



ISTA
Seed Quality Assurance

ISTA Secretariat

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Activity report of the International Seed Testing Association (ISTA) Committees 2022

This yearly Activity Report was prepared by the Technical Committees, the Executive Committee, 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 2022, the budget for 2022 and preliminary budget for 2023.

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 2023.

The Activity Report was endorsed by the Executive Committee for submission to the ISTA Ordinary General Meeting 2023, to be held on June 01, 2023, 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) 2022

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 2022 to 31 December 2022. Details from the February 2023 ECOM meeting are not included but will be reported on at the 2023 annual ISTA meeting.

The Executive Committee 2021-2022 was composed of:

Officers:

| | |
|--------------------------------|-------|
| Keshavulu Kunusoth (President) | India |
| Ernest Allen (Vice-President) | USA |

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

This is the final report for the 2019-2022 Executive Committee, elected at the Ordinary General Meeting on 3 July 2019, Hyderabad, India covering the period from 1 January to 11 May 2022, and first for the 2022-2025 Executive Committee covering 12 May to 31 December 2022.

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 input from the 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.

The working groups established for the 2019-2022 triennium (working group Chair in brackets) were: Accreditation (Rita Zecchinelli), the Articles of the Association (Keshavulu Kunusoth), International Relations and Designated Authorities (Craig McGill), Events (Berta Killermann), Marketing and Publications (Ignacio Aranciaga), Membership Fees (Keshavulu Kunusoth), Science and Technology Working Group (Leena Pietilä), Technical Committees (Valerie Cockerell), Seed Health (Valerie Cockerell), Vegetable Seed Industry (Berta Killermann). Most of these working groups have continued into the 2022-2025 Triennium with new chairs in some cases due retirement from the ISTA Executive of Rita Zecchinelli and Valerie Cockerell, and Keshavulu Kunusoth becoming President and Ernest Allen Vice President at the 33rd ISTA Congress. In addition, the Membership Fees Working Group has been dissolved and a Finance Working Group established to provide a wider coverage of financial issues than only membership fees, particularly because of the difficult financial situation many parts of the world are facing and their potential impact on ISTA.

The working groups (working group Chair in brackets) for the 2022-2025 Triennium are: 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 as required. See sections A.3.1 to A.3.11 for reports from the Working Groups.

2. Meetings of the Executive Committee

The February 2022 Executive Committee meeting was held virtually over four Fridays in February. This change in format from holding the meeting over five consecutive days to over four consecutive weeks was made because several Executive Committee members were joining the meeting during the night due to time zones. The Executive Committee meeting focussed on the final preparatory work needed for the 2022 Congress. In addition, the Executive Committee met monthly for two hours as a group up until the 2022 Congress. This online work was undertaken in the expectation that the 2022 Congress would be a physical meeting but with the possibility that it would need to be moved online. Due to the uncertainty around the delivery mode of the 2022 Congress the decision was made to separate the Symposium from the Congress. The Seed Symposium took place 2-4 November 2022 in Athens, Greece.

At and after the February meetings leading up to the Congress, the 2022 Rules Change Proposals, the Report of the Secretary General, the Financial Report, the 2022 Budget and provisional 2023 Budget, proposals for the subscription fees for 2023, reports of the ISTA Committees, and the 2022-2025 ISTA Strategy were discussed. There were no Articles change proposals developed for voting at the 2022 Congress.

Prior to the Congress the Executive Committee met over three days (5-7 May) and one day (12 May) after the Congress. A joint meeting was held between the Executive Committee and the Technical Committee (TCOM) Chairs and Vice-Chairs on 7 May. During the Executive Committee meeting with the Technical Committee Chairs a workshop on succession planning with the Technical Committees and how to encourage people to become Chairs and Vice-Chairs was held.

Post the Congress on 12 May the 2022-2025 Executive Committee reviewed the Congress and established the Executive Committee Working Groups for the 2022-2025 Triennium.

On 9 May a meeting between the Executive Committee and the ISTA Designated Voting Members discussed the following items:

1. The Executive Committee asked the Designated Voting Members present for feedback on how the ISTA Designated Authorities and seed laboratories in their countries responded to the pandemic.
2. eCertificates – there was considerable interest in eCertificates from the Designated Voting Members and how the eCertificates would be utilised by the various agencies requiring access.

Other key topics worked on by the Executive Committee during 2022 were the special project funding and the Young@ISTA initiative. For both the special project funding and the Young@ISTA initiative the Executive Committee reviewed and approved applications for funding. The special project fund has been operating for four years. The Executive Committee decided not to make a call for applications for 2023 but to review the success of the previous four years of projects and determine whether the current approach and criteria are still fit-for-purpose. During the Executive Committee meeting with the Technical Committee Chairs on 7 May the Technical Committees gave their feedback on the success or otherwise of the special project fund. The review of the special project fund will be undertaken by the Executive Committee Working Group on the Technical Committees.

Young@ISTA was formally launched at the Seed Symposium in Athens. Applications for funding also opened in 2022. There is also a Young@ISTA online discussion forum via LinkedIn. The aim is for the initiative to be led as much as possible by the Young@ISTA group.

During the 2022 Congress a Young@ISTA meeting was held. This was an opportunity to discuss and promote the initiative to senior managers and encourage them to support involvement in Young@ISTA for appropriate staff within their organisations.

The 2022 Congress was the first ISTA physical meeting since the 2019 Congress in Hyderabad. The lingering effects of the pandemic were felt in lower numbers than usual participating although number of Designated Voting Members present was higher than for most Annual Meetings and equal to that usually expected for a Congress. Overwhelming people were pleased to be again meeting physically where greater interaction, exchange of ideas and discussion around complex issues is possible. There was a strong desire to return to physical meetings for both the Executive and Technical Committees and membership in general. This is the approach that ISTA will take whenever possible.

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.

Activities in 2022. As consolidated over the 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 ISTA Secretariat the Accreditation Department is composed by four staff. The audits were performed by 22 ISTA contracted auditors and three ISTA Secretariat auditors and the audits administration is coordinated by the ADT.

Eight more candidates to be approved as contracted ISTA auditors are in different steps of the process (three technical auditors, one system auditor, one GMO expert, one Variety and GMO expert and two SH experts).

Overview - ISTA audits

In 2022 the audits, 58 in total, were performed mostly with on-site assessment apart from one audit performed partially remote and eight audits performed complete remote due to the difficulties to travel internationally in the first part of the year.

The procedure on how to perform remote/partially remote audits approved in 2020 was applied as well in 2022 for nine audits. For all nine audits performed remote or partially remote, the approval of the Accreditation Working Group was required.

Status of ISTA accreditation

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.

Review or strengthening of quality documentation

Reviewing and updating documents is a continuous ongoing process. In 2019 and 2020 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 ready to be proposed for approval.

The AWG and ATD instead decided to postpone the revision in order not to create additional burdens on the laboratories during the pandemic. The revision was restarted in 2022 based on former comments and new additions regarding new technologies and use of non-human analysts and the final draft will be presented for the ECOM discussions in the 2023 February ECOM meeting. The final format should be 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 in order to clarify specific issues arising during audits or for clarifications relating to the ISTA Rules. A particular case is that of the collaboration with the Proficiency Test Committee for the development and improvement of the PT programme. The collaboration with the Variety Committee must also be commended as this year the second PT for DNA-based methods was organised.

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

The year 2022 was the year coming back to the normal process in performing audits; however, the auditors travel was more demanding in requirements as before the Covid-19 pandemic period (e.g., PCR tests for going and coming back, flights delay, or flight cancelled).

The revision of the accreditation standard was restarted to consider the new technologies and the non-human analysts in performing tests or part of a test in the ISTA accredited laboratories.

The AWG started to discuss the revision of the ISTA policy for the non-conformities identified during an ISTA audit. The proposal will be discussed in the 2023 February ECOM Meeting.

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 - physical Workshops was organised in November in collaboration with APSA.

The preparation of a Quality Assurance Workshop for beginners in French language started to be prepared. This will take place in 2023 in Dakar, Senegal.

Two licences of GoToMeeting platform for the remote audits and other meetings of the auditors still in use.

3.2 Articles of the Association Working Group

Members: Ernest Allen (Chair), Craig McGill, Ignacio Aranciaga, Keshavulu Kunosoth, Andreas Wais. There were no Article change proposals to vote on at the OGM in 2022.

There were no proposals for Article changes for the working group to progress during 2022 for voting on during the OGM 2023.

3.3 International Relations and Designated Authorities Working Group

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

The focus of the working group is on strengthening interaction between ISTA and its Designated Authorities (DAs) and ISTA with other international organisations. The DA & IR WG plans and holds meetings with the ISTA DAs (currently 68), develops the international relations policy, coordinates the representation of ISTA in international fora and meetings during Annual Meetings and Congresses, for discussion and approval by the whole ISTA Executive Committee (ECOM). In addition, the Secretary General and ECOM members meet with the DAs individually when visiting countries which have an ISTA DA. Meetings may be physical, virtual or both.

Feedback from the ISTA DAs and ISTA Designated Voting Members helped formulate and modify the 2022-2025 ISTA Strategy voted on at the 2022 voting meeting in Cairo.

Meetings with ISTA DAs

During the 2022 ISTA Congress in Cairo the ECOM members present met with the Designated Authorities, two main topics were discussed:

1. The Executive Committee asked the Designated Voting Members present for feedback on how the ISTA Designated Authorities and seed laboratories in their countries responded to the pandemic.

It was pleasing that for all countries represented seed was seen as an essential service and seed laboratories were allowed to continue to operate during lockdowns albeit with split shifts or other health risk minimisation procedures. This does however emphasise that ISTA needs to be able to continue to operate effectively during global crises and continue to provide the services needed to the membership and governments/distinct economies. The Secretariat had contingency plans in place, or quickly developed them to cope with the needs of the COVID pandemic, including using remote audits, so ISTA was able to continue to provide services to its members.

2. 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 will be beta-tested during 2022 and 2023 with the aim of making them available for use in 2023. An online session will be 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.

International Relations

The international organisations ISTA's interactions fall into five groups:

1. Regulatory organisations: including at the national level, the DA of member countries and international organisations such as OECD, FAO, UPOV, IPPC. ISTA has regular contact with FAO and OECD. ISTA participates at OECD Meetings as observer organisation on a regular basis. ISTA is working with FAO to publish a joint handbook on “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 2022, ISTA was not able to attend but plans to in 2023. 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. Two joint webinars took place in 2022. These were well attended and the feedback was positive. It is planned to continue the series in 2023. The December 2022 webinar included presentations from another organisation the International Network for Seed-Based Restoration (INSR) and Society for Ecological Restoration (SER) which updated people on the hosting and relaunch of the updated of the SID-Kew database that many seed scientists use.
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 2022 and the Secretary General the ABRATES meeting in in Brazil. ISTA also works with ISHI as part of ISF with a ECOM Working Group on Seed Health.
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. The Secretary General attended the APSA meeting in Bangkok, November 2022. The ISTA Secretary General also attended the ISF Congress in Barcelona, July 2022 as well as the Euroseeds Congress in Berlin and the ASTA Meeting in Chicago. In addition, the ISTA President attended the ASTA innovations forum in Chicago. The Secretary General and regional representative from the ECOM (Vanessa Sosa) attended the Seed Associations of the Americas (SAA) Congress in Punta del’Este in 2022. 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 2022 the working group was involved in the organisation of:

1. The shortened 33rd ISTA Congress 2022 in Cairo, Egypt including the elaboration of a common programme and the Seminar "Advancements and innovation in seed testing: from science to robust test"
2. The scientific Seed Symposium 'Quality Seed for Sustainable Agriculture' 2022 in Athens, Greece.
3. 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”.
4. The ISTA Annual Meeting 2024 in Cambridge, UK and the 34th ISTA Congress 2025 in Christchurch, New Zealand.

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 2022 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 Twitter ISTA has more than 2100 and on LinkedIn > 9800 followers with an increased level of engagement. Finally, on YouTube, ISTA has over 1300 subscribers. Also, 4 webinars were developed.

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 2022 International Rules for Seed Testing in 4 languages (English, French, German and Spanish).

Finally, it is important to mention that 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.

3.6 Science and Technology Working Group

Members: ECOM members of the working group: 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.

The ECOM Members of the Working Group met to discuss the needs within ISTA for documents and the ISTA Rules to explain the use of new technologies like machine vision, artificial intelligence etc.. The ECOM Members of the Working Group also discussed their ideas with the Technical Committee and Accreditation Working Groups to develop a statement 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), Keshavulu Kunosoth, Sergio Pasquini, Ruel Gesmundo, Claid Mujaju, Andreas Wais, Florina Palada, Nadine Ettel and Andreea Militaru.

The Technical Committee Working Group has the role of developing policy that will enhance and facilitate the work of the ISTA Technical Committees. The 2019-2022 Working Group in collaboration with the ISTA Secretariat prepared an Executive Committee -Technical Committee Chairs meeting for the 2022 ISTA Congress in Cairo. Topics discussed included (i) succession planning within the Technical Committees. Succession planning will be an ongoing discussion within the Executive and Technical Committees over the 2022-2025 triennium. (ii) Increasing the number of tropical and sub-tropical species in the ISTA Rules. A number of technical committees are working on validation of *Moringa oleifera* for inclusion into the ISTA Rules. (iii) feedback on the CHF 100,000 projects. The funding has been in operation since 2019. The Executive Committee decided to review the CHF 100'000 projects to determine if these projects had achieved the aims of the funding of advancing the ISTA strategy and building collaborations across technical committees and with external stakeholders. The 2022-2025 Technical Committee Working Group has prepared the terms of reference for this review. The terms of reference will be discussed at the February 2023 meeting of the Executive Committee.

The Technical Committee Working Group also worked with the Science and Technology Working Group and Accreditation Working Group to develop the ISTA policy on “Introducing New Technologies Equivalent to the Human Analyst for Seed Analysis”. This policy will be discussed at the February 2023 meeting of the Executive Committee.

3.8 Membership Fees Working Group (now Finance WG, report see B.10)

The membership fees remained unchanged and the provision of 10% discounts for early payments, i.e. on or before 31 December 2022 were maintained.

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 Group

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

The Young@ISTA project's mission is to develop plans & strategies to promote Young@ISTA as a means of attracting young seed professionals to the association. This will enable a younger generation to become more involved in ISTA and continue the activities of ISTA into the future, empower seed professionals to lead innovative solutions in seed science and testing and also facilitate an ongoing contribution of seed professionals within ISTA. The concept was developed in collaboration with a group of young seed professionals who first came together in 2019 during the ISTA Congress in Hyderabad, India. A framework has been developed as a part of the promotion strategies, the selection criteria and application procedures for enabling young people to apply for one-time financial support to attend ISTA events like workshops, training (including laboratory-to-laboratory training), annual meetings, congresses, conferences and also financial support for the publication of research publication. All these activities have the aim of inspiring a new generation to become involved in ISTA.

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 2022, ISTA supported a total of 16 applicants [8 for workshops, 6 for symposiums, 1 application for lab-to-lab training and 1 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 2022 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 2022 and posted their thanks for the opportunity to travel to ISTA events.

3.10 ISTA – ISF Seed Health Working Group

Members: Craig McGill (Chair), Valerie Grimault, Rose Souza Richards.

The purpose of this working group is to provide a forum to discuss seed health related topics that concern both organisations and explore synergies. Discussions regarding each organisation's pest lists considered future updates could communicate, and where there might be potential to share information for common crops of interest were discussed. A workflow to communicate future updates has been agreed. ISF proposed that the work of the working group was complete and that it was no longer needed. ISTA agreed to this request.

3.10.1 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. In 2022 the Working Group met only via conference calls. The first species of the agreed experiment with the Vegetable Seed Industry to provide data to increase the number of sub-lots of vegetable seeds was sampled and tested. An ISTA Rules proposal to increase the number of sub-lots for tomato

for voting at the Annual Meeting 2023 is forwarded. The sub-lot experiment will continue in 2023. The possibility to reduce the weight of the working sample for the other seed determination for fruity crops is also under consideration.

3.11 Expansion of Seed Testing Worldwide Working Group

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

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:

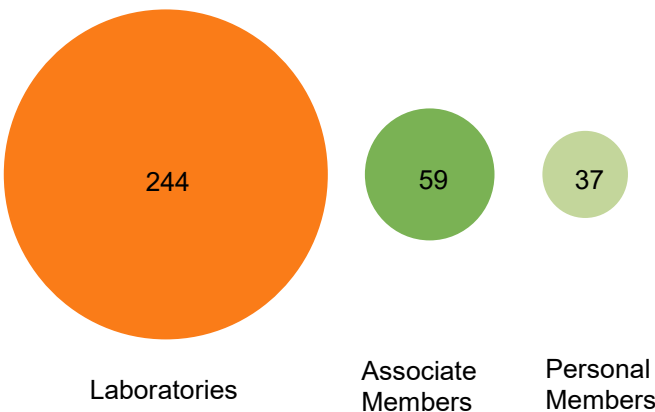
5. Facilitating the expansion of the involvement of ISTA into new regions and countries where it is not yet present or is underrepresented
6. Encouraging (membership) participation from new regions and countries where ISTA is not yet present or is underrepresented also to attract members
7. Facilitating the inclusion of new species, especially tropical and sub-tropical species, into the ISTA Rules
8. 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
9. 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

