Minutes of the Ordinary General Meeting 2016

This document contains the Minutes of the Ordinary General Meeting 2016, published on the ISTA web site within two months following the Ordinary General Meeting as defined in the ISTA Articles. If there are no comments requiring amendment to the minutes within the subsequent two month period, the minutes will be considered approved. If there are comments and the comments are accepted by the Executive Committee, then the minutes including the comments will be considered approved and published on the ISTA web site. Any comments about these minutes will be considered at the Ordinary General Meeting 2017, to be held in June at the Renaissance Denver Stapleton Hotel, Denver, Colorado, USA, under Agenda point 4. Comments about the Minutes of the previous meeting.
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The Ordinary General Meeting of the Association

1. Call to Order

The President of ISTA, Joël Léchappé (France), called the Meeting to order at 08:30 h.

2. President’s Address

The President: “Mr and Madame Presidents, Mr President of the National Organizing Committee, Mr and Madame Directors, ladies and gentlemen, dear colleagues: on behalf of ISTA, I have great pleasure in welcoming you to the Ordinary General Meeting here on 21 June 2016. I declare the Ordinary General Meeting 2016 open. Today is the last day of the official programme of the Congress. It was preceded by two workshops: a Germination Workshop, with the aim to present and discuss the principles of the ISTA germination test, including seedling evaluation and quality assurance aspects. 35 participants attended the workshop, coming from 22 countries and distinct economies. The lead speakers were Sylvie Ducournau from France and Christine Herzog from Switzerland, and it was hosted by the Seed Testing Laboratory of the Agricultural Research Centre in Saku. The aim of the Quality Assurance Workshop for advanced laboratories was to improve quality assurance in seed testing laboratories according to the ISTA Accreditation Standard. The workshop, with lead speakers Florina Palada from Switzerland and Ronald Don from Scotland had 21 participants from 20 countries and distinct economies. It took place at the Board of Agriculture in Saku, and all participants expressed their satisfaction at the very friendly atmosphere at both workshops.

“The official programme started with the Seed Symposium, chaired by Laura Bowden, Seed Symposium Convenor. The theme of the Symposium was “Progress in Seed Testing and Seed Quality Improvements through Science and Technology”. The five oral sessions and two poster sessions were the opportunity for seed science specialists and applied seed engineers from stake and industry laboratory representatives to meet and exchange scientific discoveries and technical innovations, as well as their practical applications. The best presentations were rewarded during the official dinner.

“The Symposium was followed by the presentation of the TCOM chairs and the technical work of their Committees. It demonstrated the great amount of work done by the Technical Committees and their crucial role to propose innovative and efficient seed testing methods to be included into the ISTA Rules. Science and its technical applications were discussed during the forum, chaired by Alison Powell, to better define how to meet the needs of seed testing in developed and developing laboratories and countries. I am very pleased to announce that there were more than 250 people attending the Congress, from 53 countries and distinct economies, and 41 voting delegates.

“As you know, today is the regulatory meeting of our Association, called the Ordinary General Meeting. I bring to you the regrets from our Honorary Life President, Attilio Lovato, and his best wishes for success of our Meeting today. I would like to extend a very warm welcome to the invited organizations, and thank them for participating in the Congress and the Ordinary General Meeting today. Representing international organizations, I would like to mention the ISF, with Secretary General Michael Keller and Piero Sismondo; ISSS, with President Françoise Corbineau; the OECD, represented by Eddie Goldschagg; UPOV, represented by Peter Button, Deputy Secretary General; and representing the regional organizations: ABRATES, Francisco Krzyzanowski; AFSTA, Charles Nyachae; AOSA, Ernest Allen; ICARDA, Zewdie
Bishaw; and SCST, David Johnston. Thank you for attending our Meetings; it’s very important for us to have you among us.

“This OGM is the third Ordinary General Meeting of the term 2013-2016. It is the last meeting of the current Executive Committee, and the Voting Delegates will vote for the new Executive Committee, which will be chaired by Craig McGill, current Vice-President, elected in 2013 at the 30th Congress in Antalya. The Order of Business will appear on the screen, and is also in the document OGM16-01.”

Agenda of the Ordinary General Meeting of the Association

1. Call to order
2. President’s Address
3. Roll Call of Designated Members entitled to vote
4. Comments about the Minutes of the previous Ordinary General Meeting
5. Report of the Executive Committee
6. Report of the Secretary General
7. Consideration and Adoption of the proposed Changes to the ISTA Articles
8. ISTA Strategy 2016/2019
9. Election of Officers on Members at large of the Executive Committee
10. Fixation of annual subscriptions
11. Consideration and Adoption of the proposed Rules Changes
12. Consideration and Adoption of the Reports of the Technical Committees
13. Any other business raised by a Member, of which notice in writing has been received by the Secretary General at least two months prior to the date of the meeting
14. Any other business raised by consent of the Executive Committee
15. Announcement of the place and date for the next Ordinary General Meeting
16. President’s closing address
17. Adjournment

“I want to mention a modification of agenda point 7. The final agenda is available as a hard copy. Please not that the votes on ordinary regulatory topics will be using the keypad devices, as in Montevideo last year. The votes to elect the Executive Committee members will be using the ballot box.

“I want to draw your attention to specific agenda points. Under the agenda point 5, Report of the Executive Committee, a specific item on implications of the EU regulation 765/2008 and the recognition of the ISTA accreditation within the EU will be presented for update and discussion. The Strategy proposal for the triennium, which we discussed yesterday afternoon, for the triennium 2016-2019, will be voted under agenda point 7.2, and this is an amendment of the agenda for the OGM, as it was posted on the web site. Agenda point 13, Any other business raised by a Member, the Secretariat did not receive any proposal. Agenda point 14, Any other business raised by consent of the Executive Committee, the Executive submitted to the ISTA Ordinary General Meeting 2016 for discussion and voting an information document OGM16-10, called International Seed Sampling Certificate, and a document OGM16-10a, Proposed wording for the motion on the International Seed Sampling Certificate. As required by the Articles of the Association, the relevant document were posted on the 21 April 2016 to the Designated Authorities, all ISTA Members, all stakeholders and observer organization. It was posted for information two months prior to the ISTA Ordinary General Meeting, and has been available on the ISTA web site. Please note
that the document OGM16-10a, Proposed wording on the Sampling Certificate, was posted on the 27 April as an additional explanatory document.

“The agenda points will be presented and discussed for a vote, as usual, and the text to be voted will appear on the screen.

“Do you have any question about this agenda? Do you approve the agenda with the modification on the vote on the Strategy and as it appear on the screen? I propose, if you agree, to approve it by applause.”

The modified agenda was approved by applause.

“These agenda point have been carefully prepared by the ECOM members with input of the Technical Committee, the Rules Chair and the ISTA Secretariat.

“I would like to thank now the ECOM members sitting on the stage and the Secretariat, sitting in front to stand, and I would everybody to thank them for their commitment and the exemplary standard of their work. Thank you very much.”

3. Roll Call of Designated Members entitled to vote

The President of ISTA, Joël Léchappé (France):

“Now, the Secretary General will call the roll.”

Australia
Lindsay Cook
Australia
Andreas Ratzenboeck
Belgium
Anja Ritserveldt
Brazil
Miriam A.G.L. Alvisi
Canada
Steve Jones
Chile
Luis Riveros Cuadra
Denmark
Grethe Tarp
Estonia
Mari Jürmann
Finland
Leena Pietilä
France
Joël Léchappé
Germany
Berta Killermann
Hungary
Zita Ripka
India
Keshavulu Kunusoth
Iran
Aidin Hamidi
Israel
Lea Mazor
Italy
Rita Zecchinelli
Japan
Masatoshi Sato
Latvia
Velta Evelone
Luxembourg
Franz Kremer
Netherlands
Marcel Toonen
New Zealand
Craig R. McGill
Norway
Birgitte Henriksen
Philippines
Ruel C. Gesmundo
Poland
Irena Gera
Republic of Korea
Eunhee Soh
Russian Federation
Alexander M. Malko
S.C.T. of Taiwan, Penghu, Kinmen and Matsu
Tso-Chi Yang
Serbia
Tanja Petrovic
Slovak Republic
Zuzana Kochanová
South Africa
Pamela Strauss
Sri Lanka
Yasintha Liyanage
Sweden
Karin Sperlingsson
Switzerland
Christine Herzig
Thailand
Tudsanee Srisopha
Tunisia
Salwa Ben Fredj
Turkey
Mehmet Sahin
The Secretary General, Dr. Beni Kaufman:

"You see on the screen the proposal for the vote counters, these will be the people that will help me to count the calls of the elections for the ECOM Vice-President, and they will be Cheryl Dollard, Eddie Goldschagg, Alison Powell, Zewdie Bishaw, nominated by us, and agreed to do this chore.

If these people meet your approval, please applause."

The proposal for the vote counters was approved by applause.

4. Comments about the minutes of the previous Meeting

The President of ISTA, Joël Léchappé (France):

“According to the Articles of the Association, I am honoured and pleased to present the Report of the Executive Committee.

“This report has been prepared by the ECOM members, with specific input from the leaders of the ECOM Working Groups. The full text is in the document OGM 16-03, called Activity Report of the ISTA Committee 2015. This document has been sent to the members 2 months before the Audit of the General Meeting, and more information is available in the April issue of ISTA, in the Present Report.

“This report focuses on the main achievements since the last year’s Ordinary General Meeting from Montevideo, and I will start with the presentation of the ECOM members, you have already seen them on the stage, reminder of the goals, followed by the contribution of the ECOM to the work of Technical Committees, plus review of the work by the ECOM Working Groups.

“Again, I will like to warmly thank all members of the 2013 to 2016 Executive Committee, they represent all regions of the world, all are very active as Chairs or members of ECOM Working Groups, and they are also liaison offers for the Technical Committees.

“I am happy to announce that the ECOM appointed, Ignacio Aranciaga, from Argentina, has substitute Cecilia Jones, who resigned in 2015. I thank the Argentinean designated authorities, the organization Ignacio belongs to, for their support on the designation of Ignacio. Unfortunately, Ignacio couldn’t join us this week, and he will not be there for the presentation later on.

“This appointment of Ignacio was made in accordance with ISTA Article 15C.3, Ignacio started to work as ECOM member in April 2016. He has been a member of
the Executive Committee until today, the General Ordinary Meeting, at which the election of officers and members will be held, and we know from the list, that he will candidate for.

“Now, the goals from 2013 to 2016, works of the Executive Committee, have been to implement the strategy on ISTA Congress 2013. The key objectives are listed in the document OGM 13-09.

“The Action Plan 2015 - First Semester 2016, can be found in the Activity Report of the ISTA Committee 2015. Both documents can be found on the ISTA website.

“As a general policy, the whole ECOM is strongly involved in supporting the ISTA Technical Committees.”

“The ECOM liaison officers have the mission to listen to the needs of the Technical Committees, and provide the link with the ECOM. So, we advise on support the TCOMs, when they apply for financial support, and in 2015 were 10 applications, 7 reported expenses, among which, 4 were for travel to attend meetings. In 2015, several TCOMs expressed a strong need for support to develop the statistical capacity of the committees, to facilitate the validation of methods.

“The ECOM, with the contribution of Nadine, Technical Coordinator, decided to support financially the training and statistics for up to 2 members of each committee. Ten committees, represented by 22 members, will participate in a training workshop in October, and they will be trained by the statistical committee.

“According to the ECOM policy to involve more the Technical Committee into international representation of ISTA, 4 TCOM members represented ISTA at international meetings. The ECOM is frequently questioned about membership of the Technical Committees, or the capacity of ISTA in funding for travelling, or developing new projects.

“To answer these questions, the ECOM, started two projects, which may be slightly modified by the new ECOM if necessary, and we have to review the conditions of those projects: in becoming a member of Technical Committees, to improve the efficiency, to attract more volunteers, and a new project which is being dealt with, by a new working group, how is the best to find the ISTA TCOMs, and proficiency tests activities.

“As presented the previous years, the ECOM is organized in Working Groups, to work on specific items, and were 7 Working Groups, in 2015-2016. The result of the work of these Working Groups will be presented in alphabetic order:

**Accreditation**

The Executive Committee Working Group on Accreditation is chaired by Rita Zecchinelli, and the main task of the Working Group was to support ISTA Accreditation Department, and has been completely participating in definition of a new policy, for contracting system and technical auditors, development of the QA system, the recruitment of the head of accreditation department, a new system auditor, analyzing suspension of accreditation, when appropriate, and answering questions from members.

The Accreditation Working Group has also contributed in the work of larger group of topics, such as accreditation for sampling only, the experiment on International Seed Sampling Certificate, the EU question on recognition of the accreditation, and the revision of the audit structure, including the 5% reduction of fees for early payment.”

**Articles**

“The Articles Working Group is chaired by Craig R. McGill. Were not changes of the article in 2015, the working group maintains permanent attention to any changes in ISTA, which may impact or be against the articles.

“Consultation with lawyers is thought when necessary.

“In 2016, the working group prepared 2 proposals which will be submitted for vote today, and one is regarding the position of the ECOM for the ISTA Congress
Organizer, the second proposal is to create a new position of Immediate Past President of the ECOM.”

Events
“The Events Working Group is chaired by Berta Killermann, and I would like to mention that Laura Bowden, same position, is also a member of this working group.
“The role of the working group is to prepare, and to propose to executive committee the policy on events.
“In 2015, the Working Group on Events has supported the local organizers of meetings, seminars or workshops.
“Margus Friedenthal, Executive Committee Member, has represented the Estonian organizers in the working group, and you all know that Margus has done a tremendous work to guarantee the high quality of the organization of this year congress. Thank you, Margus, thank you very much.
“The Working Group has proposed new structures, new contents of the meetings, such as a merge of the seminar of the Seed Seminar with the Seed Symposium, here in Tallinn, and we have all seen that has been very successful to merge both, and the Working Group also proposed an organization of the TCOM presentations, or to adapt to the joint meeting, in Colorado USA, next year.
“The Event Working Group has also organized new side meetings, to help joining ISTA at annual meetings, and this has started last year in Montevideo, with a seed industry, meetings with non-ISTA members, and this year, these meetings, have been extended to more meetings, to include international organizations, and meeting with designated authorities.”

International Relations
“The International Relations Working Group is chaired by Grethe Tarp. The goals of this working group are to propose international relation policies, to coordinate representation of ISTA in international flora, and optimise ISTA’s contribution to this flora.
“Six areas of international flora have been defined, where ISTA wants to be present, and straighten its participation. The first area is collaboration with a regulatory and international organization, the second is the organization related to accreditation, third area is a contribution to scientific flora, and collaboration with other scientific associations, the fourth is a technical collaboration with other organizations, to harmonize seed-testing methods worldwide, where ISTA wants to be proactive. The fifth is collaboration on mutual information with seed industry, which is major topic for ISTA. And the sixth area of the International Policies is a collaboration which has goal to be a platform for keen information on seeds, developments of workshops, as presented yesterday by Peter Button.
“The Working Groups takes care of a good coordination with the goals and travel plans on marketing.”

Management and Finances
“Management and Finances Working Group is chaired by Steve Jones. All Executive Committee members belong to this Management and Finances group.
“Sub-working group, with a small number of people, Steve Jones, Craig R. McGill, Rita Zacchinelli, Joël Léchappé, are preparing the topics to be discussed by the whole ECOM.
“The Management and Finances Working Group deals with general management of the association, and makes links between the other ECOM Working Groups, for better interoperability of topics. The Working Group interacts with external advisors, via secretary general, for specific topics, such as legal advice.
“In 2015, and first semester 2016, the Working Group worked on general policy topics, such as the question of the recognition of ISTA accreditation by EU, translation policy of the rules in Spanish, sorting activities or specific projects, such as HR activities, website, and electronic certificates, and complaints or requests from members, when appropriate.

“The Working Group on Management and Finances worked on new ongoing projects, among which are the fusibility of Electronic Orange International Certificates, the approval of Secretary General plans for the new website, and publication of ISTA, definition of terms of reference for vegetable working group, set-up in Montevideo, and its membership in close collaboration with ISF.

“This Working Group is also tightly involved in HR, or finances of the association, and the HR work focuses on giving headlines and supporting the Secretary General plans. The work on finances focuses in discussing the General Policy, for allocating resources for expenses and analyses on approval of the budget.”

**Marketing**

“The Marketing Working Group is chaired by Berta Killermann. The goals are to define the policy from marketing, and promotion of ISTA, and to approve and contribute to extension plans implemented by the secretariat.

“There is a close collaboration on interaction with the secretariat, Head of Marketing, and the marketing policy is based on two complementary approaches: horizontal approach, which is aimed at promoting ISTA in all regions of the world, and this is done via the participation into meetings and congresses of regional seed trade association, and other actions are informing on ISTA services, such as the Accreditation Scheme, or the benefit of workshops and trainings. The vertical approach, is based on campaigns targeted to select geographical areas, where needs have been expressed by the countries concerned, or identified by ISTA.

“From this General Policy, Secretariat has developed Marketing business plans.

“The Secretariat has also developed very good tools, such as documents, videos, links to social media, and, I invite you to have a look at these marketing tools on the ISTA website. Both, vertical and horizontal approaches in marketing, aim to encourage new accredited lab members and to increase your awareness of ISTA role in seed testing and sampling.”

**Publications**

“The Publications Working Group, the seventh working group, is chaired by Craig R. McGill. The goals are to define ISTA policy on Publications, and to contribute on support to the work of the Secretariat, Secretary General and Publication Specialist, Jonathan Taylor.

“Significant progress has been made in the three main areas in 2015, the first is generic contracts for translation, which have been developed, a contract for the translation of the rules into other languages than English, German and French, where ISTA has requested the translation has been developed. Second area is the translation of ISTA rules into Spanish, has been developed as part of the ISTA strategy to facilitate access to the ISTA rules. In 2015, the ECOM decided to strongly encourage a support for translation of the ISTA rules into Spanish, this has been agreed with, and has been taken by Fabio Gorian, thanks to the contribution of Rita Zecchinelli. Thank you also to Rosa Pina, from Chile, who volunteered, and took the initiative to translate the chapter 7 - Seed Testing Methods. These rules in Spanish should be available by the end of this year. This Working Group is also looking at developing the electronic publications of handbooks and proposals have already been drafted by Jonathan Taylor, in the Secretariat.

“To conclude, I will summarize main areas where progresses have been significant during the term 2013-2016, and the first main area is the ISTA Rules. New methods have been developed by the Technical Committees, the availability of the ISTA Rules have been improved via the electronic version, and the translation policy. Research and application of science to the technical work have been strengthened, the policy to
support the Technical Committees has been developed and implemented. The ISTA Accreditation System has been reviewed in many aspects. A new policy for international relations will facilitate getting the needs of the seeds sector, and help promote ISTA to a wide audience. And, of course, all this is strongly supported by the Secretariat strengthen in term of missions, organizational staff, HR Management. It is also supported by the marketing approach to communicate on promoting ISTA. And, finally, finances, including reserves allocated to projects give optimistic perspectives.

“I thank all the colleagues and members of the Executive Committee, Beni Kaufman-Secretary General, colleagues of the Secretariat, the chairs and members of the Technical Committees, and all ISTA colleagues who have contributed achieving the actions and missions described. Thank you very much.”

The speech ended in applause.

[179 00:03]
The President of ISTA, Joël Léchappé asked if are any questions or comments, and nobody had any.

The Secretary General, Dr Beni Kaufman, asked the participants to vote for the approval of the Report of the Executive Committee.

The Report of the Executive Committee was approved.

**EU recognition of ISTA Accreditation**

Joël Léchappé is giving the update regarding the Recognition of the World Accreditation, in regards to the EU regulations 765.

[180 00:01]
The President of ISTA, Joël Léchappé:

“As you know, the regulation is EU 765 from 2008, which is called Requirements for Accreditation on Market Surveillance related to the Marketing of Product. This regulation says that should be only one accreditation body per EU country, meaning that the use of the world accreditation is restricted. As a consequence, ISTA cannot, within EU, use the world accreditation to recognize the competency of the ISTA laboratories. There was a meeting between ISTA and EU on September 2015, and the statement made by the EU is that EU cannot recognize ISTA as an accreditation body, ISTA cannot use the accreditation in EU countries, but ISTA can continue to audit. ECOM decided first to explore the use of the world authorization with consultation of the seed industry, represented by ISF, and a survey on the use of authorization.

“The same survey was sent by ISTA to ISTA members and by ISF to members of ISF, and regional industry organizations. The result of the survey: 60% answers do not see problems using the authorization."

The conclusion was that, despite 60% of the answers said "we don't see any problem", among the 40% remaining, half really see problems, and the other ones do not know, because they didn't analyse exactly the consequences."

"At the moment, ECOM has not made any decision, and the next steps are to continue communication with the EU, to make a risk analyses, to change the name, to meet the designated authorities within EU, and to keep the membership informed.”

[181 00:03]
The President of ISTA, Joël Léchappé, ended his speech by asking if there are any comments on this topic, and was not any comments.

**6. Report of the Secretary General**

[182 00:22]
The President of ISTA, Joël Léchappé, asked the Secretary General, Dr Beni Kaufman, to move to the next agenda point, which is Report of the Activity.

