposal on number of sublots: examples, clarification | | | United States of America |
| 11 | rule 2.5.2.2.4 hand halving method | | | Australia |
| 12 | sampling for lots with different packaging sizes | | | ? |
| 13 | date of Rule change for seed lots size for perennial ryegrass from 5,000 kilos to 10,000 kilos (before 1985) | | | New Zealand, via ISTA Secretariat |
| 14 | sampling calculator: no reference to large seed lots for sampling on seed stream | | | Denmark |
| 15 | new version of Handbook: identification of changes | | | Japan |
| 16 | maximum lot size for <i>Triticum</i> sp. or <i>Oryza sativa</i> seed lots | | | Iran |
| 17 | possibility to reduce the sample size for germination test at the point of entry into the country, hybrid seeds of high value | | | Pakistan, via ISTA secretary General |
| 18 | new version of Handbook: identification of changes | | | Germany |
| 19 | authorisation to use tables and figures from the Handbook for samplers training and sampling manual | | | Norway, via ISTA secretariat |
| 20 | dividers for encrusted seed | | | Greece |
| 21 | approval of automatic samplers: ISTA approval needed? | | | Hungary |
| 22 | number of containers of a seed lot for vegetables (boxes of small containers) | | | Accreditation Dept |
| 23 | historical reasons for sampling intensities | | | ISTA President and Secretary General |
| 24 | repacking of seed lot and number of bags on the IOC | | | Poland |

| | | |
|----|--|--------------------------|
| 25 | calculation of coefficient of variation (CV) for samples | Japan, via PUR |
| 26 | approval of automatic sampler for another species | Slovak Republic |
| 27 | reporting on an OIC: number of containers, seal of the lot, lot number | Netherlands |
| 28 | example/retaining material on sublots | United States of America |
| 29 | statistics used for sampling | Australia |
| 30 | vacuum samplers for seed testing | United States of America |
| 31 | reconditioning a lot and sampling for OIC | Italy |
| 32 | size of box for composite sample for automatic sampling | United States of America |
| 33 | sampling before packing in different container types; information on OIC | Thailand |
| 34 | seed lot size for pelleted seeds, and unit used (kg, KS) | ISTA auditors |
| 35 | send back to the applicant seed from submitted sample not used in working sample | Iran |
| 36 | number of species in ISTA Rules (for a brochure on 'ISTA Key Figures') | ISTA Secretariat |
| 37 | sampling calculator wording in Danish | Denmark |
| 38 | submitted sample is the whole lot | ISTA Secretariat |
| 39 | submitted sample size if no OSD size is no OSD size is in table 2C; sampling before packaging | ISTA auditors |
| 40 | coated seeds (with photo)? | ISTA auditors |
| 41 | reporting on an OIC: species name when only the genus name is in table 2C | ISTA auditors |
| 42 | automatic sampling, falling distance for the sample and for the seed flow (seed flow not direct) | ISTA auditors |
| 43 | automatic sampler: is the complete seed stream sampled? | ISTA auditors |
| 44 | precision on sampling on seed streams | Argentina |
| 45 | treated seeds: incrustated or pelleted? | ISTA auditors |
| 46 | tins/sachets in boxes: possible to stop using labels to seal the boxes after analysis? | the Netherlands |
| 47 | spiral trier for sees small than whet: why? | The Czech Republic |
| 48 | why is there a difference between the maximum number of pellets and the lot size for encrusted seed? | ISTA auditors |
| 49 | possible to sample on the stream not entering a container? | ISTA auditors |
| 50 | submitted sample weights for seed mixtures | South Africa |
| 51 | Juglans listed in 2.5.2.2.4 but not in table 2C | The Czech Republic |
| 52 | changes on ISTA Certificate for variety name possible? | Denmark |

- New project
- New proposed finalisation date

3. FSC Flower Seed Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|--|--|--------------------------|---|
| | | Country | change comments |
| 1 | Sarah Dammen (Chair) | United States of America | New chair |
| 2 | Meriam Dekalo Karen (Vice Chair) | Israel | New vice-chair |
| 3 | Rachael Davies | United Kingdom | |
| 4 | Sylvie Ducournau | France | |
| 5 | Erik van Egmond | Netherlands | |
| 6 | Stefanie Kramer | Germany | |
| 7 | Shizka Takeuchi | Japan | |
| 8 | Lucele Pretorius | South Africa | |
| 9 | Zita Ripka | Hungary | Left committee due to retirement |
| 10 | Maria Marin | Croatia | |
| 11 | Alessandra Barbante | Italy | |
| A. RULES DEVELOPMENT | | | |
| <u>A1. Introduction of New Methods</u> | | | |
| | Method name | proposed | collaboration remarks update |
| | subject | finalisation | progress |
| 1 | Add 25C to rules for Begonia spp. | | (Shizka Takeuchi) |
| <u>A2. Introduction of New Species</u> | | | |
| | Species and test | proposed | collaboration remarks update |
| | | finalisation | progress |
| 1 | | | |
| <u>A3. Introduction of Rules Changes</u> | | | |
| | Subject | proposed | collaboration remarks update |
| | | finalisation | progress |
| 1 | Sample size for flower species (Table 2A part 3) | On-going | BSC Data collection in progress. Not easy. (R. Zecchinelli) |
| 2 | Clarification about OSD for species listed in Table 2A, part 3 | 2020 | BSC To be started (R. Zecchinelli) |
| B. PUBLICATIONS | | | |
| <u>B1. Publications to accompany the Rules</u> | | | |
| | Publication title | proposed | collaboration remarks update |
| | | finalisation | progress |

| | | | | |
|---|---|--------------|---------------|---|
| 1 | | | | |
| | <u>B2. Training publications on specific seed testing topics</u> | | | |
| | Publication title | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| 1 | Collaboration in the project of the website TSWS (Testing Seeds of Wild Species): wild flower species | | WS | In progress (R. Davies) |
| 2 | ISTA Handbook on Flower Seed Testing | 2024 | GER | Evaluate pages that are in progress and what is needed to complete these pages. (Sylvie Ducournau and Sarah Dammen) |
| | <u>B3. Scientific information publications</u> | - | - | |
| | Publication title | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| 1 | | | | |
| | C. WORKSHOPS AND SEMINARS | | | |
| | <u>C1. Training and education workshops</u> | | | |
| | workshop subject | proposed | collaboration | remarks update |
| | location | finalisation | | progress |
| 1 | | | | |
| | <u>C2. Seminars</u> | | | |
| | Seminar subject | proposed | collaboration | remarks update |
| | location | finalisation | | progress |
| 1 | | | | |
| | D. Proficiency Tests | | | |
| | Proficiency Test Subject | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| 1 | ISTA PT Programme 2022/25 | 2023 | PTC | Matthiola longipetala GER |
| | F. SPECIAL PROJECTS | | | |
| | project title / subject | proposed | collaboration | remarks update |
| | collaborating committees | finalisation | | progress |
| 1 | Participation in the preparation of the exercise on seed mixture (distribute with PT samples) | 2023-25 | PUR -PTC | Ongoing (S. Takeuchi) |

| | | | | |
|---|--|------|------|--|
| 2 | Collaboration with AOSA: comparison of species listed in AOSA and ISTA Rules | 2024 | AOSA | Comparison was made on Germination and purity rules of ISTA and AOSA. (S. Dammen) |
| 3 | Collection of information about Flower seed Testing by ISTA laboratories | 2024 | | To be started (Alessandra Barbante) |
| 4 | Inventory of TZ methods used by the laboratory for flower species | 2022 | TEZ | To be started (S. Kramer, TBD) |
| | New project | | | |
| | New proposed finalisation date | | | |

4. FTS Forest Tree and Shrub Seed Committee

| COMMITTEE MEMBERSHIP LIST | | | | change comments |
|--|--|--------------------------|---------------|---|
| 1 | Chair: Elisa Vieira | Brazil | | |
| 2 | Vice-Chair: Viktor Vankus | United States of America | | |
| 3 | Magdalena Beza | Poland | | |
| 4 | Lena Bezděčková | Czech Republic | | |
| 5 | Valerie Blouin | France | | |
| 6 | Marija Gradecki-Postenjak | Croatia | | |
| 7 | Dave Kolotelo | Canada | | |
| 8 | Geângelo Calvi | Brazil | | |
| 9 | Stefanie Krämer | Germany | | |
| 10 | Shelagh McCartan | United Kingdom | | |
| 11 | Heidi Røsok Bye | Norway | | |
| 12 | Edoardo Vincenti | United Kingdom | | |
| 13 | Chandrashekara Vokkaliga Devegowda | India | | |
| 14 | Sergio Pasquini | Italy | | |
| A. RULES DEVELOPMENT | | | | |
| A1. Introduction of New Methods | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 2 | Validation of germination tests for <i>Khaya grandifoliola</i> and <i>Khaya senegalensis</i> | 2024 | | Leader: Elisa Vieira Seeds will be harvested in February-March and will be sent to the laboratories. |
| A2. Introduction of New Species | | | | |
| | | | | remarks |

| | | | | |
|--|--|----------------|---------------|---|
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| | None | | | |
| A3. Introduction of Rules Changes | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | | finalisation | | progress |
| | None | | | |
| B. PUBLICATIONS | | | | |
| B1. Publications to accompany the Rules | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | | | | |
| B3. Scientific information publications | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | OECD Forest Seeds and Plant Scheme Meeting – Slovakia 2023 | 2023 | | Article published in Seed Testing International, no. 166, October 2023. |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Participation in the OECD Forest Seed Scheme meeting, Paris-France | September 2023 | | Edoardo Vincenti participation, as he is the FTSCom representative in OECD. |
| 2 | Participation in the ISF-TAS meeting, | August 2023 | | Edoardo Vincenti participation. |
| C2. Seminars | | | | |
| | | | | remarks |
| | Seminar subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | None | | | |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | None | | | |
| E. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |

| | | | |
|---|---|-----------|---|
| 1 | Forest and Shrub Seeds E-Handbook | 2024-2025 | The committee members that agreed to contribute are organizing the information to which genera they chose. Some modification is been done in the Joomla system to adequate the new information that will be uploaded. |
| F. QUESTIONS TO THE COMMITTEE | | | |
| | subject of question | | from country |
| 1 | Germination test methodology for 22 african tree species | | South Africa |
| 2 | Germination test methodology for <i>Adesmia argyrophylla</i> , <i>Heliotropium filifolium</i> , <i>Heliotropium floridum</i> and <i>Balbisia peduncularis</i> | | Chile |
| G: Further Comments - Responsibilities | | | |
| <u>leader of working groups</u> | | | |