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

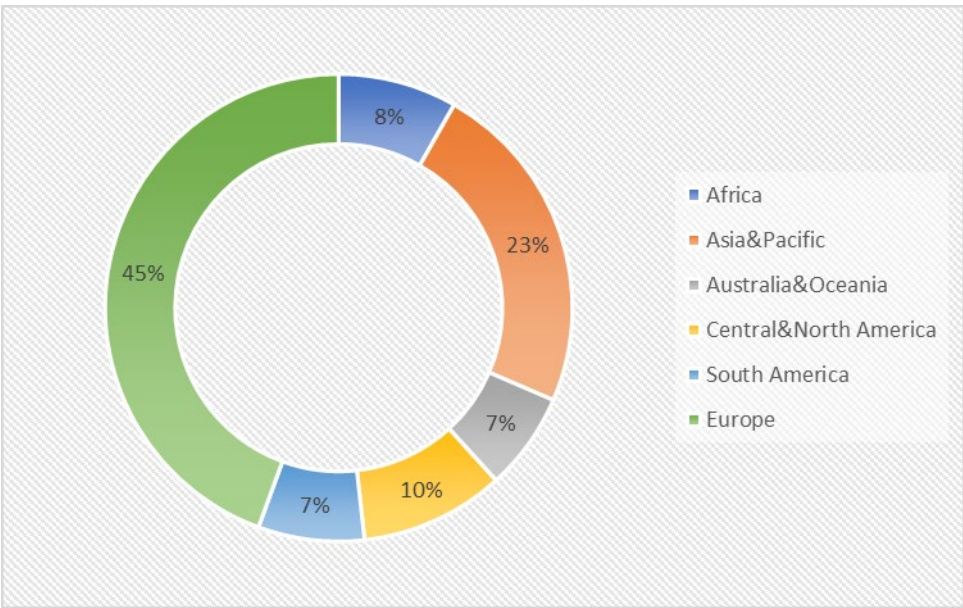
1. ISTA Membership



ISTA Membership 2021

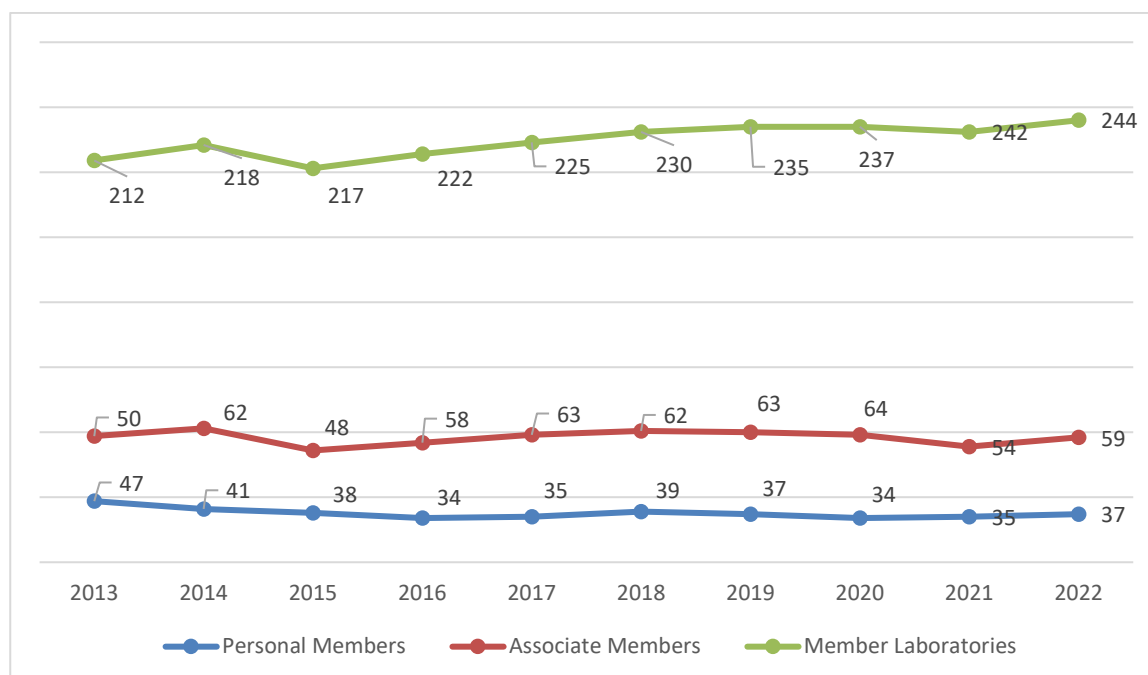


ISTA has at least one member in 82 countries





ISTA Members 2013 – 2022



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 2022 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 |
| | Valerie Grimault (SHC) | France |
| | 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) | Italy |
| | Brigitte Hamman (SSAG) | South Africa |
| | Gil Waibel (WSWG) | United States |
| <i>Ex-officio:</i> | 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 are usually made by one of the TCOMs or 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 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.

The Rules Committee is assisted by staff at the ISTA Secretariat, who collate the Rules proposals and validation studies and then coordinate the translation and the production of the revised Rules. Following the results of the voting at the annual meeting, the amended Rules are edited, translated and distributed to the membership.

This year the ISTA Rules Session was conducted prior to the OGM via virtual meeting on 21 April 2022. Voting was conducted in person at the OGM held on 11 May 2022 in Cairo.

The revised electronic version of the 2023 ISTA Rules was made available to the membership for download on 1st December 2022. This was made possible by the dedicated teamwork of the Rules Committee, the TCOMs and the ECOM, and the ISTA Secretariat, starting with the coordination of the proposals by Nadine Ettel (ISTA Secretariat) and Andreea Militaru (ISTA Secretariat), the preparation of the translation into Spanish, French, and German by the translators in Argentina, France and Germany as coordinated by Ignacio Aranciaga, Clotilde Polderman-Roussille and Elke Nitschke, and final publishing, proofreading, editing, and membership distribution by Karen De La Rosa (ISTA Secretariat), Vanessa Sutcliffe (HeartWood Editorial), and Agnes Hegedus (ISTA Secretariat).

The effective date for the 2023 ISTA Rules is 1st January 2023. 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.

Sales of online ISTA Rules for 2020-2022

| Item | | 2020 | | 2021 | | 2022 | |
|--|---|------|---------------|------|---------------|------|---------------|
| | | Sold | Income (CHF) | Sold | Income (CHF) | Sold | Income (CHF) |
| Royalties from direct download sales (remitted in USD) | Full Rules issues | 35 | CHF 14'426.00 | 22 | CHF 9'357.60 | 16 | CHF 6'774.67 |
| | Single chapters | 57 | CHF 3'465.00 | 70 | CHF 3'427.00 | 30 | CHF 2'820.51 |
| Sales via Secretariat (CHF) | Multiple-user access (e.g. non-member labs) | 14 | CHF 19'600.00 | 18 | CHF 25'200.00 | 13 | CHF 18'059.68 |
| | Single-user access (Associate Members) | 39 | CHF 9'446.24 | 40 | CHF 10'854.00 | 64 | CHF 16'977.55 |
| Total | | 145 | CHF 46'937.24 | 150 | CHF 48'838.60 | 123 | CHF 44'632.41 |

Overview of Rules change proposals approved in May 2022

Changes to the 2023 Edition of the ISTA Rules approved at the Ordinary General Meeting in May 2022 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>

Summary of Changes to the ISTA Rules for 2023

Chapter 1

1.1, 1.2, 1.2.4, 1.3, 1.4.1, 1.4.2, 1.4.3, 1.6: Edits made to clarify rules for new optional electronic seed analysis certificates for 2023. New eCertificates may only be used by accredited member laboratories of ISTA.

Chapter 3

3.7: Paragraph moved for clarification of reporting authorities when determining scientific names for pure and other seeds reported on ISTA Certificates. Harmonisation of reporting between 3.7 and 4.7. Indication of how

other seeds and inert matter found in the second whole sample test shall be reported, providing clear guidance to the second whole sample test.

Chapter 4

4.7: Wording altered for clarification of reporting authorities when determining scientific names for pure and other seeds reported on ISY+TA Certificates. Harmonisation of reporting between 3.7 and 4.7.

Chapter 5

5.6.2.3, 5.6.3.1: Clarification that the temperature prescribed for prechilling should be measured from on or in the substrate during prechilling.

5.6.5.3: Clarification that a tetrazolium test can be conducted to determine viability of fresh ungerminated seeds, at the end of a germination test, for species listed in Table 5A.

5.10, Table 5A Parts 1, 2 and 3: Addition of Seedling Evaluation Groups to Table 5A (Parts 1, 2, and 3), giving benefit to seed analysts and ensuring that correct group is used.

Table 5A Part 1: Addition of new temperature regime (20°C) for germination of *Anethum graveolens*.

Chapter 7

Method 7-031: Addition of option to use a sieve with filter paper or an equivalent nematode-permeable container (such as a no-woven plant growth bag) for filtration.

Chapter 8

8.10.4 (new section): Inclusion of DNA-based test for testing *Pisum* varieties.

8.10.5 (new section): Inclusion of DNA-based test for testing *Avena sativa*.

Table 8I: Table relabelled as 8R due to addition of new methods in Chapter 8.

Chapter 9

9.2.7: Paragraph moved and bullet point added to improve clarity.

9.3.2.6: Editorial correction to improve sentence clarity.

9.3.2.7: Bullet point added to improve clarity.

Table 9A Part 1: Editorial corrections of nomenclature changes approved in 2019 ISTA *List of Stabilised Plant Names*. *Elytrigia* spp. updated to *Elymus* spp.

Chapter 19

19.1: Introduction of acronym TP for 'trait purity.' Small risk of ambiguity with TP used in Chapter 5 for 'top of paper.' In cases where ambiguity might exist, 'trait purity' should be used in full.

19.2: Editorial corrections made that do not modify intent, including renumbering of paragraphs and word substitutions. New definitions added and numbering of definitions throughout section modified as a result.

19.2.17: Improvement of definition of term "analyte," relating to term "target" widely used in Chapter 19.

19.2.20: Improved definition of 'performance-based approach' as a mechanism to ensure uniformity in testing.

19.2.21: Improved definition of 'proficiency test' to clarify object of assessing ability of subject (laboratory operator) to carry out a test, not a specific method.

19.3: Section revised, including precise definition of pieces of evidence a laboratory must provide to apply for accreditation under performance-based approach. Requirement of method validation or verification is introduced. Precise specification of requirement of production of performance data on seed samples is given. Use by laboratories of results obtained in no-ISTA proficiency tests is accepted as evidence.

19.4: Section retitled 'Objectives and approaches' consistent with revised terminology. Testing objectives and approaches defined in relation to each other with reference to Fig. 19.1. Two paragraphs describing 'technical aspects' moved to end of section. Sentence indicating need for reference material in quantitative PCR deleted since digital PCR does not necessarily require it. Several editorial changes made.

19.4.1: Redundant sentence deleted regarding size of working sample compared to submitted sample. Specification that working sample can be analysed in single or multiple units of observation. Clarification of concept of limit of group/bulk size (not of working sample size) in relation to limit of quantification.

19.5: Section retitled 'Testing technologies' consistent with revised terminology.

19.5.1.1: Minor changes and specification in bullet points.

19.5.1.3: Addition of need to verify identity of PCR products in real-time PCR when using intercalating dyes.

19.5.2.2: Simplification of test on lateral flow strip test.

19.5.2.3: Simplification of text on enzyme-linked immunosorbent assay.

19.5.3.1: Replacement of 'resistance' with 'tolerance' as a more appropriate term when referring to herbicides.

19.6.1: Specification added that testing results for both assessment of presence or estimation of level can be referred either to seed sample or seed lot. Deletion of unnecessary sentence, and other minor changes and specifications.

19.6.2: Modification of section title and text for consistency with revised terminology and to improve clarity.

19.6.3: New reference (Remund *et al.*, 2020) added.

19.7: Specification of details to be provided when reporting results on an ISTA Certificate, including conditions for reporting results of GMO testing on Orange or Blue International Certificates.

19.7.1: Section retitled 'Assessment of presence of GMO' consistent with revised terminology, and editorial changes made. Clarification of how to express compliance to a given standard when a working sample tests negative to a qualitative assay for a given target.

19.7.2: Section retitled 'Estimation of the level of GMO by multiple qualitative tests of individuals or groups' consistent with revised terminology.

19.7.3: Section retitled "Estimation of the level of GMO by quantitative measurements on groups of bulks" consistent with revised terminology. Specification of conditions for reporting results of GMO testing on Orange or Blue International Certificates. Other editorial changes made to improve clarity.

19.8: New reference (Remund *et al.*, 2020) added and link for SeedCalc download on ISTA website updated.

Table 19A (new table): Table to summarise types of analytical output that can be attained using different approaches in GMO testing.

Figure 19.1: Figure redrawn according to revised terminology. More information provided including new concepts (unit of observation, testing approach) and relating workflow to different analytical outputs.

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 2022 preparation and dispatch

In 2022 three standard proficiency test rounds (PT) were prepared by PT Leaders and dispatched to laboratories from the ISTA Secretariat, according to the 2020–2022 Programme Plan (see Table B.3.1).

Table B.3.1. List of species and test types for 2022

| Round | Species | Test round scope | Test leader | Sample number | Number of participants |
|-------|--------------------------|--|---|---------------|------------------------|
| 22-1 | <i>Glycine max</i> | G | Elena Perri (started by Rita Zecchinelli) | 3 x 240 | 187 |
| | MIX for training | Purity Committee | | 200 | |
| 22-2 | <i>Spinacia oleracea</i> | P, OSD, G | Sharon Davidson | 3 x 220 | 180 |
| 22-3 | <i>Lolium perenne</i> | P, OSD, G, TZ, OIC (M test was cancelled) | Christian Boehm | 3 x 220 | 178 |

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

The statistical analysis and reports for four PTs has been finalised and published during the year (PT 21-2 *Alnus glutinosa*, PT 21-3 *Fagopyrum esculentum*, the PT 21-1 *Glycine max* and PT 22-2 *Spinacia oleracea*). The PT round 21-2 *Medicago sativa*, published in 2022 January was already included in the 2021 PT Committee annual report and therefore its data is excluded from this 2022 report.

The PT 22-1 *Glycine max* also included the seed mixture exercise, which is not under the rating system as the training exercise provided by the ISTA Purity Committee.

3.2 Reporting of Proficiency test results

In 2022, three PT leaders prepared 3'270 samples, performed 18 heterogeneity tests, and added 15180 seeds in the samples for the OSD test. Also 200 mixture seed sample were prepared by the Purity Committee for training purposes.

Statistical analysis was done on PT results, and individual reports were sent by the ISTA Secretariat to laboratories (1240 preliminary and final reports). We received and answered 18 questions, request of explanation or complains from participants. Summary reports were published and are available on the ISTA website: <https://www.seedtest.org/en/proficiency-tests/standard-pt-results.html>

The following diagrams represent the trend in performance of accredited laboratories versus non-accredited for the four PTs published in 2022. It is noticeable that voluntary participants have less A ratings and more C and BMP ratings in comparison with accredited laboratories.

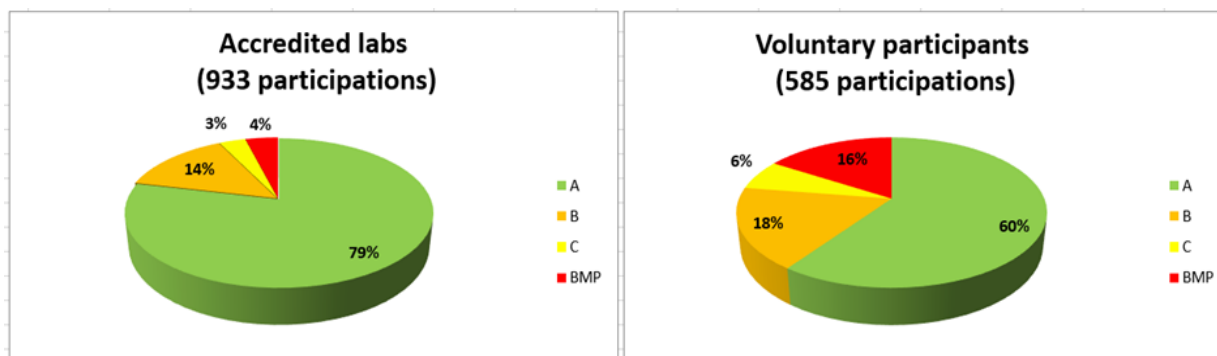


Figure 1: Laboratories rating for the year 2022 for all tests and all participants. Comparison between accredited and voluntary participating laboratories.

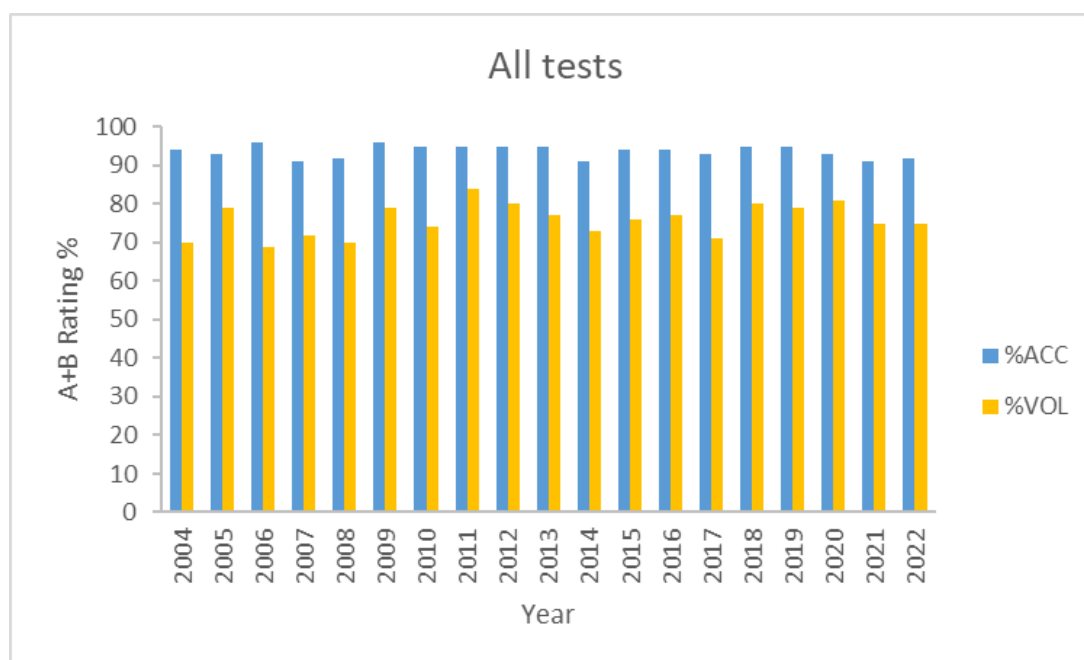


Figure 2: A and B ratings trend for accredited and non-accredited laboratories

The figure 2 shows that ratings A and B are 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.

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.

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 committee prepared the new program plan for 2023-2025. It was distributed to the members and the individual participation status has been recorded. This plan is available at the ISTA website (<https://www.seedtest.org/api/rm/C95346V3N27VTN3/ista-standard-proficiency-test-programme-plan-2023-5.pdf>)

There are three new members in the PT committee coming from ISTA accredited laboratories: Elena Perri, Claudia Falch and Mihaela Gheorghe.

The three PT rounds for 2023 are already under preparation, using the newly revised preparatory procedure (confidential document). 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 2023 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

2022 was the year that we started to come back to the normal as the COVID-19 pandemic has less impact on the activities of the Accreditation and Technical Department including the possibility to perform on-site assessment for the planned audits.

Traveling was not easy at the beginning of the year and also during the year in some geographical regions, but the audits were mostly performed with on-site assessment.

A total number of 53 re-accreditation audits, three accreditation audits and two re-audits were performed in 2022. Once single audit was postponed from 2021 to 2022 at the request of the accredited laboratory due to difficulties in travelling for the auditors and also health issues of some laboratory staff.

The procedure on how to perform remote/partially remote audits approved in 2020 was applied as well in 2022 for nine audits. For all nine audits performed remote or partially remote, the approval of the Accreditation Working Group was required.

The Auditors Workshop planned in Poznan was postponed for 2023.

3.5 Accreditation under the Performance- Based Approach

By the end of 2022, a number of 13 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 |
| GERMANY | DE04 |
| HUNGARY | HU01 |
| ITALY | IT01 and IT03 |
| JAPAN | JP03 and JP07 |
| SERBIA | RS02 |
| URUGUAY | UY02 |
| UNITED STATES OF AMERICA | US11 |

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: 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 and Neelam Ok – Audits and Standard PT administrator.

The contracted auditors in 2022: 2 System & Technical auditor, 4 System auditors and 14 Technical auditors.

In 2022 the Accreditation and Technical Department has continued to recruit new contracted system and technical auditors to perform ISTA audits. Eight candidates (1 System auditor, 3 Technical auditors, 1 GMO Expert, 1 GMO and Variety Expert, 2 SH Experts) were in different steps of the process. One Technical auditor, based on the training and exam performed in 2022 was approved in January 2023.