The Secretary General, Dr Beni Kaufman:

“The 2015 report, together with the coming budget, will be all wrapped up within this presentation. The year 2015 was marked by the fact that we had two openings of the department head, within the Secretariat. In the absence of these people, we benefited in some ways, because we have redistributed the responsibilities within the Secretariat, that gave them the opportunity to spread their wings and get more involved, we all have a strong sense of ownership, on what we are doing there, and everybody had maybe more opportunities that usual to show their skills and their qualifications, and we are possibly in a better place right now. Other changes, that, were already mentioned in the past years, significant changes, were the restructuring, the new edition of system contracted auditors, our accreditation system. Similarly, we have ongoing recruitment for additional technical auditors. Other things to highlight are efforts that are ongoing, and you may have seen some of the fruits already, in increasing efficiencies of our databases and our accounting systems, some examples you may have witnessed is the way that you are able to upload now PT results, what you may not be able to see is that, within the offices, these new features also makes our work much easier. Similarly, there are new features in the way that we are invoicing, which makes the work more efficient and accurate. Professional production of Seed Testing International started in 2015, we did not get any bad feedback, which is good, we are open to hear some positive feedback. The fact that were not complains I will take it as positive, we are very happy with the new format, and the new mode of operation, I think it puts this newsletter into a different bracket, more professional, and this is just the beginning, and we hope that these improvements will continue.

“This year, 2015, we also welcomed two industry members, this new category of membership will tighten the relationships with the industry, and at the moment we are actually standing at 4, so we already have 4 industry members. In late October we chose Florina to fill in the position of the Head of the Accreditation and Technical Department, you've seen her presenting, and the work of the department and her presentation speaks for themselves. We are ongoing in our recruitment efforts, we are in the last step in recruiting another System Auditor, and on the Administration side, we are recruiting finding a new position, called Members and Data Management Administrator. This position will do what pretty much Cannice used to do, but also will give us somebody that will coordinate all the IT, and related functions in the Secretariat. This is how the Secretariat chart looks right now, you can see the 2 question marks, which define the positions that I just mentioned, another new important and significant position that was mentioned by Joël, is the Quality Manager, and you can see here Branka, she represented twice, because she was nominated the Quality Manager of the Secretariat, and there is an ongoing effort on improving our quality system. We are at the end of 2015, we achieved the very flat organizational structure, where each person has a pretty defined territory, but at the same time we are working very well as a team.

“Regarding the Membership, at the end of 2015, we have 218 member laboratories, we maintained the number as last year, actually at the end of the first trimester in 2016 the number of laboratories was already 226, so the numbers are moving into the right direction. The new member laboratories that have joined in 2015 are coming from Argentina, Bangladesh, Burkina Faso, Egypt, Turkey, and the latest addition, I welcome Malaysia. If we look at the distribution of the member laboratories by continents, Europe has the larger number of laboratories - 95, and this is 44% of the membership, Asia is coming back from behind, and we expect to have some more growth there, currently with 64 laboratories - 29% of the membership.

“In TCOM coordination, 7 method validations were completed during 2015, I guess I don't have much news to tell you about this, probably some of you are involved in some in these validations and activity. The reports are coming from the Germination TCOM, Variety, Moisture, and you will be voting in the outcome of this shortly.

“In 2015 we didn't had as many workshops as in previous years, you can see that half of the workshops were associated with the annual meeting last year, and you can also
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see that the workshops in 2015 are strongly dominated by the sampling committee workshops.

“Regarding Publications, in 2015 were fewer Rules sold, but you can see a significant increase in the single-use access, and that is really what is compensating for the rest, so this is associated with the increase that we see in associate members, and it also reflects the requests from the TCOM members. A lot of work was put on the website, some of the work had to do within the Secretariat, working on modifying the content, making it more friendly, to follow a better, more intuitive flow. More important is the fact that, the work that was put is enabling the communication of the website with some of the databases, or applications that we are using in the Secretariat. We will have a soft launch first, where we will ask the members of the ECOM and TCOM to have a look at the almost final product, give us feedback, we'll address their feedback, and once we are done with that we will go live, and the expectation is that this will happen in September.

“Next topic I want to highlight is Marketing. Joël mentioned that in 2015, Pierrick created what we call “Marketing Tool Box”, so you already have seen some of those, that includes the boot that will follow us at the associated meetings that we are participating, you have seen the passport in the boot outside, there were 3 videos produced that are used for marketing, and I sure that all of you are followers of ISTA on Linkedin. Other related activities that should be highlighted are media coverage of the organization in all kind of seed related international publications, and you see some of them listed here, Pierrick is collecting all these communications and coverages, he has a clipbook of all these presentations of the associations, and I am sure we will find ways to use it through. I mentioned Social Media, I should mention that currently, we have more than 750 followers, and this is pretty impressive within the time that took us to collect this, less than a year, and we have quite a number of followers that are getting on a short-term news from the association.

“ISTA Events - there is going to be a new way to organize our events. The idea is that, with your help, we need you to tell us your wishes to have annual events, within your country. What we hope is that we will make it easier for you to come to the decision that you want to invite the association, with the fact that from 2018 on, the Secretariat will take on the initial financial risk and the financial burden that it is involved with having an annual event within your country. We will engage professional event organizers, so the decision to get into such an adventure with the association may be easier. We hope that in this new mode of operation we will be able to increase efficiencies, that eventually will translate into lower registration fees for the members, so obviously your invitations to host events, and some Secretariat recommendations will be put in front of the ECOM, and they will make the final decision, where we are going next. As far as 2017, I hope that everybody already knows, we are going to Denver, Colorado - USA, and have a joint event with all. For 2018, we have 4 different proposals that are being considered by the ECOM, to have an annual meeting in Asia, and we are still waiting on some ECOM decisions, regarding where will be the congress in 2019.

“And last, I want to finish with these invoices, reminding you that if you pay your annual invoice before the 31th December, you receive a 5% discount, and if you pay after you will have to pay the full fee. This time, the invoices will be send automatically, in beginning of July.

“I want to thank all my colleagues. I am not sure that everybody realises the amount of work that is done by the Secretariat and Secretariat members. This is not only when we have events, this is on an ongoing basis, so I want to thank to all the Secretariat members for their engagement, for their conscious work, commitment, for all the overall time that is put into their work, and for the great work that you are doing. Thank you for your attention.”

[183 00:02] Part I
The President of ISTA, Joël Léchappé:
“Thank you very much Beni, for the presentation and for the work done, to the Secretariat. We come to a formal part of this, which is approval of the Report of the Secretary General, as it is presented in the document OGM 16-03.

“Do you approve the Report of the Secretary General, contained in the document OGM 16-03? If you approve, please press the "YES" button.”

The Report of the Secretary General was approved, and the president of ISTA thanked everybody for their votes.

**Financial Report 2015**

The Secretary General started by showing the balance sheets on the screen.

[183 03:40] Part II

“The figure from 2015 is comparable to previous years, please keep in mind that in 2015 we still had the Accreditation being paid through the older scheme, and you can see this reflected in the amount of income that we had in 2015. By 2018, this should be getting to a stable figure, that will be similar to what we have experienced in the past, when all the laboratories will be audited again. Altogether, the total income in 2015, is very close to what we had in 2014.

“The year 2015 ended up very similar to what was budgeted, when you put the 2 numbers together, the total income and the total expenditure, we end up the end of the year with a positive outcome of 53 000 CHF, and that is including after we have added to our provision fond of reserves, or what we call the cushion, an amount of 843 000 CHF. Positive year by any counts, and, as I mentioned earlier, in the coming years, it is very likely that we may have to use some of this accumulated reserves to be able to compensate for the decrease, or the temporal decrease in the income, coming out in the Accreditation. On the subscription, we are very similar to last year, on the decrease of ISTA Rules sale, the income from the rules is little higher this year, but is still lower than what used to be the average income in the last 3 years of hard copies sales. We hope that this a trend that will continue, and will get to a similar place after more people will get used to this online publication. The income from Accreditation was as we budgeted, so no surprises there, however, the recruitments and the trainings of the contracted auditors had a price, and this is reflected in higher cost of the Accreditation, due to these activities. In Technical Publications, as I mentioned, there is a decrease in the income, and it is due mostly to the fact that are not new handbooks or any updates published. Other observation, the certificates sale, the total sale was 13% lower than previous year. However, the certificates in 2014 were a blog bust if we are comparing to the multi-year average. The total costs for keeping the Association working have increased by about 17 000 CHF, this is coming out of the fact that we are having now activities like marketing, which we didn't had before. ”

**Budget 2016**

"Some points regarding the 2016 budget, as I mentioned the predicted decrease in the Accreditation income. Because of moving to the instalment program, we have a decrease of almost 16%. This decrease is expected to recover in the next 3 years, when all the accredited labs are integrated in the payments schedule. An increase in the payroll, because we are filling the vacant positions, so by mid-year or by next months, I hope we will have all the positions filled, and that will be reflected in the cost of the Secretariat. There is also an increasing cost because of some changes in the way the office is being maintained, some services that we were getting in previous years as included in the rent, now we have to pay for them separately, so this is being reflected on the back office costs, and of course, projects that cost us, the website is costing us, and similarly, we have an upgrade of Navision, which I mentioned earlier. We have to make a plan use of the accumulated reserves in the coming 2 years, and we are lucky that we have where to take those from.

“As in previous years, I am going to present some of the analyses that we are doing using the financial tool. For those that don't remember, the financial tool is a program that was put in place to help us allocate expenses, mostly associated with the time that
people are spending while working on particular activities, so the tool is enabling us to allocate these expenses to different sources of income, and it works in such a way that there is a long list of activities that captures what people are doing or on what they are spending their time on. Within the Secretariat, these activities are collapsed on the processors, and then these processors are collapsed into 9 business areas, and these are the different business area which to some extend are corresponding to the lines that you see in the balance sheet:

- Method Standardization
- Science and Dissimilation of Knowledge
- Accreditation Program
- Membership Administration
- Certificates
- Proficiency Tests
- International Relationships and Strategy
- Back Office
- Projects

[183 19:45] Part III

"The objective of the financial tool, as I mentioned, is to allocate expense to income, this is not such a straight forward calculation, in the previous years I presented the fact that you can do this in more than one way. The way that we have landed on, which may be the best way right now to do it, is by allocating Method Standardisation to Membership Administration, Science and Dissimilation of Knowledge to Membership, Proficiency Tests are allocated to the Accreditation Program, International Relationships and Strategy is allocated to Membership Administration. Back office, which is the most challenging part, is allocated to "all sources of income". The way that makes it the most logic, is to look at the relative proportion of the different processors. How much is the proportion of certain surface, and then takes the same relative proportion and use it in the allocation of the back office. So, if the relative proportion of the time that is spent on the process of Accreditation Management is 3.5%, then the total allocation for this, out of the back office, is similarly 3.5% of the total cost of the back office. When is all set and done, and we do all this allocation for all the different sources of income, which are Accreditations, Membership and Certificates, this is the final outcome, and you can see that the only business area that is yielding positive results is the Certificates, while, in the case of Accreditation and Membership, the overall result is in the red. In January 2016, we went through limited statutory examinations by BDO, which is our external auditor, and we passed this audit, which is a confirmation that the Association is in sound financial practices and outcome.

"I want to thank to the Executive Committee, working group on Finances and Management, for their support and advice, and again, I want to thank to our Secretariat team. Thank you for your attention, and I'll take questions."

The speech of Dr. Beni Kaufman ended with applause.

[184 00:08] Part I

The President of ISTA, Joël Léchappé, thanked the Secretary General, Dr Beni Kaufman. Further, he asked the participants to vote first for the Financial Report 2015, next round of votes was for approval of Budget 2016, and the last round of votes were for the approval of BDO as Financial Auditor for the ISTA financial year 2016. All three were approved.

[184 05:27] Part II

There was a comment from a participant at the voting, regarding BDO as Financial Auditor for the ISTA financial year 2016:

"We voted against because, I think is important after few years, to have another auditing organization, and I think we have the same remark last year, that it would be
good, at sometime, to switch to another organization, in order to have a different prospective. So that's why we voted against."

The Secretary General, Dr Beni Kaufman:

„To answer that, as a matter of fact, when I started working, I also had the same opinion, not that I had any information about BDO, just coming from the fact that I knew the other auditors for a number of years, or many years of the Secretariat, so we looked around and we also invited BDO to come to talk to us, and I got convinced that this is the best choice. And one of the arguments for them is, there is obviously you can say that for their appearance may be better to have different auditor often. On the other side, is the reason-advantage of the fact that the organization, the auditors, is better accounted with your systems. So, if I get a new auditor tomorrow, much of the audit will be spend to explain how this is working and so on. While this company, they have this in the records, and they have an understanding of the business, which makes the auditing more efficient. Another argument is that, in the world of financial auditing, there are separate tiers. There is the higher ration of the auditors, that are auditing the big banks, and the big multinationals, and we are not there, but if you go to the next tier, BDO is actually the leading auditor. Worldwide, this is not a Swiss joint, this is an organization that is operating worldwide, and they are leading auditor in this tier of medium size or small businesses. Last thing, if it makes any difference, we had a new set of auditors coming to us this year, that is auditing 2015, then the auditor that was in 2014. Frankly, I don't remember who was in 2013. So, it is the same film, there is some continuity, their familiarity with the way that the association is working, but the auditors are not the same. At least, they were not this year.”

The President of ISTA, Joël Léchappé:

“Thank you, Beni, for the comment. I can also say that the first comment on that was made by you 2 or 3 years ago, we took seriously this comment in the Executive Committee, and we examined together with Beni, and the arguments from Beni regarding BDO are the reason we are still proposing them, but this is still something to be considered for the future. We fully agree on that. Just as an information to be presented, this year, when the BDO company made the evaluation or part of it, I can say that the work done is really seriously work. There is no doubt about that. Is only the fact that is good to change from time to time. Thank you very much for the comment. Are there any more comments?”

[185 00:02]

The President of ISTA, Joël Léchappé:

„Thank you very much to all of you."

7. Consideration and adoption of the proposed Changes to the ISTA Articles

[186 00:08]

The President of ISTA, Joël Léchappé:

“Next, we will move to the next Agenda Point, which is Consideration and Adoption of the Proposed Changes to the ISTA Articles, and there are 3 points:

• Motion to not longer have the ISTA congress organizer as a member of the Executive Committee
• Article change to decrease the number of Executive Committee members, as a consequence of the first point
• Article change to create a position of Immediate Past-President

The first two points will be presented by Craig R. McGill.

The Vice-President, Craig McGill (New Zealand):
“Thank you. I will like to begin by giving you some backgrounds on why we are having a motion before we actually move to the article change proposal. The reason is that, at the all-region meeting in 2009, in Zürich, the position of Second Vice President was removed from the ISTA Constitution. The position of Second Vice President has been held by the person who was the Organizer Leader of the Organizing Committee for the ISTA congresses. When that change was made, the intention in the documentation was that the position of Second Vice President would go, but that the Congress Organizer would become a member of the Executive Committee, and that is the important point. However, when the Constitution change was made, there was no provision put in the Constitution to allow the National Organizer of the Congress to be a member of the Executive.

“In the last 7 years, the situation has changed, and the Executive is proposing that the ISTA Congress Organizer no longer be a Executive Member, for the following reasons:

• match of the Congress Organization is now handled directly with the Secretariat, and you saw from Beni’s presentation this morning that is likely to increase
• Congress Organizer being a member of the Executive, that means that the Congress Organizer needs to come to the Executive Committee meeting, so there is an additional expense for the host country

"So, this is why we are putting a motion to the membership, that the Organizer of the tri-annual ISTA Congress be no longer appointed as a member of the Executive Committee of ISTA, but that the Congress Organizer be invited to attend the Executive Committee meetings for agenda items relevant to the organization of the congress. Their attendance could be via video link, that would mean that the Congress Organizer would no longer physically have to come to the meetings. Just to summarize, and I will take any questions if people are not clear, the motion is because the intention in 2009 was for the Congress Organizer to be a member of the Executive Committee, so we would like the membership to give a clear intention that they support the proposal of the ISTA Executive, that no longer be the case.

“Are there any questions?

"If not, then I will ask the President to formally move the vote on the motion.”

The Vice President asked for a vote. The motion was adopted, and the Vice President continued his speech:

188 [00:01] Part I

“Because the Membership has now agreed that the Congress Organizer will no longer be a member of the Executive at large, the second motion is that an article change proposal will be put forward to reduce the number of Executive Committee Members to 8. So, currently they are 9, including what was the Congress Organizer. Without the Congress Organizer we are suggesting that the number go down to 8. Are there any questions or comments on that? If this motion is approved, we will go to the article change proposal vote, and if it is not approved, we will not go to the article change proposal vote. I will now ask the President to put the motion."

The votes were closed, and the motion was approved as well.

188 [02:11] Part II

“With the adoption of the motion, we now need to change the article. The article change is relatively simple: simply deleting 9 from Art. 15 and replacing it with 8, so the article is now in line with the motion just approved. Are there any questions, comments on that? If not, I will ask once again the President to put on the motion for the vote."

The President of ISTA, Joël Léchappé:

“Thank you. Are you ready to vote on the article change, and the new article will be: the Executive Committee shall consist of Vice President, together with 8 members at
large, who shall be designated members? If you are ready to vote, we now open the vote.”

188 [03:35] Part III

“Thank you for your vote. With this vote, the article change is adopted, to decrease the number of Executive Committee Members, as a proposal OGM 1607-1. Thank you very much. Thank you Craig, for this presentation.”

189 [00:01] Part I

The President of ISTA, Joël Léchappé:

“Change proposed in the articles is to create a position of Immediate Past President, and Grethe Tarp will present this item. The current President, the incoming President and the candidate for Vice President, we consider that the three of them couldn't present this proposal, as they may be personally involved.”

189 [00:46] Part II

Grethe Tarp (Denmark):

“The next article change is to create the position of the Immediate Past President. The background for that is that at the end if the ISTA President term, this needs to have a formal role within ISTA. The skills and experience of the President are lost. So, the creation of the position of Immediate Past President will retain these skills and experience for ISTA, for at least 3 years. The Immediate Past President would be available to contribute and lead working groups, within the Executive Committee, and to contribute and to continue to represent the Association at for example, meetings of the organization. The Immediate Past President will have all the rights, including voting, and obligations, as other members at large of the Executive Committee. Therefore, the ISTA Executive Committee is also recommending that if the position of the Immediate Past President is created, the number of members at large of the Executive Committee will reduce to 8. I would like to note that the role of the ISTA Executive Committee of the Immediate Past President is different from that of the Congress Organizer. This article change proposal, OGM 1607-02, to create the position of Immediate Past President is one vote, but are two parts in the vote: the first one is to create and define the role of the Immediate Past President, Art. 13C, and then to add the Immediate Past President to Art. 15A, where it states that the Executive Committee shall consist of the President, Past President, and Immediate Past President, together with 8 members at large, who shall be designated members. Are there any questions to this proposal? It doesn't seem like, so I would like to vote on this proposal, which is to create and define the role of the Immediate Past President, and then to add the Immediate Past President.”

The President of ISTA, Joël Léchappé:

“Thank you, Grethe. Together with Craig, we want to give you the information that, we separately consulted our designated authorities, and they instructed us the way to vote on this question. As we are the voting members, we will be voting on those instructions of our designated authorities. Is not our personal vote, but the vote of our designated authorities, that, we will cast.”

189 [06:11] Part III

Grethe Tarp (Denmark):

“Please, Jonathan, you can open the vote.

“So, the votes are: 38 YES, 2 NO. Congratulations.”

The President of ISTA, thanked Mrs. Grethe, and to the participants for voting.
ISTA Strategy 2016/2019

190 [00:00] Part I
The President of ISTA, Joël Léchappé:

“Now, we move to the next Agenda Point, which is the vote on the ISTA Strategy 2016/2019. Yesterday, you all participated in the discussion on the ISTA Strategy, and a new version, modified, as we discussed yesterday, is available, and has been available at the entrance of this room. The vote will be made on this proposal, and I will ask Craig to present the new strategy, to be voted on.”

190 [02:00] Part II
The Vice-President, Craig McGill (New Zealand):

“The first proposal is that, the word “draft” be deleted from before the word “strategic”, and that the word “assumptions” be changed to "directions”. Are there any comments from the Membership in regard to those two propose changes, or any questions?

“I see nobody has any questions, so, we will move back to the beginning of the document, and provide an opportunity for anyone to raise any other issues or questions. If there are none, then I propose to move towards the vote on the Strategy, and ask the President to put the vote.”

190 [04:40] Part III
The President of ISTA, Joël Léchappé:

“Just a question, before we put the vote. Is it clear for everybody regarding the part dealing with the sampling certificate? ”

190 [06:38] Part IV
The Vice-President, Craig McGill (New Zealand):

“Just to explain that, there is a vote later this afternoon, by the Membership. International Seed Sampling Certificate would be introduced with this vote. On the strategy, the vote is qualified by the condition that, if the Membership rejects the International Seed Sampling Certificate, that section of the strategy where that certificate is referred to, would be deleted. I will now ask the President to put the vote to the Membership.”

190 [07:43] Part V
The President of ISTA, Joël Léchappé:

“Are you now ready to vote on the strategy 2016/2019? If yes, do you approve the ISTA Strategy for 2016/2019, including or excluding the text, depending on the result of the vote, at the point 14?”

190 [08:50] Part VI
The President of ISTA, Joël Léchappé:

“The Strategy 2016/2019, as proposed with the modifications discussed, and the other condition I mentioned under the Agenda point 14, this strategy is approved. Thank you very much.”

8. Election of Officers on Members at large of the Executive Committee

191 [00:13] Part I
The President of ISTA, Joël Léchappé:
“The next Agenda Point is related to the Election of Officers on Members at large of the Executive Committee, and that will be leaded and presented by Dr Beni Kaufman, Secretary General.”