- New project
- New proposed finalisation date

5. GER Germination Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------|-------------------------------|--------------------------|-----------------|
| | | | change comments |
| 1 | CHAIR: Gillian Musgrove | United Kingdom | |
| 2 | VICE-CHAIR: David Johnston | United States of America | |
| 3 | Ignacio Aranciaga | Argentina | |
| 4 | Janek Bartel | Canada | |
| 5 | Sarah Dammen | United States of America | |
| 6 | Gillian Durrant | United Kingdom | |
| 7 | Meriam Dekalo-Keren | Israel | |
| 8 | Sylvie Ducournau | France | |
| 9 | Lesly Gonzalez | Chile | |
| 10 | Aidin Hamidi | Iran | |
| 11 | Andrea Jonitz | Germany | |
| 12 | Augusto Martinelli | Argentina | |
| 13 | Takayuki Okuda | Japan | |

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|----|----------------------|--------------------------|--|
| 14 | Elena Perri | Italy | |
| 15 | Dot Vittrup Pedersen | Denmark | |
| 16 | Melissa Phillips | United States of America | |
| 17 | Erik van Egmond | Netherlands | |

A. RULES DEVELOPMENT

A1. Introduction of New Methods

| | | | | remarks |
|---|--|--------------|-----------------------------------|---|
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Consider more efficient methods to break sunflower (<i>Helianthus annuus</i>) seed dormancy | 2025 | | Preliminary work reported by Sylvie Ducournau. A comparative test is planned in 2024 to test more efficient dormancy breaking treatments led by Audrey Dupont. |
| 2 | Work on optimal germination conditions for sunflower (<i>Helianthus annuus</i>) confection seeds | 2025 | | Work programme still to be considered. |
| 3 | Addition of dormancy breaking methods for <i>Cannabis sativa</i> (hemp) | 2025 | AOSA/SCST and CFIA | This work is at an early stage and will be taken forward by Ruoqing Wang when time is available. |
| 4 | Addition of 20°C for <i>Solanum tuberosum</i> | 2025 | Netherlands Industry/ Secretariat | Erik van Egmond had preliminary discussions with Netherlands Potato Seed Industry. May be difficulty in obtaining true potato seeds for testing and potential phytosanitary issues. |
| 5 | Maize (<i>Zea mays</i> L.) secondary root system seedling evaluation criteria for classifying a seedling as normal. | 2025 | | Aidin Hamidi & Marija Milivojevic working on a proposal to improve root evaluation criteria. |

A2. Introduction of New Species



| | | | | remarks |
|---|--|--------------|------------------|--|
| | Species and test | proposed | collaboration | update |
| | | Finalisation | | progress |
| 1 | Introduction of <i>Diplotaxis</i> spp. | 2024 | STAT, BSC PUR | Leader: Erik van Egmond. Germination samples sourced and to be sent to participants in February 2024. |
| 2 | Introduction of a germination method for Dwarf Saltwort (<i>Salicornia bigelovii</i> Torr. and <i>Salicornia persicum</i>) | 2025 | STA, BSC, PUR | Leader: Aidin Hamidi. Preliminary study examining suitable germination methods completed. Further information to be provided. May have difficulty in getting seed lots. |
| 3 | Introduction of a germination method for | 2025 | STA, BSC, PUR | Leader: Aidin Hamidi. This study is ongoing. Further information to be provided. |

| | | | | |
|---|---|--------------|---------------------------|---|
| | Saatar (<i>Zataria multiflora</i> Boiss.) and Camelthorn (<i>Alhagi camelorum</i> F.). | | | A Method Validation Study may start in 2024 for Camelthorn. |
| 4 | Introduction of <i>Moringa oleifera</i> | 2024 | BSC, PUR, TZ, MOI, NZ Lab | Leader: Craig McGill. Preliminary work in progress to find suitable germination methods before Method Validation Study starts. |
| | <u>A3. Introduction of Rules Changes</u> | | | |
| | Subject | proposed | collaboration | update |
| | | Finalisation | | progress |
| 1 | Review of retesting when fresh seed is present (ISTA Rules Section 5.7a) | 2023 | RUL | Rule proposal submitted for 2023 Annual Meeting and accepted. |
| 2 | Review of Chapter 11 (germination) considering reporting requirements | 2023 | RUL | Rule proposal submitted for 2023 Annual Meeting and accepted. |
| 3 | Review of Chapter 13 (germination) reporting results | 2023 | RUL | Rule proposal submitted for 2023 Annual Meeting and accepted. |
| 4 | Pre-washing of <i>Beta</i> seeds | 2024 | RUL | Rule proposal submitted for 2024 Annual Meeting. Leader: Lesly Gonzalez. Method Validation Study completed. |
| 5 | Expand the list of Families in the ISTA Rules (5.2.10.1) that have hard seeds | 2024 | RUL | Rule proposal submitted for 2024 Annual Meeting. |
| 6 | Merger of Table 5A Part 1 and Part 3 into Table 5A Part 1 | 2024 | RUL | Rule proposal submitted for 2024 Annual Meeting. |
| 7 | Additional advice of "low moisture level advisable" for testing <i>Spinacia oleracea</i> to be added to Table 5A, Part 1. | 2024 | RUL | Rule proposal submitted for 2024 Annual Meeting. |
| | <u>B2. Training publications on specific seed testing topics</u> | | | |
| | Publication title | proposed | collaboration | update |
| | | Finalisation | | progress |

| | | | | |
|---|---|----------------|---------------|--|
| 1 | ISTA Handbook of Seedling Evaluation (Spanish Version) | 2024 | Secretariat | Leader: Augusto Martinelli. The Handbook is in the final stages of being translated into Spanish and will be completed in 2024. |
| 2 | ISTA Workshop on Germination Testing, Chilanga, Zambia | 2023 | | Leaders: Augusto Martinelli and Melissa Phillips. Article written for Seed Testing International published in October 2023. |
| 3 | ISTA Workshop on Germination Testing, Bucharest, Romania | 2024 | | Leaders: Augusto Martinelli and Janek Bartel. Article written for Seed Testing International to be published in April 2024. |
| 4 | Study on the influence of the substrate water level for germination on <i>Spinacia oleracea</i> | 2023 | | Leader: Takayuki Okuda. Follow up work from ISTA PT22-2 <i>Spinacia oleracea</i> examining different levels of water added to the substrate during germination tests. Article written for Seed Testing International to be published in April 2024. |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | ISTA Workshop Germination - Zambia | April 2023 | | Leaders: Augusto Martinelli and Melissa Phillips. Complete. |
| 2 | ISTA Workshop on Germination - Romania | September 2023 | | Leaders: Augusto Martinelli and Janek Bartel. Complete. |
| 3 | ISTA Workshop Purity & Germination – Kyiv, Ukraine | TBD | PUR | Currently on hold. May try to go ahead with online workshop. |
| 4 | ISTA Workshop on Germination & Tetrazolium - New Zealand | May 2024 | TZ | Leaders: Augusto Martinelli and Sergio Pasquini. Delayed from November 2023. |
| 5 | ISTA Workshop Purity, Germination and Moisture Committee - Iran | TBD | PUR MOI | Currently on hold. May need to consider an online workshop. |
| D. PROFICIENCY TESTS | | | | |
| Proficiency test subject | | | | |
| | PT information | finalisation | | progress |
| 1 | 22-3 <i>Lolium perenne</i> | 2023 | PTC | Completed |

| | | | | |
|--------------------------------------|--|--------------|---------------|---|
| 2 | 23-1 <i>Vicia villosa</i> | 2023 | PTC | Completed |
| 3 | 23-2 <i>Raphanus sativus</i> | 2023 | PTC | Completed |
| 4 | 23-3 <i>Trifolium hybridum</i> | 2024 | PTC | Samples shipped to laboratories. |
| E. SPECIAL PROJECTS | | | | |
| project title / subject | | | | |
| collaborating committees | | proposed | collaboration | update |
| | | finalisation | | progress |
| | Update Seedling Images for Handbooks and Training as a basis for regular image collection (ISTA Special Project) | 2023 | Secretariat | Leader: Janek Bartel. Images approved by majority vote of Germination Committee. Completed. |
| F. QUESTIONS TO THE COMMITTEE | | | | |
| subject of question | | | | from |
| | | | | Country |
| 1 | Retesting procedures 5.7f | | | Argentina |
| 2 | Lighting requirements | | | Denmark |
| 3 | Method for true potato seed needs updated | | | Netherlands |
| 4 | Temperatures for germination and using Table 5A | | | United Arab Emirates |
| 5 | Seedling evaluation of <i>Bituminaria bituminosa</i> (not in ISTA rules) & advice on root evaluation | | | Australia |
| 6 | Counting normal seedlings during evaluation | | | Denmark |
| 7 | Coated seed germination | | | USA |
| 8 | Use of different growing media at 5.4.1 of the rules | | | Italy |
| 9 | Use of codes in germination testing for abnormal seedlings | | | Poland |
| 10 | Germination testing temperatures | | | Denmark |
| 11 | Classification of abnormal seedlings in <i>Lolium</i> sp. | | | Australia |

| | | | |
|----|--|--|----------------------|
| 12 | Phytotoxicity testing | | Switzerland |
| 13 | Germination methods | | Chile |
| 14 | Water retention checking of media | | USA |
| 15 | Measuring temperature at substrate level for prechill and germination | | USA |
| 16 | Phaseolus evaluation | | Netherlands |
| 17 | Clarification of fresh seeds | | Switzerland |
| 18 | Lighting requirements | | USA |
| 19 | Prewashing of <i>Beta vulgaris</i> | | Switzerland |
| 20 | Testing less than 400 seeds and tolerance tables | | United Arab Emirates |
| 21 | Detached endosperms | | UK |
| 22 | Temperature controls | | Switzerland |
| 23 | Differences between the rules and Handbook (<i>Helianthus</i>) | | Germany |
| 24 | Extending germination period | | Italy |
| 25 | Literature availability | | Norway |
| 26 | Evaluation of seedlings at the final count | | Norway |
| 27 | Using Top of Sand (TS) as a substrate | | Switzerland |
| 28 | Loss of germination in storage | | Switzerland |
| 29 | Pleated paper suppliers | | Slovenia |
| 30 | First count criteria to apply in group A.1.2.3.3 | | Argentina |
| 31 | Substrate moisture and sand composition regarding <i>Phaseolus</i> germination methods | | Netherlands |
| 32 | Evaluation of the coleoptile and first leaf in <i>Triticum</i> | | Sweden |
| 33 | Germination rounding tool | | Netherlands |
| 34 | Filter papers for germination | | Finland |
| 35 | Germination testing of popcorn and sweetcorn | | Zambia |
| 36 | ISTA Handbook on Seedling Evaluation - Asparagaceae | | USA |
| 37 | Tolerance tables used in Table 13C | | France |
| 38 | First counts in germination tests | | India |
| 39 | Alternative germination methods | | Turkey |
| 40 | Water retention checking of media | | Republic of Korea |
| 41 | Water retention checking of media | | Australia |