3.7 Document updates

In 2022 the procedure on how to complete ISTA Certificates was revised to be aligned to the valid ISTA Rules.

<https://www.seedtest.org/api/rm/D7MSWW5E689923M/acc-p-07-how-to-complete-an-ista-certificates-v5.pdf>

Two other internal procedures related to the travel policy and how to claim expenses after auditing are also approved.

The revision of the Accreditation standard was restarted in 2022 based on former comments and new concerns regarding new technologies and non-human analysts and will be discussed for approval of the ECOM in the 2023 February ECOM meeting.

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 – 2022

| Country/Distinct Economy | ISTA Laboratory code |
|--------------------------|--|
| Argentina | AR01 |
| Austria | AT03, AT04 |
| Australia | AU01, AU02, AU06, AU07, AU09, AU13 |
| 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 | ZA01, ZA03, ZA04, ZA05, ZA06 |
| Zambia | ZM01 |

| | |
|--|------|
| Zimbabwe | ZW01 |
| Total number of accredited laboratories 151 | |

There were 63 countries/distinct economies with at least one ISTA-accredited laboratory.

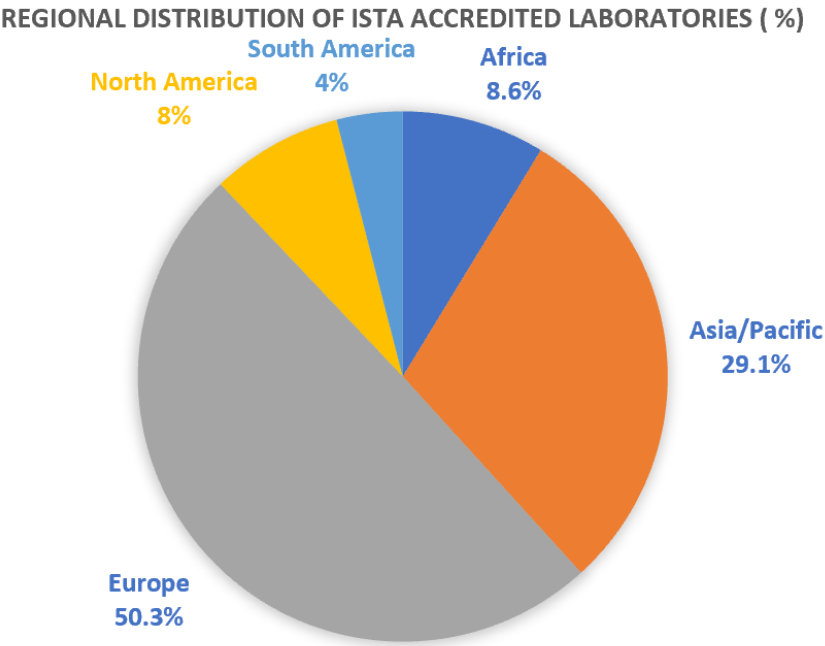
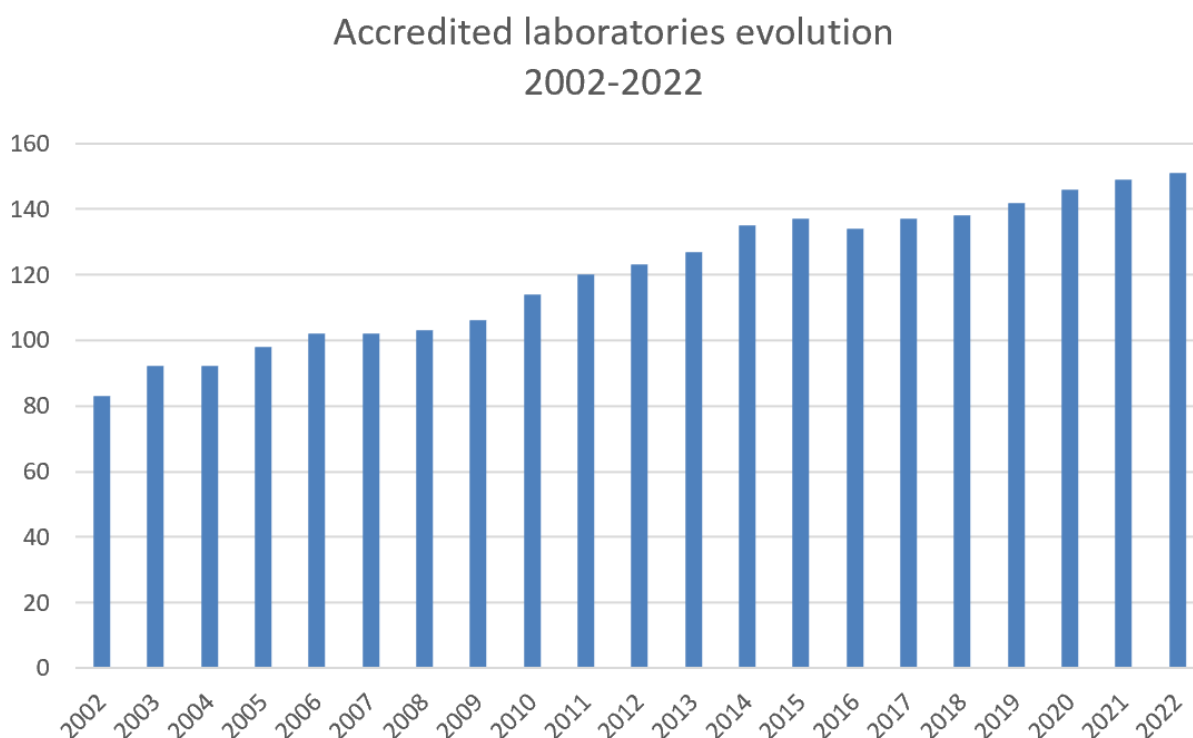


Figure B.3.19 Regional distribution of the 151 ISTA accredited laboratories

Figure B.3.20 Number of ISTA accredited laboratories since 2002**Contribution of Accreditation Department team to:**

- ISTA/FAO Project – Quality assurance part and contribution to some other chapters
- ECOM-VSI WG
- eCertificates Project
- ISTA Website Project
- ISTA Secretariat QMS revision
- Certification surveillance audit
- Revision of the leaflet - Passport to seed quality

Presence in social media:

International representations

- EUCARPIA Conference (2022) – Belgrade (invited speaker)
- APSA – Participation at the Congress; several meetings with people interested in ISTA and ISTA accreditation

3.9 Sales of ISTA Certificates

A total of 198'540 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 | 2017 | 2018 | 2019 | 2020 | 2021 | 2021 | 2022 |
|--|--------|--------|--------|--------|--------|--------|--------|
| Orange International Seed lot Certificates | 204000 | 190800 | 163700 | 202500 | 181360 | 181360 | 189040 |

| | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|------|
| Blue International Seed Sample Certificates | 14100 | 15100 | 11400 | 15400 | 18600 | 18600 | 9500 |
|---|-------|-------|-------|-------|-------|-------|------|

4. ISTA Publications and Products

4.1 ISTA Handbooks and Proceedings

Table B.4.1. Total sales of ISTA publications 2018–2022

| Type/year | 2018 | 2019 | 2020 | 2021 | 2022 |
|--|-----------|------------|-----------|------------|------------|
| Handbook on Seed Sampling | 7 | 6 | 0 | 7 | 36 |
| Handbook on Seedling Evaluation | 6 | 54 | 40 | 55 | 42 |
| Handbook on Pure Seed Definitions | 10 | 12 | 5 | 5 | 16 |
| Handbook on Moisture Determination | 8 | 11 | 4 | 7 | 9 |
| Handbook on Flower Seed Testing | 7 | 3 | 12 | 22 | 9 |
| ISTA Working Sheets on Tetrazolium Testing Vol. I | 6 | 4 | 1 | 9 | 11 |
| ISTA Working Sheets on Tetrazolium Testing Vol. II | 1 | 6 | 3 | 5 | 3 |
| Various Handbooks/Publications | 50 | 44 | 15 | 29 | 79 |
| Total Publications sold | 95 | 140 | 80 | 139 | 205 |

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 2022 2 samples of *Poa pratensis* and 4 of *Dactylis glomerata* were sold.

5. ISTA Training and Education Programmes

5.1 ISTA Workshop overview

In 2022, one online and three physical workshops were held.

Quality assurance workshops

The ISTA Accreditation and Technical Department and Asia & Pacific Seed Alliance (APSA) as organisers, in collaboration with DoA Thailand and United States Department of Agriculture (USDA) organised in Thailand, Bangkok a Workshop on Quality Assurance and ISTA Accreditation for Beginners in November 2022.

The workshop was participated by five government laboratory delegations from Cambodia, 7 government officers from DoA Thailand and 17 participants of APSA's members from 8 countries including Bangladesh, India, Indonesia, Chinese Taipei, Malaysia, Pakistan, Philippines and Thailand.

A workshop with the same topics was planned in French language for 2022 and to be hosted in Tunis in collaboration with the African Seed Trade Association (AFSTA) but was not performed. The possibility to organise it with physical participation in March 2023 in Senegal is considered.

The lecturers preparing all above-mentioned workshops are Dr. Florina Palada, Head of Accreditation and Technical Department, ISTA Secretariat and Dr. Joël Léchappé, ISTA Technical Auditor, ISTA Honorary Life Member.

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:

Christophe Bailly (France)

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

Laura Bowden (United Kingdom)

Seed quality, priming, storage

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

Valerie Grimault (France)

Seed Health

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, ..

David Mycock (South Africa)

Seed storage (orthodox and the range to Recalcitrant) in particular Cryostorage; Germplasm conservation; plant cell, tissue and organ culture; plant cell biology

Daniel Perry (Canada)

Variety identification, molecular or DNA markers, polymerase chain reaction (PCR), microsatellite, simple-sequence-repeat, single-nucleotide polymorphism (SNP)

Moctar Sacandé (United Kingdom)

Seed storage, recalcitrant species, germination/dormancy

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

Andrea Mondoni (Italy)

Seed dormancy, germination, storage

Shyam S. Phartyal (Germany)

Irfan Afzal (Pakistan)

Ibrahim Demir (Turkey)

Sergey Rosbakh (Germany)

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

Highlights of the Year (1 January – 31 December 2022):

2022 was an important year for *Seed Science and Technology*, as we celebrated publishing the 50th volume of the journal. This anniversary was marked in two ways. Firstly, authors were able to apply for a waiver of the open access publication fee. The application form included a question about why the authors were applying for a waiver. Many explained that they just didn't have additional funding to pay for publication. This was particularly the case for authors from low- or middle-income countries. Moving forward, please note that if you are Young@ISTA you can still apply for support in relation to publishing your research in *Seed Science and Technology*.

The other way in which we marked the 50th volume was through a special issue of invited review articles. The topics and authors were selected based on the key topics of articles that are published in *Seed Science and Technology* and on historical citation reports, considering publication year. For example, the most cited paper in the history of the journal was a 1981 paper by R.H. Ellis and E.H. Roberts on the "*Quantification of ageing and survival in orthodox seeds*", which at the time of writing (10 January 2023) has been cited 806 times according to Web of Science. In the special issue, the first author of that paper, Richard Ellis, gives an overview of advances in our understanding of seed ageing and its quantification since the 1981 paper was published. There are seven other papers in this special issue, and an editorial article written by ISTA's Immediate Past-President, Steve Jones. You can find them all at <https://www.ingentaconnect.com/content/ista/sst> (Look for Volume 50, Supplement 1, October 2022). Please also keep a look out for further Invited Review articles in upcoming issues.

Apart from the special issue, there were three regular issues published in 2022, containing 34 research articles, two editorial articles and a book review, and over the course of 2022, the Editorial Board handled 116 papers. A total of 40 papers were accepted and 68 were rejected (a decision on a paper is not necessarily reached in the same year that it was submitted).

Another highlight of the year was the workshop on *Writing scientific papers for publication in Seed Science and Technology* held just before the ISTA Seed Symposium in November, in Athens, Greece. A full report on the workshop has been written by some of the attendees. We look forward to holding more of these workshops, so if you are interested, please let the Secretariat know.

6.1 Editorial figures for 2022

Papers received: 116

Papers accepted: 40

Papers rejected: 68

Papers published (3 regular virtual issues): 34 + 1 book review + 2 editorials

Full papers in 3 issues: $10 + 8 + 8 = 26$

Research Notes in 3 issues: $2 + 4 + 2 = 8$

Editorial Articles in 3 issues: $1 + 0 + 1 = 2$

Pages published in 3 issues: $153 + 126 + 109 = 388$

Average number of pages per paper: 10.8

Invited review articles published in special issue (virtual + 250 hardcopies): 8 + 1 editorial

6.2 Sales of 'Seed Science and Technology' 2018– 2022

| | 2018 | 2019 | 2020 | 2021 | 2022 |
|--------------------------------------|-----------|-----------|-----------|-----------|-----------|
| SST Print | 0 | 0 | 0 | | |
| SST Online Single | 0 | 1 | 0 | 1 | |
| SST Print+ Online single | 0 | 0 | 0 | | |
| SST Print+ Online Multiple | 0 | 0 | 0 | | |
| SST OnlineMultiple | 3 | 0 | 0 | | |
| SST Back Issues, print | 5 | 1 | 0 | | |
| SST Dowload of Individual Chapters | 18 | 9 | 13 | 11 | 10 |
| SST Open Access Fee Full Lengh Paper | 18 | 11 | 12 | 15 | |
| SST Open Access Fee Research Note | 11 | 11 | 10 | 3 | |
| Total SST | 55 | 33 | 35 | 30 | 10 |

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 |
| 8 | Stan Matthews | United Kingdom |
| 9 | Manuela Nagel | Germany |
| 10 | Alan Taylor | United States |
| 11 | Jane Thomas | United Kingdom |
| 12 | Adel Zayed | United States |

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.

The SSAG received data from three laboratories investigating the potential to predict normal germination (NG) from an early radicle emergence (RE) count during germination. Good relationships between RE and NG for *Sorghumbicolor*, *Capsicum annuum* and *Triticum aestivum* subsp. *aestivum* supported the hypothesis that RE can predict NG. There have been many research papers published to support this hypothesis therefore no further work will be initiated by the SSAG

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

We have been involved in the appraisal of three approaches / pieces of equipment that have been put forward for seed testing.

Use of respiration data:

Two pieces of equipment were evaluated:

1) VIM technology (Centor Group). This uses the same principles as those applied in the Q2 seed analyser previously evaluated by the SSAG (see <https://www.seedtest.org/api/rm/GE55KFE56UGE95V/reportontheevaluationoftheperformanceoftheq2seedan.pdf>). The VIM technology equipment claims to predict germination and vigour, but there is no new evidence provided in the marketing material to support these claims that adds to the data already evaluated for the Q2.

2) Seed Respiration Analyser (SRA) (Fyttagoras). The data provided by the SRA reveals the level of homogeneity within seed lots in terms of the rate of germination and allows comparison of the effects of different seed treatments, such as priming. There are no claims with regard to prediction of germination or vigour, although comparison of the SRA data with field emergence of seed lots might reveal a relationship to vigour.

Seed alive:

This approach uses seed leakage plus a colorimetric analysis and claims to predict seed germination and vigour. The SSAG raised a number of questions about this approach during their presentation at the ISTA Annual Meeting. The Seedalve developers contacted us following the Annual Meeting, provided further evidence in support of their approach, and stated 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 Seedalve.

SeedX:

This company produces equipment called “SeedX GeNee Detect” which claims to predict germination from seed morphological characteristics, using deep learning and RGB image data. However, the marketing data appears to highlight that it is a modern sorting tool that can be used to upgrade seed lots, rather than a method to predict germination *per se*. The members of the SSAG query whether morphological features can predict physiological characteristics of the seed such as germination. This approach is also very specialised and likely to require highly trained staff, with challenges to scale up the technology for high volume crops.

8. Wild Species Working Group

| MEMBERSHIP LIST | | | |
|-----------------|---------------------------------------|----------------|-----------------|
| | | | change comments |
| 1 | CHAIR: Gil Waibel | USA | |
| 2 | VICE CHAIR: Ruojing Wang | Canada | |
| 3 | Riad Z. Baalbaki | USA | |
| 4 | Laura Bowden | United Kingdom | |
| 5 | Ted Chapman | USA | |
| 6 | Rachael Davies | United Kingdom | |
| 7 | Stefanie Krämer | Germany | |
| 8 | Heidi Larson | USA | |
| 9 | Sergio Pasquini | Italy | |
| 10 | Alison A. Powell | United Kingdom | |
| 11 | Victor Vankus | USA | |
| 12 | Fabricia Cristina dos Reis | Brasil | |
| | ECOM liaison officer: Craig R. McGill | New Zealand | |

The Wild Seed Working Group (WSWG) is working toward having a programmed tool to help assemble protocols for each species posted in the web site. We are focusing on 10 families to start and have defined the definitions of normal seedlings, abnormal seedlings, are taking images of these species, and lists for synonyms and active scientific names for each prioritized species. Once these basic items are developed (projected by August 2023) the programmers will be able to build a tool to put all the pieces together. Currently, the ten selected families are the focal points for gathering images. When programming is completed to build protocols for the first 10 families, additional families will be prioritized and prepared to build testing protocols. There are 3500 species on the priority list that we will begin to work with. KEW has provided their data for thousand seed weights and testing criteria which we will use to help build protocols.

9. Report of the ISTA Secretariat

9.1 Secretariat staff

This report lists the activities and changes in the Secretariat during 2022, where the Secretariat had no unplanned staff changes:

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 12 members of staff corresponding to 10.8 full time equivalent employees:

| Role | Name | %FTE |
|---|---------------------------|------|
| Secretary General | Dr. Andreas Wais | 1 |
| Head of Accreditation and Technical Department / Acting Secretary General | Dr. Florina Palada | 1 |
| TCOM Manager | Nadine Ettel | 0.6 |
| TCOM Administration | Andreea Nicoleta Militaru | 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 |
| 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 |

9.2 Secretariat work

A long-term goal of the Secretariat was to move to another location in the area. The search was successful and in Q2 the Secretariat moved to Wallisellen (Richtiring 32, postal address Richtiarkade 18). This new location is more modern build facility with better infrastructure (i.e Internet capabilities, safety both to reach and work also late hours, social possibilities, and energy wise).

Due to the requirement of the Swiss Government, the Secretariat staff was mainly working from home during 2021, which made the move more easily to happen.

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.

Olga is responsible for the Events organisation, Administration documentation and all Membership administration. As a new task she is inside the Secretariat responsible to organise 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. 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. Olga's responsibility increased due to the implemented PL process for the Annual Meetings and Congresses.

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.

During the pandemic the Secretariat operates under a 4-step pandemic plan since January 2020. This plan was terminated during 2022.

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.

As requested by the auditors, the ECOM started a project to register the association in the Swiss Commercial Register as an Association. This project is ongoing and will allow ISTA to work more effectively and seamlessly with institutions within Switzerland. The project is under finalisation with the ISTA lawyer Thomas Brunner.

Following the Office365 initiative all bookkeeping is now completely virtual. This does not only save paper, but also showed clear benefits during the COVID-19 measures like home office, as documents were exchanged easily between different locations.