The Secretary General, Dr Beni Kaufman:

“We will start by voting, or electing the Vice President, and then, we will proceed to the members at large. Nominated for Vice President of ISTA for 2016/2019 is Steve Jones from Canada. You have received all the election cards, which you will be using for this election.”

The President of ISTA invited the candidate, Dr. Steve Jones, to make his presentation.

191 [02:36] Part II
Steve Jones (Canada):

“As people know me, I work for the Canadian Food Inspection Agency, I am one of the biologists that head up the units there, and my particular unit is Seed Certification Testing, which monitors the market place and also does export testing for Canada.

“I have been Rules Chair since 2000, my first ISTA meeting was in 2001, and I have been an ECOM Voting Member since 2004. I have been on the ECOM as a Voting Member since then. I have been member of the Purity Committee, and also now, currently, an active member of the Bulking Sampling Committee, so, I have been active involved in ISTA for quite a while now.

“One of the goals I wanted to achieve, being nominated for the Vice Presidency, which is a great honour to be nominated by several countries here, and then got permission from my designated authorities, while I was here, to accept the nomination, because was not something that was planned before the meeting. I gratefully acknowledged my boss and the director, to allow me to do this, and I would also like to acknowledge my wife, Jo, for permission to do this as well, because is a significant contribution. One of the goals I'd like to take forward within the Vice Presidency is continuing this process of transparency, being able to discuss with people in an open forum, hear other people views and accept those views, then move to a decision. Is something that I am going to continue with, not something I am going to create, but something I would like to continue with, because I think people are happy with that, and I think it gives the Association strength. I'd also like to continue in the financial review, the Association, to make sure that we continue to be on a stable format, to make use of some of the reserves to help us move forward, with support to the Technical Committee, and achieve some of the strategies that we have planned and agreed on in the last few days. One of the other things that I am interested in is trying to make sure that we have a legacy situation of training for people, and I make that available, to take the next generation forward in training and keep the Association strong in the years to come. This is a short summary of me, I hope is ok for you, and if are any questions, please feel free.”

191 [06:42] Part III
The Secretary General, Dr Beni Kaufman:

“Now the vote is open, please step forward and place your voting card in this white box, your vote for the Vice President of ISTA.”

192 [00:08] Part I
The Secretary General, Dr Beni Kaufman, presented on the screen the random order with the candidates for the Member at large of the Executive Committee, and invited each of them to give their 3 minutes speech, according to the random list on the screen. Dr Beni Kaufman also specified that since Ignacio Aranciaga was not able to come, he will be represented by Luis Rivero from Chile.

192 [02:17] Part II
Leena Pietilä (Finland):
“My name is Leena Pietilä, I come from Finland, and I work for the Finnish Food Safety Authority - Evira. I am botanist in my background and I have made my PhD on sexual reproduction of *Ullucus tuberosus*. I have been a member of ISTA Bulking and Sampling Committee since 2005, as a Chair for 6 years, and now, from 3 years I am Vice Chair. I have been at different workshops for Seed Sampling during the last years. What would be my goals:

- I first think that a strong organization that you can trust and is transparent in all, it’s function is a special benefit for small countries and small companies. I would work for keeping the level of transparency in ISTA, I think that a trust is gained by good ISTA rules. All the handbooks that ISTA has, and the new methods or new species that are added to ISTA rules, they have a good scientific background and good validation behind them. I would very much appreciate that this will continue also in the future.

- Also, training is close to my heart, and I think that the training tools needs to be developed also for remote training and to facilitate all members to use different types of training material that ISTA, and especially Technical Committees could provide for them.

- I would also like to pay more attention to the Accreditation System. The Accreditation System is giving good results, but it seems that in every annual meeting we are somehow discussing that they should be reviewed in the financial aspects.

These are my 3 most important calls that I would like to achieve in ECOM. Thank you.”

193 [00:25]

Marcel Toonen (Netherlands):

“Good morning, my name is Marcel Toonen, from the Netherlands. My background is in Plant Cell and Molecular Biology, but since the last 8 years I am working as a manager at Naktuinbouw, at the moment as Head of laboratories. The work in the lab is focusing on Plant and Seed Health Quality, and Seed Quality Testing, mainly in vegetables and in ornamentals. In contradiction to many of the other candidates, I do not have a strong background being active within the Technical Committee of ISTA. Four members of my staff are working within the Technical Committees, so why you should chose me? I think I bring all the skills: I am a manager and I look mainly at the management aspects of the organization, like looking into the financial situation, and other management aspects. Also, in my work, I did a lot with international trade, worldwide, talking to Governments, talking to companies, about problems they are facing when seeds are being traded around the world. Sometimes, I have a different prospective than other people, so that can enhance discussion with any ECOM and helps making good decisions.

“Other points that I can add to the ECOM and bringing more of the management experience: I think ISTA Technical Committees should be able to prioritize their work more to what it is required from other parties. So, making contacts with external parties is also in the strategy, but also put our work in that line. Capacity building, training in various regions of the world stays important, and we have to realise that we have different levels of expertise, not only in different areas of the world, but also within one area, but we have to cope with that. I think the management part, the costs of the organization, we have to keep track of that.

“Finally, my organization at Naktuinbouw, fulfils the legal tasks in the Netherlands, and as part of that work we have a number of quality plus systems in place, like the NAL system, that could be a possible conflict of interest. I have discussed that with several members of the ECOM, and for me, at the moment, I did not see any risk that this could be the case, but I will bring that forward. Thank you.”

194 [00:10]

Alexander M. Malko (Russian Federation):
“Good morning, I am very happy to be here. I am Malko Alexander and I am from Russian Federation. I graduated Agronomist University, my area was cereals. I was Head of laboratory, after that I was Head of Seed Inspection for Russian Federation, and now I am Head of Russian Agricultural Centre. It is the biggest organisation in Russia in the agricultural domain, because our area of responsibility is Seed Quality. We have offices in all region of Russia, and Seed Qualities are very important for us. I must say that, in previous years, our cooperation with ISTA was very successful. During the last 6 years, we created 6 labs in Russian Federation. We started to use rules of ISTA Seed Testing in our practice, but of course we have some problems with it, because of our legislation in seed field. It is very important to continue this book, to create new seed legislation, with international rules. That's why I think that next time I will work in the ISTA Executive Committee, will be the same, to create our legislation, and maybe to organize some more labs on the territory of Russia, because now all are laboratories in the European part of the Russia. For us it is important to create laboratories on the border with China, because step by step, our trade relations with China are increasing. That's why, I suppose, we will continue this work.

“I must say that for our country it is very important to be in ISTA, because of the variety of seeds from another countries, especially New Zealand, United States, South Africa, South America, because we cannot produce all special vegetables, flowers in our country. That's why I hope that our cooperation will continue. I suppose there are not any conflicts of interests, because there are not different financial sources, in different legislation basis. I hope that my work in the ISTA Executive Committee will be successful. Thank you.”

195 [00:22]

Luis Riveros Cuadra (Chile), representing Ignacio Aranciaga (Argentina):

“I am Luis Riveros Cuadra, from Chile, and I am here to represent Ignacio, because he unfortunately couldn't attend this congress in the last moment. I will say some aspects of Ignacio. He is an Agricultural Engineer, with Master in Seed Technology. His laboratory is accredited from 1999. From 2009, he is Director of the Quality Department of Argentina. Ignacio has been participating in different committees: germination, tetrazolium, bulking and sampling. From this year, he had the honour of being included in the ECOM, working with the Marketing working group. He agreed with the proposal of the Association, and he is supported by the Argentinean Designation Authority with this nomination. His contributions to the ECOM had not any conflicts of interests. Thank you.”

196 [00:19]

Masatoshi Sato (Japan):

“Good morning. I am Masatoshi Sato, from Japan. I am Director of Department of DUS Test and also Seed Testing, in the ISTA accredited laboratory. And NCSS of National Agricultural and Food Research Organization. This is quite new organization in Japan, created this year in April. My first meeting was at the ISTA Congress in Budapest, in 2004, and from 2007, I am involved in several ISTA activities, as a member of Seed Health Committee, and also Executive Committee. In 2011, we had a big challenge, that was to organize ISTA meeting in Japan, but unfortunately, we missed it. I am analysing again the possibility to be host country. During the last 9 years, it was a very good opportunity for me to get a lot of experience in ECOM. So, I became aware of some particular situations in Asia, through many opportunities, when I met many people in this region. I would like to support Asia members by organising workshops or training courses. I joined a technical support project, running in some Asian countries, to set up or establish Seed Health Testing laboratories. This opportunity provided me the challenge as a member of the Executive Committee. I would like to continue my activity as a hub of network, connecting people in Asia, and also as a bridge connecting to ISTA. In these days, looking at current ISTA situation, the number of member laboratories in my region is increasing, just next to Europe. Three candidates, including me, show up from Asian countries. Also, we need your support, from all of you. Thank you very much.”
“Good afternoon everybody, I am very glad to introduce myself. I am Keshavulu Kunusoth, from India. I did my Master, PHD in Seed Science Technology. The 20 years of experience in Seed Science Technology made contributions in Seed Testing Certification, and also Seed Research. Beside teaching, working in the University of Hyderabad, and involved in international collaborations with few countries in South Asia, East Africa, and United States. Currently, I am leading Seed Certification Agency and official seed laboratory, and I am also a designated member of OECD Seed Scheme. Coming to my involvement into the ISTA, I have been involved in ISTA since 2007, starting as a working collaborator, and then I became TCOM member in 2010 and contributed my best to the varietal TCOM. I have been participating at ISTA congresses, workshops and annual meetings since then. Planning to have couple of workshops in India, near future. Encouraging ISTA activities to improve the quality seed supply, especially in India sub-continents countries, through presentations, to improve the lab competency, and to deliver quality seed supply to the resource for farmers as well.

“Coming to the goals, I encourage participation with more strength in ISTA activities, promotion of uniformity in Seed Testing, in range of laboratories in our region, establish linkages, collaborations with the India seed industry. If opportunity given, willing to organize even ISTA’s bigger meetings in the future. Experience and knowledge gained over the years will certainly be useful, if I become the ECOM member from our region. As far as I know, I don't have conflicts.

“Thank you, and looking forward for your support, as India seed industry is committed to search international seed market. Thank you again.”

Berta Killermann (Germany):

“Good morning. I am Berta Killermann, from Germany. I started Agricultural Science at the Technical University Munich, majoring in Crop Science and Plant Breeding. I did my PHD on Assisted Selection and Quality Weed Breeding, by using biochemical markers. I started to work at the Bavarian Plant Breeding Association, and then I changed to the Bavarian State Research Centre for Agriculture. Since 2000, I am the Head of the ISTA Seed Testing station in Bavaria. My activities within ISTA started in 2004, when I became a member of the Variety Committee. In 2007 I took over the Chairmanship of the Variety Committee, and since 2013 I am a member of the Executive Committee. It is important that things change, progresses possible and aims, as well as visions can be achieved. Sometimes, conventional and creative ideas and activities are necessary, by acting consistent, trustful and independent. To make ISTA further fit and robust for the future, my visions and aims are to:

- increase the corporation with ISTA's affiliated organizations,
- support the introduction of highly effective methods into the rules,
- support effective and transparent communication,
- increase training possibilities,
- and finally, to promote ISTA all over the world.

These are some of my reasons wanting to become a member of the ECOM, to aim for uniformity and seed testing.

Thank you.”

Valerie Cockerell (United Kingdom):

“Good morning. I am Valerie Cockerell, and I am Head of the Official Seed Testing station for Scotland. We are part of SASA, and part of Scottish Government. My laboratory is ISTA accredited, and we have a wide scoop of accreditation, testing, from purity and germination to seed health and vigour. My involvement with ISTA
started in 1995, when I attended the ISTA Congress in Denmark, and I was invited to take part in some working groups, for the Plant Disease Committee, as the Seed Health Committee was known then. Three years later, I was asked to be a member of that committee, and that started my journey of 14 years with the Seed Health Committee, as member, Vice Chair and as Chair. I worked with Jim Sheppard on the ISTA Handbook of Method Validation for Seed-Borne Diseases. That provided the basis for the method validation program that we have today in ISTA. I have had many experiences within the Seed Health Committee, as Vice Chair and Chair, both dealing with the Executive Committee, and dealing with industry. Some of them were very challenging, but I lead the Seed Health Committee through those and to the success that is today. I left the Seed Health Committee in 2012, to concentrate on other projects work, the organization of the 2014 ISTA Annual Meeting, and the 7th ISTA Seed Health Symposium. I have had the pleasure and experience of contributing to and organizing various seed workshops, training courses and symposiums. As well as organizing one of the first ISTA Quality workshops in Edinburgh.

Most recently, I have become an ISTA Technical Auditor. As a member of the ECOM, I will have full support from SASA and the UK's designated authorities. Given my knowledge, and experience of ISTA, my goals within the ISTA Executive Committee, will include helping to review the ISTA accreditation service. The rules are an incredibly important part of ISTA, and I would support the application of new technologies to test methods, validated as methods with tools, as the new technology, or as methods themselves. I would like to promote ISTA within my region, and to promote and encourage the use of ISTA methods in the field of testing. If I come back to the rules, there is one thing that I have been involved in for many years, for the vegetables seeds, or for the high-value seeds, I wonder whether there is a need to see how we deal with those, within the ISTA rules, to further facilitate treat in this area. Maybe that may require a different chapter. Finally, I would like to support the ideas for training material across the technical areas, and lastly, just to inform you, that I have no current potential conflict of interest."

200 [00:18]
Mable Simwanza (Zambia):

“My name is Mable Simwanza, I am from Zambia. I have been working for the Minister of Agriculture, and specifically for the department which is responsible for Seed Quality Control in the country. I have been working with this department in the Minister of Agriculture for so many years, and for different positions. I started as Seed Inspector, later Seed Sampler, then changed to Head of the Seed Testing Lab, which is the only Seed Testing Lab accredited to ISTA. Two years ago, I was promoted to the position of Director of the Department in the Minister. Zambia has been a member of ISTA for so many years, and I’ve known ISTA for all the years that I have worked. I have been a member of the Sampling Committee since 2008, and for the last 3 years, I was a member of the ECOM.

During the last 3 years, there was an increase on the membership from the African countries. From what we saw this morning, there is some progress that has been achieved, in the sense that the number has been steadily increasing. We were only 6 members - nations which had ISTA accredited labs in Africa, now we are increased to 19. So, there is an achievement. And my vision, my goal, still remains that I should make sure that the memberships from Africa still continue to increase. I know very well that, the African countries, they know the benefits of belonging to ISTA, but how to become a member has been a challenge. So, I will continue explaining to them the benefits, and make sure that they appreciate, and probably become members of ISTA.

Regarding the conflicts of interest, as far as I know, in Africa we are harmonizing the way we do things, searching variety of seed testing, seed certification. All the meetings that we had, there has been an emphasis on the use of ISTA rules. ISTA is the only accreditation body in Africa, regarding seed trade. I don't have any conflict of interest if I am retained in the Executive Committee for the next 3 years. Thank you very much."
Rita Zecchinelli (Italy):

“Good morning to all of you. It is the fifth time that I come to this stage, to candidate as ECOM member, for the next 3 years. My name is Rita Zecchinelli, I am Italian, I am the Head of Seed Testing Laboratory, based in the north of Italy, near Milano, which is the city where I live. My laboratory belongs to the Seed Certification Institute. In Italy, this Institute has changed several times, the name, the organization, but has continued to carry on seed certification, registration of variety, quality control on seeds, and related topics. My laboratory is an ISTA accredited laboratory, having as a scope sampling, as well as variety testing. I have started to participate in ISTA in 2001, and from the beginning I became a member of the Flower Seed Testing Committee and of the Proficiency Test Committee. Nowadays, I am the Chair of the Flower Seed Testing Committee, I am still a member of the Proficiency Test Committee, and also participating in the Germination Committee. As some of you know, I am also an ISTA Auditor, I am cooperating with ISTA as Technical Auditor since 2007, and more recently, also as System Auditor. I am very interested in accreditation and accreditation related topics, I am the Chair of the ECOM Working Groups for Accreditation. I have joined ECOM for the first time in 2004, and from that time, I always have seen my role in the ECOM as a representative from the ISTA laboratories. I think the ISTA laboratories are, and should remain the soul of ISTA, and so I see my mission for the next time, always in this direction. Of course, I am willing to contribute to other activities, projects undertaken by the ECOM, in particular I would say the field of accreditation, where I think and I hope that my experience can be useful, and as well in seed certification related topics.

Regarding the conflict of interest, I don't see any in my case, and I am very aware that, as ECOM members, we are not representing our country, our laboratory, any specific category of members, but we are representing all the ISTA members. Thank you very much.”

202 [00:01] Part I
The President of ISTA, Joël Léchappé:

“We will now present the result of the election, for Vice President.”

The Secretary General, Dr Beni Kaufman:

“It is my pleasure to announce that, with decisive majority, Steve Jones was elected to be the next Vice President of ISTA.”

9. Fixation of Annual Subscriptions

[202 01:53] Part II
The Vice-President, Craig McGill (New Zealand):

“Before we move to the vote for Fixation of Annual Subscriptions, I will just give you a background. The relevant document is OGM 16-04 "Proposals for Membership Fees 2017". The process within the Association is that the membership fees are proposed by the ISTA Executive Committee, and they are voted by the membership at the Ordinary General Meeting, means they are voted today. Any changes in the fees approved by the Ordinary General Meeting will take effect on the 1st of January, after their approval. For the vote today, any fee changes approved will take effect on 1st January 2017.

However, for 2017, the ISTA Executive Committee is proposing there be no increasing in the membership fees. The reason for that is the low inflation rate in Switzerland, and how the Secretary General pointed out this morning, there are potentially expected to be some increasing costs within the Secretariat, for example salaries and maintenance of the premises for the Secretariat, these can be absorbed at the current level of fees. The proposal is that there will be no increase in the fees, hence, the fees for 2016, and the fees for 2017, will remain the same. Before I ask the President to put the vote, are there any questions or comments?”
There were not any questions or comments, so the President asked the participants to start voting.

The proposal was adopted, there will be no increase of the Membership fees for 2017.

**Honorary Life Member**

[203 00:24]
The President of ISTA, Joël Léchappé:

“With a very great pleasure and great honour, Grethe Tarp from Denmark has been elected as ISTA Honorary Life Member. Congratulation, Grethe.

According to the articles, we will give you the main headlines, the reasons, to nominated and elected Grethe as Honorary Life Member:

- Grethe Tarp has made significant contributions to the Association, first as an ISTA Member, participating in all the ISTA congresses, annual meetings, since 1981. That started in the congress in Ottawa/Canada, she was designated member from Denmark from 2003 to 2016, and she has been Chair or member of several Technical Committees: one Technical Committee on Equipment, which no longer exists, then Moisture, Germination, and Grethe participated in many others.
- she has been a member of the Executive Committee since 1995, contributing to several projects: Implementation of the ISTA Accreditation Scheme, the opening of Accreditation on private or seed company laboratories, the experiment on monitoring on private or seed companies laboratories. The experiment on monitoring on private or seed company laboratories ended in 2004, the Accreditation for sampling only, and specific topics, she leaded the task for introducing tropical and sub-tropical species into the rules. The topic on issuing ISTA OIC has been also leaded by Grethe, she also leaded Executive Committee Working Group on the International Relations, while she really helped to structure and develop the international relations.
- more information will be published in the next issue of ISTA, all these activities where Grethe had major contribution, to training, developing seed capacity worldwide, and she also contributed to promote ISTA and the ISTA Rules.

All this contributed to your nomination, and we are very happy with that. Congratulation, Grethe.

Now is time for the lunch break, and later we will continue with the vote for the candidates.”

**10. Consideration and adoption of the proposed Rules Changes 2017**

[205 00:57] Part I

Steve Jones (Canada):

“Thank you to everybody who congratulated me and wished me well for the Vice President role. I really appreciate the support, thank you very much.

“The new Vice Chair for the coming period will be Ernest Allen.”

[205 02:49] Part II

“The Activity Report of the Rules has been published in previous years, and essentially, the result of those is the new edition of the rules every year. This year proposals, you did a very good job the other day, of getting through the 93 pages pretty rapidly, we will still pause for a chance to discuss any changes, or if you have any comments, and the discussion will be indispersed with the vote sessions. We now have the electronic version of the rules available for download for free, as part of the
membership fee, and for other people to purchase. On the website you can have the
Chapter 1, Chapter 2, and also the Seed Health Methods, for free download from the
ISTA website.

"Who puts forward the Proposals? Mainly the Technical Committee, but it can come
from anybody. If it comes from outside the Technical Committee, then it will get
rerouted into the Technical Committee, so that they get involved, and the product of
their work ends up with the Rules Proposals, that we are going to discuss today. One
of the things I mentioned the other days, we need to get better about coordination
between AOSA/STST and ISTA, and so that we can make sure we don't get out of
harmony, or bring other things into harmony.