 New project
 New proposed finalisation date

6. GMO Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|--|--|-----------------------|-------------------------------|
| | | Country | |
| 1 | CHAIR: Enrico Noli | Italy | |
| 2 | VICE-CHAIR: René Mathis | France | |
| 3 | Tajinder Grewal | Canada | |
| 4 | Andrea Jonitz | Germany | |
| 5 | Jean-Louis Laffont | France | |
| 6 | Dwarkesh Parihar | India | |
| 7 | Elena Perri | Italy | |
| 8 | Kirk Remund | United States | |
| 9 | Ana Laura Vicario | Argentina | |
| 10 | Bruno Zaccomer | France | |
| 11 | Ray Shillito | United States | |
| 12 | Laura Bowden | UK | |
| 13 | Benoit Maes | Belgium | |
| 14 | Sophie Seoane | France | |
| | | | |
| | | | |
| A. RULES DEVELOPMENT | | | |
| <u>A1. Introduction of New Methods</u> | | | |
| <u>A2. Introduction of New Species</u> | | | |
| <u>A3. Introduction of Rules Changes</u> | | | |
| | Subject | Proposed finalisation | Progress report Date: |
| | <i>No Rules changes/development</i> | - | - |
| B. PUBLICATIONS | | | |
| <u>B1. Publications to accompany the Rules</u> | | | |
| | Publication title | Proposed finalisation | Progress report Date: |
| 1 | <i>GMO Testing Handbook (R. Mathis and E. Noli WG Leads) Further progress made in Chapter 6 and related documents. Collaboration with STA and VAR TCom and Accreditation and Quality Management Team at the Secretariat.</i> | 2024 | <i>Draft January 2024</i> |
| <u>B3. Scientific information publications</u> | | | |

| | Publication title | Proposed finalisation | Progress report Date: |
|--|--|--|---------------------------------------|
| | | | |
| C. WORKSHOPS AND SEMINARS | | | |
| <u>C1. Training and education workshops</u> | | | |
| | Workshop subject and location | Proposed finalisation | Progress report Date: |
| 1 | <i>Workshop: “GMO Testing: Statistical Aspects and Implementation of the Performance-Based Approach, hosted by CREA DC Seed Testing Laboratory in Tavazzano (Lodi, Italy) Collaboration with STA and CREA personnel.</i> | <i>Held June 1-3 2023</i> | -- |
| <u>C2. Seminars and education workshops</u> | | | |
| | Seminar subject and location | Proposed finalisation | Progress report Date: |
| 1 | <i>ISTA Seminar: “From Biodiversity to Diversification: resources, tools and technologies to meet new challenges” – The afternoon session was devoted to the New Genomic Techniques, in particular on their creation, utilisation and testing of NGT plants, organised by GMO members (E. Perri and E. Noli)</i> | <i>Held May 29 2023</i> | -- |
| D. Proficiency Tests - | | | |
| | Proficiency Test Subject | Proposed finalisation | Progress report Date: |
| 1 | <i>PT24 – Maize Collaboration with industry, TCom Coordinator and STA TCom</i> | 2024 | <i>Early stages January 2024</i> |
| E. Questions to the Committee - Since date of last report | | | |
| | Question subject | Date | From (Country) |
| | | | |
| 1 | <i>Clarification requested on the need to report the size of the working sample (i.e. number of seeds) when issuing an OIC with GMO testing results. Explanation provided, but need to improve clarity in Rules 19.7.</i> | 11/01/2023 | Japan |
| 2 | <i>Several exchanges with GMO-accredited laboratories regarding the interpretation of new standardised terminology in relation to their Scope of Accreditation.</i> | 10/11/2023 23/11/2023 27/11/2023 30/11/2023 | USA France Denmark Argentina |
| F. SPECIAL PROJECTS | | | |
| | project title / subject and collaborating committees | Proposed finalisation | Progress report Date: |

| | | | |
|---|--|------|---------------------------|
| | <p><i>The List of Standard Terms in GMO Testing was finalised reaching the desired harmonization.</i></p> <p><i>The new terminology has been adopted in the accreditation database at the Secretariat.</i></p> <p><i>A new Application form for (Re-)Accreditation for GMO testing of an ISTA Member laboratory has been developed allowing data exchange with accreditation database at the Secretariat.</i></p> <p><i>The display of the Scope of Accreditation of individual laboratories on ISTA website has been improved, allowing a more precise description of their competences for the benefit of ISTA stakeholders.</i></p> <p><i>Project realized with the collaboration of the Accreditation and Quality Management Team at the Secretariat.</i></p> | 2023 | Finalised 2023 |
| 2 | <p><i>Revision of document “Performance Data Evaluation for the assessment of presence and estimation of level of seed with specified traits in seed lots”, almost complete.</i></p> <p><i>Collaboration with STA Com</i></p> | 2024 | Final draft, January 2024 |
| 3 | <p><i>Revision of document “GMO PT seed check and sample preparation”.</i></p> <p><i>Collaboration with TCom Coordinator and STA Com</i></p> | 2024 | Revisions to be discussed |

7. MOI Seed Moisture Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------|----------------------------|--------------------------------------|--|
| | | | change comments |
| 1 | Chair: Axel Goeritz | Germany | chair since 2020, member since 2015 |
| 2 | Vice-Chair: Tanja Petrovic | Serbia | Vice chair since 2021, Member since 2019 |
| 3 | Sergio Pasquini | Italy | Liasion officer since 2022; member since 2007 |
| 4 | Gerarda de Boer-Raatgever | Netherlands | member since 2007 |
| 5 | Susan Alvarez | United States of America | member since 2015 |
| 6 | Baymolo Goma | Zambia | Member since 2015 |
| 7 | Wen-Ju Yang | Separate Customs Territory of Taiwan | Member since 2015 |
| 8 | Celine Herbert | France | Member since 2016 |
| 9 | Selma Kurt | Turkey | Member since 2019 |
| 10 | Ramesh D M | India | Member since 2020 |
| 11 | Fiona Hay | Denmark | Member since 2020 |
| 12 | Brady Carter | United States of America | Member since 2021 |
| 13 | Daniela Villa | Italy | Member since 2022 |
| 14 | Chandreschekara Bhat | India | Member since 2022 |
| 15 | Ainara Fernandez | Ireland | Member since 2023 |

| A. RULES DEVELOPMENT | | | | |
|--|--|--------------|--|--|
| <u>A1. Introduction of New Methods</u> | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Use of equilibrium Relative Humidity (eRH) as an alternative method for the determination of seed moisture status | 2023 | FTS, STA | The use of eRH for testing of coated seeds to be investigated. Experiments have been conducted to see whether determination of seed equilibrium relative humidity can be used for coated seeds, i.e. whether a coating changes the equilibrium moisture content-relative humidity relationship. |
| <u>A2. Introduction of New Species</u> | | | | |
| | | | | remarks |
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | <i>Moringa oleifera</i> oven method | 2025 | | The first drafts of a test plan for a validation study has been created and is currently discussed. |
| <u>A3. Introduction of Rules Changes</u> | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Checking the need for grinding of small species with hard seeds - <i>Medicago sativa</i> , <i>Lotus pedunculatus</i> , <i>Lotus corniculatus</i> , <i>Trifolium pratense</i> , <i>Trifolium repens</i> , | 2024 | STA | This work has not yet conducted due to staffing issues but is planned to progress as soon as volunteers are available. |
| 2 | <i>Helianthus annuus</i> | 2023 | STA | Goal is to introduce the high temp. oven method for H. in the rules. The results of a comparison between two labs has been presented in Cairo 2022. The influence of TSW will be checked in more labs, a proposal for a comparative test is currently being prepared. This project is planned to progress as soon as volunteers are available. |
| 3 | Review 9.3 Determination of moisture content by moisture meters | 2025 | ISTA labs accredited to issue OIC and BIC with moisture meters | A project group has been formed and a questionnaire has been sent to all ISTA labs accredited for the use of moisture meters. |
| B. PUBLICATIONS | | | | |
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | | | | remarks |

| | Publication title | proposed finalisation | collaboration | update progress |
|--|---|-----------------------|---------------|---|
| 1 | Review and update Handbook on Moisture Determination | 2025 | Secretariat | Lead is named and chapters to work on are given to resp. members, planned changes on moisture calculator and calibration of moisture meters will influence the handbook as well |
| B3. Scientific information publications | | | | |
| | Publication title | proposed finalisation | collaboration | remarks update progress |
| 1 | Extension of the Excel Moisture calculator on the homepage regarding routine tests and QM | 2024 | | Project is in work |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | workshop subject location | proposed finalisation | collaboration | remarks update progress |
| | Tetrazolium Testing and Equilibrium Relative Humidity (eRH) Determination for Native Species Peri, Italy | 2023 | TTG | " In 2 workshops of 2 days each one, the 40 participants got a very good insight in preparing and evaluating seeds applying TEZ test and the eRH method for 6 native species not included in ISTA Rules". |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject location | proposed finalisation | collaboration | update progress |
| 1 | | | | |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | Month | | from country |
| 1 | Minimum sample size required for samples that need to be cut | Jul 2023 | BSC | BSC |
| 2 | Will water activity replace in future the moisture content? | 11-2023 | | ZA |
| remark: many questions have been answered on a bilateral basis and are not meant to be published | | | | |

- New project
- New proposed finalisation dae

8. NOM Nomenclature Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|-------------------------------|---|--------------------------|---|
| | | | change comments |
| 1 | CHAIR: Melanie Schori | United States of America | |
| 2 | VICE-CHAIR: Ernest Allen | United States of America | |
| 3 | Susan Alvarez | United States of America | |
| 4 | Michel Chauvet | France | |
| 5 | Axel Diederichsen | Canada | |
| 6 | Carol Elliott | New Zealand | New member |
| 7 | Marco Hoffman | Netherlands | |
| 8 | Deborah Meyer | United States | |
| 9 | Romina Rodriguez | Argentina | New member |
| 10 | Diogo Tobolski | France | New member |
| 11 | Sigyn Valgrind | Denmark | New member |
| 12 | John Wiersema | United States of America | |
| | | | |
| | | | |
| | | | |
| F. SPECIAL PROJECTS | | | |
| | project title / subject | | remarks |
| | collaborating committees | proposed collaboration | update |
| | | finalisation | progress |
| | Updates to ISTA Stabilised List for species added to Rules | | There are 60 names that members have asked to have included in the next edition. NOM will be sending these names to other committees for their consideration in 2024. |
| | Request from 2018 to add to GRIN names of native species grown as ornamentals | | Finished adding names from list of more than 3000 taxa sent by Gil Waibel |
| E. QUESTIONS TO THE COMMITTEE | | | |
| | subject of question | date | from country |
| 1 | Aligning name changes with OECD | January | Switzerland |
| 2 | Inclusion of <i>Thinopyrum</i> in <i>Elymus</i> in Table 9A | January | Germany |
| 3 | Request for fewer name changes | January | Serbia |

| | | | | |
|----|--|-----------|--|--------------------------|
| 4 | Request for proposed changes document from 6 th edition of <i>Stabilised List</i> | March | | United Kingdom |
| 5 | Request to add <i>Anthriscus caucalis</i> to the <i>Stabilised List</i> | August | | Germany |
| 6 | Request for <i>Stabilised List</i> in Excel format | August | | Denmark |
| 7 | Request for addition of UPOV codes to Excel file | August | | Denmark |
| 8 | <i>Eucalyptus pulverulenta</i> authorship | September | | Germany |
| 9 | Membership in <i>Festuca ovina</i> s.l. and <i>Festuca rubra</i> s.l. | September | | France |
| 10 | Reporting species vs. subspecies | October | | Italy |
| 11 | Placement of section in <i>Solanum</i> sect. <i>Lycopersicon</i> | October | | Canada |
| 12 | Reporting a species identification when germination table lists Genus spp. | November | | Switzerland |
| 13 | Correct name for <i>Ocimum citriodorum</i> | November | | Moldova |
| 14 | EPPO codes | December | | Netherlands |
| 15 | Placement of <i>Solanum torvum</i> in <i>Solanum</i> sect. <i>Lycopersicon</i> | December | | Italy |
| 16 | Request for data from GRIN for seed testing protocol website | December | | United States of America |
| 17 | Listing a taxon according to Rules or as stated by applicant | December | | Moldova |