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 Prima, a company located in Zurich. The current website is hosted by MySign AG (maintenance of the website contents is done by the Secretariat staff).

A software change to Office365 was done in 2019 and nearly completed in 2020. This process is ongoing and under the project management of Sejal Patel. Since 2020 and the COVID-19 pandemic ISTA also transferred this system so as to be used by TCOMs, ECOM and other external cooperates (including auditors) 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.

In 2020 ISTA introduced LinkedIn learning as a tool for staff training in the Secretariat. This was continued in 2022.

Both, Office365 solutions and LinkedIn learning are delivered to ISTA on a reduced rate (NPO rate).

In 2023 it is scheduled to move MS Navision also to a cloud solution, as the offline service will be terminated in 2024. Further this will reduce the service and maintenance cost as ISTA qualifies to the MS non-profit scheme.

9.3.5 Marketing

Social media and digital marketing

The ISTA YouTube channel has more than 1'300 subscribers, which nearly doubled. All relevant actions 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 Twitter account, which is used for quick information to the stakeholders and interested parties. ISTA has now about 2'000 followers on Twitter. At the end of 2022, the ISTA LinkedIn profile counted nearly 10'000 followers. 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 Twitter. The LinkedIn Young@ISTA forum had a boost after the Seed Symposium now having about 350 followers.

Since 2021/Q4 ISTA has a relevant introduction in Wikipedia, which is giving information on all relevant topics (https://en.wikipedia.org/wiki/International_Seed_Testing_Association). This is maintained and updated frequently.

The new website was launched in Q1 2022. Maintenance is done by the Secretariat by the Marketing & Communication group.

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 2022 in order to move this project forward after the COVID-19 break. For this purpose a half day seminar is scheduled for 2023 during the ISF World Congress.

9.3.6 Representation

During 2022, 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, ABRATES, SAA, AOSA/SCST, OECD, FAO, APSA, AFSTA, Euroseeds, UPOV and ASTA. The Secretary General also had contact 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 Congress in Cairo, Egypt due to best accessibility and the COVID-19 measure put in place by Egypt, which allows participation from all ISTA member countries and distinct economies to participate in person.

It was decided by the ECOM, that the Congress was held without a Seed Symposium. During the year COVID-19 measures were mostly lifted and the Seed Symposium was organised as a separate event in November to be held in Athen, Greece.

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, 2022, 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.163 and no. 164) 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 in 2022.

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 Ettel manages the TCOM work with the help of Andreea Militaru, 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, as well as a team of contracted system and technical auditors around the world with ISTA auditors also originating from areas, where it 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 provides the Audits administration and Certificate shipment and administration.

Neelam is 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.

- **Electronic Certificates.** 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 in 2022. 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 2023, 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 in the same area compared to previous year (-18'686 CHF). After the COVID-19 break income was generated again on Annual Meeting & Congresses (including the Seed Symposium in Athens) of 66'639 CHF. The income on Accreditation audits decreased due to the number of audits performed in 2022. In 2021 the number of audits was higher due to postponed audits, which did not take place in 2020. This resulted in less income of 88'105 CHF. The commission of Certificates is stable over the years. There was a slight decrease of 31'525 CHF in 2022. The turnover increased to a total of 2'839'512 CHF for 2022, which is significantly lower than the 2022 budget (2'984'521 CHF). Reasons for this are highlighted below. The financial result shown for the year 2022 is negative. The balance of 5'215 CHF could only be reached by taking 585'000 CHF from the reserves, which is significantly higher than budgeted (499'000 CHF), and mainly due to the fact, that the financial market showed a high negative fluctuation, which effected the ISTA funds of the reserves.

Some areas to highlight include:

Membership subscription: The increase of 34'132 CHF compared to previous year was partially due to an increase in membership and a less used option of the 10 % discount on on-time payments. This increase was expected, but is still 12'615 CHF higher than budgeted.

ISTA Annual Meeting & Congresses: The ISTA Congress was held in Cairo and the Seed Symposium in Greece. Both resulted in income of 66'639 CHF and expenditure of 129'644 CHF. The expenditure was within the budget, whereas, the income was 20'011 CHF below budget.

ISTA Rules sales: Sales decreased marginally by 3'499 CHF compared to previous year, but stays stable around 50'000 CHF.

Accreditation: The reason for the lower income on audits of 88'105 CHF is mainly due to less audits realised in 2022, as audits performed in 2021 did include 22 audits initially planned for 2020. Expenditures did raise by 137'417 CHF, which is due to more physical audits in 2022. The expenditure was 25'213 CHF above budget,

where the income was only 1'133 CHF above budget. This was partly due to higher cost for travelling in the beginning of 2022.

Seed Science and Technology subscriptions: The income from sales and publication fees decreased as compared to previous year due to special promotions for publication as announced in the last activity report. For 2023 we are moving back to the same expected income as in the last years.

For 2023 a balanced Zero budget is presented with using 445'137 CHF from the reserves, which is mainly due for 4th year of the 100'000 CHF projects, eCertificates, new website, Moving Navison (bookkeeping programme) to a cloud, auditors in person training, and all new projects mentioned in the ISTA 2022-2025 Strategy for the first year of financing. All these projects mount up to 445'000 CHF, which means that they are fully covered by the reserves.

The reserves decreased at end of 2022 by 585'000 CHF to be at 3'985'000 CHF. That means that the 2021 budget could to a great extend not be finances from the cash flow, which will be similar for 2023.

| ISTA draft Budget 2023 | 2021 | 2022 | Budget 2023 | Proposed 2024 |
|--|---------------------|---------------------|---------------------|---------------------|
| INCOME | | | | |
| <i>Subscriptions</i> | | | | |
| Annual Membership Subscription | 1'215'478.78 | 1'249'610.80 | 1'239'489.54 | 1'250'000.00 |
| Accreditation Subscription | 168'300.00 | 170'136.00 | 173'196.00 | 173'000.00 |
| Annual Meetings | 0.00 | 66'638.85 | 127'450.00 | 140'000.00 |
| Technical Committees WS | 0.00 | 32'860.78 | 105'000.00 | 105'000.00 |
| STI Advertisement | 0.00 | 0.00 | 1'500.00 | 1'500.00 |
| | 1'383'778.78 | 1'519'246.43 | 1'646'635.54 | 1'669'500.00 |
| <i>Service Centres</i> | | | | |
| ISTA Rules | 52'672.13 | 49'172.85 | 60'000.00 | 60'000.00 |
| Accreditation Audits | 702'809.00 | 614'704.00 | 568'712.20 | 650'000.00 |
| Proficiency Test incl. GMO | 30'000.00 | 12'000.00 | 22'000.00 | 20'000.00 |
| QA Workshops | 7'546.93 | 0.00 | 8'000.00 | 10'000.00 |
| Seed Science and Technology | 20'989.67 | 237.28 | 10'000.00 | 10'000.00 |
| Technical Publications and calibration samples | 31'862.01 | 50'725.04 | 30'000.00 | 30'000.00 |
| Certificates | 661'375.02 | 629'850.00 | 659'750.00 | 660'000.00 |
| Website | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1'507'254.76 | 1'356'689.17 | 1'358'462.20 | 1'440'000.00 |
| Losses in receivables | -32'836.00 | -36'424.00 | -15'642.00 | -15'000.00 |
| Total Income | 2'858'197.54 | 2'839'511.60 | 2'989'455.74 | 3'094'500.00 |

| ISTA draft Budget 2023 | 2021 | 2022 | Budget 2023 | Proposed 2024 |
|--|----------------------|----------------------|----------------------|----------------------|
| EXPENDITURE | | | | |
| <i>Direct Costs</i> | | | | |
| Annual Meetings & Congresses | -7'880.67 | -129'644.28 | -153'381.25 | -150'000.00 |
| Executive Committee+President | -8'055.58 | -15'773.48 | -40'000.00 | -40'000.00 |
| Technical Committees WS and 3K grants | -62'187.37 | -114'500.03 | -157'500.00 | -180'000.00 |
| Seed Testing International | -28'659.09 | -30'520.57 | -30'000.00 | -30'000.00 |
| | -106'782.71 | -290'438.36 | -380'881.25 | -400'000.00 |
| <i>Service Centres</i> | | | | |
| ISTA Rules | -10'627.34 | -6'602.96 | -14'000.00 | -14'000.00 |
| Accreditation Audits | -250'306.03 | -387'723.18 | -269'455.45 | -380'000.00 |
| Proficiency Test incl. GMO | -59'372.81 | -39'547.22 | -41'750.00 | -45'000.00 |
| QA Workshops | -498.34 | -2'335.97 | -8'500.00 | -10'000.00 |
| Seed Science and Technology | -55'507.85 | -60'410.47 | -55'000.00 | -55'000.00 |
| Technical Publications and calibration samples | -15'970.07 | -39'599.33 | -16'500.00 | -16'000.00 |
| Certificates | -420'062.21 | -229'136.75 | -90'000.00 | -120'000.00 |
| Provisions for fluctuations | 40'000.00 | 585'000.00 | 445'136.88 | 101'500.00 |
| | -772'344.65 | -180'355.88 | -50'068.57 | -538'500.00 |
| <i>Personnel expenses</i> | | | | |
| Salaries | -1'222'088.05 | -1'215'118.25 | -1'285'389.17 | -1'323'000.00 |
| Social Security and insurances | -297'744.75 | -311'427.85 | -385'616.75 | -396'500.00 |
| Other personel expenses incl. Recruitments | -6'467.95 | -8'485.52 | -5'000.00 | -5'000.00 |
| Staff Training | -9'646.84 | -18'168.98 | -30'000.00 | -30'000.00 |
| Secretary General Cost | 0.00 | 0.00 | 0.00 | 0.00 |
| | -1'535'947.59 | -1'553'200.60 | -1'706'005.92 | -1'754'500.00 |
| <i>Operating Costs</i> | | | | |
| Office Costs | -328'371.65 | -245'001.12 | -263'000.00 | -265'000.00 |
| Travel Costs (International Representation) | -12'761.95 | -41'028.35 | -40'000.00 | -40'000.00 |
| Sponsoring Projects (Young@ISTA) | 0.00 | -21'188.11 | -25'000.00 | -25'000.00 |
| Marketing Costs | -28'969.75 | -3'802.96 | -20'000.00 | -15'000.00 |
| Website | -212'249.97 | -88'364.28 | -20'000.00 | -20'000.00 |
| Projects | 0.00 | 0.00 | -445'000.00 | 0.00 |
| | -582'353.32 | -399'384.82 | -813'000.00 | -365'000.00 |
| Depreciation of tangible fixed assets | -21'528.43 | -15'900.00 | -12'000.00 | -9'000.00 |
| Financial costs | -150'812.42 | -541'505.80 | -35'000.00 | -35'000.00 |
| Financial income | 277'709.53 | 75'836.79 | 7'500.00 | 7'500.00 |
| Prior-period costs | -949.68 | -34'233.18 | 0.00 | 0.00 |
| Prior-period income | 40'715.57 | 104'885.67 | 0.00 | 0.00 |
| Total Expenses | -2'852'293.70 | -2'834'296.18 | -2'989'455.74 | -3'094'500.00 |
| Result | 5'903.84 | 5'215.42 | 0.00 | 0.00 |

| 2022 YEAR END CLOSING | ACCOUNT 2020 | ACCOUNT 2021 | ACCOUNT 2022 |
|--|--------------|--------------|--------------|
| ASSETS | | | |
| <i>Currents Assets</i> | | | |
| <i>Cash</i> | | | |
| Petty Cash (Accounts 1000,1001,1002) | 5'314.40 | 4'905.58 | 10'377.85 |
| Postal account (Accounts 1010,1011,1015,1016) | 68'439.07 | 53'137.55 | 47'157.62 |
| Zürcher Kantonalbank, current account (Account 1020) | 2'520'248.84 | 2'524'680.23 | 2'500'758.02 |
| Zürcher Kantonalbank, deposit account (Account 1021) | 499'248.70 | 499'105.71 | 219'008.94 |
| Zürcher Kantonalbank, USD account (Account 1025) | 2'941'954.79 | 248'035.63 | 216'326.02 |
| Zürcher Kantonalbank, EUR account (Account 1026) | 1'005'148.48 | 860'674.29 | 648'794.96 |
| Zürcher Kantonalbank, EUR account (Account 1030) | 0.00 | 0.00 | 0.00 |
| Zürcher Kantonalbank, GBP account (Account 1031) | 43'092.27 | 52'909.40 | 8'108.69 |
| Zürcher Kantonalbank, USD asset management account (Account 1055) | 0.00 | 113'998.46 | 52'521.20 |
| | 7'083'446.55 | 4'357'446.85 | 3'703'053.30 |
| <i>Trade receivables</i> | | | |
| Membership subscriptions, certificates and publications (Accounts 1100,1111,1112,1113) | 33'737.91 | 56'241.66 | 25'559.80 |
| Allowance on doubtful accounts (Account 1120) | -3'500.00 | -5'600.00 | -18'000.00 |
| | 30'237.91 | 50'641.66 | 7'559.80 |
| <i>Other accounts receivable</i> | | | |
| Other accounts receivable (Account 1108,1109,1110,1135,2320) | 44'036.45 | 17'801.21 | 0.00 |
| Withholding tax (Account 1150) | 11'615.67 | 2'608.44 | 547.56 |
| Value added Tax (Account 1155,1156,1157,2055,2057) | 12'180.79 | 69'765.59 | 116'433.63 |
| | 67'832.91 | 90'175.24 | 116'981.19 |
| <i>Accrued income and prepaid expenses</i> | | | |
| Prepaid expenses (Accounts 1300) | 79'916.15 | 74'933.35 | 343'072.62 |
| | 79'916.15 | 74'933.35 | 343'072.62 |
| <i>Fixed assets</i> | | | |
| Financial assets (Account 1400,1410,1420) | 154'118.00 | 2'852'370.51 | 2'487'490.95 |
| Tangible fixed assets (Accounts 1500,1520) | 5'900.00 | 63'000.00 | 47'100.00 |
| | 160'018.00 | 2'915'370.51 | 2'534'590.95 |
| | 7'421'451.52 | 7'488'567.61 | 6'705'257.86 |

| 2022 YEAR END CLOSING | ACCOUNT 2020 | ACCOUNT 2021 | ACCOUNT 2022 |
|--|---------------|---------------|---------------|
| LIABILITIES + EQUITY | | | |
| <i>Short-term liabilities</i> | | | |
| Trade creditors (Account 2000,2001,2002,2005,2006,2007) | -54'602.58 | -224'126.00 | -110'040.86 |
| Other accounts payable (Accounts 2200,2220,2250,2260,2270,2280,2321) | -33'948.70 | -3'959.25 | -7'352.05 |
| Advance payments (Accounts 2100,2101,2102,2103,2104,2106,2107,2108,2109,2110,2112) | -1'514'065.20 | -1'559'493.25 | -1'536'120.71 |
| Accrued expenses (Accounts 2120,2121,2122,2123,2124,2125,2126,2127,2128,2129,2150,2160,) | -282'732.38 | -198'982.61 | -129'522.32 |
| | -1'885'348.86 | -1'986'561.11 | -1'783'035.94 |
| <i>Long-term liabilities</i> | | | |
| Provisions (Account 2910) | -4'610'000.00 | -4'570'000.00 | -3'985'000.00 |
| | -4'610'000.00 | -4'570'000.00 | -3'985'000.00 |
| <i>Equity</i> | | | |
| Equity (Account 2800) | -885'265.16 | -926'102.66 | -932'006.50 |
| Profit/Loss (Account 2998) | -40'837.50 | -5'903.84 | -5'215.42 |
| | -926'102.66 | -932'006.50 | -937'221.92 |
| | -7'421'451.52 | -7'488'567.61 | -6'705'257.86 |



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BDO Ltd
Schiffbaustrasse 2
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To the Executive Committee of
ISTA International Seed Testing Association
Richtiarkade 18
8304 Wallisellen

Zurich, 24 January 2023
2110 0520/DSH/NIS

Management letter concerning the audit (Limited statutory examination) of the 2022 annual financial statements

Dear Members of the Executive Committee

On January 19, 2023 we have conducted the audit of the 2022 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 2022

The 2022 financial year reported earnings, changes in hidden reserves and net loss are as follows:

| | | |
|--|------------|-----------------|
| Reported profit of 2022 financial year (external) | CHF | 5'215 |
| Decrease in provisions | CHF | -585'000 |
| Loss 2022 financial year (internal) | CHF | -579'785 |

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 2022. 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 | |
| 5 | Mailén Ariela Martinez | Argentina | |
| 6 | Henry Bruggink | Netherlands | |
| 7 | Aurélie Charrier | France | |
| 8 | Devaraja Achar | India | |
| 10 | Zhujun Zhu | China | |
| 11 | Brigitte Hamman | South Africa | |
| 12 | Mieczyslaw Grzesik | Poland | |
| 13 | Tomoko Sakata | Japan | |
| 14 | Sebastian Bobber | Germany | |
| 15 | Giovanny Lopez | Netherlands | |
| B. PUBLICATIONS | | | |
| B1. Publications to accompany the Rules | | | |
| B3. Scientific information publications | | | |
| | Publication title | proposed finalisation | collaboration remarks update progress |
| 1 | ATC Web-pages | | Content to be added continuously |
| 2 | | | |
| 3 | Overview of all image forming technologies and their application to seeds | Continues | Presented (partly) at different meetings. In prep for web publication. |
| 4 | Info paper on nanotechnology | 2022 | Working group concluded that current status of nanotechnology in seed applications is too immature to play a role in seed testing. Activities are on hold from mid 2022. |
| 5 | Concluding paper on Exploration of Methods for Detecting Insects in Seed Lots. | 2023 | SHC, ISTA Special project 20-1: Exploration of Methods for Detecting Insects in Seed Lots. Seed Testing International |
| 6 | Concluding paper on the Preliminary Survey Summary on ISTA Special project 19-1 | 2023 | PUR, ISTA Special Project 19-1: Assessment on available technologies of imaging and image analysis for other seeds determination , purity analysis and germination Seed Testing International (2023) |

| | | | | |
|---|--|--------------|-------------------------------|---|
| 7 | Chapter X-ray imaging in "Handbook of Tree and Shrub seed testing" | Postponed | Tree and Shrub Seed Committee | |
| 8 | Advanced Technologies Committee Report | 2022 | | Seed Testing International Issue 164, 2022 pp 24-25 |
| 9 | Inventory of (potential) role of mathematical modelling in seed testing | 2023 | Statistics Committee | Seed Testing International (2023) |
| 10 | | | | |
| 11 | | | | |
| | | | | |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Workshop on Imaging technologies for seed evaluation, Italy | Autumn, 2023 | Italy | |
| 2 | Workshop on Methods for insect detection in seeds (related to ISTA special project 20-1) | 2023 | SHC, France | |
| 3 | | | | |
| 4 | | | | |
| <u>C2 Seminars</u> | | | | |
| | | | | remarks |
| | Seminar subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Seminars on advanced seed technologies | 2023-2024 | | China, postponed till after Covis-19 issues are cleared |
| 2 | Seminar: Advancements and innovation in seed testing: from science to robust test. | May, 2022 | | At the ISTA Congress 2022, Cairo, Egypt |
| 3 | Seminar/interest meeting on Mathematical modelling in seed testing | May, 2023 | Statistics committee | At the ISTA annual meeting in Verona |
| D. Proficiency Tests | | | | |
| | Proficiency Test Subject | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| 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 |