"ISTA Rules is for sure a team effort, the amount of work that the TCOM puts into it
is considerable, and you have seen that reported to you in the TCOM Activity Reports.
If the Membership today accepts the proposals to become the next edition of the ISTA
Rules, the process is that the proposals should be received from the Technical
Committees by the 1st of November, in a complete (ready to go) format, very similar
to what you see in the document, then some editing is done by the Chair, Vice Chair
and the Secretariat, to get them into the document that you had issued on the ISTA
website 2 months before the meeting. The Rules Committee vote on them, and look
for any issues, we have discussions between the 1st November and the 1st February,
because February the Executive Committee have an extra meeting, where they
approve and discuss any issues that they might have with the ISTA Rules. Then there
is a period of feedback to the committees before they are published on the ISTA
website, 2 months before the meeting. Once then we have a new edition based on the
proposals voted here in June, if they are accepted, and the new edition will become
effective from 1st of January. This is something that has been raised by several
people, how can we get them into use by the laboratories quicker than this. With the
electronic age, we will probably achieve that. Something we will have to do is consult
with the laboratories – do they want that delay, to know what's coming, to be able to
update their Quality Assurance Manuals, and update their staff? Or do they actually
want those methods available to them more or less next week, once they have been
voted on? This is something we need to discuss within the community of the
laboratories and the Association - what do we need, how do we want to do it, and how
can we facilitate that?

"Just briefly mentioning that, for sure everybody knows, we have the Orange and the
Blue International Certificate, later on this afternoon Rita is going to talk about the
proposed Sampling Certificate. If that experiment is accepted and moves ahead, the
point that is an experiment is that we are not going to change the rules, the articles, but
each of those three could have a very different end users or purpose, and it would be
the applicant that really determines what they want. Do they want an Orange
Certificate that ensures the continuity from Sampling to Testing, do they need a Blue
Certificate because the lot exceeds the maximum seed lot size, so it can't go on an
Orange, or do they just need something for sampling?

"At this point, I am quite happy to pause for any other questions you have. We are
working on reissuing the "How to complete an ISTA Certificate", document that was
taken off the website a few years ago, and I am hoping that will be done by end of this
year, ready for the new edition of the Rules to come out as well. Any questions or
something you have always wanted to ask about the rules?

"I would like to thank the TCOM Chairs, Accreditation Department, for all the help
they gave with the rules process, especially thanks to Jonathan, Nadine, and Craig as
the Vice Chair. I'd also like to thank the staff of SSTS, back in Saskatoon, because
they support myself and other colleagues that are here, by allowing us to come here,
while continuing the day job there.

"We are ready now to go to the Word document and start the voting process."
PART B. NEW SPECIES AND CHANGES TO SPECIES NAMES

B.1.1 Addition of *Carica papaya* L.

New entries: Table 2A Part 2:

Table 2A Part 2. Lot sizes and sample sizes: tree and shrub seeds

<table>
<thead>
<tr>
<th>Species</th>
<th>Maximum weight of lot (kg) (except see 2.8 Note 2)</th>
<th>Minimum submitted sample (g)</th>
<th>Minimum working sample for purity analysis (3.5.1) (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td><em>Carica papaya</em> L.</td>
<td>1000</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

Addition of a PSD for *Carica papaya* seeds

Table 3B Part 1. Pure seed definition numbers and chaffiness of seeds, listed by genus

<table>
<thead>
<tr>
<th>Genus</th>
<th>Family</th>
<th>PSD no.</th>
<th>Chaffiness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carica</td>
<td>Caricaceae</td>
<td>10</td>
<td>C</td>
</tr>
</tbody>
</table>

Addition of a germination method for *Carica papaya* seeds

New entries: Table 5A Parts 1 and 2. Detailed methods for germination tests

<table>
<thead>
<tr>
<th>Species</th>
<th>Substrate</th>
<th>Temperature* (°C)</th>
<th>First count (d)</th>
<th>Final count (d)</th>
<th>Recommendations for breaking dormancy</th>
<th>Additional directions</th>
<th>Additional advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td><em>Carica papaya</em></td>
<td>S</td>
<td>20&lt;=&gt;=30</td>
<td>12</td>
<td>28</td>
<td>Soak in water for 16 h; soak in GA3 0.05% for 16 h.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VOTE TO ACCEPT ITEM

<table>
<thead>
<tr>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

B.1.2 Changes to the ISTA Stabilized List

None this year.
PART C. RULE CHANGES AND NEW METHODS REQUIRING A VOTE

Chapter 1: Certificates

C.1.1. Revision of 1.3 j) Conditions for issuance of ISTA Certificates

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each container within the lot or sublot must be identified in such a way that the containers of the lot or sublot can be readily recognized by the information provided on the certificate issued. Each container of a sublot must be marked with the identification of the original lot. When the seed is located in a different country to the sampling laboratory, …</td>
<td>Each container within the lot or sublot must be identified in such a way that the containers can be readily recognized by the information provided on the certificate issued. Each container of a sublot must be marked with the identification of the original lot. A sublot-specific identification is not necessary. When the seed is located in a different country to the sampling laboratory, …</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1.1</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

C.1.2. Revision of 1.4.2 Orange International Seed Lot Certificate (OIC).

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4.2 Orange International Seed Lot Certificate</td>
<td>1.4.2 Orange International Seed Lot Certificate</td>
</tr>
<tr>
<td>The completed Orange International Seed Lot Certificate must show the following information:</td>
<td>The completed Orange International Seed Lot Certificate must show the following information:</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>c) seed lot identification (i.e. marks of the lot);</td>
<td>c) seed lot identification (i.e. marks of the lot);</td>
</tr>
<tr>
<td>d)…</td>
<td>d)…</td>
</tr>
<tr>
<td>e) number of containers for which the certificate is issued;</td>
<td>e) either the number of containers for which the certificate is issued; or N/A, for not applicable.</td>
</tr>
<tr>
<td>f) date of sampling;</td>
<td>f) date of sampling;</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1.2</td>
<td>35</td>
<td>5</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
### C.1.3. Clarification about re-issuance of certificates

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.6 Validity of Orange International Seed Lot Certificates</strong></td>
<td><strong>1.6 Validity of ISTA Certificates</strong></td>
</tr>
<tr>
<td>An Orange International Seed Lot Certificate is valid until it is superseded by another valid Orange International Seed Lot Certificate.</td>
<td>The results on an original ISTA Certificate are valid until superseded, or partly superseded, by new results on another valid original ISTA Certificate, issued, for the same particular test(s).</td>
</tr>
<tr>
<td>Not more than one Orange International Seed Lot certificate is valid for a lot or sublot at one time for any particular test.</td>
<td>If an original certificate is re-issued because of new or amended test results, it must carry a statement indicating that the new results replace previous results, and referring to the Reg. No. of the superseded certificate. In this case, the date entered on the certificate is the new date of issuing.</td>
</tr>
<tr>
<td>A new original Orange International Seed Lot Certificate may be issued for the same seed lot or sublot, provided that a new submitted sample from that lot or sublot is taken and tested. The new certificate is only valid for the particular lot or sublot that was re-sampled. If a sublot is re-sampled it becomes a new seed lot and must be given a new seed lot identification mark.</td>
<td>If an original, duplicate or provisional certificate is lost, a replacement certificate can be issued. In this case, the date entered on the certificate is the same as on the lost certificate.</td>
</tr>
<tr>
<td>Any previous certificate is cancelled by the latest certificate issued on the same seed lot or sublot under the same reference, i.e. seed lot seal and identification, for the same particular test(s). …</td>
<td>A new original Orange International Seed Lot Certificate may be issued to supersede a previous certificate for the same seed lot or sublot under the same reference (i.e. seed lot seal and identification) and the same particular test(s), provided that a new submitted sample from that lot or sublot is taken and tested. The new certificate is only valid for the particular lot or sublot that was re-sampled. If a sublot is re-sampled it becomes a new seed lot and must be given a new seed lot identification mark.</td>
</tr>
<tr>
<td>Previously issued certificates do not need to be returned to the issuing laboratory</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1.3</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

OGM17-02-Minutes-OGM-2016 Final 2018-01-17 15:01
Chapter 2: Sampling
C.2.1a. Revision of 2.5.1.2 – Sampling intensity

CURRENT VERSION

2.5.1.2 Sampling intensity
For seed lots in containers of 15 kg to 100 kg capacity (inclusively), the sampling intensity according to Table 2.1 must be regarded as the minimum requirement.

For seed lots in containers smaller than 15 kg capacity, containers must be combined into sampling units not exceeding 100 kg, e.g. 20 containers of 5 kg, 33 containers of 3 kg or 100 containers of 1 kg. For seed-mats and tapes, small packets or reels may be combined to sampling units of not exceeding 2 000 000 seeds. The sampling units must be regarded as containers as described in Table 2.1.

PROPOSED VERSION

2.5.1.2 Minimum sampling intensity
For seed lots in containers of 15 kg to 100 kg capacity (inclusively), the sampling intensity according to Table 2.1 must be regarded as the minimum requirement holding up to and including 100 kg, the minimum sampling intensity is the following:

a) For containers holding between 15 kg and 100 kg (inclusive) of seed, the number of primary samples according to Table 2.1.

b) For seed lots in containers holding less than 15 kg of seed capacity, containers must be combined into sampling units not exceeding 100 kg, e.g. 20 containers of 5 kg, 33 containers of 3 kg or 100 containers of 1 kg. The sampling units must be regarded as containers as described in Table 2.1.

c) For seed pellets, seed granules, seed tapes and seed mats, containers of less than 300 000 seed units must be combined to sampling units not exceeding 2 000 000 seeds. The sampling units must be regarded as containers as described in Table 2.1.

<table>
<thead>
<tr>
<th>Number of containers</th>
<th>Minimum number of primary samples to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–4</td>
<td>3 primary samples from each container</td>
</tr>
<tr>
<td>5–8</td>
<td>2 primary samples from each container</td>
</tr>
<tr>
<td>9–15</td>
<td>1 primary sample from each container</td>
</tr>
<tr>
<td>16–30</td>
<td>15 primary samples from the seed lot</td>
</tr>
<tr>
<td>31–59</td>
<td>20 primary samples from the seed lot</td>
</tr>
<tr>
<td>60 or more</td>
<td>30 primary samples from the seed lot</td>
</tr>
</tbody>
</table>

Table 2.1. Minimum sampling intensity for seed lots in containers of 15 kg to 100 kg capacity (inclusively)

<table>
<thead>
<tr>
<th>Number of containers</th>
<th>Minimum number of primary samples to be taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1–4</td>
<td>3 primary samples from each container</td>
</tr>
<tr>
<td>5–8</td>
<td>2 primary samples from each container</td>
</tr>
<tr>
<td>9–15</td>
<td>1 primary sample from each container</td>
</tr>
<tr>
<td>16–30</td>
<td>15 primary samples, one each from 15 different containers</td>
</tr>
<tr>
<td>31–59</td>
<td>20 primary samples, one each from 20 different containers</td>
</tr>
<tr>
<td>60 or more</td>
<td>30 primary samples, one each from 30 different containers</td>
</tr>
</tbody>
</table>

Table 2.1. Minimum sampling intensity for seed lots in containers containing holding up to and including 100 kg seed, of 15 kg and up to 100 kg or less (inclusively).
When sampling seed in containers of more than 100 kg, or from streams of seed entering containers, the sampling intensity according to Table 2.2 must be regarded as the minimum requirement.

Table 2.2. Minimum sampling intensity for seed lots in containers of more than 100 kg, or from streams of seed entering containers.

When sampling seed in containers containing seed of holding more than 100 kg of seed, or from streams of seed entering containers, the sampling intensity according to Table 2.2 must be regarded as the minimum requirement.

Table 2.2. Minimum number of primary samples to be taken from seed lots in containers containing seed of holding more than 100 kg of seed, or from seed streams.

As there was major revision and reformatting during the meeting, a 2-stage vote was required:

Stage 1: permission to vote on amended proposal C.2.1a.

Stage 2: Vote on amended C.2.1a.

Stage 1 was accepted with 38 votes to 2.

Stage 2 was accepted with 41 votes to 0.

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.2.1a</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

**C.2.1b. Revision of 2.5.1.2 – Changing ‘must’ to ‘may’**

<table>
<thead>
<tr>
<th>REVISED VERSION ACCEPTED IN C.2.1a</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.5.1.2 Sampling intensity</strong></td>
<td><strong>2.5.1.2 Sampling intensity</strong></td>
</tr>
<tr>
<td>For seed lots in containers of 15 kg to 100 kg capacity (inclusively), the sampling intensity according to Table 2.1 must be regarded as the minimum requirement.</td>
<td>For seed lots in containers containing seed of 100 kg or less, the sampling intensity according to Table 2.1 must be regarded as the minimum requirement.</td>
</tr>
<tr>
<td>For seed lots in containers of less than 15 kg capacity, containers must be combined into sampling units not exceeding 100 kg, e.g. 20 containers of 5 kg, 33 containers of 3 kg or 100 containers of 1 kg.</td>
<td>For seed lots in containers of less than 15 kg capacity, containers may be combined into sampling units not exceeding 100 kg, e.g. 20 containers of 5 kg, 33 containers of 3 kg or 100 containers of 1 kg.</td>
</tr>
<tr>
<td>For seed pellets, seed granules, seed tapes and seed mats, containers of less than 300 000 seed units may be combined to sampling units not exceeding 2 000 000 seeds.</td>
<td>For seed pellets, seed granules, seed tapes and seed mats, containers of less than 300 000 seed units may be combined to sampling units not exceeding 2 000 000 seeds.</td>
</tr>
<tr>
<td>The sampling units must be regarded as containers as described in Table 2.1.</td>
<td>The sampling units must be regarded as containers as described in Table 2.1.</td>
</tr>
</tbody>
</table>

<table>
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<td>WITHDRAWN</td>
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C.2.2. Revision of 2.5.1.3 Taking primary samples

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<tr>
<td>2.5.1.3 Taking primary samples</td>
<td>2.5.1.3 Taking primary samples</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>c) Sampling stick.</td>
<td>c) Sampling stick.</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>However, when used vertically or diagonally downwards, the sampling stick must either have partitions dividing the instrument into a number of compartments or have slots in a spiral arrangement. The minimum inside diameter should be about 25 mm for all species.</td>
<td>However, when used vertically or diagonally downwards, the sampling stick must either have partitions dividing the instrument into a number of compartments or have slots in a spiral arrangement. The minimum inside diameter should be <strong>wide enough to allow the smooth and free flow of seed and contaminants into the sampling stick.</strong></td>
</tr>
<tr>
<td>d) Nobbe trier</td>
<td>d) Nobbe trier</td>
</tr>
<tr>
<td>... The minimum internal diameter of the Nobbe trier should be about 10 mm for clover and similar seeds, about 14 mm for cereals and about 20 mm for maize.</td>
<td>... The minimum internal diameter of the Nobbe trier should be <strong>wide enough to allow the smooth and free flow of seed and contaminants through the trier.</strong></td>
</tr>
</tbody>
</table>

C.2.3. Revision of 2.5.2.2 Sample reduction methods

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<tbody>
<tr>
<td>2.5.2.2 Sample reduction methods</td>
<td>2.5.2.2 Sample reduction methods</td>
</tr>
<tr>
<td>... for seed tapes and mats take pieces of tape or mat at random, to provide sufficient seeds for the test.</td>
<td>... for seed tapes and mats take pieces of tape or mat at random, to provide sufficient seeds for the test.</td>
</tr>
<tr>
<td>After obtaining a working sample or half-working sample the remainder must be re-mixed before a second working sample or half-working sample is obtained.</td>
<td></td>
</tr>
<tr>
<td>To obtain the submitted sample for moisture content determination (2.5.4.5 a), subsamples must be taken in the following way: first, mix the composite sample. Then, take a minimum of three samples from different positions and combine them to create the subsample for moisture of the required size. The subsample for moisture must be taken as soon as possible to avoid changes in moisture content.</td>
<td>To obtain the submitted sample for moisture content determination (2.5.4.5 a), subsamples must be taken in the following way: first, mix the composite sample. Then, take a minimum of three samples from different positions and combine them to create the subsample for moisture of the required size. The subsample for moisture must be taken as soon as possible to avoid changes in moisture content.</td>
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<td>C.2.3</td>
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C.2.4. Revision of 2.5.2.2.1 Approved dividers

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<tbody>
<tr>
<td>2.5.2.2.1 Mechanical divider method</td>
<td>2.5.2.2.1 Mechanical divider method</td>
</tr>
<tr>
<td>… This process of reduction is continued until a working sample of approximately, but not less than, the required size is obtained.</td>
<td>… This process of reduction is continued until a working sample of approximately, but not less than, the required size is obtained.</td>
</tr>
<tr>
<td>The dividers described below are examples of suitable equipment.</td>
<td>The descriptions of dividers as given below contain specifications that were found to be suitable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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C.2.5. Revision of 2.5.2.2.1a) & b) Mechanical divider method

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<tr>
<td>2.5.2.2.1 Mechanical divider method</td>
<td>2.5.2.2.1 Mechanical divider method</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>a) Conical divider. The conical divider (Boerner type) consists …</td>
<td>a) Conical divider. The conical divider (Boerner type) consists …</td>
</tr>
<tr>
<td>The following dimensions are suitable: About 38 channels, each about 25 mm wide for large seeds and about 44 channels, each about 8 mm wide for small free-flowing seeds.</td>
<td>Dividers with more than 18 40 channels have been found to be suitable. Channels must be wide enough to allow the smooth free flow of seed and contaminants.</td>
</tr>
<tr>
<td>b) Soil divider. The soil divider (riffle divider) consists of a hopper with about 18 attached channels or ducts alternatively leading to opposite sides. A channel width of about 13 mm is suitable.</td>
<td>b) Soil divider. The soil divider (riffle divider) consists of a hopper with about 18 attached channels or ducts alternatively leading to opposite sides. Channels must be wide enough to allow the smooth free flow of seed and contaminants.</td>
</tr>
</tbody>
</table>

<table>
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C.2.6. Revision of 2.5.4.3 Marking/labelling and sealing of containers

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<td>2.5.4.3 Marking/labelling and sealing of containers</td>
<td>2.5.4.3 Marking/labelling and sealing of containers</td>
</tr>
</tbody>
</table>
Where the seed lot is already marked/labelled and sealed before sampling, the seed sampler must verify marking/labelling and sealing on every container. Otherwise the sampler has to mark/label the containers and must seal every container before the seed lot leaves his/her control.

Where the seed lot is already marked/labelled and sealed before sampling, the seed sampler must verify the marking/labelling and sealing of the containers. Otherwise the sampler has to mark/label the containers and must seal every container before the seed lot leaves their control.

<table>
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C.2.7. Revision of 2.5.4.5 Submitted sample and 2.5.4.7 Storage of submitted samples after testing

### CURRENT VERSION

#### 2.5.4.5 Submitted sample

The minimum sizes of submitted samples are as follows:

a) For moisture determination, 100 g for species that must be ground (see Table 9A) and 50 g for all other species. When moisture meters are to be used for testing, a larger sample size may be necessary. Contact the ISTA seed testing laboratory for specific instructions.

b) For verification of species and variety, as prescribed in Chapter 8.

c) For all other tests, at least the weight prescribed in column 3 of Table 2A. As long as a determination of other seeds by number is not requested, the submitted sample must weigh at least the amount indicated for the working sample for purity analysis in column 4 of Table 2A. In the case of coated seeds, the submitted samples must contain not less than the number of pellets or seeds indicated in column 2 of Table 2B, Part 1 and Part 2. As long as a determination of other seeds by number or size grading is not requested, the submitted sample need only contain as a minimum the number of seeds indicated for the working sample for purity analysis in column 3 of Table 2B, Parts 1 and 2.

### PROPOSED VERSION

#### 2.5.4.5 Submitted sample

The minimum sizes of submitted samples are as follows:

- If a determination of other seeds by number is required: the weight prescribed in Table 2A, column 3; or
- If a determination of other seeds by number is not required: the weight prescribed for the working sample for purity analysis in Table 2A, column 4, or in 3.5.1.

For certain tests or under certain conditions, the following exceptions apply:

a) For coated seeds, if a determination of other seeds by number or size grading is required: the number of seeds indicated in Table 2B, Parts 1 and 2.

b) For coated seeds, if a determination of other seeds by number or size grading is not required: the number of seeds indicated for the working sample for purity analysis in Table 2B, Parts 1 and 2.

c) For moisture determination of species that must be ground (see Table 9A): 100 g. For all other species: 50 g. When moisture meters are to be used for testing, a larger sample size may be necessary. Contact the accredited ISTA laboratory for specific instructions.
For verification of species and variety: as prescribed in Chapter 8.

For germination or viability tests of small seed lots (2.2.14): the number of seeds required to complete one of these tests plus 25 seeds for identity assurance.

For determination of other seeds of small seed lots (2.2.14): the amount necessary to complete this test according to 4.5.1 b). Chapter 4).

If the submitted sample is smaller than prescribed above, the sampler must be notified accordingly and analysis withheld until sufficient seed is received in a single submitted sample.

The submitted sample must be sealed and labelled or marked.

2.5.4.6 Sample reduction

... 

2.5.4.7 Storage of submitted samples after testing

Submitted samples on which ISTA Certificates have been issued must be stored. Only in the case of very expensive seed, the remainder of the submitted sample, except 25 seeds for assurance of identity, may be sent back to the applicant. The seed testing laboratory cannot be held responsible for any deterioration of the sample during storage.

Submitted samples on which ISTA Certificates have been issued must be stored. In the case of small seed lots (see 2.2.14), the remainder of the submitted sample, minus 25 seeds for assurance of identity, may be sent back to the applicant. The seed testing laboratory cannot be held responsible for any deterioration of the sample during storage.

C.2.7

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C.2.8. Revision of 2.2 Definitions

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<tr>
<td>2.2 Definitions</td>
<td>2.2 Definitions</td>
</tr>
<tr>
<td>2.2.1 Seed lot</td>
<td>2.2.1 Seed lot</td>
</tr>
<tr>
<td>A seed lot is a specified quantity of seed</td>
<td>A seed lot is a specified quantity of seed</td>
</tr>
</tbody>
</table>
that is physically and uniquely identifiable.