New project

New proposed finalisation date

9. PUR Purity Committee

| COMMITTEE MEMBERSHIP LIST (2023) | | | |
|-----------------------------------|---|--------------------------|-------------------|
| | Members | Country | Member since |
| 1 | CHAIR: Ruoqing Wang | Canada | 2009 |
| 2 | VICE-CHAIR: Andrea Jonitz | Germany | 2010 |
| 3 | Augusto Martinelli | Argentina | 2007 |
| 4 | Aurelie Charrier | France | 2018 |
| 5 | Axel Goeritz | Germany | 2017 |
| 6 | Deborah Meyer | United States of America | 1995 |
| 7 | Dot Vittrup Pedersen | Denmark | 2013 |
| 8 | Sue Cousins | New-Zealand k | 2017 |
| 9 | Kepha Oganda | Kenya | 2010 |
| 10 | Maria Duter | New Zealand | 2011 |
| 11 | Selma Kurt | Turkey | 2016 |
| 12 | E. (Erik) van Egmond | Netherlands | 2019 |
| 13 | Sumaia Mahmuda | Bangladesh | 2021 |
| 14 | Tauhid Parvez | Canada | 2022 |
| 15 | Shankara Naika | Netherlands | 2022 |
| A. RULES DEVELOPMENT | | | |
| A1. Introduction of New Methods | | | |
| | Method name | Proposed/ finalisation | collaboration |
| | Remarks/ update/ progress | | |
| 1 | Working weight determinations for adding and revising Table 2C were introduced in 2023 in collaboration with BSC and STA. <i>Calculator for adding working weights to Table 2C of the ISTA Rules</i> was published on the ISTA website https://www.seedtest.org/en/services-header/tools/statistics-committee/calculator-adding-working-weights-table-2c-ista-rules.html | | |
| 2 | Blower Calibration | Proposed | In progress |
| A2. Introduction of New Species | | | |
| | Species and test | Proposed/ finalisation | collaboration |
| | remarks /update /progress | | |
| | NA | | |
| A3. Introduction of Rules Changes | | | |
| | Subject | Proposed /finalisation | collaboration |
| | Remarks/ update /progress | | |
| 1 | Chapter 3, Table 3B Part 3. Revised for the definition of "Seed Unit" | Proposed | proposed for 2024 |
| 2 | Chapter 3, Table 3B Part 1. PSD 36 | Proposed | proposed for 2024 |
| 3 | Chapter 3, Table 3B Part 1. PSD 64 | Proposed | proposed for 2024 |
| 4 | C.3.2. and 3.7, 1.5.2.2. Revised for adding | Proposed | proposed for 2024 |

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|--|--|------------------------|------------------|--|
| | special test requests by applicants | | | |
| B. PUBLICATIONS | | | | |
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | Publication title | Proposed /finalisation | collaboration | Remarks/ update/ progress |
| 1 | PSD Handbook Revision | In the work plan | | Draft was ready in 2023 |
| <u>B2. Training publications on specific seed testing topics</u> | | | | |
| | Publication title | Proposed/finalisation | Collaboration | Remarks/ update/ progress |
| 1 | Training materials for seed ID on the ISTA universal list | In progress | | ISTA Secretariat made a proto type for the website publication in 2024 |
| 2 | Publish an inventory of references of Seed ID | In progress | | Draft format in ISTA webiste |
| 3 | Publish FAQ in ISTA website to the PUR committee | In progress | | Drafted |
| 5 | Standardization on training materials used in ISTA purity workshop | In progress | | Work plan for 2023-2026 |
| <u>B3. Scientific information publications</u> | | | | |
| | Publication title | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1 | Project Summary on ISTA Special Project 20-2 | Published | ISMA, CFIA | Seed Testing International |
| 2 | Calculator for working sample weight | Published | STA | Seed Testing International |
| 3 | Seed ID Fact sheets | Published (partially) | ISMA/Authors | Seed Identification Guide® |
| 4 | Seed ID reference Inventory | Proposed | ISTA Secretariat | ISTA website |
| 5 | Purity Committee annual activities | Published | | Seed Testing International |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | workshop subject /location | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1 | Workshop to India | Delivered | GER | Delivered |
| 2 | PUR Open meeting and new technology panel discussion | Delivered | PT, STA, ATC | Make a wide update to ISTA members |
| 3 | Webinar on New Technologies in Seed Testing | Delivered | FAO-ISTA | Delivered on 4 October 2023 |

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|-----------------------------|---|------------------------|------------------------------------|---|
| | presentation | | | |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1 | Seed Mixture Round 12 | 2023 | PTC, accreditation department | Delivered by Dot Vittrup Pedersen for PT23-2 |
| F. SPECIAL PROJECTS | | | | |
| | Project title /subject | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1. | Training materials for seed ID on the ISTA universal list | Approved project | | Project started in July 2021 50% (70) species in the UL were completed |
| 3. | Look into ways of training in seed identification and practical purity work | ongoing | ECOM/ISTA accreditation department | A seed ID webinar was planned for 2024 |

E. QUESTIONS TO THE COMMITTEE

| | subject of question (see more details in PUR Teams) | date | country |
|----|--|------------|--------------------|
| 1 | PUR-#23-01 (half) Blower calibration sample | 2023-01-24 | UK |
| 2 | PUR-#-23-02 PSD difference between ISTA and AOSA | 2023-02-13 | Germany |
| 3 | PUR #23-03: Purity Reporting 3.7 | 2023-03-08 | Indonesia |
| 4 | PUR-#-23-04 3.6.1.1 Test for weight gain or loss during analysis | 2023-04-28 | Ireland |
| 5 | PUR #23-05 Common name for inert | 2023-04-30 | Argentina |
| 6 | PUR #23-06 Reporting extra info for Limited Test | 2023-05-11 | ISTA Accreditation |
| 7 | PUR-#23-07 Seed Identification Inquiry | 2023-06-12 | Bangladesh |
| 8 | PUR #23-08 Coating materials % | 2023-06-22 | Uruguay |
| 9 | PUR #23-09 Other Seeds for sub-species | 2023-07-23 | Sweden |
| 10 | PUR #23-10 Report % in OSD test? | 2023-02-13 | New Zealand |
| 11 | PUR#23-11 Tolerance table-Table 4A | 2023-09-25 | Netherlands |
| 12 | PUR#23-12 PDS-Testing on Cotton | 2023-09-11 | UK |
| 13 | PUR#23-13 OIC name reporting, Table 2C? | 2023-10-18 | Japan |
| 14 | PUR#23-14 Chapter 11 -Encrusted seeds? | 2023-11-14 | ISTA Accreditation |
| 15 | PUR#23-15 Multiple Results Reporting-Chapter 4 | 2023-11-21 | Netherlands |
| 16 | PUR#23-16 Seed Identification Inquiry | 2023-11-27 | Italy |
| 17 | PUR# 23-17 Seed Identification Inquiry | 2023-11-28 | India |
| 18 | PUR#23-18 Chapter 11-Coated seeds | 2023-12-07 | ISTA Accreditation |

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|----|---|------------|---------------------|
| 19 | PUR#23-19 Insect Reporting | 2023-12-07 | ISTA Accreditation |
| 20 | PUR#23-20 ID accuracy | 2023-12-07 | ISTA Accreditation |
| 21 | PUR#23-21 Seed Counter Accuracy | 2023-12-13 | China |
| 22 | PUR#23-22 Applications of 3.5.4.1 indistinguishable species | 2023-12-12 | Italy |
| 23 | PUR#23-23 Reporting Chapter 3 | 2023-12-20 | Republic of Moldova |

10. SHC Seed Health Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------------|---|--|--|
| | | | change comments |
| 1 | CHAIR: Ruud Barnhoorn | Netherland | Chair |
| 2 | VICE-CHAIR: Stephan Brière | Canada | Vice chair |
| 3 | VICE-CHAIR: Isabelle Serandat | France | Vice chair |
| 4 | Ilaria Alberti | Italy | |
| 5 | Rouke Bakker | New Zealand | |
| 6 | Gary Munkvold | United States | |
| 7 | Dorota Szopinska | Poland | |
| 8 | Rosa Piña González | Chile | Since 2016 |
| 9 | Xiulan Xu | China | Since 2017 |
| 10 | Marian Mc Ewan | United Kingdom | Since 2019 |
| 11 | Kohei Osaki | Japan | Since 2019 |
| 12 | Dr. Mahesh B | India | Since 2021 |
| 13 | Luciana Ferrand | Argentina | Since 2022 |
| 14 | Sandra Nagamani | India | Since 2023 |
| 15 | Shih-Min Su | S.C.T. of Taiwan, Penghu, Kinmen and Matsu | Since 2023 |
| A. RULES DEVELOPMENT | | | |
| A1. Introduction of New Methods | | | |
| | | | remarks |
| | Method name | proposed | collaboration |
| | subject | finalisation | update |
| | | | progress |
| 1 | <i>Fusarium graminearum</i> , <i>F. langsethiae</i> , <i>F. culmorum</i> , <i>F. poae</i> ... – Cereals new method | 2013-2023 | Nibio Norway |
| | | | All validation criteria are met and CT for the test is executed. Data analysis currently being processed. Report finished in 2024. |
| 2 | <i>Fusarium oxysporum</i> on tomato – new method | 2013-2023 | Naktuinbouw |
| | | | Test plan accepted by ISTA, dilution plating, PCR for identification and pathogenicity test confirmation, analytical specificity, analytical sensitivity, selectivity and robustness performed. Diagnostic sensitivity and specificity data generated in 2023. |