2. BSC Bulking and Sampling Committee

| COMMITTEE MEMBERSHIP LIST | | | |
|---------------------------|-------------------------------------|-----------------|-----------------|
| | | | change comments |
| 1 | Chair: Corinne Guimier | France | Elected 2022 |
| 2 | Vice-Chair: Eddie Goldschagg | South Africa | Elected 2022 |
| 3 | Ignacio Aranciaga | Argentina | |
| 4 | Chandrashekara Bhat | India | New member 2022 |
| 5 | Lotta Claesson | Sweden | |
| 6 | Gerry Hall | United Kingdom | |
| 7 | David Johnston | United States | |
| 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> | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Sampling for dust-like species | 2024 | PUR, RUL | First proposal removed in 2022, further consideration |
| 2 | Validation of the tube trier | 2024 | | 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 |
| 4 | Sampling conditions for issuing OICs when ISTA methods are described only for untreated seeds | 2024 | | First discussions in progress |
| <u>A2. Introduction of New Species</u> | | | | |
| | | | | remarks |
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | | | | |
| <u>A3. Introduction of Rules Changes</u> | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Number of sub-lot certificates | 2023 | ISTA WG VSI, ISF Veg WG | Rules proposal for Tomato seed lots in discussion with ECOM |
| 2 | Size of submitted and working samples for vegetable seeds | | ISTA WG VSI, ISF Veg WG | |
| B. PUBLICATIONS | | | | |
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | . | finalisation | | progress |
| 1 | ISTA Handbook on Seed Sampling | 2022 | ISTA accreditation Department | Published April 2022 |
| 2 | ISTA Handbook on Seed Sampling – Spanish translation | 2022 | | In progress |
| <u>B2. Training publications on specific seed testing topics</u> | | | | |
| | | | | Remarks |
| | Publication title | proposed | collaboration | Update |
| | | finalisation | | Progress |
| 1 | | | | |

| B3. Scientific information publications | | | | |
|---|--|--------------|--------------------------|--|
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | | | | |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | ISTA Workshop on Seed Sampling and Quality Assurance in Sampling, Aug/Sept 2021, Türkiye | 2022 | VRSCC, Türkiye | Moved to 2022 due to COVID-19 travel restrictions in 2020/2021. Done from 05.09 to 08.09 in Karacabey-Bursa, Türkiye |
| 2 | ISTA Combined Workshop on Sampling, Purity & Germination, Hyderabad, India | 2022 | PUR, GER, TSSOCA - India | Done November 2022 |
| 3 | ISTA Workshop on Seed Sampling and Quality Assurance in Sampling, Denmark | ? | DFL Seeds A/S, Denmark | Moved to 2022 due to COVID-19 travel restrictions in 2020/2021; planned for May 2022, moved to 2023 due to low number of registrations in 2022; postponed indefinitely, due to workload of host laboratory |
| D. Proficiency Tests | | | | |
| | Proficiency Test Subject | proposed | collaboration | remarks update |
| | | finalisation | | 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 | | |
| F. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| | | | | country |
| 1 | sampling by hand / all positions not accessible: pouring onto the floor? - no | | | Accreditation Dept |
| 2 | testing for approval for large seed lots | | | New Zealand |
| 3 | sensitive seeds in bin containers, probe with a spiral at the bottom acceptable? | | | USA |

| | | |
|----|--|------------------------------------|
| 4 | sampling of a seed lot with containers of different size, due to packaging the different kernel sizes separately | South Africa |
| 5 | Indication of seed treatment active ingredient on OIC - referred to Florina | South Africa |
| 6 | OIC on a seed lot, changes requested by customer buying a part of the lot - repackings sub-lot certificates | South Africa |
| 7 | pictures of plastic seed buckets that are properly sealed for OECD + need of additional seals? - no if the bucket cannot be opened without showing traces of tampering | USA |
| 8 | modifying a partitioned probe by filling in the bottom pockets so the cavity is the same size as the opening - possible | USA |
| 9 | manual sampling on the stream at regular intervals - yes | USA |
| 10 | Use of vacuum samplers for bulk sampling, and new types of manual samplers (Silo Rocket Sampler) | USA |
| 11 | OIC for a seed lot with containers of different sizes - possible only if sampled from original lot that was repacked | Egypt / via Rules Committee |
| 12 | OIC for a seed lot with 1 container half-filled - yes | Lithuania / via Accreditation Dept |
| 13 | sampling stick (used not for OIC) for very chaffy seeds | Australia, via Accreditation Dept |
| 14 | dividers check methods in Handbook; choose pan from the same side every time when doing dividing? - only if dividers are accurate enough | Romania |
| 15 | seed counter described in Handbook on Seedling Evaluation - not appropriate for sampling for submitted samples | France |
| 16 | seal of submitted samples in post satchels | Australia |
| 17 | precisions on testing for large seed lots | New Zealand |
| 18 | calculation formulas for dividers check | Poland |
| 19 | cascaded multichannel divider | Argentina |
| 20 | use of sampling calculator | Iran |
| 21 | Verification of divider methods | USA |
| 24 | sampling lot with large number of small containers "e-reception", "e-certificates" - referred to ISTA Secretariat | Japan |
| 25 | size of the OSD working sample for table 2C parts 2 and 3 (including spices) - referred to FSC and FTS committees | Australia / via Purity Committee |
| 26 | steps for ISTA accreditation - referred to ISTA Secretariat | India |
| 27 | submitted sample weight and ISTA Rule 3.7c for small Purity working samples | Argentina |
| 28 | automatic sampler, constitution of 2 composite samples - not in accordance with ISTA Rules | Italy |

| | | | |
|----|--|--|------------------------|
| 29 | sample division with small containers for subsample reception | | ISTA Auditor |
| 30 | sampling on seed lots with containers of different size - no | | ISTA Auditor |
| 31 | container with lower weight at end of processing - yes | | Uruguay |
| 32 | possibility to conditionate the seeds in bags from the client instead of company's bags - yes | | via Accreditation Dept |
| 33 | preparing submitted sample from composite sample | | Netherlands |
| 34 | vario divider control, automatic sampler | | Türkiye |
| 35 | lot numbers for OICs | | India |
| 36 | seals of lots: photos and question | | Brazil |
| 37 | sampling intensity for seed flows / sampling calculator - round up to the nearest whole number | | USA |
| | New project | | |
| | New proposed finalisation date | | |

3. FSC Flower Seed Committee

| | COMMITTEE MEMBERSHIP LIST | | | | |
|----|--|--|----------------|-----------------|--|
| | | | Country | change comments | |
| 1 | Sarah Dammen (Chair) | | USA | 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 | | |
| 10 | Alessandra Barbante | | Italy | New member | |
| 11 | Alice Di Sacco | | United Kingdom | | |
| 12 | Maria Marin | | Croatia | | |
| 13 | Soo-Young KIM | | South Korea | | |
| | A. RULES DEVELOPMENT | | | | |
| | A1. Introduction of New Methods | | | | |
| | Method name | | proposed | collaboration | remarks update |
| | subject | | finalisation | progress | |
| 1 | Addition of 20°C for <i>Papaver somniferum</i> | | | GER | Organised by Vladislava Gregorová, CZ. The analysis of the results in progress. <u>Results between laboratories are too great to successfully compare.</u> |
| 2 | | | | | |
| | A2. Introduction of New Species | | | | |
| | Species and test | | proposed | collaboration | remarks update |
| | | | finalisation | progress | |
| | A3. Introduction of Rules Changes | | | | |
| | 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. (S. Dammen and committee) |
| 2 | Clarification about OSD for species listed in Table 2A, part 3 | | TBD | BSC | To be started (S. Dammen) |
| 3 | | | | | |
| | B. PUBLICATIONS | | | | |

| | | | | |
|--|---|--------------|---------------|----------------------------------|
| B1. Publications to accompany the Rules | | | | |
| Publication title | | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| B2. Training publications on specific seed testing topics | | | | |
| 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) |
| B3. Scientific information publications | | | | |
| Publication title | | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| workshop subject | | proposed | collaboration | remarks update |
| location | | finalisation | | progress |
| 1 | ISTA Workshop on Tetrazolium Testing and Equilibrium relative humidity (ERH) determination for Wild Species and Flowers | 2023 | TEZ, MOI | (S. Kramer, F. Hay, S. Pasquini) |
| C2. Seminars | | | | |
| Seminar subject | | proposed | collaboration | remarks update |
| location | | finalisation | | progress |
| D. Proficiency Tests | | | | |
| Proficiency Test Subject | | proposed | collaboration | remarks update |
| | | finalisation | | progress |
| 1 | ISTA PT Programme 2022/25 | 2023 (TBC) | PTC | Under discussion (Z. Ripka) |
| 2 | | | | |
| 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 | 2023 | AOSA | To be started (S. Dammen) |
| 3 | Collection of information about Flower seed Testing by ISTA laboratories | 2023 | | To be started |
| 4 | Inventory of TZ methods used by the laboratory for flower species | 2023 | TEZ | To be started (S. Kramer, TBD) |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| | | | | Country |
| 1 | Storage moisture percentage for flower seed | | | USA |
| 2 | Weights for OSD for Flower Seed species | | | Australia |
| | 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 | USA | | |
| 3 | Magdalena Beza | Poland | | |
| 4 | Lena Bezděčková | Czech Republic | | |
| 5 | Valerie Blouin | France | | |
| 6 | Marija Gradecki-Postenjak | Croatia | | |
| 7 | Dave Kolotelo | Canada | | |
| 8 | Isolde Dorothea Kossmann Ferraz | 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 | | |
| A. RULES DEVELOPMENT | | | | |
| A1. Introduction of New Methods | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 2 | Validation of germination test for <i>Khaya grandifoliola</i> | 2023 | | Leader: Elisa Vieira |

| | | | | |
|--|---|---------------|---------------|---|
| | | | | Seeds will be harvested in February-March and will be sent to the laboratories. |
| A2. Introduction of New Species | | | | |
| | Species and test | proposed | collaboration | remarks |
| | | finalisation | | update |
| | None | | | progress |
| A3. Introduction of Rules Changes | | | | |
| | Subject | proposed | collaboration | remarks |
| | | finalisation | | update |
| | None | | | progress |
| B. PUBLICATIONS | | | | |
| B1. Publications to accompany the Rules | | | | |
| | Publication title | proposed | collaboration | remarks |
| | | finalisation | | update |
| | | | | progress |
| 1 | | | | |
| 2 | | | | |
| B3. Scientific information publications | | | | |
| | Publication title | proposed | collaboration | remarks |
| | | finalisation | | update |
| | None | | | progress |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | workshop subject | proposed | collaboration | remarks |
| | location | finalisation | | update |
| | | | | progress |
| 1 | Participation at the OECD Forest Scheme meeting | October 2022, | | Edoardo Vincenti participation, as he is the FTSCom representative in OECD. |
| C2. Seminars | | | | |
| | Seminar subject | proposed | collaboration | remarks |
| | location | finalisation | | update |
| | None | | | progress |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | None | | | |

| E. SPECIAL PROJECTS | | | |
|--|-----------------------------------|--------------|--|
| | project title / subject | | remarks |
| | collaborating committees | proposed | update |
| | | finalisation | progress |
| 1 | Forest and Shrub Seeds E-Handbook | 2025 | The committee members that agreed to contribute are organizing the information to which genera they chose. The chair is learning how to manage the database. |
| F. QUESTIONS TO THE COMMITTEE | | | |
| | subject of question | | from |
| | | | country |
| | | | |
| | | | |
| G: Further Comments - Responsibilities | | | |
| | leader of working groups | | |

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 | Erik van Egmond | Netherlands | |
| 8 | Meriam Dekalo Keren | Israel | |
| 9 | Sylvie Ducournau | France | |
| 10 | Lesly Gonzalez Galaz | Chile | |
| 11 | Aidin Hamidi | Iran | |
| 12 | Andrea Jonitz | Germany | |
| 13 | Augusto Martinelli | Argentina | |
| 14 | Dot Vittrup Pedersen | Denmark | |

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| 15 | Melissa Phillips | United States of America | | |
| 16 | Rita Zecchinelli | Italy | | Retired February 2022 |
| 16 | Elena Perri | Italy | | Joined December 2022 |
| 17 | Takayuki Okuda | Japan | | Joined December 2022 |
| | | | | |
| A. RULES DEVELOPMENT | | | | |
| <u>A1. Introduction of New Methods</u> | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Addition of 20°C for <i>Anethum graveolens</i> germination | 2022 | | Accepted as a new method for Germination at ISTA Annual Meeting, Cairo, 2022. Completed. |
| 2 | Addition of 20°C for <i>Papaver somniferum</i> | 2022 | FSC | Unsuccessful method validation study – currently no further plans to repeat. -This study was organised by Vladislava Gregorová, CZ. The analysis of the results has been completed however the repeatability and reproducibility results are not acceptable. |
| 3 | Addition of dormancy breaking methods for <i>Cannabis sativa</i> (hemp) | 2025 | AOSA/SCS Tand CFIA | This work is at an early stage and will be taken forward by Ruojing Wang when time is available. |
| <u>A2. Introduction of New Species</u> | | | | |
| | | | | remarks |
| | Species and test | proposed | collaboration | update |
| | | Finalisation | | progress |
| 1 | Introduction of <i>Diploaxis</i> spp. | 2023 | STAT, BSC PUR | This study is led by Erik van Egmond. Method validation study test plan in progress. Germination samples to be sent to participants in 2023. |
| 2 | Introduction of <i>Basella alba</i> L. (Malabar Spinach) using the AOSA study data | 2022 | STAT, BSC, PUR | This study was led by Sue Alvarez. Unsuccessful method validation study due to reproducibility data. |
| 3 | Introduction of a germination method for Dwarf Saltwort (<i>Salicornia bigelovii</i>) | 2023 | STA, BSC, PUR | The study is carried out by Aidin Hamidi. No further action has been progressed. May be difficulty in getting seed lots. |

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| | Torr. and <i>Salicornia persicum</i>) | | | |
| 4 | Introduction of a germination method for Saatar (<i>Zataria multiflora</i> Boiss.) and Camelthorn (<i>Alhagi camelorum</i> F.). | 2023 | STA, BSC, PUR | This study is carried out by Aidin Hamidi and is ongoing. A method validation study may start in 2023 for Camelthorn, led by Aidin Hamidi. |
| 5 | Introduction of <i>Moringa oleifera</i> | 2023 | BSC, PUR, TZ, MOI, NZ Lab | Method Validation study test plans being formulated. This study is led by Craig McGill. |
| A3. Introduction of Rules Changes | | | | |
| | | | | remarks |
| | 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 |
| 2 | Review of Chapter 11 (germination) considering reporting requirements | 2023 | RUL | Rule proposal submitted for 2023 Annual Meeting |
| 3 | Review of Chapter 13 (germination) reporting results | 2023 | RUL | Rule proposal submitted for 2023 Annual Meeting |
| 4 | Pre-washing of <i>Beta</i> seeds | 2023 | RUL | A method validation study will be led by Lesly Gonzalez, Chile. The samples will be shipped to participants in 2023. |
| | | | | |
| | | | | |
| B2. Training publications on specific seed testing topics | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | Finalisation | | progress |
| 1 | Early counts of radicle emergence, counted manually and by image analysis, can reveal differences in the production of normal seedlings and the vigour of seed lots of cauliflower. | 2022 | VIG, STA Takashi Shinohara, Sylvie Ducournau, Stan Matthews, Marie-Helene Wagner and | <i>Seed Science and Technology</i> , 49 , 3, 219-235 Completed |

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| | | | Alison A Powell | |
| 2 | ISTA Handbook of Seedling Evaluation (Spanish Version) | 2023 | Secretariat | The Handbook is undergoing translation into Spanish by Augusto Martinelli and is with the publisher (in progress) |
| 3 | RGB image analysis assesses radicle emergence to predict normal germination and vigour in Brassica species | 2022 | Takashi Shinohara, Sylvie Ducournau, Stan Matthews, Marie-Helene Wagner and Alison Powell GER, STA | Oral presentation at ISTA Seed Symposium, Athens, November 2022. Presented by Sylvie Ducournau |
| 4 | Radicle emergence test can be assessed using multispectral imaging for <i>Brassica oleracea</i> | 2022 | Marie-Hélène Wagner, Audrey Dupont, Stan Matthews, Alison Powell, Takashi Shinohara, Sylvie Ducournau GER, STA | Oral presentation at ISTA Seed Symposium, Athens, November 2022 Presented by Marie-Hélène Wagner |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | ISTA Workshop on Seed Sampling, Purity and Germination – Hyderabad, India | November 2022 | BSC PUR | Completed |
| 2 | ISTA Workshop Germination - Zambia | April 2023 | | Leaders appointed and planning underway |
| 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 & Vigour – Izmer, Turkey | TBD | TZ VIG | Currently on hold. No further update. |

| | | | | |
|-----------------------------|--|--------------|---------------|---|
| 5 | ISTA Workshop on Germination & Tetrazolium - New Zealand | TBD | TZ | Currently on hold. No further update. |
| 6 | ISTA Workshop Purity & Germination – Ankara, Turkey | TBD | PUR | Currently on hold. No further update. |
| 7 | 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 | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | 21-3 <i>Fagopyrum esculentum</i> | 2022 | PTC | Completed |
| 2 | 22-1 Glycine max | 2022 | PTC | Completed |
| 3 | 22-2 <i>Spinacia oleracea</i> | 2022 | PTC | Completed |
| 4 | 22-3 <i>Lolium perenne</i> | 2023 | PTC | Samples shipped to laboratories |
| E. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Update Seedling Images for Handbooks and Training as a basis for regular image collection (ISTA Special Project) | 2023 | Secretariat | This work is led by Janek Bartel and is in progress. The objective of this project is to improve the quality of images in the Handbook to current standards. Approximately 20 percent of the total pictures to be replaced have been taken. Finding Abnormalities in seed lots is the biggest challenge, slowing down the process of getting images ready for approval. Committee reviewing images and deadline extension sought. |
| 2 | Assessment on available technologies of imaging and image analysis for other seeds determination (OSD), purity analysis and germination. | 2022 | ATC PUR | Two surveys have been prepared, one for laboratories and one for the technology providers. The information collected will only be used for research purposes aimed at: - Promoting technology development in the application used for seed testing. - Analysing and identifying potential solutions and strategies for the speedy application of advanced technology in seed testing. |