2.2.2 Sublot

A sublot is a portion of not less than 20 % of the seed lot. Each container of a sublot must be marked with the identification of the seed lot.

2.2.3 Primary sample

2.2.12 Coated seeds

2.2.13 Coated seeds

2.2.14 Small seed lots

Small seed lots are seed lots of high-value seed, where obtaining a submitted sample of standard size could have a substantial effect on the quantity of the remaining seed lot. High-value seed includes, but is not limited to, hybrid vegetable seeds that are sold per seed, or seed that is not commercially available and is used for research or for higher generation multiplication.

Sampling of small seed lots requires prior notification of the accredited ISTA laboratory.

### C.2.8

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### C.2.9, Revision of 2.5.1.5 Obtaining the submitted sample

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<tr>
<td>2.5.1.5 Obtaining the submitted sample</td>
<td>2.5.1.5 Obtaining the submitted sample</td>
</tr>
<tr>
<td>The submitted sample must be obtained by reducing the composite sample to an appropriate size by one of the methods referred to in 2.5.2.2. Obtaining subsamples such as for moisture testing must be carried out in such a way that changes in moisture content are minimal.</td>
<td>The submitted sample must be obtained by reducing the composite sample to an appropriate size by one of the methods referred to in 2.5.2.2. In the case of very large composite samples, a method according to 2.5.1.3 may also be used. Obtaining subsamples such as for moisture testing must be carried out in such a way that changes in moisture content are minimal.</td>
</tr>
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### C.2.9

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C.2.10. Revision of 2.5.4.4 Sampling from the seed lot

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<tr>
<td><strong>2.5.4.4 Sampling from the seed lot</strong>&lt;br&gt;For sampling from the seed lot methods listed under 2.5.1 must be used. Automatic seed samplers must be approved by the ISTA seed testing laboratory.</td>
<td><strong>2.5.4.4. Sampling from the seed lot</strong>&lt;br&gt;For sampling from the seed lot methods listed under 2.5.1 must be used. Automatic seed samplers must be approved by the ISTA seed testing laboratory according to the “Protocol for the approval of automatic seed samplers” as approved by the ISTA membership and published on the ISTA website.</td>
</tr>
</tbody>
</table>

See separate document “Protocol for the approval of automatic seed samplers”.

**NOTE:** By accepting proposal C.2.10 the “Protocol for the approval of automatic seed samplers” is also deemed approved by the membership.

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C.2.11. Revision of 2.5.1.3 Taking primary samples

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<tbody>
<tr>
<td><strong>2.5.1.3 Taking primary samples</strong>&lt;br&gt;…&lt;br&gt;a) Automatic sampling from a seed stream. Seed may be sampled by automatic sampling devices, provided that the instrument uniformly samples the cross section of the seed stream and the material entering the instrument does not bounce out again. It may be operated either under manual or automatic control. The intervals between taking primary samples should be constant but may also vary randomly.</td>
<td><strong>2.5.1.3 Taking primary samples</strong>&lt;br&gt;…&lt;br&gt;a) Automatic sampling from a seed stream. Seed may be sampled by automatic sampling devices, provided that the instrument uniformly samples the cross section of the seed stream and the material entering the instrument does not bounce out again. It may be operated either under manual or automatic control. The intervals between taking primary samples should be constant.</td>
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C.2.12. Revision of 2.9.1.3 Testing procedure

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<tr>
<td>2.9.1.3 Testing procedure</td>
<td>2.9.1.3 Testing procedure</td>
</tr>
<tr>
<td>c) The seed count may be of any component that can be counted, e.g. a specified seed species, or all other seeds together. Each working sample must be of a weight estimated to contain about 40,000 seeds and a count is made in it of the number of seeds of the kind selected (i.e. other seed count).</td>
<td>c) The seed count may be of any component that can be counted, e.g. a specified seed species, or all other seeds together. Each working sample must be of a weight estimated to contain about 2500 seeds and a count is made in it of the number of seeds of the kind selected (i.e. other seed count).</td>
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</table>

VOTE TO ACCEPT ITEM | YES VOTES | NO VOTES | RESULT
---|---|---|---
C.2.12 | 39 | 1 | ACCEPTED

C.2.13. Revision of Table 2G Part 1.

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<td>137</td>
<td>64</td>
</tr>
<tr>
<td>138</td>
<td>64</td>
</tr>
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</table>

For higher other seed counts, tolerances (R) are calculated by using the following formula and rounding up to the next whole number:

- For N = 5-9: R = square root(average count of other seed) * 5.44
- For N = 10-19: R = square root(average count of other seed) * 6.11
- For N = 20: R = square root(average count of other seed) * 6.69

VOTE TO ACCEPT ITEM | YES VOTES | NO VOTES | RESULT
---|---|---|---
C.2.13 | 40 | 0 | ACCEPTED

C.2.14. Revision of Table 2G Part 2.

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<td>136</td>
<td>80</td>
</tr>
<tr>
<td>137</td>
<td>80</td>
</tr>
</tbody>
</table>
For higher other seed counts, tolerances (R) are calculated by using the following formula and rounding up to the next whole number:

For N = 5-9: \( R = \sqrt{\text{average count of other seed}} \times 6.82 \)

For N = 10-19: \( R = \sqrt{\text{average count of other seed}} \times 7.65 \)

For N = 20: \( R = \sqrt{\text{average count of other seed}} \times 8.38 \)

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**C.2.15. Revision of 2.2.10 Marked/labelled**

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</thead>
<tbody>
<tr>
<td><strong>2.2.10 Marked/labelled</strong></td>
<td><strong>2.2.10 Marked/labelled</strong></td>
</tr>
<tr>
<td>A container of a seed lot can be considered as marked or labelled when there is a unique identification mark on the container, which defines the seed lot to which the container belongs. All containers of a seed lot must be marked with the same unique seed lot designation (numbers, characters or combination of both). Marking of samples and subsamples must ensure that there is always an unambiguous link between the seed lot and the samples and subsamples.</td>
<td>A container of a seed lot can be considered as marked or labelled when there is a unique identification mark on the container, which defines the seed lot to which the container belongs. All containers of a seed lot must be marked with the same unique seed lot designation (numbers, characters or combination of both). Should the unique identification mark be indicated on a label attached to the container, it must not be possible to remove the label and replace it with another label without showing signs of tampering. Marking of samples and subsamples must ensure that there is always an unambiguous link between the seed lot and the samples and subsamples.</td>
</tr>
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</table>

<table>
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[206 00:00]
Chapter 3: The Purity Analysis

C.3.1 Improved guidance in 3.2.2 Other seeds

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<tr>
<td><strong>3.2.2 Other seeds</strong></td>
<td><strong>3.2.2 Other seeds</strong></td>
</tr>
<tr>
<td>Other seeds must include seed units of any plant species other than that of pure seed. With respect to classification as other seeds or inert matter the distinguishing characteristics described in the pure seed definitions (Table 3B Part 2) must also be applicable except that:</td>
<td>Other seeds must include seed units of any plant species other than that of pure seed. With respect to classification as other seeds or inert matter the distinguishing characteristics described in the pure seed definitions (Table 3B Part 2) must also be applicable except that:</td>
</tr>
<tr>
<td>1. Seed units of species for which a uniform blowing procedure applies are evaluated without blowing.</td>
<td>1. Seed units of species for which a uniform blowing procedure applies are evaluated without blowing.</td>
</tr>
<tr>
<td>2. Multiple seed units (MSU) must be separated and the single units classified according to the general principles in 3.2.</td>
<td>2. Multiple seed units (MSU) must be separated and the single units classified according to the general principles in 3.2.</td>
</tr>
<tr>
<td>3. <em>Cuscuta</em> spp. seed units which are fragile or ashen grey to creamy white in colour are classified as inert matter.</td>
<td>3. <em>Cuscuta</em> spp. seed units which are fragile or ashen grey to creamy white in colour are classified as inert matter.</td>
</tr>
</tbody>
</table>

For species and genera without pure seed definitions in…

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C.3.2 Amendment to PSD 10

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<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10. Seed, with or without testa. Piece of seed larger than one-half the original size, with or without testa</td>
<td>10. Seed, with or without testa. Piece of seed larger than one-half the original size, with or without testa</td>
</tr>
</tbody>
</table>

*Allium: Pairs of *Allium* seeds adhering together do not need to be separated.*

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.3.2</td>
<td>40</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
C.3.3 Move *Hedysarum* from PSD 11 to PSD 23

Table 3B Part 1. Pure seed definition numbers and chaffiness of seeds, listed by genus

<table>
<thead>
<tr>
<th>Genus</th>
<th>Family</th>
<th>PSD no.</th>
<th>Chaffiness</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Hedysarum</em></td>
<td>Fabaceae</td>
<td>11, 23</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.3.3</td>
<td>40</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

Chapter 4: Determination of other seeds by number

4.1 Reporting results in 4.7 and consequential change in Chapter 1

1.5.2.4

**CURRENT VERSION**

4.7 Reporting results

…

– The scientific name and number of seeds of each species sought and found in this weight.

**PROPOSED VERSION**

4.7 Reporting results

…

– The scientific name and number of seeds of each species sought and found in this weight. **If no other seeds are found, this must be indicated on the certificate.**

Consequential change in Chapter 1:

**CURRENT VERSION**

1.5.2.4.

…

– The scientific name and number of seeds of each species sought and found in this weight.

**PROPOSED VERSION**

1.5.2.4.

…

– The scientific name and number of seeds of each species sought and found in this weight. **If no other seeds are found, this must be indicated on the certificate.**

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.4.1</td>
<td>40</td>
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<td>ACCEPTED</td>
</tr>
</tbody>
</table>
Chapter 5: The Germination Test

C.5.1. Revised 5.6.3 Procedures for promoting germination of dormant seed

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6.3 Procedures for promoting germination of dormant seed</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
<tr>
<td>More complete germination may be obtained by retesting after one or a combination of the procedures listed in 5.6.3.1, 5.6.3.2 and 5.6.3.3. These procedures may be applied to the original test, if dormancy is suspected. Recommended procedures are indicated in column 6 of Table 5A, but this does not prevent the use of other procedures listed in 5.6.3.1, 5.6.3.2 and 5.6.3.3.</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
</tr>
</tbody>
</table>

If dormancy is suspected, more complete germination may be obtained by retesting after one or a combination of dormancy-breaking procedures. For some species, recommended procedures are indicated in column 6 of Table 5A, but these and all other procedures listed in 5.6.3.1, 5.6.3.2 and 5.6.3.3 can be used for any species without restriction.

C.5.2. Revised 5.6.5.2, 5.8 and 5.9 regarding the reporting of multigerm seeds

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.6.5.2 Multigerm seed units</td>
<td></td>
</tr>
<tr>
<td>When a unit produces more than one normal seedling, only one is counted for determining the germination percentage. On request the number of normal seedlings produced by 100 units, or the number of units which have produced one, two or more than two normal seedlings may also be determined.</td>
<td></td>
</tr>
</tbody>
</table>

5.6.5.2 Multigerm seed units
When a unit produces more than one normal seedling, only one is counted for determining the germination percentage. On request, the number of normal seedlings produced by 100 units; or the number of units which have produced one, two or more than two normal seedlings; or the proportion of units producing one, two or more than two normal seedlings, may also be determined.
5.8 Calculation and expression of results

... For multigerm seed units, only one normal seedling per unit is counted to calculate the result of the germination test. On request, the number of units producing one, two or more than two normal seedlings may also be reported, expressing the results as a percentage of the total number of units which have produced at least one normal seedling, or alternatively the total number of seedlings produced by a given number of seed units.

5.8 Calculation and expression of results

... For multigerm seed units, only one normal seedling per unit is counted to calculate the result of the germination test. On request, the number of normal seedlings produced by 100 units; the number of units producing one, two or more than two normal seedlings; or the proportion of units producing one, two or more than two normal seedlings, may also be reported. The proportion is expressed as a percentage of the total number of units which have produced at least one normal seedling.

5.9 Reporting results

... - in the case of multigerm seed units: the number of normal seedlings produced by 100 units, and the proportion of units producing one, two or more than two normal seedlings.

5.9 Reporting results

... - in the case of multigerm seed units: the number of normal seedlings produced by 100 units; the number of units which have produced one, two or more than two normal seedlings; or the proportion of units producing one, two or more than two normal seedlings. The proportion is expressed as a percentage of the total number of units which have produced at least one normal seedling.

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.5.2</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

C.5.3. Revised 5.11 – Tolerance tables

5.11 Tolerance tables

5.11.1 Tolerances in one laboratory

Table 5B gives the maximum…… calculated in accordance to Miles (1963).

Table 5B

... 5.11.2 Tolerances in the same laboratory

Tables 5C–5E give the tolerances for percentages of normal seedlings, abnormal seedlings, dead seeds, hard seeds, fresh seeds or any combination of these, when tests are made on the same or a different submitted sample in the same laboratory. For two tests, use Table 5C, for three, Table 5D, and for four, Table 5E.

Table 5F gives the tolerances for percentages of normal seedlings, abnormal seedlings, dead seeds, hard seeds, fresh seeds or any combination of these, when tests are made on the same or a different submitted sample in two different laboratories. For tolerances between results of more than two laboratories or on tests of less than 400 seeds, see Miles (1963) or the Germination tolerances calculator in the Germination Committee Toolbox on the ISTA website.
To determine whether..............

........ International Seed Testing Association, 28 (3).

Table 5C-5E

5.11.3 Tolerances in different laboratories

Table 5F. Tolerances between results of two tests made in different laboratories on the same or different samples from the same seed lot (2 way test at 5% significance level) on 400 seed tests. In accordance with Miles (1963), column C, 400 seed tests.

<table>
<thead>
<tr>
<th>Average germination percentage of 2 tests</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-100%</td>
<td>0-50%</td>
</tr>
<tr>
<td>99</td>
<td>2</td>
</tr>
<tr>
<td>97-98</td>
<td>3-4</td>
</tr>
<tr>
<td>94-96</td>
<td>5-7</td>
</tr>
<tr>
<td>91-93</td>
<td>8-10</td>
</tr>
<tr>
<td>87-90</td>
<td>11-14</td>
</tr>
<tr>
<td>82-86</td>
<td>15-19</td>
</tr>
<tr>
<td>76-81</td>
<td>20-25</td>
</tr>
<tr>
<td>70-75</td>
<td>26-31</td>
</tr>
<tr>
<td>60-69</td>
<td>32-41</td>
</tr>
<tr>
<td>51-59</td>
<td>42-50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
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<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.5.3</td>
<td>40</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

Steve Jones:

“Maybe this is something for the other Technical Committees to think about: do they want similar tolerance tables added back into the Rules.”
Chapter 7: Seed Health Testing Methods

C.7.1. Correction to text in all existing seed health methods.

For all Chapter 7 Seed Health Methods the existing “Reporting Results” section is to be replaced with the following text.

7-001a: *Alternaria dauci* on *Daucus carota* (Carrot) by blotter method

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g. infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, **n**, and is approximately 3/n (P = 0.95) (see Roberts *et al.*, 1993).

In the case of a positive result, the report should indicate the percentage of infected seeds.

7-001b: *Alternaria dauci* on *Daucus carota* (Carrot) by malt agar method

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

7-002a: *Alternaria radicina* on *Daucus carota* (Carrot) by blotter method

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.
In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g. infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, n, and is approximately $3/n \times P = 0.95$ (see Roberts et al., 1993).

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-002b: *Alternaria radicina* on *Daucus carota* (Carrot) by malt agar method

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g. infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, n, and is approximately $3/n \times P = 0.95$ (see Roberts et al., 1993).

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-003: *Botrytis cinerea* on *Helianthus annuus* (Sunflower)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-004: *Phoma lingam* on *Brassica* spp.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.
name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

7-005: Ascochyta pisi on Pisum sativum (Pea)

| Reporting results: The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’. |
| The report must indicate that the results only concern the sample tested and indicate the number of seeds tested. |
| In case of a negative result (pathogen not detected), the results must be reported as “not detected”. |
| In the case of a positive result, the report should indicate the percentage of infected seeds. |

7-006: Colletotrichum lindemuthianum on Phaseolus vulgaris (Bean)

| Reporting results: The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’. |
| The report must indicate that the results only concern the sample tested and indicate the number of seeds tested. |
| In case of a negative result (pathogen not detected), the results must be reported as “not detected”. |
| In the case of a positive result, the report should indicate the percentage of infected seeds. |

7-007: Alternaria linicola, Botrytis cinerea and Colletotrichum lini on Linum usitatissimum (Flax)
**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g. infection level less than 1 % with 95 % probability). The tolerance standard depends on the total number of seeds tested, n, and is approximately $\frac{1}{2n}$ ($P = 0.95$) (see Roberts et al., 1993).

In the case of a positive result, the report should indicate the percentage of infected seeds.

**7-008: Caloscypha fulgens on Picea engelmannii and Picea glauca (Spruce)**

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

**7-009: Gibberella circinata on Pinus spp. (Pine) and Pseudotsuga menziesii (Douglas-fir)**

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infected seeds.
7-010: *Drechslera oryzae* on *Oryza sativa* (Rice)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

7-011: *Pyricularia oryzae* on *Oryza sativa* (Rice)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

7-012: *Alternaria padwickii* on *Oryza sativa* (Rice)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the
report should indicate the percentage of infected seeds.

### 7-013a: *Ustilago nuda* on *Hordeum vulgare* (Barley) by embryo extraction

<table>
<thead>
<tr>
<th>Reporting results:</th>
<th>Reporting results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
</tr>
<tr>
<td>The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.</td>
<td>The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.</td>
</tr>
<tr>
<td>In case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
<td>In case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
</tr>
<tr>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
</tr>
</tbody>
</table>

### 7-013b: *Ustilago nuda* on *Hordeum vulgare* (Barley) by dehulling and embryo extraction

<table>
<thead>
<tr>
<th>Reporting results:</th>
<th>Reporting results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
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<td>The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.</td>
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<td>In case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
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</tr>
<tr>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
</tr>
</tbody>
</table>

### 7-014: *Stagonospora nodorum* on *Triticum aestivum* (Wheat)

<table>
<thead>
<tr>
<th>Reporting results:</th>
<th>Reporting results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
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</tr>
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<td>In case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
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</tr>
<tr>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
<td>In the case of a positive result, the report should indicate the percentage of infected seeds.</td>
</tr>
</tbody>
</table>
### 7-015: Neotyphodium spp. on Festuca spp. (Fescue) and Lolium spp. (Ryegrass)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g., infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, $n$, and is approximately $3/n$ ($P = 0.95$) (see Roberts et al., 1993). In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-016: Phomopsis complex on Glycine max (Soybean, Soya bean)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g., infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, $n$, and is approximately $3/n$ ($P = 0.95$) (see Roberts et al., 1993).

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-019b: Xanthomonas campestris pv. campestris on disinfected Brassica spp.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any subsamples), the results should be reported in terms of the tolerance standard (e.g., infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, $n$, and is approximately $3/n$ ($P = 0.95$) (see Roberts et al., 1993).

In case of a negative result (pathogen not detected), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the percentage of infected seeds.
standard and detection limit. The tolerance standard depends on the total number of seeds tested, n, and is approximately \(3/n\) \((P = 0.95)\) (see Roberts et al., 1993); the detection limit per subsample is equal to the detection limit per mL multiplied by the volume of extract.

In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and either the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infected seeds.

In the case of a negative result (pathogen not detected in any subsamples), the results—must be reported as “not detected”.

In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.

### 7-021: *Xanthomonas axonopodis pv. phaseoli* on *Phaseolus vulgaris* (Bean)

<table>
<thead>
<tr>
<th>Reporting results:</th>
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</thead>
<tbody>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>In the case of a negative result (pathogen not detected in any subsamples), the results should be reported in terms of the tolerance standard and detection limit. The tolerance standard depends on the total number of seeds tested, n, and is approximately (3/n) ((P = 0.95)) (see Roberts et al., 1993); the detection limit per subsample is equal to the detection limit per mL multiplied by the volume of extract.</td>
<td></td>
</tr>
<tr>
<td>The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.</td>
<td></td>
</tr>
<tr>
<td>In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.</td>
<td></td>
</tr>
<tr>
<td>In the case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
<td></td>
</tr>
<tr>
<td>In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.</td>
<td></td>
</tr>
</tbody>
</table>

### 7-022: *Microdochium nivale* and *Microdochium majus* on *Triticum* spp. (Wheat)

<table>
<thead>
<tr>
<th>Reporting results:</th>
<th>Reporting results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
<td></td>
</tr>
<tr>
<td>The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.</td>
<td></td>
</tr>
<tr>
<td>In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard and detection limit.</td>
<td></td>
</tr>
<tr>
<td>The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.</td>
<td></td>
</tr>
<tr>
<td>In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.</td>
<td></td>
</tr>
<tr>
<td>In the case of a negative result (pathogen not detected), the results must be reported as “not detected”.</td>
<td></td>
</tr>
</tbody>
</table>
tolerance standard (e.g., infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, n, and is approximately 3/n (P = 0.95) (see Roberts et al., 1993). In the case of a positive result, the report should indicate the percentage of infected seeds.

In case of a negative result (pathogen not detected), the results must be reported as "not detected".

In the case of a positive result, the report should indicate the percentage of infected seeds.