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|--|---|-----------------------|---------------------------------|---|
| | | | | CT planned 2024 validation to be done in 2024. |
| 3 | <i>Ascochyta rabiei</i> / chickpea | 2013-2023 | GEVES | Part of a research project at GEVES. CT organized and completed. Validation report reviewed and approved new rule proposed for the rule changes of 2024. Project finished |
| 4 | <i>Tilletia</i> species/wheat | 2018-2023 | GEVES | Validation of performance criteria on several modalities/options (shaking, filtration and centrifugation steps) Once the method is validated, give the laboratories the freedom to choose. Ring testplan expected in 2024 |
| 5 | <i>Pseudomonas syringae</i> pv. <i>glycinea</i> | 2018-2023 | USDA | Test plan accepted by ISTA, dilution plating, multiple enzyme mediated characteristic screening and pathogenicity test confirmation, The original timeline due date for the validation report was 2023. The project is behind schedule due to several factors. The factors include soybean plant issues in the U.S. and the project lead at GEVES leaving. New projected completion date is the end of 2024 |
| 7 | <i>Botrytis cinerea</i> on hemp seeds | 2019-2023 | CREA, GEVES | Test plan accepted by ISTA, All validation performance characteristics are conducted. CT planned for early 2024 |
| A3. Introduction of Rules Changes | | | | |
| | | | | <u>remarks</u> |
| | Subject | Proposed finalisation | collaboration | Update progress |
| 1 | PCR detection of <i>L. maculans</i> | 2019-2024 | Canadian Food Inspection Agency | Test plan accepted by ISTA, All validation performance characteristics are conducted. CT planned for early 2024 |
| 2 | Change of process flow Xcc (7-019a) | 2023 | Ruud Barnhoorn | Current process flow is that of ISF-ISHI and is not complete. New ISTA standard lay-out the method determined. |
| 3 | thorough Methods review | 2023 | All members of SHC | Methods to review shared among members to check for clarity |
| 4 | Making rules taxonomical just | | Ruud Barnhoorn | Adding new taxonomic names of pathogens between brackets to the methods |
| 5 | Xhc 7-020 PCR not specific enough | 2023 | All members of SHC | Editorial modification submitted to rules proposals |
| B2. Training publications on specific seed testing topics | | | | |
| | | | | <u>remarks</u> |
| | Publication title | proposed | collaboration | update |
| 1 | Seed Health Handbook | 2013-2022 | Terry Aveling, SHC, ISTA editor | Handbook to be published in 2024 |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | | | | <u>remarks</u> |
| | Workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |

| | | | | |
|-----------------------------|---|--------------|---------------------------------|--|
| 1 | Bangalore India, advanced QA workshop, QA in Seed health testing, and accreditation | AUG 2024 | SHCOM | |
| C2. Seminars | | | | |
| | | | | <u>remarks</u> |
| | Seminar subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | Webinar 'Chemical treatments to manage seedborne pathogens' | 21 Apr 2023 | ISPP, ISF, AIPP | Chair provided an introduction presentation on ISTA's Perspective on the webinar topic. |
| | Webinar on New Technologies in Seed Testing | 4 OKT 2023 | FAO | Chair presented the SH topic of the Webinar Advancement in technologies for Seed Health testing |
| | qPCR <i>Leptosphaeria maculans</i> + SH symposium | 2024 | Canadian Food Inspection Agency | Seed Health seminar and workshop, 2024 Ottawa, Canada |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | 7-029, <i>Pseudomonas syringae</i> pv. <i>pisi</i> | 2022-2023 | Naktuinbouw | PT Performed and published on ISTA website |
| 2 | 7-031, <i>Ditylenchus dipsaci</i> | 2020-2021 | GEVES | Performed |
| 3 | 7-014, <i>Parastagonospora nodorum</i> | 2019-2022 | CREA | 2023 Seeds to be used for the PT obtained, screening of usability to be done. Investigation on artificial infected seed usage to be started afterwards. PT to be conducted in 2024. |
| 4 | 7-022, <i>Microdochium nivale</i> | 2019-2022 | SASA | PT Performed and published on ISTA website |
| 5 | 7-006 <i>Colletotrichum lindemuthianum</i> | 2019-2022 | NARO | Planned 2024 looking for infected seed lots (seeds available from SGS Canada) |
| 4 | 7-016 <i>Phomopsis</i> complex | 2022-2023 | GEVES | PT Performed and published on ISTA website |
| F. SPECIAL PROJECTS | | | | |
| | Project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| | ISTA Reference Pest List: | 2018-2024 | GEVES | One additional crop (chickpea) added making the total crops published 24, two additional lentil and lupin under review by SHC to be published early 2024. Project including tree and millet seed under progress. |

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| Insect detection/identification project | 2021-2022 | ATC, ANSES-LSV | Project finalized. Report and paper in STI published. Closing workshop organized in January 2024. |
| Pathogen image collection | 2024-2025 | SGS, whole SHC, ISTA secretariat | ISTA Special project granted: Develop an image collection linked to the pests of the ISTA Reference Pest List, with explanations on morphology |

- New project
- New proposed finalisation date

11. Statistics Committee

| COMMITTEE MEMBERSHIP LIST | | | | |
|---|---|---|---------------|---------------------------------|
| | | | | change comments |
| 1 | CHAIR: Kirk Remund | United States of America | | |
| 2 | VICE-CHAIR: Jean-Louis Laffont | France | | |
| 3 | Gabriel Carré | France | | |
| 4 | Mustapha El Yakhlifi | France | | |
| 5 | Zhou Fang | United States of America | | |
| 6 | Bonnie Hong | United States of America | | |
| 7 | Oluseyi Odubote | United States of America | | |
| 8 | Thomas Michelin | Brazil | | |
| 9 | Bo-Jein Kuo | Separate Custom Territory of Taiwan, Penghu, Kinmen and Matsu | | |
| 10 | Ray Shillito | United States of America | | Ray resigned at the end of 2023 |
| 11 | Kelly Evans | New Zealand | | |
| 12 | Lara Carolina Figueroa | Argentina | | |
| 13 | Nicholas Syring | United States of America | | |
| A. RULES DEVELOPMENT | | | | |
| A1. Introduction of New Methods/New Species | | | | |
| | | | | remarks |
| Method name | | proposed | collaboration | update |
| subject | | finalisation | | progress |
| 1 | Beta vulgaris Method Validation Analysis | Complete | GERM | |
| 2 | Beta vulgaris Method Validation Review | Complete | GERM | |
| 3 | Ascochyta rabiei Method Validation Review | Complete | SHC | |

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|--|---|--------------|--------------------|--|
| 4 | Addition of Glycine max to radicle emergence test for seed vigour Review | Complete | VIG | |
| A3. Introduction of Rules Changes | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | collaborating committees | finalisation | | progress |
| 1 | High oven temperature tolerance for seed moisture | Complete | Moisture | Rule proposal passed in Verona |
| C. WORKSHOPS AND SEMINARS | | | | |
| C2. Seminars | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | ISTA Webinar on Minimum Seed Weight for New Species Purity | April | Purity Secretariat | |
| 2 | Presentation "Statistical modelling in ISTA" for "Mathematical Modelling in Seed Testing" seminar | June | ATC | |
| 3 | GMO Testing Workshop in Tavazzano, Italy | June | GMO | Successful workshop with ~25 participants |
| 4 | AOSA/SCST Workshop on Method Validation in Saskatoon, Canada | June | Purity AOSA/SCST | Successful workshop with ~30 participants |
| F. SPECIAL PROJECTS | | | | |
| | project title / subject | | | Remarks |
| | collaborating committees | proposed | collaboration | Update |
| | | finalisation | | Progress |
| 1 | STI Article for minimum seed weight for purity | January | Purity | |
| 2 | STI Article for seed moisture limits | January | Moisture | |
| 3 | R package <i>ISTAGemMV</i> Rollout | September | | Rebuilt the package for R 4.0 and rolled it out with Germination Committee |
| 4 | Seed Lot Heterogeneity Test Tool for Continuous Responses | October | PT BSC | This tool is for continuous responses like conductivity and moisture |
| E. QUESTIONS TO THE COMMITTEE & Reviews | | | | |
| | subject of question | | Date | From |
| 1 | Moisture Rules Change | | February | PT Committee |
| 2 | Moisture Tolerances | | March | Denmark |
| 3 | Germination Tolerances | | March | France |
| 4 | ISTAGermMV program & LS Means | | March | Argentina |
| 5 | SST Review of Wild Species TZ vs Germ Testing Paper | | March | SST |
| 6 | Multispectral Imaging in seed testing | | May | Denmark |

| | | | |
|----|--|-----------|---------------------------|
| 7 | Repeatability/Reproducibility interpretation | July | Chile |
| 8 | Lot heterogeneity for continuous responses | August | PT Committee |
| 9 | ISTA tolerances for TSW reps | August | Canada |
| 10 | ISTA Tool Macro Security Error | August | Seed Health |
| 11 | Vigour Test & Field Emergence | August | Rwanda |
| 12 | CV Use for TSW in Rules 10.5.2.2 | August | Japan |
| 13 | Method validation | August | Argentina |
| 14 | Submitted & working sample weight | September | Bulk & Sampling Committee |
| 15 | LOD for GMO group testing | September | France |
| 16 | R&r question for GLMM model | September | France |
| 17 | Z-score quantiles for PT tests | September | Israel |
| 18 | ISTA Rules Table 4A on Purity | October | Netherlands |
| 19 | Tolerance Question | November | Iran |

12. STO Storage Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|--|---|--------------------------|---------------|
| | | Country | Active since |
| 1 | Chair: Jayanthi Nadarajan | New Zealand | 2019 |
| 2 | Vice-Chair: Steven Groot | Netherlands | 2016 |
| 3 | Andreas Börner | Germany | 2010 |
| 4 | Sershen Naidoo | RSA | 2011 |
| 5 | Christina Walters | United States of America | |
| 6 | Xiang-Yun Yang | China | 2011 |
| 7 | G V Jagadish | India | 2019 |
| 8 | Nelson Barbosa Machado-Neto | Brazil | 2022 |
| 9 | Umarani Sinniah | Malaysia | 2022 |
| 10 | Louise Colville | UK | 2022 |
| 11 | Elisa Monteze Bicalho | Brazil | 2022 |
| 12 | Irfan Afzal | Pakistan | 2022 |
| 13 | Vacant* | | |
| 14 | Vacant* | | |
| 15 | Vacant* | | |
| | *Applications have been received for these vacant positions | | |
| A. DEVELOPMENT OF NEW SCIENTIFIC KNOWLEDGE AND TECHNOLOGY | | | Target |

A1. Development of new scientific knowledge on optimum storage of recalcitrant seeds innovation in seed storage

Comment as below

Proposed for completion by 2025 - Target achieved (completed in 2022, & 2023)

A2. Development of effective storage methods for short-lived intermediate, oily, primed seeds and exceptional species

Target achieved (completed in 2022 & 2023)

For both activities A1 and A2, the committee is carrying out various research activities in this area to increase the understandings in optimum storage conditions for short-lived and recalcitrant seeds. These are reflected in the publication list, presentations at seminars and knowledge transfer through workshops as listed below. One highlight would be the review on “Seed Longevity—The Evolution of Knowledge and a Conceptual Framework” published in the journal *Plants* early this year which was co-authored by the STO TCOM committee members. This review captures the evolution of knowledge in seed longevity over the past five decades in relation to seed ageing mechanisms, technology development, including tools to predict seed storage behaviour and non-invasive techniques for seed longevity assessment. It particularly highlights that seed longevity is a complex trait and varies greatly between species and even seed lots of the same species. Environmental factors that induce cytoplasmic solidification and affect glassy properties and therefore seed storability was also discussed. The review concluded that seed storage biology is a complex science covering seed physiology, biophysics, biochemistry and multi-omic technologies, and simultaneous knowledge advancement in these areas is necessary to improve seed storage efficacy for crops and wild species biodiversity conservation (Nadarajan, J.; Walters, C.; Pritchard, H.W.; Ballesteros, D.; Colville, L. Seed Longevity—The Evolution of Knowledge and a Conceptual Framework. *Plants* **2023**, *12*, 471. <https://doi.org/10.3390/plants12030471>.)