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| | | | | - Providing information to assist laboratories in making informed decisions on whether to use imaging and AI technologies in seed testing. No further information |
| 3 | Radicle emergence and conductivity tests to predict germination of five vegetable Brassica species. (ISTA special project) | 2022 | VIG | Completed |
| | | | | |
| | | | | |
| F. QUESTIONS TO THE COMMITTEE | | | | |
| | | | | |
| | subject of question | | | from |
| | | | | Country |
| 1 | Seed treatment and priming | | | Croatia |
| 2 | <i>Pisum</i> evaluation criteria | | | Finland |
| 3 | <i>Zea mays</i> and <i>Sorghum</i> germination | | | Switzerland |
| 4 | Germination equipment | | | Ukraine |
| 5 | <i>Beta vulgaris</i> germination methods | | | Italy |
| 6 | Reporting of germination results on an Orange International Certificate | | | Switzerland |
| 7 | Reporting results of <i>Helianthus</i> when empty achenes are present | | | USA |
| 8 | Disinfection of samples during transit | | | China |
| 9 | Hard seed information | | | Thailand |
| 10 | TPS method of germination | | | Poland |
| 11 | Table 5A information required about pre-treatments and symbols etc. | | | Germany |
| 12 | <i>Fagopyrum esculentum</i> germination evaluation | | | United Arab Emirates |
| 13 | Water retention calculations | | | Pakistan |
| 14 | Pre-chilling temperatures and tolerances | | | Germany |

| | | | | |
|----|--|--|--|----------------------|
| 15 | Growing media specification checks | | | Brazil |
| 16 | Germination test method for <i>Hippophae</i> spp. (sea-buckthorn). | | | United Arab Emirates |
| 17 | Counting equipment for germination | | | France |
| 18 | Specifications for filter pad paper media (TP) | | | United Arab Emirates |
| 19 | Pure seed fraction for germination test of <i>Chloris</i> spp. | | | Switzerland |
| 20 | <i>Glycine max</i> germination evaluation | | | France |
| 21 | Epicotyl elongation in <i>Phaseolus</i> seedlings | | | Poland |
| 22 | Light intensity specifications | | | Switzerland |
| 23 | Pre-chilling requirements | | | United Arab Emirates |
| 24 | <i>Zea mays</i> evaluation | | | Chile |
| 25 | Confection sunflower abnormal seedlings | | | Argentina |
| 26 | <i>Allium</i> spp. seedling evaluation/test methods | | | Australia |
| 27 | Tomato seedling evaluation and fresh ungerminated seed | | | India |
| 28 | Evaluation of imaging technology in seed testing | | | Sweden |
| 29 | ISTA Handbook on Seedling Evaluation | | | India |
| 30 | Legume grass species test methods | | | Nepal |
| 31 | Germination calculator on ISTA Website | | | Senegal |
| 32 | Evaluation/test method of <i>Spinacia</i> | | | Denmark |
| 33 | Pre-chilling requirements | | | United Arab Emirates |
| 34 | Understanding of ISTA Rules at 5.6.5.3 | | | Germany |
| 35 | Dormancy and hardseededness | | | New Zealand |
| 36 | Evaluation/test method of <i>Spinacia</i> | | | United Arab Emirates |
| 37 | Sand and organic growing media retesting | | | Japan |
| 38 | Germination test period | | | USA |
| 39 | <i>Zea mays</i> and <i>Sorghum</i> germination evaluation | | | Japan |

| | | | | |
|----|---|--|--|--------------|
| 40 | Double testing of tree species | | | Switzerland |
| 41 | Measuring temperatures in germinators/germination rooms | | | Canada |
| 42 | Calibration certificates | | | South Africa |
| 43 | Evaluation/test method of <i>Spinacia</i> | | | South Africa |
| 44 | Germination and viability | | | New Zealand |
| 45 | Temperature profiling | | | Bangladesh |

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| | 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 | Dabing Zhang | China | |
| 12 | Ray Shillito | United States | |
| 13 | Laura Bowden | UK | |
| 14 | Benoit Maes | Belgium | |
| 15 | Sophie Seoane | France | |
| <i>The composition of the Committee has changed during the year for three members leaving (Sofia Ben Tahar, Elizabeth Bates, and Luz Grohmann). The three members at the end of the list applied for membership to this Committee in 2022, and were accepted as new members by vote of the Committee and approved by ECom in January 2023.</i> | | | |
| 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 | collaboration |
| | finalisation | |
| <i>Chapter 19 was thoroughly revised and the new version is current in 2023 Rules. However, some changes in section 19.7 on reporting of results on ISTA certificates were not reflected in Chapter 1. The Chair of the Rule Committee was informed, and the necessary amendments will be included, as editorial changes, in the Rule proposal for the 2023 AM.</i> | 2022 | - |
| B. PUBLICATIONS | | |
| <u>B1. Publications to accompany the Rules</u> | | |
| Publication title | proposed | collaboration |
| | finalisation | |
| GMO Testing Handbook (R. Mathis and E. Noli WG Leads) <i>Progress made in 2022 in Chapter 6.</i> | 2023 | STA, VAR, Audit team at Secretariat |
| <u>B3. Scientific information publications</u> | | |
| Publication title | proposed | collaboration |
| | finalisation | |
| | | |
| C. WORKSHOPS AND SEMINARS | | |
| <u>C1. Training and education workshops</u> | | |
| workshop subject | proposed | collaboration |
| Location | finalisation | |
| <i>No training workshops this year</i> | | |
| D. Proficiency Tests - | | |
| Proficiency Test Subject | proposed | collaboration |
| | finalisation | |
| PT24 – Maize: In early stages of preparation – planning with Industry. PT25 – Cotton?: In early stages of preparation – planning with Industry. | 2023 2024 | Secretariat STA |
| E. Questions to the Committee - Since date of last report | | |
| Question subject | Date | From (Country) |
| <i>Clarification requested on how to report results of GMO testing on ISTA Certificates. Available space is limited, in spite of detailed description required.</i> | 28/04/2022 | Germany |
| <i>Is it possible to include information such as TSW on ISTA Certificates among information stated by the applicant?</i> | 13/06/2022 | Auditors |
| <i>Reporting of GMO test results for a species/method not included in the Scope of Accreditation of a laboratory (not possible).</i> | 06/09/2022 | Auditors |

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|----------------------------|---|---------------------|--|
| | 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 | 11/01/2023 | Japan |
| | | | |
| F. SPECIAL PROJECTS | | | |
| | project title / subject | proposed | collaboration |
| | collaborating committees | finalisation | |
| 3 | ISTA GMO Website: No updates – A new WG leader will need to be appointed after departure of Liz Bates | Ongoing | Secretariat |
| 4 | ATC Contact: (A. L. Vicario) No updates | Ongoing | Advanced Technology Com. |
| 5 | Statistical tools for GMO Testing: (J.-L. Laffont, WG Lead) Continued collaboration for PT design and Handbook preparation. | Ongoing | STA |
| 6 | WG on Standardized Terms (E Noli, WG Lead) WG has further reviewed the List of Standard Terms in GMO Testing and proposal is being discussed with the ISTA Secretariat and Accreditation Department. Before its adoption, the standardised terminology will need to be harmonised with that in use in the database at the Secretariat and in documents concerning laboratory accreditation. | Ongoing 2023 | Audit Team and TCom Manager at Secretariat |

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 | 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 | Member since 2021 |
| 13 | Daniela Villa | Italy | Member since 2022 |

| | | | | |
|--|--|--------------|-------------------|---|
| 14 | Chandreschekara Bhat | India | Member since 2022 | |
| 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. The survey will be sent out in Jan 2023 |
| <u>A2. Introduction of New Species</u> | | | | |
| | | | | remarks |
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | <i>Moringa oleifera</i> oven method | 2023 | | 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> , | 2023 | 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 | | 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. |
| B. PUBLICATIONS | | | | |
| <u>B1. Publications to accompany the Rules</u> | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |

| | | | | |
|--|---|--------------|---------------|--|
| 1 | Review and update Handbook on Moisture Determination | 2023 | Secretariat | Lead is named and chapters to work on are given to resp. members, planned changes on moisture calculator will influence the handbook as well |
| B3. Scientific information publications | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Extension of the Excel Moisture calculator on the homepage regarding routine tests and QM | 2023 | | Project is in work |
| 2 | Moisture Content of cereal lots before and after seed treatment | 2022 | | Project has been conducted by Tanja Petrovic and is finalized with a report. |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | | | | |
| | | | | |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | | | | |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | Month | | from |
| | | | | country |
| 1 | A bug in the Moisture Calculator (has been fixed) | Dec 2022 | | Sweden |
| 2 | Difference between capacity and performance of the oven? | June 2022 | | USA |
| 3 | Why for checking capacity the difference is 0.15% and not 0.2%? | June 2022 | | USA |
| 4 | Is the handbook mandatory? | June 2022 | | USA |
| 5 | What to do with a species that is not listed in Table 10A? | June 2022 | | USA |
| 6 | How the Moisture test can be performed with bhindi seeds? | Sep 2022 | | India |

8. NOM Nomenclature Committee

| COMMITTEE MEMBERSHIP LIST | | | | |
|-------------------------------|--|---------------|---------------|---|
| | | | | change comments |
| 1 | CHAIR: Melanie Schori | United States | | |
| 2 | VICE-CHAIR: Ernest Allen | United States | | |
| 3 | Susan Alvarez | United States | | |
| 4 | Michel Chauvet | France | | |
| 5 | Axel Diederichsen | Canada | | |
| 6 | Marco Hoffman | Netherlands | | |
| 7 | Deborah Meyer | United States | | |
| 8 | John Wiersema | United States | | |
| F. SPECIAL PROJECTS | | | | |
| | project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| | Updates to ISTA Stabilised List for species added to Rules | | | Will commence in 2024, adding names proposed for inclusion to a working document as they are received |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | date | | from |
| | | | | country |
| 1 | Adding species to the Stabilised List | January | | Brazil |
| 2 | Lavatera/Malva distinction | March | | France |
| | Adding species to the Stabilised List | March | | Australia |
| 3 | <i>Stabilised List</i> in Excel format | June | | Germany |
| | Adding species to the Stabilised List | June | | Australia |
| | Discrepancies between Stabilised List and GRIN Taxonomy | August | | Argentina |
| | Names in Table 9A | August | | Germany & Serbia |
| 4 | Catalpa genus not on Stabilised List | August | | Serbia |

| | | | | |
|---|--|-----------|--|-------------|
| 5 | Link updates for GRIN in Stabilised List | September | | Switzerland |
| | New project | | | |
| | New proposed finalisation date | | | |

9. PUR Purity Committee

| COMMITTEE MEMBERSHIP LIST (2019-2022) | | | | |
|--|---|------------------------|---------------|---------------------------|
| | Members | Country | Member since | |
| 1 | CHAIR: Ruojing 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 | 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 |
| No new methods were introduced in 2022 | | | | |
| | | | | |
| A2. Introduction of New Species | | | | |
| | Species and test | Proposed/ finalisation | collaboration | remarks /update /progress |
| 1. | Working weight determination for a New species introduced into ISTA Rules | In the work plan | BSC, STA | Completed in 2023 |
| A3. Introduction of Rules Changes | | | | |
| | Subject | Proposed /finalisation | collaboration | Remarks/ update /progress |
| 1 | Chapter 14 Revision | voted | ATC, FTS | proposed for 2023 |
| 2 | 3.7 Reporting results | voted | | proposed for 2023 |
| 3 | 4.7 Reporting results | Voted | | proposed for 2023 |
| 4 | 3.5.2.4 Indistinguishable species | voted | | Proposed for 2023 |

| | | | | |
|--|--|------------------------|---------------|--|
| 5 | 3.4.2. Calibration of the seed blower | Deferred to 2023 | | Work plan for 2023 |
| 6 | Revision Chapter 11: Coated seeds | Voted | | Proposed for 2023 |
| 7 | New species Malabar Spinach | Deferred to later date | STA, GER | Not passed the data evaluation |
| 8 | Calculator for working sample weight | Voted | STA, BSC | Proposed for 2023 |
| | | | | |
| 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 | | Project lead assigned |
| <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 | | Project for 2021-2023, project started in July 2021. Requested to ECOM for an extension to 2024 |
| 2 | Publish an inventory of references of Seed ID | In the work plan | | Project lead assigned, for 2023-2026 work plan |
| 3 | Publish FAQ in ISTA website to the PUR committee | In progress | | Project lead assigned for 2023-2026 work plan |
| 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 |
| | Project Summary on ISTA Special Project 19-1 | Submitted | ATC | Seed Testing International |
| | Calculator for working sample weight | Submitted | STA | 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 Uruguay (Spanish) | proposed | | In discussion |
| 2 | Workshop to India | Delivered | GER | Delivered |
| 3 | PUR Open meeting | completed | | Make a wide update to ISTA members |
| 4 | Webinar about new technology | Completed | ATC | Delivered on Aug 9, 2022 |
| 5 | Seminar, Advancements and innovation in seed | | ATC | Delivered on May 8, 2022 |

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|-----------------------------|---|---|--|---------------------------------------|
| | testing: from science to robust test | | | |
| | presentation | | | |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1 | Seed Mixture Round 11 | 2022 | PTC, accreditation department | Delivered by Andrea Jonitz for PT22-1 |
| F. SPECIAL PROJECTS | | | | |
| | Project title /subject | Proposed /finalisation | Collaboration | Remarks/ update/ progress |
| 1. | Assessment on available technologies of imaging and image analysis | 2019-2022 | ATC, GRM, other organisations | Officially started on November 2019 |
| 2. | Training materials for seed ID on the ISTA universal list | Completed work plan and author training | Four PUR members and their organizations | Project started in July 2021 |
| 3. | Look into ways of training in seed identification and practical purity work | ongoing | ECOM/ISTA accreditation department | One meeting was conducted |

E. QUESTIONS TO THE COMMITTEE

| | | | |
|----|---|------------|--------------------|
| | subject of question (see more details in PUR Teams) | date | country |
| 1 | PUR-#22-1 Seed Counter-Thousand Seed Weight Calibration | 2022-01-21 | ISTA Accreditation |
| 2 | PUR-#-2 Seed ID assistance | 2022-01-30 | Iran |
| 3 | PUR #22-03: Purity Analysis-Rounding Confirmation | 2022-02-10 | USA |
| 4 | PUR-#-4 Seed ID assistance | 2022-02-15 | Netherlands |
| 5 | PUR #22-05 Seed Mixture Clarification (Chapter 18) | 2022-02-22 | ISTA Accreditation |
| 6 | PUR #22-06 Result Reporting-3.7, and 1.4.1c | 2022-03-03 | ISTA Accreditation |
| 7 | PUR-#22-7 comparative tests (retest) and trend analysis in purity lab | 2022-03-13 | Turkey |
| 8 | PUR #22-08 Ergots in purity test (Chapter 3) | 2022-03-16 | Australia |
| 9 | PUR #22-09 Seed ID Inquiry | 2022-03-29 | France |
| 10 | PUR #22-10 Seed ID Inquiry | 2022-04-09 | Israel |
| 11 | PUR#22-11 OSD-Seed collection SOP | 2022-04-11 | Bangladesh |
| 12 | PUR#22-12 Coated seeds-Reporting | 2022-04-28 | ISTA Accreditation |
| 13 | PUR#22-13 Inert Matters of Encrusted Seeds? | 2022-05-05 | Mauritius |
| 14 | PUR#22-14 TSW - Weighing of Whole Pure seed fraction | 2022-07-05 | Kenya |
| 15 | PUR#22-15 Encrusted seed Reporting-Chapter 11 | 2022-08-30 | USA |
| 16 | PUR#22-16 Interpretation of minimum decimal place | 2022-9-21 | ISTA Accreditation |
| 17 | PUR# 22-17 Soil Definitions | 2022-10-05 | New Zealand |
| 18 | PUR#22-18 OSD working weight for vegetables | 2022-10-31 | Bangladesh |
| 19 | PUR#22-19 Vulpia sp or Vulpia myuros or Vulpia bromoides??? | 2022-11-03 | Denmark |
| 20 | PUR#22-20 PSD-38 | 2022-11-08 | Bangladesh |

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| 21 | PUR#22-21 Decimal place of Working sample and component parts. | 2022-11-09 | Canada |
| 22 | PUR#22-22 Interpretation of the Definition of Treated Seeds | 2022-11-16 | France |
| 23 | PUR#22-23 Undue effect PT 22-2 | 2022-11-22 | Germany |
| 24 | PUR#22-24 Question about other seed in purity on ISTA certificate | 2022-12-15 | Netherlands |
| | | | |

10. SHC Seed Health Committee

| COMMITTEE MEMBERSHIP LIST | | | | |
|--|--|----------------|------------------------------|--|
| | | | | change comments |
| 1 | CHAIR: Valerie Grimault | France | | Chair |
| | VICE-CHAIR: | | | Vice chair |
| 2 | Ilaria Alberti | Italy | | |
| 3 | Rouke Bakker | New Zealand | | |
| 4 | Mark Buimer | Netherlands | | |
| 5 | Gary Munkvold | United States | | |
| 6 | Rosa Piña González | Chile | | Since June 2016 |
| 7 | Dorota Szopinska | Poland | | |
| 8 | Xiulan Xu | China | | Since June 2017 |
| 9 | Stephan Brière | Canada | | Since June 2018 |
| 10 | Isabelle Serandat | France | | Since June 2019 |
| 11 | Marian Mc Ewan | United Kingdom | | Since June 2019 |
| 12 | Kohei Osaki | Japan | | Since June 2019 |
| 13 | Ruud Barnhoorn | Netherland | | Since June 2019 |
| 14 | Dr. Mahesh B | India | | Since June 2021 |
| 15 | Luciana Ferrand | Argentina | | Since June 2022 |
| A. RULES DEVELOPMENT | | | | |
| <u>A1. Introduction of New Methods</u> | | | | |
| | Method name | proposed | collaboration | remarks |
| | 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 | Test plan accepted by ISTA, based on plating on media and morphological identification, collection of isolates performed, analytical specificity performed, analytical sensitivity and robustness under progress (obtaining seed samples). CT planned 2023 |
| 2 | <i>Fusarium oxysporum</i> on tomato – new method | 2013-2023 | Naktuinbouw, GEVES, Microlab | Test plan accepted by ISTA, dilution plating, PCR for identification and pathogenicity test confirmation, analytical specificity, analytical sensitivity, selectivity and robustness performed. CT planned 2023 |
| 3 | <i>Ascochyta rabiei</i> chickpea | 2013-2023 | GEVES | Part of a research project at GEVES. Test plan accepted by ISTA, based on plating on media, morphological identification and pathogenicity test, collection of isolates performed, analytical specificity and sensitivity, robustness performed. CT planned 2023 |