### 7-023: Pseudomonas savastanoi pv. phaseolicola on Phaseolus vulgaris (Bean)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any subsamples), the results should be reported in terms of the tolerance standard and detection limit. The tolerance standard depends on the total number of seeds tested, n, and is approximately 3/n (P = 0.95) (see Roberts et al., 1993); the detection limit per subsample is equal to the detection limit per mL multiplied by the volume of extract.

In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and either the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infested seeds (Most Probable Number).

### 7-024: Pea early browning virus and Pea-borne mosaic virus on Pisum sativum (Pea)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA International Seed Analysis Certificate, results are entered under Other Determinations.

In the case of a negative result (pathogen not detected in any of the subsamples), the results must be reported as "not detected".

In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA International Seed Analysis Certificate, results are entered under Other Determinations.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In the case of a positive result, the report should indicate the mean number of pathogen propagules (cfu) per seed and the number of positive subsamples out of the total number tested.
In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infested seeds.

### Reporting results: 7-025: *Aphelenchoides besseyi* on *Oryza sativa* (Rice)

The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any subsamples), the results should be reported in terms of the tolerance standard and detection limit. The tolerance standard depends on the total number of seeds tested, n, and is approximately 3/n (p = 0.95) (Roberts et al., 1993). The detection limit per subsample is equal to the detection limit per mL multiplied by the volume of extract.

In the case of a positive result, the report should indicate the mean number of nematodes per subsample and either the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infested seeds.

### Reporting results: 7-026: *Squash mosaic virus*, *Cucumber green mottle mosaic virus* and *Melon necrotic spot virus* on cucurbits

The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

The report must indicate that the results only concern the sample tested and indicate the number of seeds tested.

In the case of a negative result (pathogen not detected in any subsamples), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the mean number of nematodes per subsample and the number of positive subsamples out of the total number tested.
7-027: *Pyrenophora teres* and *Pyrenophora graminea* on *Hordeum vulgare* (Barley)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected), the results should be reported in terms of the tolerance standard (e.g. infection level less than 1% with 95% probability). The tolerance standard depends on the total number of seeds tested, n, and is approximately $\frac{3}{n}$ ($P = 0.95$) (see Roberts et al., 1993).

In the case of a positive result, the report should indicate the percentage of infected seeds.

---

7-028: Infectious Tobacco mosaic virus and Tomato mosaic virus on *Solanum lycopersicum* (Tomato)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any of the subsamples), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infected seeds.

---

7-029: *Pseudomonas syringae* pv. *pisi* on *Pisum sativum* (Pea)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any of the subsamples), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested and the sample size or the maximum likelihood estimate of the proportion of infected seeds.
The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any subsample), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested.

7-030: Acidovorax valerianellae on Valerianella locusta (corn salad)

**Reporting results:** The result of a seed health test should indicate the scientific name of the pathogen detected and the test method used. When reported on an ISTA Certificate, results are entered under ‘Other Determinations’.

In the case of a negative result (pathogen not detected in any subsample), the results must be reported as “not detected”.

In the case of a positive result, the report should indicate the number of positive subsamples out of the total number tested.

**General changes**

The following modifications are proposed.

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-026: Detection of Squash Mosaic Virus, Cucumber Green Mottle Mosaic Virus and Melon Necrotic Spot Virus in cucurbits</td>
<td>7-026: Detection of Squash Mosaic Virus, Cucumber Green Mottle Mosaic Virus and Melon Necrotic Spot Virus in cucurbits</td>
</tr>
<tr>
<td>CURRENT VERSION</td>
<td>PROPOSED VERSION</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------</td>
</tr>
<tr>
<td>1.2.4 Place a drop of the virus inoculum on the surface of both cotyledons and 1st leaf of each emerged plant and rub it with fingers using latex gloves and/or finger cots. Apply light pressure, such that the leaf tissue is not damaged.</td>
<td>1.2.4 Place a drop(s) of the virus inoculum on the surface of both cotyledons and 1st leaf of each emerged plant and rub it with fingers using latex gloves and/or finger cots. <strong>Use enough liquid so that all surface areas are wetted.</strong> Apply light pressure, such that the leaf tissue is not damaged.</td>
</tr>
<tr>
<td>1.2.5 Rinse the plants with tap water 5 min after the inoculation and continue their greenhouse incubation with the rest of the plants until the final reading.</td>
<td>1.2.5 Rinse the plants with tap water <strong>within 5 min of completing</strong> the inoculation and continue their greenhouse incubation with the rest of the plants until the final reading.</td>
</tr>
<tr>
<td>- The use of Negative and Positive control plants is very important to compare the visually observed SqMV symptoms on evaluated cucurbit plants in the grow-out test (Step1.3.2.) and to validate the DAS-ELISA results (Step 2.6. and 2.11.).</td>
<td>- The use of Negative and Positive control plants is very important to compare the visually observed SqMV symptoms on evaluated cucurbit plants in the grow-out test (Step1.3.2.) and to validate the DAS-ELISA results (Step 2.6. and 2.11.). <strong>If control plants do not perform as expected, the test is considered as invalid and discarded, and a retest must be done:</strong></td>
</tr>
<tr>
<td>Plates of MT medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls). Plates of MSP medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls).</td>
<td>Plates of MT medium: 9.0 cm Petri dishes. Plates of MSP medium: 9.0 cm Petri dishes</td>
</tr>
<tr>
<td>7-019a: Detection of <em>Xanthomonas campestris</em> pv. <em>campestris</em> on Brassica spp. Plates of FS medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls) Plates of mCS20ABN medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls)</td>
<td>7-019a: Detection of <em>Xanthomonas campestris</em> pv. <em>campestris</em> on Brassica spp. Plates of FS medium: 9.0 cm Petri dishes Plates of mCS20ABN medium: 9.0 cm Petri dishes</td>
</tr>
<tr>
<td>7-019b: Detection of <em>Xanthomonas campestris</em> pv. <em>campestris</em> on Brassica spp. disinfested/ disinfected seed with grinding Plates of FS medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls) Plates of mCS20ABN medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls)</td>
<td>7-019b: Detection of <em>Xanthomonas campestris</em> pv. <em>campestris</em> on Brassica spp. disinfested/ disinfected seed with grinding Plates of FS medium: 9.0 cm Petri dishes Plates of mCS20ABN medium: 9.0 cm Petri dishes</td>
</tr>
<tr>
<td>2.5 Pipette 100 μL of the tenfold dilution (10⁻¹ dilution) and then the undiluted seed extract onto one plate of each of the selective media (FS and mCS20ABN) and spread over the surface with a sterile bent glass rod (see General methods).</td>
<td>2.5 Pipette 100 μL of the tenfold dilution (10⁻¹ dilution) and then the undiluted seed extract onto plates of each of the selective media (FS and mCS20ABN) and spread over the surface with a sterile bent glass rod (see General methods).</td>
</tr>
</tbody>
</table>
### CURRENT VERSION

2.6 Pipette 100 μL of the tenfold concentrated seed extract (10^1 concentration) onto one plate of each of the selective media (FS and mCS20ABN) and spread over the surface with a sterile bent glass rod (see General methods).

7-021: Detection of *Xanthomonas axonopodis pv. phaseoli* and *Xanthomonas axonopodis pv. phaseoli var. fuscans* on *Phaseolus vulgaris* (bean)

Plates of MT medium: 9.0 cm Petri dishes (3 plates of each medium per subsample + controls)
Plates of XCP1 medium: 9.0 cm Petri dishes

8.1. Make a slightly turbid cell suspension at 10^7 cfu/mL (OD600nm approximately 0.05) in 1.0 mL sterile distilled/deionized water from the suspect colonies cultured on YDC medium, and the positive and negative controls (CCP). Boil the suspension for 5 min at 95 °C for DNA extraction. Store at −20 °C until identification (CCP).

8.5. Fractionate 10 μL of the PCR products and water (negative PCR control) by gel electrophoresis in a 1.5 % agarose gel in 1X Tris-acetate EDTA (TAE buffer) (CCP). Include a 100 bp ladder. Stain with ethidium bromide in a bath and rinse in water.

**Critical control points**
- Positive and negative control isolates and negative PCR control should be included in every PCR test (Step 8.1).

7-029: Detection of *Pseudomonas syringae pv. pisi* on *Pisum sativum* (pea) seed

6.1 Pick up at least two suspect colonies, if present, per subsample grown on KBBCA medium and subculture on sectored plates of SNAC medium (CCP).

6.2 Pick up at least two suspect colonies, if present, per subsample grown on SNAC medium and subculture on sectored plates of KBBCA medium (CCP).

### PROPOSED VERSION

2.6 Pipette 100 μL of the tenfold concentrated seed extract (10^1 concentration) onto plates of each of the selective media (FS and mCS20ABN) and spread over the surface with a sterile bent glass rod (see General methods).

7-021: Detection of *Xanthomonas axonopodis pv. phaseoli* and *Xanthomonas axonopodis pv. phaseoli var. fuscans* on *Phaseolus vulgaris* (bean)

Plates of MT medium: 9.0 cm Petri dishes
Plates of XCP1 medium: 9.0 cm Petri dishes

8.1. Make a slightly turbid cell suspension at 10^7 cfu/mL (OD600nm approximately 0.05) in 1.0 mL sterile distilled/deionized water from the suspect colonies cultured on YDC medium, and the positive and negative controls (CCP). Transfer 1 mL of sterile distilled/deionized water in a separate Eppendorf tube to use as negative process control. Boil the suspension for 5 min at 95 °C for DNA extraction. Store at −20 °C until identification (CCP).

8.5. Fractionate 10 μL of the PCR products, the negative process control and water (negative PCR control) by gel electrophoresis in a 1.5 % agarose gel in 1X Tris-acetate EDTA (TAE buffer) (CCP). Include a 100 bp ladder. Stain with ethidium bromide in a bath and rinse in water.

**Critical control points**
- Positive and negative control isolates, negative process control and negative PCR control should be included in every PCR test (Step 8.1).

7-029: Detection of *Pseudomonas syringae pv. pisi* on *Pisum sativum* (pea) seed

6.1 Pick up at least six suspect colonies, if present, per subsample grown on KBBCA medium and subculture on sectored plates of SNAC medium (CCP).

6.2 Pick up at least six suspect colonies, if present, per subsample grown on SNAC medium and subculture on sectored plates of KBBCA medium (CCP).

---

**VOTE TO ACCEPT ITEM**

<table>
<thead>
<tr>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
</table>

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C.7.2. Revised sample and subsample size for method 7-025

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample and subsample size</td>
<td>Sample and subsample size</td>
</tr>
<tr>
<td>The sample (total number of seeds tested) and subsample size to be tested depends on the desired tolerance standard (maximum acceptable percentage of seeds infested) and detection limit (theoretical minimum number of pathogen propagules per seed which can be detected). The minimum recommended sample size is 30 000 seeds. In any case, the maximum subsample size should be 100 seeds.</td>
<td>The sample (total number of seeds tested) and subsample size to be tested depends on the desired tolerance standard (maximum acceptable percentage of seeds infested) and detection limit (theoretical minimum number of pathogen propagules per seed which can be detected). The minimum recommended sample size is 1000 seeds. In any case, the maximum subsample size is 250 seeds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.7.2</td>
<td>40</td>
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</tr>
</tbody>
</table>
Chapter 8: Species and variety testing

C.8.1. Changes to DNA testing based methods

8.1 Object
8.2 Definitions

8.2.1 Authentic standard sample

8.2.2 Standard reference

8.2.3 Performance approved methods

Performance approved methods are evaluated, approved and implemented by the testing laboratory according to the principles of the performance based approach as laid down in the ISTA document Principles and Conditions for Laboratory Accreditation under the performance based approach.

8.2.3 Allele

An allele is one of several alternate forms of a DNA sequence that may occur at a particular gene or other specific location within an organism’s genome.

8.2.4 Microsatellite

A microsatellite is a repetitive DNA element, also known as a simple sequence repeat (SSR), consisting of a short, tandemly repeated motif of one to a few DNA subunits (nucleotides). For example, CTGCTGCTGCTGCTGCTGCTGCTG is a microsatellite with a “CTG” repeat motif. A given microsatellite at a particular location within an organism’s genome may vary in size when examined in different individuals due to differences in the number of times the motif is repeated.

8.2.5 Semi-performance based approach

The semi-performance based approach (SPBA) is an approach to testing in which individual laboratories can choose some components of the test method, as long as those components have been validated as fit for purpose and comply with given performance standards, while one or more other components of the test method are prescribed.

8.2.6 Allele profile

An allele profile is the combination of alleles determined for a specific set of DNA markers examined within a sample, individual or variety. It is sometimes referred to as a DNA ‘fingerprint’.

8.3 General principles

8.3.1 Field of application

8.3.2 Testing principles

8.3.3 Semi-performance based approach (SPBA) for DNA-based testing

The technologies associated with DNA analysis are continuously evolving and an assortment of instrumentation and procedures exist that may yield equivalent results. Individual laboratories have invested in varied instrumentation according to their circumstances and it is not practical to require standardized use of specific technologies. Therefore, in order to establish a harmonized approach that both provides guidance to laboratories and facilitates processes for laboratories seeking accreditation for these types of tests, a SPBA has been instituted. Specific molecular
Markers are prescribed, but the analytical procedures used to interrogate those markers are at the discretion of individual laboratories so long as those procedures have been evaluated as fit for purpose and the end result meets acceptable standards as set by ISTA.

8.4 Personnel and Equipment
8.5 Procedures
8.6 Calculation and expression of results
8.7 Reporting results

8.7.3 Reporting probabilities of meeting specifications
The result may be reported as: “On the basis of the traits tested, the seed lot meets the specification of ... % minimum species (or variety) purity with ... % confidence.”

8.8 Standardized methods
8.8 Conventional methods

8.8.1 Cereals
Morphological characters...

8.8.2 Fabaceae and Poaceae
In some species of Fabaceae...

8.9 Examination of seedlings

8.9.1 Principle of the DNA based methods
DNA is extracted from seeds and a minimum number of microsatellite markers are amplified by the polymerase chain reaction (PCR). The amplified DNA fragments are separated according to size using electrophoresis and detected using an appropriate technique. Generally, electrophoresis and fragment detection are accomplished concurrently by the same instrument. Alleles are defined by length (number of base pairs). Allele profiles are characteristic of variety and can be used to identify unknown samples. Mixtures may be assessed by single seed analysis.

The procedure consists of several stages, including DNA extraction, PCR
amplification, fragment separation and detection, and evaluation of results. Although recommended protocols are provided, in line with the principles of a SPBA, testing may be carried out using any suitable procedure for each stage of the process so long as the procedures have been validated as fit for purpose and the end result meets acceptable standards as set by ISTA. A core set of microsatellite markers is prescribed; its use is required for reports and issuance of ISTA Certificates. In some circumstances the prescribed set of markers may not be sufficient to provide unique allele profiles for all of the varieties that may be encountered. In such cases the analysis may be enhanced through the addition of recommended supplementary microsatellite markers, or other suitable microsatellites markers.

8.10.2 Triticum (wheat)

The standard reference DNA-based method for verifying varieties of Triticum is by analysis of a minimum of eight microsatellite markers. Verification of the identity of a single-constituent seed lot may be achieved using pooled seed samples or analysis of a small number of individual seeds. Estimates of varietal purity will require analysis of larger numbers of individual seeds; sample sizes of greater than 100 may be required for precise estimates.

8.10.2.1 Microsatellite markers

Use of the following prescribed microsatellite markers is required for reports and issuance of ISTA Certificates:

Table 8.5. Prescribed microsatellite markers and PCR primers for verification of wheat varieties.

<table>
<thead>
<tr>
<th>Marker</th>
<th>Forward primer</th>
<th>Reverse primer</th>
<th>Source¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuPw167</td>
<td>cggacagagcagactagg</td>
<td>caccacaccaatcaggaacc</td>
<td>A</td>
</tr>
<tr>
<td>DuPw217</td>
<td>egaattacacttcctcctctcgg</td>
<td>cgagegtgtcacaagttgc</td>
<td>A</td>
</tr>
<tr>
<td>DuPw004</td>
<td>gtgtctgtagagagaagacg</td>
<td>tggagctacgtggtgatcc</td>
<td>A</td>
</tr>
<tr>
<td>DuPw115</td>
<td>tggctctcctcctgcctgc</td>
<td>cctcagatcctcagttatcg</td>
<td>A</td>
</tr>
<tr>
<td>DuPw205</td>
<td>atccagatcacaacaaacgg</td>
<td>ctccagctctcctctcgg</td>
<td>A</td>
</tr>
<tr>
<td>Xgwm155</td>
<td>caatcattttttttccc</td>
<td>aatcatggaatccatagcc</td>
<td>B</td>
</tr>
<tr>
<td>Xgwm413</td>
<td>tggctctttagttgcttggg</td>
<td>gatcgtctctctctctgca</td>
<td>B</td>
</tr>
<tr>
<td>Xgwm003</td>
<td>gcagcgccactgtgtacattt</td>
<td>aatcgctactcatctc</td>
<td>B</td>
</tr>
</tbody>
</table>


Addition of 5’-tail sequences for labelling using a universal primer approach, or direct labelling through the addition of a fluorophore are the only modifications permitted to PCR primers of the prescribed microsatellite markers.

The following are recommended as supplementary microsatellite markers. Their use is optional.

Table 8.6. Recommended supplementary microsatellite markers and PCR primers for verification of wheat varieties.

<table>
<thead>
<tr>
<th>Marker</th>
<th>Forward primer</th>
<th>Reverse primer</th>
<th>Source¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
8.10.2.2 Recommended DNA extraction protocol

The following procedure is suitable for extraction of DNA from individual seeds or pools of up to 10 seeds. Portions (400 mg) of finely ground bulk samples may also be used as starting material, in which case the initial pulverisation step may be omitted.

To make one litre of extraction buffer, the following are combined and mixed well:

- 200 mL 1 M Tris-HCl (pH 7.5)
- 16.8 g NaCl
- 50 mL 0.5 M EDTA (pH 8.0)
- 5 g SDS
- ultrapure water to 1 L final volume

For each kernel or pool of seeds to be extracted, a single grinding bead (such as a Qiagen 5 mm stainless steel bead) is placed in a 2 mL round-bottom microcentrifuge tube. Individual seeds are crushed with needle-nose pliers as they are placed into the tubes. The seeds are then pulverized for 1 min at 30 Hz in a mixer mill (such as a Qiagen TissueLyser II). The tubes are then tapped on the countertop to settle the contents and 1.25 mL extraction buffer is added to each, followed by agitation at 30 Hz for 30 seconds in a mixer mill. Solids are pelleted by centrifugation for 5 minutes at ~5800 × g.

For each extract, 750 μL of supernatant is transferred to a 1.5 mL microcentrifuge tube containing an equal volume of isopropanol. Mixing is accomplished through repeated inversion. Precipitated DNA is then pelleted by centrifugation for 2 min at ~4000 × g. The supernatant is poured off; the remaining liquid is collected at the tube bottom by brief centrifugation and then removed with a pipette.

Pellets are allowed to air-dry for about 15 min before resuspension in 200 μL ultrapure water, assisted by agitation for 15 seconds at 30 Hz in a mixer mill. Immediately prior to use in PCR, any remaining solids should be pelleted by centrifugation for at least 5 min at maximum speed in a microcentrifuge. Single-seed extracts can be used directly in PCR; for preparations from seed pools, a 1:10 dilution in ultrapure water should be used.

8.10.2.3 Recommended PCR procedures

The microsatellite markers comprising the prescribed and recommended supplementary marker sets were selected in part because they are compatible in multiplexed analyses; each set is amenable to amplification in a single PCR.

Fluorescent labelling can be accomplished using a universal primer approach (Oetting et al., 1995) in which the M13 sequence 5′-CAGACGTTCTAAAACGAC-3′ is added to the 5′ end of each forward primer and a single fluorescently labelled M13 primer having the identical sequence is included in the reaction mixture. During PCR, this universal fluorescent primer hybridizes with complementary sequences generated in early amplification cycles, resulting in the synthesis of fluorescent products for all of the microsatellite markers in the reaction.

8.10.2.3.1 Reaction components
A master mix with all reaction components except the template DNA should be set up and aliquoted into reaction tubes or plate wells. The following is a list of reagents for a single 10 µL reaction.

Table 8.7. Recommended reaction composition for multiplexed PCR amplification of microsatellite markers for verification of wheat varieties

<table>
<thead>
<tr>
<th>Amount per reaction (µL)</th>
<th>Component</th>
<th>Final concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>X^a</td>
<td>ultrapure H2O</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>10 × PCR buffer^b</td>
<td>1 ×</td>
</tr>
<tr>
<td>0.6^c</td>
<td>25 mM MgCl2</td>
<td>1.5 mM</td>
</tr>
<tr>
<td>0.25^d</td>
<td>each forward primer (2 µM stock)</td>
<td>0.05 µM</td>
</tr>
<tr>
<td>0.25</td>
<td>each reverse primer (2 µM stock)</td>
<td>0.05 µM</td>
</tr>
<tr>
<td>0.25</td>
<td>labelled M13 primer (2 µM)</td>
<td>0.05 µM</td>
</tr>
<tr>
<td>0.8</td>
<td>dNTP mix (2.5 mM each dNTP)</td>
<td>0.2 mM each</td>
</tr>
<tr>
<td>0.1</td>
<td>Taq DNA polymerase (5 U/µL)</td>
<td>0.05 U/µL</td>
</tr>
</tbody>
</table>

^a Determined as the amount required to achieve a reaction volume of 9 µL (prior to addition of template DNA) and is dependent upon the total number of PCR primers included.

^b Generally, the buffer should be as supplied with the DNA polymerase.