B. PUBLICATIONS

B1. Publications of the seed storage handbook

Target Collaboration

Handbook on Seed Storage

| | | |
|--|---|---|
| <p>1. The writing of the Seed Storage Handbook is a major task being undertaken by the STO TCOM. After various discussions, finalisation was made on chapters and authors to contribute to these chapters. After a period of slow progress, the activities for writing the handbook have accelerated in 2023. For most chapters initial drafts have been prepared or are almost in that stage. The chapter outline and drafts are on STO TCOM Team SharePoint site. The committee is aiming to finalise the handbook by the end 2024.</p> | <p>Proposed for completion by 2024 - On target</p> | <p>Several external authors who are experts in different seed storage biology area are collaborating for this task.</p> |
| <p>B2. Scientific information publications</p> | | |
| <p>Publication title Target: 20 scientific publications (book chapters and journal articles, including in SS&T) on seed storage.</p> <ol style="list-style-type: none"> 1. Prasad C. T., M., Kodde, J., Angenent, G.C., Hay, F.R., McNally, K.L. and Groot, S.P.C. (2023) Identification of the rice Rc gene as a main regulator of seed survival under dry storage conditions. <i>Plant, Cell & Environment</i>, 46, 1962-1980. https://doi.org/10.1111/pce.14581 2. Sripathy, K.V. and Groot, S.P.C. (2023) Seed development and maturation. <i>Seed Science and Technology. Biology, Production, Quality</i> (Eds. M. Dadlani, and D.K. Yadava), pp 17-38 Springer. https://doi.org/10.1007/978-981-19-5888-5_2 3. Ranganathan, U., and Groot, S.P.C. (2023) Seed longevity and deterioration. <i>Seed Science and Technology. Biology, Production, Quality</i> (Eds. M. Dadlani, and D.K. Yadava), pp 91-108 Springer. https://doi.org/10.1007/978-981-19-5888-5_5 4. Guvvala S: Determination of seed viability in wheat (<i>Triticum aestivum</i>) and barley (<i>Hordeum vulgare</i>) by delayed luminescence. (Master Thesis supervised by Andreas Börner) Stuttgart, Universität Hohenheim, Fakultät Agrarwissenschaften, Institut für Kulturpflanzenwissenschaften (2023) 70 pp. 5. Lohwasser U, Börner A (Eds.): Physical, biochemical and molecular methods for determining seed quality: Book of abstracts of the Meeting of the Working Group Seed Science and Certification (GPZ/GPW) and Section IV Seeds (VDLUFA), Nossen, Germany, 7-9 March 2023. 6. Rehman Arif M A, Tripodi P, Waheed M Q, Afzal I, Pistrick S, Schütze G, Börner A: Genetic analyses of seed longevity in Capsicum annum L. in cold storage conditions. <i>Plants</i> 12 (2023) 1321. https://dx.doi.org/10.3390/plants12061321 7. Nadarajan, J.; Walters, C.; Pritchard, H.W.; Ballesteros, D.; Colville, L. Seed Longevity—The Evolution of Knowledge and a Conceptual Framework. <i>Plants</i> 2023, 12, 471. https://doi.org/10.3390/plants12030471. 8. Nadarajan, J.; Esfandiari, A.; Mathew, L.; Divinagracia, J.; Wiedow, C.; Morgan, E. Development, Management and Utilization of a Kiwifruit | <p>Target</p> <p>Proposed for completion by 2023 - Target exceeded</p> | <p>Collaboration</p> <p>Various external collaborators</p> |

- (*Actinidia* spp.) In Vitro Collection: A New Zealand Perspective. Plants 2023, 12, 2009. <https://doi.org/10.3390/plants12102009>
9. Van der Walt, K.; **Nadarajan, J.** Seed Storage Physiology of *Lophomyrtus* and *Neomyrtus*, Two Threatened Myrtaceae Genera Endemic to New Zealand. Plants 2023, 12, 1067. <https://doi.org/10.3390/plants12051067>
 10. Jean Carlos Bettoni, Karin van der Walt, Juliana Aparecida Souza, Andrew McLachlan & **Jayanthi Nadarajan** (2023): Sexual and asexual propagation of *Syzygium maire*, a critically endangered Myrtaceae species of New Zealand, New Zealand Journal of Botany, DOI: 10.1080/0028825X.2022.2158110.
 11. Surya Diantina, Craig McGill, Andrea Clavijo McCormick, James Millner, Hugh W. Pritchard and **Jayanthi Nadarajan**. Comparative seed cryopreservation of Indonesian and New Zealand epiphytic and terrestrial orchids. CryoLetters 44(4), 197-207 (2023). <https://doi.org/10.54680/fr23410110312>.
 12. Alfaro Pinto, Alejandra, Craig McGill, Jayanthi Nadarajan, Fredy Achila Morales, and Andrea Clavijo McCormick. 2023. "Seed morphology of three Neotropical orchid species of the *Lycaste* genus". Seeds 2, 331-339. <https://doi.org/10.3390/seeds2030025>.
 13. Kai, Y.; Alfaro Pinto, A., Clavijo McCormick, A., **Nadarajan, J.**, He, X.Z., MacKay, M., McGill, C. Seed Desiccation Sensitivity Varies with Geographic Distribution in Two New Zealand Native *Pittosporum* Species. *Seeds* **2023**, 2, 370-381. <https://doi.org/10.3390/seeds2030028>.
 14. van der Walt K, **Nadarajan J**, Mathew L, Bettoni JC and Souza JA (2023) Advances in cryopreservation of *Syzygium maire* (swamp maire, maire tawake) zygotic embryos, a critically endangered tree species endemic to New Zealand. *Front. Conserv. Sci.* 4:1269881. doi: 10.3389/fcosc.2023.1269881
 15. **Jayanthi Nadarajan**. Unlocking the secrets of seed dormancy. *Plant Production Science, New Zealand Plant Producers*. ISSN 2744-7367. Issue 4. November 2023.
 16. **Jayanthi Nadarajan**. Newsletter articles for New Zealand Biological Heritage: [New paper: Effective strategies for maire tawake propagation - Biological Heritage NZ \(bioheritage.nz\)](#)
 17. **Jayanthi Nadarajan**. Newsletter articles for New Zealand Biological Heritage: [New paper outlines the challenges of preserving maire tawake seeds - Biological Heritage NZ \(bioheritage.nz\)](#)

18. **Jayanthi Nadarajan**. Assessing seed excellence: Viability, germination, and vigour. Plant Production Science, New Zealand Plant Producers. ISSN 2744-7367. Issue 4. November 2023.
19. Daniela Goeten, Rosa Angélica Elias, Luiza Giacomolli Polesi, **Christina Walters**, Miguel P Guerra, Neusa Steiner (2023). Effect of water content and biochemical cell state on the germination rate of cryopreserved *Butia eriospatha* embryos (Arecaceae). Plant Cell, Tissue and Organ Culture, 152: 339-356.
20. Hannah Tetreault, Margaret Fleming, Lisa Hill, Emma Dorr, Kathleen Yeater, Christopher Richards, **Christina Walters** (2023). A power analysis for detecting aging of dry-stored soybean seeds: Germination versus RNA integrity assessments. Crop Science 63: 1481 -1493.
21. Daniela Goeten, Francine L Farias-Soares, Gladys D Rogge-Renner, Maria LT Pereira, **Christina Walters**, Vanildo Silveira, Claudete S Catarina, Miguel P Guerra, Neusa Steiner. (2023). Carbohydrate and dehydrin-like protein profiles during *Araucaria angustifolia* seed development provides insights toward ex situ conservation. Trees. 1-15.
22. **Walters, C.**, Hill, L. M., & Tetreault, H. (2023) Seed Preservation and Genebanking: Challenges Forthcoming [Abstract]. ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.
<https://scisoc.confex.com/scisoc/2023am/meetingapp.cgi/Paper/148527>.

| C. SEMINARS | | Target | Collaboration |
|--------------------|---|---|----------------------|
| 1 | ISTA Annual Meeting, Verona, Italy 29 May -1 June 2023. STO TCOM was represented by Jayanthi Nadarajan supported by the technical committee annual fund. Jayanthi gave a presentation on the STO TCOM activity updates covering membership, seed storage handbook writing, ISTA special project, publications, conferences, and workshops. This was followed by a detailed talk on ‘Cryopreservation of <i>Syzygium mairi</i> ’ as a case study on potential problems can be accounted for when working with a challenging recalcitrant system. The lessons learned from this study could be transferred onto other difficult to store species. | Proposed for completion by 2023 - Target achieved on May 2023 | |
| 2 | Committee members presentation as various seminars on seed storage: <ol style="list-style-type: none"> 1. Groot S.P.C. Seed drying and storage. Invited lecture at MSc course Seed Science and Technology, 19 January 2023, Wageningen University, The Netherlands. 2. Groot S.P.C. The growing importance of seed vigour for crop establishment. Webinar to celebrate 50 years of Seed Science and Technology. 23 January 2023, Tamil Nadu Agricultural University, India. | Proposed for completion by 2023 - Target achieved | |

3. **Groot S.P.C.** Rice seed storage. Knowledge transfer visit Thai Rice Department to Wageningen University, The Netherlands, 22 June 2023.
4. **Groot S.P.C.** Seed drying. Perspectives from seed vigour. Workshop at Seed Meets Technology Fair, 26 September 2023, Zwaagdijk, The Netherlands.
5. **Groot S.P.C.** Emerging trends in processing and storage research. 12th National Seed Congress-2023 from the Indian Society of Seed Technology, 12 December 2023, Aurangabad, India.
6. **Groot S.P.C.** Emerging trends in seed storage research. Department of Seed Science and Technology, 14 December 2023. ICAR-Indian Agricultural Research Institute, New Delhi, India.
7. **Groot S.P.C.** Advanced techniques for seed drying and storage. Webinar for International Training Programme on “Advanced Post-Harvest Technologies for Seed Quality Improvement”, 19 December 2023. Indo-German Bilateral Cooperation on Seed Sector Development.
8. **Louise Colville**, Tim Marks, Anaité López-Alquijay, Wolfgang Stuppy, **Jayanthi Nadarajan**, Hugh W. Pritchard, Alexandre Monro. 2023. Exceptional desiccation resistance in recalcitrant seeds of the widespread, tropical tree, *Brosimum alicastrum*. Oral presentation at the 14th ISSS biennial Conference, 3-7 July 2023, Sorbonne University, Paris.
9. Diantina S, **Nadarajan J**, McGill C, Clavijo McCormick A, Millner J and Pritchard HW. 2023. A comparative cryopreservation study of Indonesian and New Zealand epiphytic and terrestrial orchid seeds. Oral presentation given at the Plant Science Central Conference, 4-6 July 2023. Palmerston North, New Zealand.