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| 4 | <i>Tilletia</i> species/wheat | 2018-2023 | GEVES | Test plan accepted by ISTA, comparison of existing methods performed, variables between methods compared, choice of method to validate under progress, analytical sensitivity under progress |
| 5 | <i>Pseudomonas syringae</i> pv. <i>glycinea</i> | 2018-2023 | USDA | Project to compare existing methods in order to select one to validate, protocol chosen, isolate collection under progress. Test plan submitted to SHC reviewers, review performed, to analyse. |
| 7 | <i>Botrytis cinerea</i> on hemp seeds | 2019-2023 | CREA, GEVES | Test plan accepted by ISTA, analytical specificity and analytical sensitivity performed. CT planned 2023 |
| A3. Introduction of Rules Changes | | | | |
| | | | | <u>remarks</u> |
| | Subject | Proposed finalisation | collaboration | Update progress |
| 1 | PCR detection of <i>L. maculans</i> | 2019-2023 | Canadian Food Inspection Agency | Project phase |
| 2 | Alternative to 250µm sieve for method 7-031 | 2022 | GEVES | Report finalised, reviewed by SHC. Submitted and accepted rules proposals 2022. |
| 3 | Five year Method reviews | 2018-2023 | Mark Buimer | Questionnaire 2019, 2020, 2021 grouped, taking over from Terry Aveling, sent, answers received and analysis shared within SHC |
| 4 | <i>Ascochyta</i> pea comparing NUV/dark | 2016-X? | | Infected seeds to be found |
| 5 | New pictures, seed samples description and dilutions for bacteria | 2022-2023 | All members of SHC | Editorial modifications 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 to take over | 12 chapters reviewed sent for publication to ISTA secretariat |
| C. WORKSHOPS AND SEMINARS | | | | |
| C1. Training and education workshops | | | | |
| | | | | <u>remarks</u> |
| | Workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Seed Health Workshop Pretoria South Africa, Seed health methods using PCR, ELISA, dilution plating and indexing methods | 2020 | University Pretoria, Starke Ayres | Cancelled |
| 2 | Online training project | 2021-2022 | All SHC | Program prepared: 2 days of lectures + demonstration videos, presentations done, more than 100 participants |
| C2. Seminars | | | | |
| | | | | <u>remarks</u> |
| | Seminar subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | qPCR <i>Leptosphaeria maculans</i> + SH symposium | 2023 | Canadian Food Inspection Agency | Seed Health seminar and workshop, 2023 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> | 2021-2022 | Naktuinbouw | PT under progress, natural infection and artificial contamination |
| 2 | 7-031, <i>Ditylenchus dipsaci</i> | 2020-2021 | GEVES | Performed |
| 3 | 7-014, <i>Parastagonospora nodorum</i> | 2019-2022 | CREA | Planned 2023, looking for infected seed lots (none available yet) |
| 4 | 7-022, <i>Microdochium nivale</i> | 2019-2022 | SASA | Performed |
| 5 | 7-006 <i>Colletotrichum lindemuthianum</i> | 2019-2022 | NARO | Planned 2023 looking for infected seed lots (none available yet) |
| 4 | 7-016 <i>Phomopsis</i> complex | 2022-2025 | GEVES | PT under progress |
| F. SPECIAL PROJECTS | | | | |
| | Project title / subject | | | remarks |
| | collaborating committees | proposed | collaboration | update |
| | | finalisation | | progress |
| | ISTA Reference Pest List: | 2018-2022 | GEVES | 23 crops published, Project on other crops under progress. Paper for EPPO bulletin published |
| | Statistical tool | 2019-2022 | Statcom | Set up a tool on the model of the germination tool, no progress |
| | NSHS-ISTA collaboration | 2020-2022 | NSHS | Compare validation guidelines for mutual recognition Done and guidelines updated |
| | Insect detection/identification project | 2021-2022 | ATC, ANSES-LSV | Review of existing methods and evaluation of these methods on selected insect/crop models to detection and identification of insects on and in seeds. Project started January 2021, literature review done, questionnaire done, species/insect of interest chosen, method to evaluate chosen, obtention of healthy and infected samples and sampling, methods compared. Report and paper in STI under progress. |
| | Pathogen image collection | 2023-2025 | SGS, whole SHC, ISTA secretariat | Develop an image collection linked to the pests of the ISTA Reference Pest List, with explanations on morphology |
| <div> <div></div> New project <div></div> New proposed finalisation date </div> | | | | |

11. Statistics Committee

| COMMITTEE MEMBERSHIP LIST | | | | |
|---|---|---|------------------|---|
| | | | | change comments |
| 1 | CHAIR: Kirk Remund | United States | | |
| 2 | VICE-CHAIR: Jean-Louis Laffont | France | | |
| 3 | Gabriel Carré | France | | |
| 4 | Mustapha El Yakhlifi | France | | |
| 5 | Zhou Fang | United States | | |
| 6 | Bonnie Hong | United States | | |
| 7 | Oluseyi Odubote | United States | | |
| 8 | Thomas Michelin | Brazil | | |
| 9 | Bo-Jein Kuo | Separate Custom Territory of Taiwan, Penghu, Kinmen and Matsu | | |
| 10 | Ray Shillito | United States | | |
| A. RULES DEVELOPMENT | | | | |
| A1. Introduction of New Methods/New Species | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Statistical reviews of Test Plans and Validation Reports | On-going | Any TCOM | A total (introduction of new methods and introduction of new species) of 5 Test Plans reviewed |
| 2 | Contribution to the analysis of some Validation Studies | On-going | Any TCOM | GMO Prof. Test #23 ratings, analysis and report, AOSA Malabar Spinach germination analysis report, Peer method validation for tetrazolium test of Ulmus spp. L. analysis report, Moisture high oven moisture temperature tolerance analysis |
| A3. Introduction of Rules Changes | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | collaborating committees | finalisation | | progress |
| 1 | High oven temperature tolerance for seed moisture | On-going | Moisture | Analysis finished and in proposal for change |
| C. WORKSHOPS AND SEMINARS | | | | |
| C2. Seminars | | | | |
| | | | | remarks |
| | Subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Web-based resources for seed scientists' ISSS/ISTA/INSR webinar Virtual | December | ISTA Secretariat | Gave presentation "ISTA Statistics Committee and statistical seed testing tools" |
| F. SPECIAL PROJECTS | | | | |
| | project title / subject | | | Remarks |
| | collaborating committees | proposed | collaboration | Update |
| | | finalisation | | Progress |
| 1 | R package <i>ISTAGemMV</i> | May | | Rebuilt the package for R 4.0 and above |

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| 2 | Protocol and calculator for minimum working sample size for seed lot purity and OSD | November | Purity ECOM | Built a very useful calculator with a variance components model to calculate the minimum sample size for purity and OSD along with the protocol |
| 3 | Contribution to the work of the ISTA WG Vegetable Seed Industry | November | BSC ECOM | Conducted statistical and simulation calculations to show the number of tomato sub-lots that can be released on the same OIC |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | Date | From |
| 1 | Seed mixtures | | January | Belgium |
| 2 | GMO PT rating in presence of missing values | | January | GMO Committee |
| 3 | Comparing results from different seed analysts | | February | USA |
| 4 | Germination uncertainty vs number seeds tested | | March | France |
| 5 | Statistical training/tools resources | | May | United States |
| 6 | TSW trends with moisture | | May | Germany |
| 7 | GMO percentage estimates in presence of 2 events not stacked | | June | Italy |
| 8 | AOSA validation bridging to ISTA | | July | United States |
| 9 | Method Validation | | July | Czech Republic |
| 10 | SeedCalc | | August | United States |
| 11 | Data transformation | | August | Italy |
| 12 | Method Validation | | August | Germany |
| 13 | Vegetable sub-lots | | September | Switzerland |
| 14 | GMO Uncertainty | | October | Italy |
| 15 | Method Validation & LOD | | October | Argentina |
| 16 | Germination Tolerance Calculator | | October | Scotland |
| 17 | Vegetable Sub-lots | | November | Germany |

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 | Cathy Offord | Australia | * |
| 4 | Joseph Asomaning | Ghana | 2013 |
| 5 | Andreas Börner | Germany | 2010 |
| 6 | Sershen Naidoo | RSA | 2011 |

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| 7 | Christina Walters | USA | * |
| 8 | Xiang-Yun Yang | China | 2011 |
| 9 | Moctar Sacandé | Italy | 2001 |
| 10 | G V Jagadish | India | 2019 |
| 11 | Nelson Barbosa Machado-Neto | Brazil | 2022 |
| 12 | Umarani Sinniah | Malaysia | 2022 |
| 13 | Louise Colville | UK | 2022 |
| 14 | Elisa Monteze Bicalho | Brazil | 2022 |
| 15 | Irfan Afzal | Pakistan | 2022 |
| | ECOM Liaison officer: Keshavulu Kunusoth | | |

| A. DEVELOPMENT OF NEW SCIENTIFIC KNOWLEDGE AND TECHNOLOGY | | Proposed | |
|---|--|----------|----------------------------------|
| A1. Development of new scientific knowledge on optimum storage of recalcitrant seeds Innovation in seed storage | | | |
| <p><i>Syzygium mairé</i> is a highly threatened Myrtaceae tree species endemic to New Zealand. Due to its recalcitrant seed storage behaviour, cryopreservation is the only viable long-term ex situ conservation option for this species. This study investigated viability, oxidative stress, thermal properties, and ultrastructure of zygotic embryo axes (EAs) desiccated to various moisture contents (MC). Fresh EAs had a MC of c. 1.9 g/g with 100% viability but rapid desiccation to MC < 0.3 g/g significantly reduced viability and decreased the activities of the enzymatic antioxidants superoxide dismutase, catalase and glutathione peroxidase, with a sevenfold increase in the production of protein carbonyls and lipid peroxides. Differential Scanning Calorimetry analysis showed no thermal events in EAs desiccated to a MC of (Reference: van der Walt K, Burritt DJ & Nadarajan J. 2022. https://doi.org/10.3390/plants11081056)</p> | | 2025 | On target (completed in 2022) |
| A2. Hermatic storage of seed in flood affected areas of Pakistan | | | |
| <p>Floods in Pakistan is an unprecedented climate catastrophe. One-third of Pakistan was inundated as floods sweep through the country this summer. About 33 million people were affected and these torrential rains and flooding have killed more than 1,191 people, including 399 children. The flood waters have washed away roads, crops, infrastructure and bridges. Agriculture, a mainstay of Pakistan's economy, has been overwhelmed as fields drown. Wheat is a staple food and poor farmers are heavily dependent on it, so they have no wheat seed for the incoming sowing season. University of Agriculture, Faisalabad Pakistan in collaboration with Concern Worldwide provided food and feed</p> | | | On target (completed in 2022) |

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| supplies to the flood victims through relief camps in first phase and then provided seed of demand driven crops to ensure food security and poverty alleviation of small-scale farmers in the second phase. In final phase, hermetically sealed drums (160 L) and hermetic bags (50 kg capacity) were provided to the small farmers for preservation of quality seed for next growing season. | | | |
| | | | |
| | B. PUBLICATIONS | | |
| | <u>B1. Publications of the seed storage handbook</u> | | |
| | | Proposed | Collaboration |
| | | finalisation | |
| Handbook on Seed Storage | | 2024 | |
| <ol style="list-style-type: none"> 1. The seed storage handbook chapters have now been finalised with the followings: Chapter 1: Introduction to seed storage biology; Chapter 2: Drying protocols for seed and embryo axis; Chapter 3: Cooling methods and rates; Chapter 4: Seed packaging; Chapter 5: Storage environments; Chapter 6: Cryostorage of seeds and axis; Chapter 7: Short-lived and oily seed storage; Chapter 8: Prediction of seed storage behaviour and seed longevity; Chapter 9: Seed microbiome and storage; Chapter 10: Oxidative modifications during seed storage. Appendix 1 will cover the list of known seed storage behaviour - compiled from the Seed Information Database Kew. The chapter outline and drafts are on STO TCOM Team SharePoint site. | | On target | Over 30 external authors who are experts in different seed storage biology area |
| | <u>B2. Scientific information publications</u> | | |
| Publication title | | Proposed | Collaboration |
| | | finalisation | |
| | | 2025 | |
| Target: 20 scientific publications (book chapters and journal articles, including in SS&T) on seed storage. | | Target achieved | Various external collaborators |
| <ol style="list-style-type: none"> 1. Almeida RL, Saldanha AV, Rosa BL, Bicalho EM, Pereira and Eduardo Gusmao. (2022). Combined role of burying and fruit structures in maintenance of viability and vigor of macaúba palm seeds after fire The performance of macaúba palm seeds after fire. Global Science and Technology, v. 14, p. 8-12. 2. Pereira Aline Aparecida Silva, Nery Fernanda Carlota, Ferreira Rafael Agostinho, Silva Victor Navarro DA, Bernardes Mateus Moreira, Santos Heloisa Oliveira DOS and Bicalho Elisa Monteze. (2022). Can priming with ascorbic acid or nitric oxide improve the germinability of stored sunflower seeds? Journal of Seed Sciences (antiga Revista Brasileira de Sementes), v. 44, p. e202244012-11. | | | |

3. Santos Talita Raissa Silva' **Bicalho Elisa Monteze** and **Garcia Queila Souza**. (2022). Oxidant system and ABA drive germination in seeds of palm species with differences in desiccation tolerance. *Seed Science Research*, v. 31, p. 1-9.
4. van der Walt K, Burritt DJ and **Nadarajan J.** (2022). Impacts of Rapid Desiccation on Oxidative Status, Ultrastructure and Physiological Functions of *Syzygium mairi* (Myrtaceae) Zygotic Embryos in Preparation for Cryopreservation. *Plants*, 11, 1056. [https:// doi.org/10.3390/plants11081056](https://doi.org/10.3390/plants11081056).
5. Diantina S, Clavijo McCormick A, Pritchard HW, Millner J, **Nadarajan J**, Mastur M and McGill C. (2022). Orchid seed micro-morphometry: importance to species' biology, ecology, and conservation *Acta Hort.* 1334. ISHS 2022. DOI 10.17660/ActaHortic.2022.1334.19 Proc. II International Symposium on Tropical and Subtropical Ornamentals Eds.: Krisantini et al.
6. Pritchard HW, **Sershen**, Tsan FY, Wen B, Jaganathan GK, Calvi G, Pence, VC, Mattana E, Ferraz ID and Seal CE. (2022). Regeneration in recalcitrant-seeded species and risks from climate change. In *Plant Regeneration from Seeds* (pp. 259-273). Academic Press.
7. **Groot SPC**, van Litsenburg M-J, Kodde J, Hall RD, de Vos RCH and Mumm R (2022). Analyses of metabolic activity in peanuts under hermetic storage at different relative humidity levels. *Food Chemistry* 373:131020. <https://doi.org/10.1016/j.foodchem.2021.131020>
8. Prasad CTM, Kodde J, Angenent GC, de Vos RCH, Diez-Simon C, Mumm R, Hay FR, Siricharoen S, Yadava DK and **Groot SPC**. (2022). Experimental rice seed aging under elevated oxygen pressure: Methodology and mechanism. *Frontiers in Plant Science* 13. <https://doi.org/10.3389/fpls.2022.1050411>
9. Karin van der Walt (2022). *Ex situ* conservation of Myrtaceae. A response to Myrtle Rust in the Pacific Region. (PhD Thesis). School of Horticultural and Agricultural Science, Massey University, Palmerston North, New Zealand. 224 pp. (supervised by **Nadarajan J**).
10. María Alejandra Alfaro Pinto (2022). *Ex Situ* Conservation of Orchid Seeds of the *Lycaste* Genus. (Masters thesis). School of Horticultural and Agricultural Science, Massey University, Palmerston North, New Zealand. 145 pp. (supervised by **Nadarajan J**).
11. Amponsah, J.O., **Asomaning, J.M.**, Gakpetor, P.M and Gaveh, E.A (2022). Seed germination, storability and moisture sorption isotherms of the endangered African rosewood

(*Pterocarpus erinaceus*). Journal of Horticulture and Forestry, 14(1), 1-9. DOI: 10.5897/JHF2021.0681

12. Afonnikov D A, Komyshev E G, Efimov V M, Genaev M A, Koval V S, Gierke P U, **Börner A.** (2022). Relationship between the characteristics of bread wheat grains, storage time and germination. Plants 11: 35.
<https://dx.doi.org/10.3390/plants11010035>
13. Gianella M, Balestrazzi A, Ravasio A, Mondoni A, **Börner A**, Guzzon F. (2022). Comparative seed longevity under genebank storage and artificial ageing: a case study in heteromorphic wheat wild relatives. Plant Biol. 24: 836-845.
<https://doi.org/10.1111/plb.13421>
14. Gianella M, Doria E, Dondi D, Milanese C, Gallotti L, **Börner A**, Zannino L, Macovei A, Pagano A, Guzzon F, Biggiogera M, Balestrazzi A. (2022). Physiological and molecular aspects of seed longevity: exploring intra-species variation in eight *Pisum sativum* L. accessions. Physiol. Plant. 174: e13698.
<https://dx.doi.org/10.1111/ppl.13698>
15. Nagel M, Arc E, Rajjou L, Cueff G, Bailly M, Clément G, Sanchez-Vicente I, Bailly C, Seal C E, Roach T, Rolletschek H, Lorenzo O, **Börner A**, Kranner I. (2022). Impacts of drought and elevated temperature on the seeds of malting barley. Front. Plant Sci. 13: 1049323.
<https://dx.doi.org/10.3389/fpls.2022.1049323>
16. Rehman Arif M A, Afzal I, **Börner A** (2022). Genetic aspects and molecular causes of seed longevity in plants - a review. Plants 11: 598. <https://dx.doi.org/10.3390/plants11050598>
17. Rehman Arif M A, Agacka-Moldoch M, Qualset C O, **Börner A.** (2022). Mapping of additive and epistatic QTLs linked to seed longevity in bread wheat (*Triticum aestivum* L.). Cereal Res. Commun. 50: 709–715. <https://dx.doi.org/10.1007/s42976-021-00240-3>
18. Rehman Arif M A, Komyshev E G, Genaev M A, Koval V S, Shmakov N A, **Börner A**, Afonnikov D A. (2022). QTL Analysis for bread wheat seed size, shape and color characteristics estimated by digital image processing. Plants 11: 2105.
<https://dx.doi.org/10.3390/plants11162105>

C. SEMINARS

Proposed
finalisation

Collaboration

1

ISTA Congress, Cairo 8-11 May 2022. STO TCOM was represented virtually by Irfan Afzal, Steven Groot and Jayanthi Nadarajan. The technical committee presentation was made on 9th May 2022 with Jayanthi gave an update on the STO TCOM