^c Amount shown assumes the PCR buffer does not contain MgCl2. If this is not the case, the amount of MgCl2 added should be adjusted accordingly.

^d This is a suggested starting point. Concentrations in multiplexed reactions may require adjustment (generally within a range of 0.03 µM to 0.10 µM) for some markers depending upon relative product intensities observed. For a given microsatellite marker, forward and reverse primers should be adjusted equally.

When preparing a master mix, component quantities are determined by multiplying the amounts indicated per reaction by the number of samples to be tested, plus one extra to accommodate pipetting inaccuracies. The components should be combined in a microcentrifuge tube in the order listed. The mixture should be gently vortexed, briefly centrifuged to collect contents at the bottom of the tube and then distributed into reaction tubes or wells (9 µL each). Lastly, 1 µL template DNA (prepared as described in 8.10.2.3) is added to each, resulting in a final reaction volume of 10 µL.

8.10.2.3.2 Thermal cycling profile
The following thermal cycling profile has been used successfully with the prescribed and recommended supplementary microsatellite markers. The total number of cycles may require alteration based on product intensities achieved.

Table 8.8. Recommended reaction composition for multiplexed PCR amplification of microsatellite markers for verification of wheat varieties

<table>
<thead>
<tr>
<th>Nº of cycles</th>
<th>Temperature</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>94 °C</td>
<td>3 min</td>
</tr>
<tr>
<td></td>
<td>58 °C</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>72 °C</td>
<td>1 min</td>
</tr>
<tr>
<td>34</td>
<td>94 °C</td>
<td>30 s</td>
</tr>
<tr>
<td></td>
<td>58 °C</td>
<td>30 s</td>
</tr>
</tbody>
</table>
8.10.2.4 Evaluation of results
This method is best used to verify varieties in a comparative manner, i.e., to determine whether the allele profile of a sample is identical to that of an authentic reference variety. It can be useful, particularly in gel-based analysis systems, to include samples of known varieties with known allele profiles to assist in the determination of sample allele sizes.

Microsatellite variation may occur among seeds within a variety of wheat. If analyses are performed on individual seeds, reference profiles should be determined using a sufficient number of individual authentic reference variety seeds to ensure that variation within a variety is adequately represented. If analyses are performed on pooled samples, it is recommended that the reference profiles used should also be based upon pooled seeds of authentic reference varieties.

8.9 Examination of seedlings

NOTE: Whole of section 8.9 needs to be renumbered and cross references updated

8.10 Examination of plants in field plots

NOTE: Whole of section 8.10 needs to be renumbered and cross references updated

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.8.1</td>
<td>36</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
Chapter 9: Determination of moisture content

C.9.1. Additional instructions for moisture testing of *Arachis hypogaea*.

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.1.7 Reporting results</strong></td>
<td><strong>9.1.7 Reporting results</strong></td>
</tr>
</tbody>
</table>
| ... | ...
| For *Arachis hypogaea*, one of the following statements must be entered: "The submitted sample for moisture determination consisted of seeds in their pod" or "The submitted sample for moisture determination consisted of seeds with the pod removed ("shelled seeds")." | ...

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.9.1</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

C.9.2. Addition instructions for moisture tests submitted for reporting on a BIC.

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.1.5.1 General directions and precautions</strong></td>
<td><strong>9.1.5.1 General directions and precautions</strong></td>
</tr>
</tbody>
</table>
| ... | ...
| The submitted sample (see 2.5.1.5-2.5.1.7 and 2.5.4.4) may be accepted for moisture determination only if it is in intact, moisture-proof container which as much air as possible has been excluded. | The submitted sample (see 2.5.1.5-2.5.1.7 and 2.5.4.4) may be accepted for moisture determination only if it is in intact, moisture-proof container (or, if issuing a Blue International Seed Sample Certificate, apparently moisture-proof) from which as much air as possible has been excluded.

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.9.2</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
Chapter 11: Testing coated seed

C.11.1. Clarification of procedure for removal of pelleting material

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.3.5.3 Procedures for purity tests on depelleted seeds and seeds removed from tapes</td>
<td>11.3.5.3 Procedures for purity tests on depelleted seeds and seeds removed from tapes</td>
</tr>
<tr>
<td>...The pelleting material is dispersed in water, and the remaining seed material is dried overnight on filter paper and then in an air oven at the temperature indicated in 9.1.5.7 for the species under test. ...</td>
<td>The pelleting material is dispersed in water, and the remaining seed material is dried overnight in a warm dry place on moisture-absorbing material e.g. filter paper.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.11.1</td>
<td>41</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

Chapter 13 Testing seeds by weighed replicates

C.13.1. Revised 13.6 and 13.9 regarding the expression of the results

<table>
<thead>
<tr>
<th>CURRENT VERSION</th>
<th>PROPOSED VERSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.6 Calculation and expression of results</td>
<td>13.6 Calculation and expression of results</td>
</tr>
<tr>
<td>The result for the no prechill test is obtained by adding together the four individual replicate no prechill results. It is expressed as the number of seeds germinated in the total weight of seed tested.</td>
<td>The result for the no prechill test is obtained by adding together the four individual replicate no prechill results. It is expressed as the number of normal seedlings in the total weight of seed tested.</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>13.9 Tolerance tables</td>
<td>13.9 Tolerance tables</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>To find the maximum tolerated range, calculate the sum of seeds germinated in the four replicates.</td>
<td>To find the maximum tolerated range, calculate the sum of normal seedlings in the four replicates.</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Table 13C. Maximum tolerated range between replicates</td>
<td>Table 13C. Maximum tolerated range between replicates</td>
</tr>
<tr>
<td>Number of seeds germinated in the total weight of seeds tested</td>
<td>Number of normal seedlings in the total weight of seeds tested</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.13.1</td>
<td>40</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
Chapter 15: Seed Vigour Testing

C.15.1. Addition of new method. 15.8.5

15.8.5 Tetrazolium vigour test

15.8.5.1 Principle
The principle of using the topographical tetrazolium test to indicate vigour differences between seed lots is the same as when using the test to estimate seed viability (Chapter 6). The test uses a colourless solution of 2, 3, 5 tetrazolium chloride as an indicator to reveal the reduction processes that occur during respiration in living cells, through the hydrogenation of 2, 3, 5 tetrazolium chloride by dehydrogenase enzymes. This results in the production of the red, stable and non-diffusible compound, formazan in living cells. It is therefore possible to distinguish red-coloured living parts of the seed from dead ones and assessment of detailed differences in the location, colour and intensity of the staining allows the identification of seeds that are either vigorous or non-vigorous.

15.8.5.2 Scope and field of application
The tetrazolium vigour test provides a vigour test for *Glycine max* which relates to field emergence.

15.8.5.3 Reagent
An aqueous solution 2, 3, 5 triphenyl-tetrazolium chloride salt is made up following the directions in 6.4.1. The concentration used is 0.1%.

15.8.5.4 Procedures

15.8.5.4.1 Working samples
A test is carried out on two replicates of 100 pure seeds drawn at random from a representative sample of the submitted sample.

15.8.5.4.2 Preparation and treatment of the seed.
Allow seeds to imbibe overnight for 16-18 h between rolled filter paper at 20ºC ± 2ºC placed within sealed plastic bags to avoid evaporation. If imbibition is incomplete seeds should be imbibed in water for 30 to 60 minutes at 20ºC ± 2ºC to complete additional imbibition. Hard seeds may be present at the end of imbibition period and these seeds must be incised at the hard seeds should then be imbibed overnight for 16-18 h between rolled filter paper at 20ºC ± 2ºC.

15.8.5.4.3 Staining the seeds.
Place the intact imbibed seeds in a 0.1% 2, 3, 5 triphenyl tetrazolium chloride solution in the dark for 3 hours at 35ºC ± 2ºC. The seeds should be completely immersed in the stain.

15.8.5.4.4 Preparation of the seeds for evaluation
Decant the tetrazolium solution and rinse the seeds with water. The seeds should then be kept submerged in water during the evaluation to avoid dehydration and discolouration. Remove the seed coat by hand and expose the embryo by cutting carefully down the middle of the cotyledons, and the hypocotyl axis with a sharp blade.

15.8.5.4.5 Evaluation
The main aim of the tetrazolium vigour test is to identify vigorous and non-vigorous seeds.

Examine each seed and classify into different categories of vigorous seed (A, B or C) according to the colour, tissue turgidity and the location (extension and depth) of damaged areas on the seed (Figure 15.1). Other staining patterns (Figure 15.5) reveal non-vigorous seed.
• **Category A**: Completely turgid and stained seed of a normal pink colour (Figure 15.2).

• **Category B**: Presence of minor area of red colour, unstained, flaccid or necrotic tissues with limited extension and superficial depth localised at any site of the seed (including embryo axis and joining area on the embryo axis and the cotyledons) (Figure 15.1 and 15.3).

• **Category C**: Presence of major or multiple areas of red colour, unstained, flaccid or necrotic tissues extending from ⅓ to the whole of the cotyledon area at the distal end of the cotyledon(s); and a depth from ⅔ to entire cotyledon (Figure 15.1 and 15.4).

• **Other staining**: non-vigorous seeds (Figures 15.5a-l).
  - Figure 15.5a: Radicle with tissues up to 1/3 deteriorated, unstained or lost; 15.5b, joining area embryo axis-cotyledons with deteriorated red tissue; 15.5c, cotyledons with tissues up to ½ deteriorated, unstained or lost; 15.5d, cotyledons with tissues up to ¼ deep deteriorated or unstained; 15.5e, cotyledon with tissues up to ⅓ deteriorated, unstained or lost; 15.5f, radicle with more than ⅔ of deteriorated, unstained or lost tissues; 15.5g, joining area embryo axis-cotyledons unstained; 15.5h, plumule deteriorated or lost; 15.5i, cotyledons with more than ½ deteriorated, unstained or lost tissues; 15.5j, cotyledons with more than ¼ deep deterioration or unstained tissues; 15.5k, cotyledon with more than ¾ deteriorated, unstained or lost tissues; 15.5l, entire seed unstained.

**15.8.5.5 Calculation, expression of results and tolerances**

Calculate the vigour of each replicate as the sum of seeds in the three categories A, B and C and, express as a percentage of the whole sample. The mean of the two replicates is expressed as the TZ vigour (%). If the two 100-seed replicates differ by more than the tolerance value shown in Table 15j, the seed lot must be re-tested.

**15.8.5.6 Reporting results**

The result of a seed vigour test using the TZ method must be reported under ‘Other determinations’. Results are expressed as a percentage, calculated to the nearest whole number of vigorous seeds e.g.:

Tetrazolium vigour tests using 0.1% TZ solution, for 3 hours at 35 ºC: 90% vigorous seeds
Figure 15.1 Diagram indicating definitions of damaged areas on the seed.

Figure 15.2 Vigorous seed: Category A, external (a) and internal (b) views. External view is uniform pink staining, the internal view brilliant white surrounded by pink area.

Figure 15.3 Vigorous seed: Category B: majority of cotyledon is pink; cross-hatched areas represent minor areas of red staining, unstained, flaccid or necrotic tissues with limited extension and superficial depth.
Figure 15.4 Vigorous seed: Category C: Cotyledon mainly pink; cross-hatched areas represent major or multiple areas of red staining, unstained, flaccid or necrotic tissues with an extension of \( \frac{1}{3} \) of the cotyledon area (a-c) to \( \frac{3}{3} \) of the cotyledon area at the distal end of the cotyledon(s) (d); and a depth of \( \frac{1}{2} \) of the cotyledon to entire cotyledon.

![Figure 15.4](image)

Figure 15.5 Other staining:
Non-vigorous seeds (a-e): Radicle with tissues up to \( \frac{1}{3} \) deteriorated, unstained or lost (a); joining area embryo axis-cotyledons with deteriorated red tissues (b); cotyledons with tissues up to \( \frac{1}{2} \) deteriorated, unstained or lost (c); cotyledons with tissues up to \( \frac{2}{3} \) deep deteriorated or unstained (d); cotyledon with tissues up to \( \frac{3}{4} \) deteriorated, unstained or lost (e); radicle with more than \( \frac{1}{3} \) of deteriorated, unstained or lost tissues (f); joining area embryo axis-cotyledons unstained (g); plumule deteriorated or lost (h); cotyledons with more than \( \frac{1}{2} \) deteriorated, unstained or lost tissues (i); cotyledons with more than \( \frac{1}{4} \) deep deterioration or unstained tissues (j); cotyledon with more than \( \frac{3}{4} \) deteriorated, unstained or lost tissues (k); entire seed unstained (l).

![Figure 15.5](image)

Table 15J. Tolerances between highest and lowest vigour percentages of replicates in one tetrazolium vigour test (two-way test at the 5.0 % significance level), 2 replicates of 100 seeds. Extracted from column K of Table G1, Miles, S. R. (1963), Handbook of Tolerances and of Measures of Precision for Seed Testing. _Proceedings of the International Seed Testing Association_, 28 (3).

<table>
<thead>
<tr>
<th>Average vigour percentage of test</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-100%</td>
<td>0-50%</td>
</tr>
<tr>
<td>99</td>
<td>2</td>
</tr>
<tr>
<td>98</td>
<td>3</td>
</tr>
<tr>
<td>96-97</td>
<td>4-5</td>
</tr>
<tr>
<td>95</td>
<td>6</td>
</tr>
<tr>
<td>92-94</td>
<td>7-9</td>
</tr>
<tr>
<td>90-91</td>
<td>10-11</td>
</tr>
<tr>
<td>86-89</td>
<td>12-15</td>
</tr>
<tr>
<td>82-85</td>
<td>16-19</td>
</tr>
<tr>
<td>77-81</td>
<td>20-24</td>
</tr>
</tbody>
</table>
C15.1 Voting results

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C15.1</td>
<td>36</td>
<td>2</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

C15.2 Consequent change as a result of the above change to text in 15.1 to include tetrazolium as a vigour test for *Glycine max*

**CURRENT**

- Conductivity test: *Cicer arietinum* (Kabuli type), *Glycine max*, *Phaseolus vulgaris*, *Pisum sativum* (garden peas only, excluding petit-pois varieties)
- Accelerated ageing test: *Glycine max*
- Controlled deterioration test: *Brassica* spp.
- Radicle emergence test: *Zea mays*, *Brassica napus* (oilseed rape, Argentine canola)

**PROPOSED**

- Conductivity test: *Cicer arietinum* (Kabuli type), *Glycine max*, *Phaseolus vulgaris*, *Pisum sativum* (garden peas only, excluding petit-pois varieties)
- Accelerated ageing test: *Glycine max*
- Controlled deterioration test: *Brassica* spp.
- Radicle emergence test: *Zea mays*, *Brassica napus* (oilseed rape, Argentine canola)
- Tetrazolium vigour test: *Glycine max*

VOTE not needed as consequential change if the previous vote was for acceptance

C15.3 Addition of a species to the Radicle Emergence test

Table 15B. Specific conditions for the radicle emergence test procedure
VOTE TO ACCEPT ITEM | YES VOTES | NO VOTES | RESULT
---|---|---|---
C.15.3 | 41 | 0 | ACCEPTED

### C15.4 Change validated tests listed in 15.3, assuming C15.1 and C15.2 also accepted

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following ISTA vigour tests have completed validation:</td>
<td>The following ISTA vigour tests have completed validation:</td>
</tr>
<tr>
<td>Conductivity test: <em>Cicer arietinum</em> (Kabuli type), <em>Glycine max</em>, <em>Phaseolus vulgaris</em>, <em>Pisum sativum</em> (garden peas only, excluding petit-pois varieties)</td>
<td>Conductivity test: <em>Cicer arietinum</em> (Kabuli type), <em>Glycine max</em>, <em>Phaseolus vulgaris</em>, <em>Pisum sativum</em> (garden peas only, excluding petit-pois varieties)</td>
</tr>
<tr>
<td>Accelerated ageing test: <em>Glycine max</em></td>
<td>Accelerated ageing test: <em>Glycine max</em></td>
</tr>
<tr>
<td>Tetrazolium vigour test: <em>Glycine max</em></td>
<td>Tetrazolium vigour test: <em>Glycine max</em></td>
</tr>
</tbody>
</table>

VOTE not needed as consequential change if the previous vote was for acceptance
### C15.5 Alternative procedures within the Controlled Deterioration test 15.8.3

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15.8.3.3 Apparatus</strong></td>
<td><strong>15.8.3.3 Apparatus</strong></td>
</tr>
<tr>
<td>Water bath: This must have a temperature range to include 45 °C and be accurate to ±0.5 °C. Alternatively, an incubator giving the same degree of accuracy could be used. A water bath maintains the required temperature more uniformly when a number of tests are being conducted. If an incubator is used, care must be taken to ensure that there are no differences in temperature within it, especially when many tests are being conducted. Analytical balance: capable of weighing to the nearest 0.0001g</td>
<td>Water bath: This must have a temperature range to include 45 °C and be accurate to ±0.5 °C. Alternatively, an incubator giving the same degree of accuracy could be used. A water bath maintains the required temperature more uniformly when a number of tests are being conducted. If an incubator is used, care must be taken to ensure that there are no differences in temperature within it, especially when many tests are being conducted. Analytical balance: capable of weighing to the nearest 0.0001g</td>
</tr>
<tr>
<td>Aluminium foil packets: Suitable for holding 100 seeds in a single layer, with at least 3 cm space above the seeds after the packet is sealed. Packets approximately 5–6 cm deep and 7–10 cm wide are suitable. Packets must be impermeable to moisture once sealed. A range of packets are available, but example specifications are: paper (white kraft 60 g) covered by aluminium foil of 8 µm and polyethylene film of 40 µm.</td>
<td>Aluminium foil packets: Suitable for holding 100 seeds in a single layer, with at least 3 cm space above the seeds after the packet is sealed. Packets approximately 5–6 cm deep and 7–10 cm wide are suitable. Packets must be impermeable to moisture once sealed. A range of packets are available, but example specifications are: paper (white kraft 60 g) covered by aluminium foil of 8 µm and polyethylene film of 40 µm.</td>
</tr>
<tr>
<td>Packet sealer: Any instrument capable of producing a watertight seal to the foil packets is suitable.</td>
<td>Packet sealer: Any instrument capable of producing a watertight seal to the foil packets is suitable.</td>
</tr>
<tr>
<td>Refrigerator or cooled incubator: capable of maintaining 7 ±2 °C.</td>
<td>Refrigerator or cooled incubator: capable of maintaining 7 ±2 °C.</td>
</tr>
<tr>
<td>Moisture content test facilities: Moisture content tests are conducted according to Chapter 9 of the ISTA Rules. If filter paper method is used in 15.8.3.4.1:</td>
<td>Moisture content test facilities: Moisture content tests are conducted according to Chapter 9 of the ISTA Rules. If filter paper method is used in 15.8.3.4.1:</td>
</tr>
<tr>
<td>Filter paper or germination paper: e.g. as used in the germination test.</td>
<td>Filter paper or germination paper: e.g. as used in the germination test.</td>
</tr>
<tr>
<td>Containers: To hold seeds and filter and germination papers during the procedure of raising the seed moisture content. A range of dishes or containers may be suitable, e.g. 9 cm Petri dishes, germination boxes.</td>
<td>Containers: To hold seeds and filter or germination papers during the procedure of raising the seed moisture content. A range of dishes or containers may be suitable, e.g. 9 cm Petri dishes, germination boxes.</td>
</tr>
<tr>
<td>CURRENT</td>
<td>PROPOSED</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Refrigerator or cooled incubator: capable of maintaining 7 ± 2 °C.</td>
<td>If added water, rolled method is used in 15.8.3.4.1:</td>
</tr>
<tr>
<td></td>
<td>Laboratory tube roller: capable of 30 revolutions per minute.</td>
</tr>
<tr>
<td></td>
<td>Glass vials with sealable top:</td>
</tr>
<tr>
<td></td>
<td>Micropipettes: capacity and accuracy determined by the weight / volume of water to be added, as shown below</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water weight (mg) or volume (µl)</th>
<th>micropipette capacity (µl)</th>
<th>accuracy (µl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200</td>
<td>200</td>
<td>1</td>
</tr>
<tr>
<td>&gt;200</td>
<td>1000</td>
<td>5</td>
</tr>
</tbody>
</table>

If the CD germination test is used to assess deterioration in 15.8.3.4.3:

Germination test facilities: Germination tests are conducted using the methods and test conditions described in Chapter 5 of the ISTA Rules.

Moisture content test facilities: Moisture content tests are conducted according to Chapter 9 of the ISTA Rules.

If the EC test is used to assess deterioration in 15.8.3.4.3:

Water: deionized water or distilled water as described in 15.8.1.3.

Conductivity meter: as described in 15.8.1.3.

Containers: beakers or flasks: the containers should have a base diameter of 50 mm (±5 mm) and provide adequate water depth to immerse all the seeds and the dip cell.

**15.8.3.4.1 Raising and equilibration of seed moisture content**

Determine the initial moisture content of the submitted sample according to Chapter 9 of the ISTA Rules. This is subsequently referred to as the initial seed moisture content.

**15.8.3.4.1 Raising and equilibration of seed moisture content**

Determine the initial moisture content of the submitted sample according to Chapter 9 of the ISTA Rules. This is subsequently referred to as the initial seed moisture content (SMC).