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| D. WORKSHOPS | | Target | Collaboration |
|---------------------|--|--|----------------------|
| 1 | A workshop on seed storage in Brazil in conjunction with the seed storage symposium Discussions are underway on planning and organisation of this symposium. The possibilities for financial support from government agencies also will be explored. | Proposed for completion by 2025 - On target | |
| 2 | Regional Seed Storage Workshop in Pakistan The organisation this workshop has been delayed due various reasons including severe flooding in Pakistan which needed much urgent attention. | Proposed for completion by 2024/2025 – On target | |
| 3 | The 18th Scientific Seed Symposium, 7-9 March 2023, Nossen, Germany | Proposed for | |

The 18th Scientific Seed Symposium of the Working Group Seed Science and Certification of the German Society of Plant Breeding and the German Society of Plant Cultivation Research took place from March 7 to 9, 2023 in Nossen, Germany. A total of 111 participants from 7 countries discussed the topic: "Physical, Biochemical and Molecular Methods for Determining Seed Quality". The conference was opened by Gerhard Leubner, Professor at Royal Holloway University of London, Great Britain. Prof. Leubner is an internationally recognized seed researcher. In his overview presentation on the topic: 'Crop seed quality and innovative seed technologies for sustainable food production and seed bank storage', he pointed out that improved seed quality, achieved through breeding and innovative seed improvement technologies, is the cornerstone for the maximum yield potential of our crops. This was followed by 14 further specialist lectures on new methods for determining seed quality. The objects examined included wheat, barley, rye, pea, rapeseed and sugar beet. After the lecture program, a workshop on seed diagnostic characteristics in cereals took place. It is planned to hold the next meeting of the Working Group from March 11 to 13, 2025 in Gatersleben, Germany.

completion
by 2023 -
Target
achieved



E. SPECIAL PROJECTS

Project title / subject

1 Use of equilibrium relative humidity measurements for determining the moisture status of stored seeds [Led by Fiona Hay (Moisture Committee) and Jayanthi Nadarajan (Storage Committee)].

- The project activities are still ongoing.

2 Storage optimization of primed seeds (Proposed by Sershen and Elisa)

Target Collaboration

Proposed for completion by 2023 - Project will be extended beyond 2023

ISTA Seed Moisture Committee

Proposed for

| | |
|--|--|
| <ul style="list-style-type: none"> This project proposal was submitted to the ISTA evaluation committee for the special projects. However, this application was not successful. The advice from the ECOM was to tailor the project to ISTA activities i.e., method development. The committee decided to withdraw this application. | <p>completion by 2025 - Target partially achieved for proposal submission.</p> |
| <p>Development of effective storage methods for short-lived primed seeds in certain vegetable crops (proposed by Jagadish and Steven)</p> <p>3</p> <ul style="list-style-type: none"> This project is being delayed due to difficulties in establishing collaborative partners and Steven's retirement. Other options are being considered currently. Not targetted for submission in January 2023. | <p>Proposed for completion by 2025 – On target</p> |

13. TEZ Tetrazolium Committee

| TEZ Tetrazolium Committee | | | |
|---------------------------|----------------------------|--|--------------------------|
| COMMITTEE MEMBERSHIP LIST | | | |
| 1 | Chair: Sergio Pasquini | | Italy |
| 2 | Vice-Chair: Steffi Krämer | | Germany |
| 3 | Ignacio Aranciaga | | Argentina |
| 4 | Maria Belen Aranguren | | Argentina |
| 5 | Alessandra Arioli | | Italy |
| 6 | Jose de Barros Franca-Neto | | Brazil |
| 7 | Sunita BH | | India |
| 8 | Valerie Blouin | | France |
| 9 | Augusto Martinelli | | Argentina |
| 10 | Shaminder Miranpuri | | United States of America |
| 11 | Tauhid Parvez | | Canada |
| 12 | Asia Roberts-Yalland | | United Kingdom |
| 13 | Veena Gouda | | India |
| 14 | Edith Daboue | | Burkina Faso |
| 15 | Eoin O'Connor | | Ireland |

| A. RULES DEVELOPMENT | | | |
|--|--|------------------------------|------------------|
| <u>A2. Introduction of New Species</u> | | | |
| | Species and test | proposed | collaboration |
| | | finalisation | |
| 1 | <i>Ulmus</i> spp. tetrazolium test | Jun 2023 | |
| 2 | <i>Glycine max</i> L. tetrazolium test | Jun 2024 | |
| <u>A3. Introduction of Rules Changes</u> | | | |
| 1 | Paragraph 6.6 was modified | | |
| 2 | Consequential changes if C.5.1 is accepted of paragraphs: 6.5.2.1.2, 6.5.4 and 6.7 | | |
| B. PUBLICATIONS | | | |
| <u>B1. Publications to accompany the Rules</u> | | | |
| 1 | ISTA Peer Method Validation for Tetrazolium test in Elms (<i>Ulmus</i> spp.) | STI nr.165 | |
| 2 | Short videos on TEZ methods | Dec 2024 | ISTA Secretariat |
| <u>B2. Training publications on specific seed testing topics</u> | | | |
| | Publication title | proposed | collaboration |
| | | finalisation | |
| 1 | New Tetrazolium Handbook | in progress, 2024 | |
| 2 | TEZ working sheets | to be published online, 2024 | |
| 3 | New TEZ Working sheets | in progress | |
| 4 | <i>Moringa oleifera</i> Lam. defined method to test viability | Jan 2023 | |
| C. WORKSHOPS AND SEMINARS | | | |
| <u>C1. Training and education workshops</u> | | | |
| | workshop subject | proposed | collaboration |
| | location | finalisation | |
| 1 | ISTA TEZ MOI WS on wild species in Peri (VR) ITALY ,24-25 May 2023 | done, May 2023 | MOI |
| 2 | ISTA TEZ MOI WS on wild species in Peri (VR) ITALY ,26-27 May 2023 | done, May 2023 | MOI |
| <u>C2. Seminars</u> | | | |

| | | | |
|--------------------------------------|--|------------------------------------|------------------------------------|
| | Seminar subject | proposed | collaboration |
| | location | finalisation | |
| D. PROFICIENCY TESTS | | | |
| | Proficiency test subject | proposed | collaboration |
| | location | finalisation | |
| 1 | PT 22-3 <i>Lolium perenne</i> L. | done, Jan 2023 | PTC, Accreditation Department |
| 2 | PT on viability <i>Glycine max</i> L. | Samples ready to dispatch Dec 2023 | |
| E. QUESTIONS TO THE COMMITTEE | | | |
| 1 | TEZ on <i>Brassica oleracea</i> L. as vigour test | Feb 2023 | from South Africa |
| 2 | Questions on par. 6.6 about tolerances | Mar 2023 | From South Africa |
| 3 | Question about how to report in OIC species not included in the Chapter 6 of the Rules | | from ISTA Accreditation Department |
| F. SPECIAL PROJECTS | | | |
| <u>Leaders of the working groups</u> | | | |
| | <i>Glycine max</i> L. method validation | | Ignacio Aranciaga (AR) |
| | <i>Moringa oleifera</i> Lam. method validation | | Steffi Kraemer (D) |
| | New TEZ Handbook | | Jose Franca Neto (BR) |
| <u>contact persons</u> | | | |
| | ECOM Liaison Officer | | Sergio Pasquini (I) |

14. VAR Variety Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------|---------------------------------|-----------|-------------------|
| | | | change comments |
| 1 | Chair: Ana Laura Vicario | Argentina | Member since 2007 |
| 2 | Vice-Chair: Marie-Claude Gagnon | Canada | Member since 2020 |
| 3 | Anne Bernole | France | Member since 2016 |
| 4 | Berta Killermann | Germany | Member since 2004 |
| 5 | Chiara Delogu | Italy | Member since 2007 |

| | | | |
|----|-------------------------------|--|---|
| | Hedwich Teunissen | Netherlands | Member since 2007 (moved to a new job position during 2023 and left the committee) |
| 6 | Kae-Kang Hwu | Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu | Member since 2007 |
| 7 | Ksenija Markovic | Serbia | Member since 2013 |
| 8 | Ksenija Taski-Ajdukovic | Serbia | Member since 2010 |
| 9 | Keshavulu Kunusoth | India | Member since 2010 |
| 10 | Ana Patricia Fernandez Getino | Spain | Member since 2021 |
| 11 | Mariana Menoni | Uruguay | Member since 2021 |
| 12 | Sean Walkowiak | Canada | Member since 2022 |
| 13 | Umashankar Bellan | India | Member since 2023 |
| 14 | Stephanie Guillet | France | Member since 2023 |
| 15 | Lorella Andreani | Italy | Member since 2023 |

A. RULES DEVELOPMENT

A1. Introduction of New Methods

| | | | | remarks |
|---|--|--------------|----------------------|---|
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | DNA-based methods for barley | 2024 | SEC, STA, | Leader: Doris Kaiser from Austria. Validations documents are under review. A draft for the rules proposal is already prepared. |
| 2 | Validation of newly developed <i>Lolium</i> markers for determination of annual types in perennial ryegrass varieties. | 2023 | SEC, USDA, AOSA, STA | Leaders: Giovanni Lopez from the Netherlands (ISTA) and as co-lead Dan Curry from the USA (AOSA). Sequencing of both annual and perennial varieties is completed. Identification and selection of markers are completed. Reagents and seed samples were distributed to 4 participating laboratories for testing 4 markers. Markers were tested by the 4 participating laboratories but the design of new markers was necessary to improve the limit of detection. Three new markers have been designed and the 4 participating laboratories should begin the testing soon. |

A2. Introduction of New Species

| | | | | Remarks |
|--|------------------|--------------|---------------|----------|
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| | | | | |