May 2022

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|---|--|---|
| | <p>activity updates covering membership, seed storage handbook writing, ISTA special project, publications, conferences, and workshops. This was followed by Steven's talk on 'The quantitative effect of oxygen on seed storage' and Irfan's presentation covering quinoa seed priming and longevity, role of oxygen and moisture on seed longevity of rice, and dry chain technology for safe storage of maize seeds. At the end, Steven Groot on behalf of all members said special thanks to Hugh Pritchard for serving as STO TCOM Member for more than thirty years.</p> | Target achieved |
| 2 | <p>The ISTA Seed Symposium Athens, November 4-6, 2022. STO TCOM was represented by Andreaa Börner. For the first time, the symposium was held separately from the ISTA Congress because of the pandemic. The topic of the event was 'Quality Seed for Sustainable Agriculture' which was covered by five sessions:</p> <ul style="list-style-type: none"> • Seed microbial interaction • Heirloom and wild species for sustainability • New Technologies • Molecular understanding of seed dormancy and deterioration • Biomolecular techniques for species and varietal assessment <p>Each session started with a keynote speaker being an expert on the field. The symposium brought together 87 participants from 26 countries representing seed analysts, technologists, researchers and managers from universities, research institutes, government organisations, and the seed trade through several oral poster. It was a platform for the discussion of the latest advances in seed science and technology giving the opportunity to exchange ideas and information.</p> <p>Most of the presentations are available online and can be visited at:</p> <p>https://www.seedtest.org/en/annual-events/ista-seed-symposium-2022-product-10023.html</p> | <p>2021</p> <p>November 2022</p> <p>Target achieved</p> |
| 3 | <p>"Empowering Seed Industry 2022" conference and the international webinar on "Paving the way for Seed Industry Symposium 2022" were organised by the Department of Agriculture, Malaysia in collaboration with the Ministry of Agriculture and Food Industry (MAFI), ASEAN Seed Council (ASC), National Seed Association Malaysia (NSAM) and the Asia & Pacific Seed Association (APSA) on 10-12 October 2022. The event was organised in a hybrid form with the physical session held at the Pacific Regency Hotel and Suites Kuala Lumpur, Malaysia. Jayanthi Nadarajan represented ISTA Seed Storage Committee and presented an invited talk on "Seed storage and seed conservation".</p> | <p>October 2022</p> <p>Target achieved</p> |

| | | | |
|-----------------------------------|--|--------------|-----------------|
| 4 | ISSS/ISTA Webinar on fundamental and applied aspects of seeds <p>Two joint ISSS/ISTA webinars were held in June and December 2022. Louise Colville was in the organising committee for these webinars. The first was focussed on the topic of seed development and viability. The most recent webinar was held in collaboration with the International Network for Seed-based Restoration (INSR) on the topic of “Web-based resources for seed scientists”. This included a presentation by Simone Pedrini (Curtin University, Australia) on “Native seeds for ecological restoration and the new life of SID (Seed Information Database)”. Simone demonstrated the new look Seed information Database (https://ser-sid.org/) that was developed by the Royal Botanic Gardens Kew and is now hosted by the Society for Ecological Restoration. The seed viability calculators are maintained in the new interface and will continue to be a useful tool for researchers and seed bank managers.</p> <p>Details and recordings of previous ISSS/ISTA webinars are available here: https://www.seedtest.org/en/events/iss-ista-webinars.html</p> | 2022 | Target achieved |
| <u>D. WORKSHOPS</u> | | | |
| | | Proposed | Collaboration |
| | | finalisation | |
| 1 | A workshop on seed storage in Brazil in conjunction with the seed storage symposium <p>Discussions are underway on planning and organisation of this symposium. Preliminary conversations during the Brazilian seed congress have drawn some interests from potential collaborators i.e., two specialists in cryopreservation: Vania Azevedo – CGIAR and Rosa Lia - EMBRAPA Clima Temperado. Discussion on possible venue for this symposium is also ongoing e.g., ESALQ as it a better hub to the proximity of two big airports and all relevant logistics for this event. The possibilities for financial support from government agencies also will be explored.</p> | 2025 | On target |
| 2 | Regional Seed Storage Workshop in Pakistan <p>Planning meetings are expected to take place in 2023.</p> | 2023 | On target |
| <u>E. SPECIAL PROJECTS</u> | | | |
| | project title / subject | Proposed | Collaboration |
| | collaborating committees | finalisation | |

| | | | |
|---|--|-------------------|------------------------------|
| 1 | <p>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)]</p> <ul style="list-style-type: none"> A collaborative project between ISTA Moisture Committee and Storage committee looking at i) to assess current use and interest in using seed eRH to assess the moisture status of seeds; ii) preparation of seed samples with different moisture contents that will be sent to different laboratories around the world for eRH determination to understand the reproducibility of seed eRH measurement; and iii) development of a proposal for next steps towards incorporating eRH measurement into the ISTA Rules. Research is now underway to develop the method for inclusion in the ISTA Rules. | 2023 On Target | ISTA Seed Moisture Committee |
| 2 | <p>Storage optimization of primed seeds (Proposed by Serphen and Elisa)</p> <ul style="list-style-type: none"> This project proposal is being developed now and targeted for submission in January 2023. | 2025 On Target | |
| 3 | <p>Development of effective storage methods for short-lived primed seeds in certain vegetable crops (proposed by Jagadish and Steven)</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. | 2025 | |

13. 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 |
| | Gary Duffy | retired Oct. 22 | Ireland |
| 9 | Soo-Yuong Kim | left May 22 | Korea |
| | Linda Maile | retired May 22 | United Kingdom |
| 10 | Augusto Martinelli | | Argentina |
| 11 | Shaminder Miranpuri | | USA |
| 12 | Tauhid Parvez | | Canada |
| | Eunhee Soh | left May 22 | Korea |
| 13 | Asia Roberts-Yalland | new entry Jul. 22 | United Kingdom |
| 14 | Edith Daboue | new entry Jul. 22 | Burkina Faso |
| 15 | <i>free position</i> | <i>from Oct. 22</i> | |
| A. RULES DEVELOPMENT | | | |
| <u>A2. Introduction of New Species</u> | | | |
| | | | |
| | Species and test | proposed | collaboration |
| | | finalisation | |
| 1 | Ulmus spp. tetrazolium test | Aug 2022 | |
| 2 | <i>Glycine max</i> L. tetrazolium test | in progress, 2023 | |
| | | | |
| <u>A3. Introduction of Rules Changes</u> | | | |
| | | | |
| B. PUBLICATIONS | | | |
| | <u>B1. Publications to accompany the Rules</u> | | |

| | | | |
|---|--|------------------------------|-------------------------------|
| | | | |
| | B2. Training publications on specific seed testing topics | | |
| | | | |
| | 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 | |
| | | | |
| | C. WORKSHOPS AND SEMINARS | | |
| | C1. Training and education workshops | | |
| | | | |
| | workshop subject | proposed | collaboration |
| | location | finalisation | |
| 1 | ISTA TEZ MOI WS on wild species in Peri (VR) ITALY ,26-27 May 2023 | scheduled, 2023 | MOI |
| | | | |
| | C2. Seminars | | |
| | Seminar subject | proposed | collaboration |
| | location | finalisation | |
| | D. PROFICIENCY TESTS | | |
| | Proficiency test subject | proposed | collaboration |
| | location | finalisation | |
| 1 | PT 22-3 Lolium perenne | scheduled, 2023 | PTC, Accreditation Department |
| | E. QUESTIONS TO THE COMMITTEE | | |
| 1 | Carrot embryos by Rosa Piña, Chile | Aug 2022 | |
| 2 | Question from an ISTA auditor about the interpretation of Rule's paragraph 6.7 | Nov 2022 | |
| 3 | Question from Decima McCloy from NZ03 ISTA lab about the meaning of what is a viability test | Dec 2022 | |
| | F. SPECIAL PROJECTS | | |

| | | | |
|--|--|--|------------------------|
| | | | |
| <u>Leaders of working groups</u> | | | |
| <i>Glycine max</i> L. method validation | | | Ignacio Aranciaga (AR) |
| <i>Moringa oleifera</i> Lam. method validation | | | Steffi Kraemer (DE) |
| New TEZ Handbook | | | Jose Franca Neto (BR) |
| | | | |
| <u>contact persons</u> | | | |
| ECOM Liaison Officier | | | Sergio Pasquini (IT) |

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 |
| | Elisa Vieira | Brazil | Member since 2007 (left) |
| 6 | Hedwich Teunissen | Netherlands | Member since 2007 |
| 7 | Kae-Kang Hwu | Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu | Member since 2007 |
| 8 | Ksenija Markovic | Serbia | Member since 2013 |
| 9 | Ksenija Taski-Ajdukovic | Serbia | Member since 2010 |
| 10 | Keshavulu Kunusoth | India | Member since 2010 |
| | Verena Peterseil | Austria | Member since 2016 (move to a new job position during 2022 and left the committee) |
| 11 | Ana Patricia Fernandez Getino | Spain | Member since 2021 |
| 12 | Mariana Menoni | Uruguay | Member since 2021 |
| 13 | Sean Walkowiak | Canada | Member since 2022 |
| 14 | Free place | | To be fulfilled with any of the member's proposals. |
| 15 | Free place | | To be fulfilled with any of the member's proposals. |
| | | | |

| A. RULES DEVELOPMENT | | | | |
|---|--|--------------|--------------------------|---|
| A1. Introduction of New Methods | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | DNA-based methods for oats and peas. | 2021 | SEC, STA, | Leader: MJ Côté from Canada. Rules Proposals were voted on during ISTA Congress in Egypt and will be published in the Rules as of January 2023. |
| 2 | DNA-based methods for barley | 2022 | SEC, STA, | Leader: Verena Peterseil from Austria. Validations documents are under review. A draft for the rules proposal is already prepared. |
| 3 | 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. |
| 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 |
| | DNA-based methods for peas and oat | 2021 | SEC, STA | Positive vote during ISTA Congress in Egypt. |
| B. PUBLICATIONS | | | | |
| B1. Publications to accompany the Rules | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| | | | | |
| 2 | Handbook – DNA-based methods | 2022 | SEC, STA, GMO, Editorial | No progress since last report. |
| | | | | |
| B3. Scientific information publications | | | | |

| | | | | remarks |
|---|---|--------------------------------|------------------------------------|---|
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | VARCOM progress report 2022 was published on STI | 2022 | 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. | 2022 | SEC | Leader: Kunusoth Keshavulu, India. Organization started. Planned for June, 2019 but postponed due to insufficient registration. Now rescheduled to September / October, 2022. No progress on this. |
| <u>C2. Seminars</u> | | | | |
| | | | | Remarks |
| | Seminar subject | proposed | collaboration | Update |
| | location | finalisation | | Progress |
| 1 | Participation at the UPOV TWM meeting | September 2022, online meeting | SEC | Ana Vicario presented ISTA and VARCOM activities during the meeting |
| 2 | Participation at the SAA Congress, IP group meeting and Mercosur Meeting | September 2022 | SEC | Ana Vicario presented ISTA and VARCOM activities during those meetings |
| D. PROFICIENCY TESTS | | | | |
| | Proficiency test subject | proposed | collaboration | Update |
| | location | finalisation | | Progress |
| 1 | DNA-based methods (SSR) - wheat | 2021 | STA, SEC, Accreditation Department | PT"1" in progress. Samples already sent to participating laboratories. Final results will be reported by March 2023. Samples for wheat PT are kept, prepared and shipped by Canadian Grain Commission. |
| E. SPECIAL PROJECTS | | | | |
| | project title / subject | | | Remarks |
| | collaborating committees | proposed | collaboration | Update |
| | | finalisation | | Progress |
| | Artificial Intelligence for variety identification | 2024 | ATC, STA, SEC | A proposal will be presented before January 20 th 2023 for evaluation of the performance of a neuronal network |

| | | | | |
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| | | | | 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. |
| F. QUESTIONS TO THE COMMITTEE | | | | |
| | | | | |
| | subject of question | | | from |
| | | | | country |
| | None | | | |
| G: Further Comments - Responsibilities | | | | |
| <u>leader of working groups</u> | | | | |
| 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 | | | Verena Peterseil (AT) and Doris Kaiser (AT) |
| 4 | Handbook leader | | | Marie-Claude Gagnon (CA) |
| 5 | Lolium WG leader | | | Giovanni López (NL) |
| | | | | |
| <u>contact persons</u> | | | | |
| | 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 | Tim Loeffler | United States | | |
| 10 | Stan Matthews | United Kingdom | | |
| 11 | Carey Matthiessen | Canada | | |
| 12 | Gillian McLaren | United Kingdom | | |
| 13 | Takashi Shinohara | Japan | | |
| 14 | Marie-Hélène Wagner | France | | |
| 15 | Yan Rong Wang | China | | |
| A. RULES DEVELOPMENT | | | | |
| A1. Introduction of New Methods | | | | |
| | | | | remarks |
| | Method name | proposed | collaboration | update |
| | subject | finalisation | | progress |
| 1 | Cold test for <i>Zea mays</i> | 2024 | | In progress |
| A2. Introduction of New Species | | | | |
| | | | | remarks |
| | Species and test | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Radicle emergence test: <i>Allium cepa</i> | 2024 | | New seed source being evaluated prior to comparative test |
| 2 | Radicle emergence test: <i>Glycine max</i> | 2023 | | Data from comparative test being analysed . |
| 3 | Radicle emergence and conductivity tests as potential vigour tests for five vegetable Brassica species. (ISTA special project) | 2023 | Germination committee | Comparative test for radicle emergence completed and data analysed. |
| 4 | Radicle emergence test for spinach (<i>Spinacia oleracea</i>) | 2022 | | Work delayed |

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| 5 | Radicle emergence test for sweet corn (<i>Zea mays</i> convar. <i>saccharata</i>) | 2023 | | Work continues |
| 6 | Radicle emergence test for dill (<i>Anethum graveolens</i>) | 2023 | | Laboratory and field tests completed. Further work in progress. |
| 7 | Field emergence in barley: comparisons to relate to radicle emergence test | 2023 | | Work continues |
| 8 | Radicle emergence test for <i>Oryza sativa</i> | 2023 | | Work continues |
| 9 | Radicle emergence test for <i>Sorghum bicolor</i> | 2023 | | Work continues |
| A3. Introduction of Rules Changes | | | | |
| | | | | |
| B. PUBLICATIONS 2020 | | | | |
| B3. Scientific information publications | | | | |
| | | | | remarks |
| | Publication title | proposed | collaboration | update |
| | | finalisation | | progress |
| 1 | Estimation of seed longevity in onion seed lots by a radicle emergence test in artificial ageing Conditions | 2022 | Ibrahim Demir, Canan Oztokat Kuzucu, Sıtkı Ermis, Nurcan Memis and Neslihan Kadioglu | <i>Horticulturae</i> 8 (11), 1063, 1-10 |
| 2 | The radicle emergence test and storage longevity of cucurbit rootstock seed lots | 2022 | Sıtkı Ermis, Güleda Oktem, Kazım Mavi, Fiona R. Hay and Ibrahim Demir | <i>Seed Science and Technology</i> , 50 , 1-10. |
| 3 | Radicle emergence (RE) test identifies differences in normal germination percentages (NG) of watermelon, lettuce and carrot seed lots | 2022 | Serpil Mis, Sıtkı Ermis, Alison A. Powell and Ibrahim Demir | <i>Seed Science and Technology</i> , 50 , 257-267 |
| 4 | Growing season climate affects phenological development, seed yield and seed quality of dill (<i>Anethum graveolens</i>) | 2022 | Ozlem Alan, Damla Kanturer, Alison Powell and Hulya. Ilbi, | <i>Seed Science and Technology</i> , 50 , 11-20. |
| 5 | Seed vigour in the 21 st century | 2022 | Alison Powell | <i>Seed Science and Technology</i> , 50 , Supplement 1, October 2022, pp. 45-73 |
| 6 | Revision of Vigour Test Handbook | 2022 | Vigour Committee | Drafts of 6 chapters completed; the remainder in progress |
| 7 | RGB image analysis assesses radicle emergence to predict normal germination and vigour in Brassica species | 2022 | Takashi Shinohara, Sylvie Ducournau, Stan Matthews, Marie-Helene Wagner and Alison Powell GER, STA | Oral presentation at ISTA Seed Symposium, Athens, November 2022. Presented by Sylvie Ducournau |
| 8 | Radicle emergence test can be assessed using multispectral imaging for <i>Brassica oleracea</i> | 2022 | Marie-Hélène Wagner, Audrey Dupont, Stan Matthews, Alison Powell, Takashi Shinohara, Sylvie Ducournau | Oral presentation at ISTA Seed Symposium, Athens, November 2022 Presented by Marie-Hélène Wagner |

| | | | | |
|--|--|--------------|--|--|
| | | | GER, STA | |
| 9 | Seed germination and dormancy biology in some taxa and populations of the genus <i>Fritillaria</i> | 2022 | Mohammad Khajeh Hosseini and H. Sharifi | Oral presentation at ISTA Seed Symposium, Athens, November 2022 Presented by Mohammad Khajeh Hosseini |
| 10 | Investigation on storage potential of camelina (<i>Camelina sativa</i> L.) seeds | 2022 | R. Cheshmeh-Sefidi, M. Khajeh Hosseini, S. Jalali-Honarmand | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 11 | Relationship between rate of cell cycle and seed vigour of wheat seeds | 2022 | N. Salehan, M. Khajeh Hosseini, A. Seifi | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 12 | Organic seed production of pepper (<i>Capsicum annuum</i> L.) | 2022 | M. Khajeh Hosseini, F. Fallahpour, M. Cheshmi, Z. Yazdi | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 13 | Effect of climatic and farm management factors on the quality and nutritional value of produced wheat seeds | 2022 | M. Khajeh Hosseini, M. Cheshmi, F. Fallahpour, M. Ghasempour, M. Fatemi, M. Mohammadi, M. Mamarabadi, M. Mazaheri, S. H. Sanaeinejad | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 14 | Establishment of automatic paddy seedling evaluation system | 2022 | I-Cheng Chen, Jo-Ping Cheng, An-Qin Xu, Shi-Jie Luo, Wei-Chung Tsai, Po-yi Chou and Kuo-Yi Huang | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 15 | Seed vigor enhancement to meet the quality requirement for pelleting in leafy celery | 2022 | Wen-Ju Yang, Ching Chen and I-Cheng Chen | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 16 | The complete correlation analysis among diverse seed performance parameters in tomato seed lots | 2022 | Wen-Ju Yang, Chin-Chu Jiang and I-Cheng Chen | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 17 | Radicle emergence test to estimate seed vigour in <i>Glycine max</i> (L. Merr) | 2022 | C. Gallo, V. Anca, L. Magnano, M.A. Petinari, G. Pischedda, M. Martínez, M.; M. Arango, | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 18 | The use of grafted seedlings to increase seed yield and quality in melon | 2022 | H. Ilbi. and B. Korkmaz | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| 19 | The AVATARS Project – An interdisciplinary approach introducing new digital technologies for seed quality analysis in oilseed rape (<i>Brassica napus</i> L.) | 2022 | J. Zur, S. Goertz, M. Enders, A. Abbadi | Poster presentation at ISTA Seed Symposium, Athens, November 2022 |
| C. WORKSHOPS AND SEMINARS | | | | |
| <u>C1. Training and education workshops</u> | | | | |
| | | | | remarks |
| | workshop subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| 1 | Tetrazolium vigour method on <i>Glycine max</i> , Oliveros, Argentina | | | Presented by Carina Gallo |
| D. PROFICIENCY TESTS | | | | |

| | | | | |
|--------------------------------------|--|--------------|---|---|
| | Proficiency test subject | proposed | collaboration | update |
| | location | finalisation | | progress |
| | | | | |
| 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 | Vigour of seed produced under organic conditions will be examined |
| E. QUESTIONS TO THE COMMITTEE | | | | |
| | subject of question | | | from |
| | | | | country |
| 1 | Interpretation of EC data | | 11 January | South Africa |
| 2 | Germination after the CD test: is total germination or normal germination assessed? | | 20 January | Turkey |
| 3 | EC for Vigna unguiculata | | 15 March | Italy |
| 4 | Tetrazolium test for Glycine max | | 24 June | Country unknown |
| 5 | Conditions for EC test of tomato: single or bulk seeds, water volume, number of seeds? | | 11 July | Japan |
| 6 | Why are petit pois varieties of peas excluded from EC test? | | 7 September | France |
| 7 | Water holding capacity for the cold test for maize | | 18 October | South Africa |
| 8 | Tests for germination and germination energy for onion and other vegetable species | | 17 November | Sweden |
| 9 | What is a suitable vigour test method for sorghum? | | 25 November | South Africa |

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| | New project |
| | New proposed finalisation date |