A3. Introduction of Rules Changes

| | | | | remarks |
|--|---------|--------------|---------------|----------|
| | Subject | proposed | collaboration | update |
| | | finalisation | | progress |
| | | | | |

| B. PUBLICATIONS | | | | |
|--|---|---------------|-------------------------------------|--|
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | | | | remarks |
| Publication title | proposed | collaboration | | update |
| | finalisation | | | progress |
| 1 | Handbook – DNA-based methods | 2025 | SEC, STA, GMO, Editorial | 8 members of the committee started working on the Handbook during 2023. Two meetings were held and some progress were made. |
| <u>B3. Scientific information publications</u> | | | | |
| | | | | remarks |
| Publication title | proposed | collaboration | | update |
| | finalisation | | | progress |
| 1 | VARCOM progress report 2023 was published on STI | 2023 | SEC | Finalized |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | | | | remarks |
| workshop subject | proposed | collaboration | | update |
| location | finalisation | | | progress |
| 1 | India - Species and Variety testing – DNA-based methods, electrophoresis, statistics, conventional methods. | 2024 | SEC | Leader: Keshavulu Kunusoth, India. Organization started. Planned for June, 2019 but postponed due to insufficient registration. Now rescheduled to 2024. The workshop will be held jointly with the STATCOM and the GMO COM. |
| <u>C2. Seminars</u> | | | | |
| | | | | Remarks |
| Seminar subject | proposed | collaboration | | Update |
| location | finalisation | | | Progress |
| D. PROFICIENCY TESTS | | | | |
| Proficiency test subject | proposed | collaboration | | Update |
| location | finalisation | | | Progress |
| 1 | DNA-based methods (SSR) - wheat | 2023 | STA, SEC, Accreditation Department | PT"1" is finalized. Final results were reported in August 2023. Samples for wheat PT are kept, prepared and shipped by Canadian Grain Commission. |
| 2 | DNA-based methods (SSR) - maize | 2025 | STA, SSEC, Accreditation Department | We are working on getting public maize lines and hybrids seed samples for preparing a PT in 2025. |
| E. SPECIAL PROJECTS | | | | |
| project title / subject | | | | Remarks |

| collaborating committees | proposed finalisation | collaboration | Update Progress |
|--|-----------------------|---------------|---|
| Artificial Intelligence for variety identification | 2024 | ATC, STA, SEC | <p>A proposal will be presented before January 20th 2023 for evaluation of the performance of a neuronal network system for variety identification. All previous discussions were carried out. A preliminary data set will soon be available for STACOM for making a decision on how to evaluate the method performance.</p> <p>The data set was sent to STACOM and reviewed. STACOM requested to run samples again in order to produce a second dataset. This will be carried out in Argentina by a member of ATC using the same samples used for the first test. Data will be sent to STACOM for analysis.</p> |

F. QUESTIONS TO THE COMMITTEE

| subject of question | from country |
|---------------------|--------------|
| None | |

G: Further Comments - Responsibilities

leader of working groups

| | | |
|---|---|--------------------------|
| 1 | PT leader for DNA-based tests | Ana Vicario (AR) |
| 2 | CT leader for AI variety identification assay | Ana Vicario (AR) |
| 3 | CT leader for barley | Doris Kaiser (AT) |
| 4 | Handbook leader | Marie-Claude Gagnon (CA) |
| 5 | Lolium WG leader | Giovanni López (NL) |

contact persons

| | |
|---------------------------|--|
| ECOM | Berta Killermann (DE) Keshavulu Kunusoth (IN) |
| UPOV | Ana Laura VICARIO (AR) |
| Website | None (at present) |
| Workshops | To be determined |
| Permanent guest from UPOV | Leontino TAVEIRA (leontino.taveira@upov.int) |
| Permanent guest from OECD | Gerry HALL (gerry.hall@sasa.gsi.gov.uk) |

- New project
- New proposed finalisation date


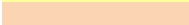
15. VIG Seed Vigour Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------------|---|--|--|
| | | | change comments |
| 1 | CHAIR: Alison Powell | United Kingdom | |
| 2 | VICE-CHAIR: Hulya Ilbi | Turkey | |
| 3 | I-Chen Cheng | Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu | |
| 4 | Ibrahim Demir | Turkey | |
| 5 | Carina Gallo | Argentina | |
| 6 | Simon Goertz | Germany | |
| 7 | G.V. Jagadish | India | |
| 8 | Mohammad Khajeh Hosseini | Iran | |
| 9 | Jaana Kaurila | Finland | New member March 2023 |
| 10 | Tim Loeffler | United States of America | |
| 11 | Stan Matthews | United Kingdom | |
| 12 | Carey Matthiessen | Canada | |
| 13 | Gillian Musgrove | United Kingdom | |
| 14 | Takashi Shinohara | Japan | |
| 15 | Marie-Hélène Wagner | France | |
| A. RULES DEVELOPMENT | | | |
| A1. Introduction of New Methods | | | |
| | Method name subject | proposed finalisation | collaboration |
| | | | remarks update progress |
| 1 | Cold test for <i>Zea mays</i> | 2025 | Test plan prepared for an international comparative test. Seed material provided by two seed companies. Comparative tests done with 7 French labs in 2023 |
| A2. Introduction of New Species | | | |
| | Species and test | proposed finalisation | collaboration |
| | | | remarks update progress |
| 1 | Radicle emergence test: <i>Allium cepa</i> | 2024 | Comparative test completed by labs in India and Europe. Data being analysed |
| 2 | Radicle emergence test: <i>Glycine max</i> | 2023 | Comparative test completed, validation report accepted . |
| 3 | Radicle emergence and conductivity tests as potential vigour tests for five vegetable Brassic species. (ISTA special project) | 2024 | Germination committee Validation report for radicle emergence to be submitted |
| 4 | Radicle emergence test for spinach (<i>Spinacia oleracea</i>) | 2024 | Practical work completed |
| 5 | Radicle emergence test for sweet corn (<i>Zea mays</i> convar. <i>saccharata</i>) | 2024 | Work continues |
| 6 | Radicle emergence test for dill (<i>Anethum graveolens</i>) | 2024 | Laboratory and field tests completed. Further work in progress. |

| | | | | |
|--|---|-----------------------|---|---|
| 7 | Field emergence in barley: comparisons to relate to radicle emergence test | 2024 | | Further work continues following positive results |
| 8 | Radicle emergence test for <i>Oryza sativa</i> | 2025 | | Work continues |
| 9 | Radicle emergence test for <i>Sorghum bicolor</i> | 2025 | | Work continues |
| 10 | Radicle emergence test for pearl millet | 2025 | | Work continues |
| 11 | Radicle emergence (RE), AA, AA+RE tests in red beet ng emergence and storage longevity. | 2025 | | Work continues |
| 12 | Controlled deterioration test for tomato seeds | 2025 | | Trials completed with 5 seed lots comparing two temperatures and three moisture contents. Data analysis in progress |
| A3. Introduction of Rules Changes | | | | |
| | Subject | proposed finalisation | collaboration | remarks update progress |
| 1 | Introduction of the RE test for soybean | 2024 | | Rules proposal submitted for consideration in 2024 |
| 2 | Clarification of the interpretation of results of the RE test carried out at different temperatures | 2024 | | Rules proposal submitted for consideration in 2024 |
| B. PUBLICATIONS | | | | |
| B3. Scientific information publications | | | | |
| | Publication title | proposed finalisation | collaboration | remarks update progress |
| 1 | Variety affects radicle emergence test results in wheat | 2023 | Pauliina A.M. Summanen and Jaana Laurila | <i>Seed Science and Technology</i> , 51 , 221-227 |
| 2 | Radicle emergence test for soybean vigour testing | 2023 | Carina Gallo and Luciana Magnano | <i>Seed Science and Technology</i> , 51 , 3, 493-503 |
| 3 | Radicle emergence as seed vigour test estimates seedling quality of hybrid cucumber (<i>Cucumis sativus</i> L.) cultivars in low temperature and salt stress conditions. | 2023 | Ibrahim Demir, Canan Oztokat Kuzucu, Sitki Ermis and Güleda Öktem | <i>G. Horticulturae</i> , 9 , 3. Online journal; https://doi.org/10.3390/horticulturae9010003 |
| 4 | Seed longevity potential predicted by radicle emergence (RE) vigor test in watermelon seed cultivars | 2023 | Erkan Eren, Sitki Ermis, Güleda Öktem and. Ibrahim Demir | <i>Horticulturae</i> 9 , 280. https://doi.org/10.3390/horticulturae9020280 |
| 5 | Radicle emergence test can be assessed using multispectral imaging for <i>Brassica oleracea</i> | 2023 | Marie-Hélène Wagner, Audrey Dupont, Stan Matthews, Alison Powell, Takashi Shinohara, Sylvie Ducournau | <i>Seed Science and Technology</i> , 51 , 291-296. |

| | | | | |
|---|--|-----------------|--|--|
| 6 | The influence of seed moisture content on the results of the Radicle Emergence test of rapeseed (<i>Brassica napus</i>) | 2023 | Sebastian Bopper, Simon Goertz, J. Zur and Michael Kruse | Public meeting "Seeds" 134th VDLUFA Congress Abstracts, page 111 |
| 7 | A study on the development of new seed vigour tests for brassica vegetables II: Flow cytometry as a technique for determination of seed aging and prediction of field emergence in mustard | 2023 | Yuka Masuda, Saki Yoshid and Takashi Shinohara | <i>Research for Tropical Agriculture</i> , 16(Extra issue 2) , 35-36. |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | workshop subject | proposed | collaboration | remarks |
| | location | finalisation | | update |
| | | | | progress |
| 1 | Workshop on Vigour for postgraduates in Seed Technology. National University of Córdoba, Argentina. | November 2023 | | Presented by Carina Gallo |
| 2 | Workshop on Vigour for postgraduates in Seed Production National University of Rosario, Argentina | April 2023 | | Presented by Carina Gallo |
| 3 | APSA Seed Technology Webinar: Using Vigour Test Results for Management of Seed Inventory | October 2023 | | Presented by Tim Loeffler |
| 4 | APSA Seed Technology Webinar: Towards seed vigour tests for the ISTA Rules: Principles and standardization | October 2023 | | Presented by Alison Powell |
| 5 | Tamil Nadu Agricultural University, webinar as part of the celebrations of their 50 th anniversary: From seed physiology to seed vigour | March, 2023 | | Presented by Alison Powell |
| 6 | APSA/ISTA Seed vigour workshop, Kasetsart University, Bangkok Thailand | September 26-28 | | Alison Powell, Hulya Ilbi, Stan Matthews, Marie-Hélène Wagner |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | EC test for radish | 2024 | PT, STA | Data being reviewed prior to report |
| F. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Organic seed production of chickpeas (Kabuli type) | | M. Khajeh Hosseini, F. Fallahpour, M. Amini | Work continues |
| 2 | Organic seed production of pepper | 2023 | M. Khajeh Hosseini, F. Fallahpour, M. Cheshmi, Z. Yazdi | Work completed, and a manuscript provided to submit. |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| | | | | country |
| 1 | Problem of hard seed in <i>Phaseolus vulgaris</i> | March | | Japan |

| | | | | |
|---|---|-----------|--|--------------|
| 2 | Is there a vigour test for sorghum? | June | | UK |
| 3 | Use of radicle emergence test for cotton | June | | USA |
| 4 | Clarification of the criterion of 2mm radicle emergence in Raphanus sativus | July | | Thailand |
| 5 | Potential use of containers that differ in the specified size for conductivity test | September | | Philippines |
| 6 | Radicle emergence vigour test for melon: possible temperatures and timing of RE count | November | | South Africa |

 New project
 New proposed finalisation date