Raise the SMC following one of the two alternative methods described below:

Filter paper method:
<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
</table>
| To adjust the seed moisture content, mix the fraction of pure seed thoroughly and draw randomly four replicates of at least 100 seeds. Weigh each replicate to four decimal places. Raise the seed moisture content of each replicate to 20%. The weight of seed at this moisture content is calculated as:  

\[
\text{Weight of replicate at 20\% mc} = \frac{(100 - \text{initial seed mc})}{(100 - \text{desired seed mc}* \cdot (\text{initial seed weight})} 
\]

* i.e. 80  

mc = moisture content  

Calculate the required weight to four decimal places. The acceptable required weight is then correct to three decimal places.  

Place each of the four replicates to imbibe on a moist germination/filter paper, placed in a suitable container.  

There should be no free water on the surface of the paper. If 9 cm germination papers are used, 3–4 mL water per paper usually gives a moist but not wet paper. Use the same volume of water for a standard amount of paper on each test occasion.  

Weigh seeds regularly to determine when they reach the required moisture content. Weighing must be accurate and correct to three decimal places. Seeds may begin to reach the required moisture content after 1.25–1.5 h depending on the seed lot, laboratory temperature and relative humidity.  

Once seeds have reached the required weight, place each replicate immediately into an aluminium foil packet. The seeds can lose moisture rapidly at this stage, so speed is essential. Flatten the packets with the edge of the hand to remove air, and heat-seal the packets approximately 3 cm above the level of the seeds.  

Place the sealed packets at 7 ±2 °C for 24 h.  

To adjust the seed moisture content, mix the fraction of pure seed thoroughly and draw randomly four replicates of at least 100 seeds. Weigh each replicate to four decimal places. Raise the seed moisture content of each replicate to 20%. The weight of seed at this moisture content is calculated as:  

\[
\text{Weight of replicate at 20\% mc} = \frac{(100 - \text{initial seed mc})}{(100 - \text{desired seed mc}* \cdot (\text{initial seed weight})} 
\]

* i.e. 80  

mc = moisture content  

Calculate the required weight to four decimal places. The acceptable required weight is then correct to three decimal places.  

Place each of the four replicates to imbibe on a moist germination/filter paper, placed in a suitable container.  

There should be no free water on the surface of the paper. If 9 cm germination papers are used, 3–4 mL water per paper usually gives a moist but not wet paper. Use the same volume of water for a standard amount of paper on each test occasion.  

Weigh seeds regularly to determine when they reach the required moisture content. Weighing must be accurate and correct to three decimal places. Seeds may begin to reach the required moisture content after 1.25–1.5 h depending on the seed lot, laboratory temperature and relative humidity.  

Once seeds have reached the required weight, place each replicate immediately into an aluminium foil packet. The seeds can lose moisture rapidly at this stage, so speed is essential. Flatten the packets with the edge of the hand to remove air, and heat-seal the packets approximately 3 cm above the level of the seeds.  

Place the sealed packets at 7 ±2 °C for 24 h.
<table>
<thead>
<tr>
<th>CURRENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CURRENT</td>
</tr>
<tr>
<td><strong>Added water, rolled method:</strong></td>
</tr>
<tr>
<td><strong>Draw a sample of approximately 500 seeds from the pure seed fraction</strong></td>
</tr>
<tr>
<td>and weigh to four decimal places. Calculate the required weight of the sample at 20% moisture content to four decimal places as described for the Filter paper method. The acceptable required weight is then correct to three decimal places.</td>
</tr>
<tr>
<td>The volume of water required to raise the seed moisture content of the sample to 20% is calculated as:</td>
</tr>
<tr>
<td>Volume of water required (μl) = Calculated weight of sample at 20% mc – initial seed weight</td>
</tr>
<tr>
<td>Place the weighed seed sample into a glass vial, add the required volume of water correct to three decimal places and seal the glass vial. Place the glass vial on a tube roller and roll at 30 revolutions per minute and 8 ± 2 °C overnight. Reweigh each sample to calculate the raised SMC and to ensure it is 20% ± 0.5% before packaging seeds into an aluminium foil packet. Flatten the packets with the edge of the hand to remove air, and heat-seal the packets approximately 3 cm above the level of the seeds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Added water, rolled method:</strong></td>
</tr>
<tr>
<td><strong>Draw a sample of approximately 500 seeds from the pure seed fraction</strong></td>
</tr>
<tr>
<td>and weigh to four decimal places. Calculate the required weight of the sample at 20% moisture content to four decimal places as described for the Filter paper method. The acceptable required weight is then correct to three decimal places.</td>
</tr>
<tr>
<td>The volume of water required to raise the seed moisture content of the sample to 20% is calculated as:</td>
</tr>
<tr>
<td>Volume of water required (μl) = Calculated weight of sample at 20% mc – initial seed weight</td>
</tr>
<tr>
<td>Place the weighed seed sample into a glass vial, add the required volume of water correct to three decimal places and seal the glass vial. Place the glass vial on a tube roller and roll at 30 revolutions per minute and 8 ± 2 °C overnight. Reweigh each sample to calculate the raised SMC and to ensure it is 20% ± 0.5% before packaging seeds into an aluminium foil packet. Flatten the packets with the edge of the hand to remove air, and heat-seal the packets approximately 3 cm above the level of the seeds.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15.8.3.4.3 Testing for germination</th>
</tr>
</thead>
<tbody>
<tr>
<td>A CD germination test should be set up using the deteriorated seed within 30 min of removing the seeds from the water bath.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15.8.3.4.3 Testing for response to deterioration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing for the response to deterioration should be done within 30 min of removing the seeds from the water bath, using the deteriorated seed and either of the two following methods:</td>
</tr>
<tr>
<td>1. CD germination test</td>
</tr>
<tr>
<td>2. EC test</td>
</tr>
<tr>
<td>Set up a CD germination test using 100 seeds from each replicate packet. The seeds may be divided into subreplicates for the germination test. The germination conditions for a CD germination test are the same as those outlined for the standard germination test for Brassica spp. in Chapter 5 of the ISTA Rules.</td>
</tr>
<tr>
<td>Set up an EC test following the general directions in 15.8.1.5 and 15.8.1.6.</td>
</tr>
<tr>
<td>Count four replicates of 100 seeds, each drawn at random from the deteriorated seed sample. Weigh the replicates to two decimal places (0.01 g).</td>
</tr>
<tr>
<td>CURRENT</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Add the 4 weighed replicates of 100 seeds to containers holding 50 ml of deionised or distilled water and imbibe for 16 hours ± 15 minutes at 20°C ± 2°C.</td>
</tr>
</tbody>
</table>

15.8.3.5 Calculation and expression of results

Express the results in accordance with the method used in 15.8.3.4.3

1. CD germination test

The total germinated percentage (normal plus abnormal seedlings) and percentage of normal seedlings are noted in each replicate. The result of the CD test is calculated as the average of the four 100-seed replicates, as described for the standard germination test in Chapter 5. Both the total germinated percentage and the percentage of normal seedlings are reported.

2. EC test after CD

Measure the conductivity of the leachate for each replicate at the end of the 16 hours ±15 mins soak period following the directions in 15.8.1.6.5

The conductivity per gram of seed weight for each replicate is calculated after accounting for the background conductivity of the original water (see 15.8.1.6.6), and the average of the four replicates provides the seed lot test result. For each replicate:

\[
\text{Conductivity reading (μS cm}^{-1}) - \text{background reading} \\
\text{Weight of replicate} = \text{Conductivity (μS cm}^{-1} \text{ g}^{-1})
\]
<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
</table>
| Then calculate the variance, standard deviation and coefficient of variation as follows:  
\[ \text{Variance} = N \sum x^2 - (\sum x)^2 / N (N-1) \]  
where  
\[ x = \text{conductivity of each replicate in } \mu \text{S cm}^{-1} \text{ g}^{-1} \]  
\[ N = \text{number of replicates} \]  
\[ \Sigma = \text{sum of} \]  
Standard deviation \( s = \sqrt{\text{Variance}} \)  
Coefficient of variation  
\[ \frac{s}{\bar{x}} \times 100 \]  
where \( \bar{x} = \text{mean conductivity of the sample} \)  
If the coefficient of variation does not exceed 10.0, the replicates are acceptable.  
If the coefficient of variation is greater than 10.0, the test must be repeated.  
When two tests are performed in different laboratories:  
the maximum tolerance value for two test results  
\[ \text{Mean conductivity reading} \times 0.3326 \]  
15.8.3.6 Reporting results  
The result of a seed vigour test using the controlled deterioration test method must be reported under ‘Other determinations’ as follows:  
15.8.3.6 Reporting results  
The result of a seed vigour test using the controlled deterioration test method must be reported under ‘Other determinations’ as follows for the two alternative methods of assessing deterioration in 15.8.3.4.3.  
CD germination test:  
Results are expressed as a percentage, calculated to the nearest whole number (5.8.1), and stated as ‘Total germinated seeds (normal plus abnormal seedlings) …. %’ and ‘Normal seedlings…. %’. If the result for either of these is found to be zero, it must be reported as ‘0’.  
The results must be accompanied by a statement of the specific variables used in the test (raised seed moisture content, deterioration period and temperature).  
Results are expressed as a percentage, calculated to the nearest whole number (5.8.1), and stated as ‘Total germinated seeds (normal plus abnormal seedlings) …. %’ and ‘Normal seedlings…. %’. If the result for either of these is found to be zero, it must be reported as ‘0’.  
The results must be accompanied by a statement of the specific variables used in the test i.e. method used to raise seed moisture content, raised seed moisture content, deterioration period and temperature.
CURRENT | PROPOSED
--- | ---
EC test after deterioration:
The result must be expressed in $\mu$S cm\(^{-1}\) g\(^{-1}\) to the nearest 0.1 $\mu$S cm\(^{-1}\) g\(^{-1}\).
The results must be accompanied by a statement of the specific variables used during deterioration (method used to raise seed moisture content, raised seed moisture content, deterioration period and temperature) and in the EC test (soaking time and temperature).

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.15.5</td>
<td>38</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>

**C15.6 Addition of radish (Raphanus sativus) as a species to which the conductivity test can be applied**

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
</table>
| **15.8.1.2 Scope and field of application**
The conductivity test offers a vigour test for *Cicer arietinum* (Kabuli type), *Glycine max*, *Phaseolus vulgaris* and *Pisum sativum* (garden peas only) which relates to the field emergence potential of seed lots. The test does not apply to field peas or the so-called ‘petit-pois’ varieties of garden peas (*Pisum sativum*). | **15.8.1.2 Scope and field of application**
The conductivity test offers a vigour test for *Cicer arietinum* (Kabuli type), *Glycine max*, *Phaseolus vulgaris*, *Pisum sativum* (garden peas only) and *Raphanus sativus* which relates to the field emergence potential of seed lots. The test does not apply to field peas or the so-called ‘petit-pois’ varieties of garden peas (*Pisum sativum*). |

| 15.8.1.3 Apparatus | **Conductivity meter:** a direct-reading meter using AC or DC current, with a dip cell that has a cell constant of 1.0, is suitable. The meter specifications should include a conductivity range of 0–1999 $\mu$S cm\(^{-1}\), a resolution of at least 0.1 $\mu$S cm\(^{-1}\), an accuracy of $\pm$1% and a temperature range of 20–25 °C. **Containers:** (Erlenmeyer flasks or beakers): the container capacity should be 400–500 mL with a base diameter of 80 mm (±5 mm) to provide adequate water depth to immerse all the seeds and the dip cell. Cleanliness is important, and all containers must be washed thoroughly and rinsed twice with deionized or distilled water before use. | **Conductivity meter:** a direct-reading meter using AC or DC current, with a dip cell that has a cell constant of 1.0, is suitable. The meter specifications should include a conductivity range of 0–1999 $\mu$S cm\(^{-1}\), a resolution of at least 0.1 $\mu$S cm\(^{-1}\), an accuracy of $\pm$1% and a temperature range of 20–25 °C. **Containers:** as specified in Table 15A, the base diameter must provide adequate water depth to immerse all the seeds and the dip cell. Cleanliness is important, and all containers must be washed thoroughly and rinsed twice with deionized or distilled water before use. |
### CURRENT

Water: deionized water or distilled water should be used. The conductivity of the deionized or distilled water must be measured and must not exceed 5 µS cm\(^{-1}\) at 20 °C. The water used for testing must be at 20 ±2 °C before use.

Germinator, incubator or walk-in room: a constant temperature of 20 ±2 °C is required.

Moisture content test facilities: moisture content tests are conducted according to Chapter 9.

### PROPOSED

Water: deionized water or distilled water should be used. The conductivity of the deionized or distilled water must be measured and must not exceed 5 µS cm\(^{-1}\) at 20 °C. The water used for testing must be at 20 ±2 °C before use.

Germinator, incubator or walk-in room: a constant temperature of 20 ±2 °C is required.

Moisture content test facilities: moisture content tests are conducted according to Chapter 9.

#### 15.8.1.4 Preparation of the sample

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine the moisture content of the submitted sample according to Chapter 9. If the moisture content is below 10.0 % or above 14.0 %, it must be adjusted to between 10.0 and 14.0 %, although it is not necessary for the moisture content of all samples to be the same within this range. To adjust the seed moisture content, mix the fraction of pure seed thoroughly and draw randomly…</td>
<td>Determine the moisture content of the submitted sample according to Chapter 9. If the moisture content is below 10.0 % or above 14.0 %, it must be adjusted to between 10.0 and 14.0 %, although it is not necessary for the moisture content of all samples to be the same within this range. To adjust the seed moisture content, mix the fraction of pure seed thoroughly and draw randomly…</td>
</tr>
</tbody>
</table>

#### 15.8.1.5.2 Checking the cleanliness of equipment

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each testing day, select at random 2 out of every 10 containers to be used, add 250 mL deionized or distilled water of known conductivity and which has been maintained at 20 ±2 °C, and read the conductivity. If the conductivity of the water in the containers is higher than 5 µS cm(^{-1}), thoroughly rewash the dip cell and all containers to be used that day in deionized or distilled water. Retest the conductivity of another 250 mL deionized or distilled water in a further 2 out of every 10 randomly selected containers. Repeat the process if necessary, until the readings are not higher than 5 µS cm(^{-1}).</td>
<td>Each testing day, select at random 2 out of every 10 containers to be used, add the required volume (Table 15A) of deionized or distilled water of known conductivity and which has been maintained at 20 ±2 °C, and read the conductivity. If the conductivity of the water in the containers is higher than 5 µS cm(^{-1}), thoroughly rewash the dip cell and all containers to be used that day in deionized or distilled water. Retest the conductivity of another specified volume of deionized or distilled water in a further 2 out of every 10 randomly selected containers. Repeat the process if necessary, until the readings are not higher than 5 µS cm(^{-1}).</td>
</tr>
</tbody>
</table>

#### 15.8.1.6.1 Preparing the test samples

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count four replicates of 50 seeds, each drawn at random from either the pure seed fraction directly or, in case of seeds with initial moisture content below 10.0 % or above 14.0 %, from the subsample with the adjusted moisture content. Weigh the replicates to two decimal places (0.01 g).</td>
<td>Count four replicates of seeds as specified in Table 15A, each drawn at random from either the pure seed fraction directly or, if seed moisture content has been adjusted, from the subsample with the adjusted moisture content. Weigh the replicates to two decimal places (0.01 g).</td>
</tr>
<tr>
<td>CURRENT</td>
<td>PROPOSED</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>15.8.1.6.2 Preparing the containers</strong></td>
<td><strong>15.8.1.6.2 Preparing the containers</strong></td>
</tr>
<tr>
<td>For each sample to be tested, prepare four containers by adding 250 ± 5 mL of water. Cover all containers to prevent contamination and equilibrate to 20 ± 2 °C for 18–24 h prior to placing the seeds in the water. Include two control containers with each test run, containing only deionized or distilled water.</td>
<td></td>
</tr>
<tr>
<td><strong>15.8.1.6.3 Soaking the seeds</strong></td>
<td><strong>15.8.1.6.3 Soaking the seeds</strong></td>
</tr>
<tr>
<td>Place each weighed replicate into a prepared container. Gently swirl each container to ensure that all seeds are completely immersed. Cover each container with, for example, aluminium foil or cling film, prior to placing at 20 ± 2 °C for 24 h. Label each container with the start time. The number of containers started at one time must not exceed the number of evaluations for conductivity that can be made within 15 minutes of the conclusion of a 24 h soak period (usually 10 to 12 containers).</td>
<td></td>
</tr>
<tr>
<td><strong>15.8.1.6.4 Preparing for the conductivity readings</strong></td>
<td><strong>15.8.1.6.4 Preparing for the conductivity readings</strong></td>
</tr>
<tr>
<td>Turn on the conductivity meter prior to testing; note that instructions for each meter may specify a minimum warm-up period. Add 400–600 mL deionized or distilled water to each of two containers for rinsing the conductivity cell between each measurement.</td>
<td>Turn on the conductivity meter prior to testing; note that instructions for each meter may specify a minimum warm-up period. Add sufficient deionized or distilled water to cover the conductivity cell to each of two containers for rinsing the conductivity cell between each measurement.</td>
</tr>
</tbody>
</table>
Measure the conductivity of the soak solution at the end of the 24 h (±15 min) soak period. Mix the leachate using one of the following methods:

a) Gently swirl the container (with seeds) for 10–15 s to ensure thorough mixing of the leachate, remove the covering of the container, and immerse the dip cell into the solution without filtration. Do not place the cell directly onto the seeds.

b) Stir the seeds and solution gently with a plastic spatula before measuring the conductivity as above. The spatula should be rinsed twice using water between each reading and dried on a clean paper towel.

c) Transfer the contents of the container to another container by pouring the seeds plus soak water into a nylon sieve. The cleanliness of the container used for transfer should have been checked before use (see section 15.8.1.5.2). Pass the soak water back over the seeds into the original container and immerse the dip cell in the solution. After measuring the conductivity of a subsample, rinse both the dip cell and the nylon sieve twice using water, and dry by blotting on a clean paper towel prior to testing the next subsample.

Once the leachate has been mixed, take several measurements of the conductivity until a stable value is obtained.

If hard seeds are observed during testing, they should be removed after the conductivity test and their number recorded.

They should then be surface dried and weighed, and their weight subtracted from the initial weight of the 50-seed replicate.

Measure the conductivity of the soak solution at the end of the soak period (Table 15A). Mix the leachate using one of the following methods:

a) Gently swirl the container (with seeds) for 10–15 s to ensure thorough mixing of the leachate, remove the covering of the container, and immerse the dip cell into the solution without filtration. Do not place the cell directly onto the seeds.

b) Stir the seeds and solution gently with a plastic spatula before measuring the conductivity as above. The spatula should be rinsed twice using water between each reading and dried on a clean paper towel.

c) Transfer the contents of the container to another container by pouring the seeds plus soak water into a nylon sieve. The cleanliness of the container used for transfer should have been checked before use (see section 15.8.1.5.2). Pass the soak water back over the seeds into the original container and immerse the dip cell in the solution. After measuring the conductivity of a subsample, rinse both the dip cell and the nylon sieve twice using water, and dry by blotting on a clean paper towel prior to testing the next subsample.

Once the leachate has been mixed, take several measurements of the conductivity until a stable value is obtained.

If hard seeds are observed during testing, they should be removed after the conductivity test and their number recorded.

They should then be surface dried and weighed, and their weight subtracted from the initial weight of the 50-seed replicate.
Measure the conductivity of one control container. Any increase in conductivity above 5 μS cm\(^{-1}\) indicates a potential problem with the cleanliness of the dip cell. Rewash the dip cell and measure the conductivity of the other control container. If this also indicates an increase in conductivity, there is a problem with the dip cell, and conductivity measurements cannot be made until this has been satisfactorily cleaned. Most conductivity meters provide instructions for cleaning the dip cell. Where the conductivity of the second control container does not show an increase above 5 μS cm\(^{-1}\), this value, or the mean of the two controls if neither has increased, represents the background conductivity, which should be subtracted from the values already recorded for each replicate container.

### 15.8.1.7 Calculation and expression of results

The conductivity per gram of seed weight for each replicate is calculated after accounting for the background conductivity of the original water (see above), and the average of the four replicates provides the seed lot test result. Thus for each replicate:

\[
\text{Conductivity reading (μS cm}^{-1}) - \text{background reading}
\]

\[
\text{Weight of replicate (g)}
\]

\[
= \text{Conductivity (μS cm}^{-1}\text{g}^{-1})
\]

If the mean conductivity of the four replicates differs by more than the tolerance value (see Table 15B) for that conductivity, the lot must be retested. If the second result is compatible with the first (i.e. the difference does not exceed the tolerance indicated in Table 15C), the average of the two tests must be reported.

When a test on a seed lot is repeated within a laboratory, the tolerance values that indicate acceptable repeatability are shown in Table 15C. Tolerances for conductivity tests completed on different submitted samples and in different laboratories, are shown in Table 15D.

### 15.8.1.7 Calculation and expression of results

The conductivity per gram of seed weight for each replicate is calculated after accounting for the background conductivity of the original water (see above), and the average of the four replicates provides the seed lot test result. Thus for each replicate:

\[
\text{Conductivity reading (μS cm}^{-1}) - \text{background reading}
\]

\[
\text{Weight of replicate (g)}
\]

\[
= \text{Conductivity (μS cm}^{-1}\text{g}^{-1})
\]

For species in Table 15A.1:

If the mean conductivity of the four replicates differs by more than the tolerance value (see Table 15B) for that conductivity, the lot must be retested. If the second result is compatible with the first (i.e. the difference does not exceed the tolerance indicated in Table 15C), the average of the two tests must be reported.

When a test on a seed lot is repeated within a laboratory, the tolerance values that indicate acceptable repeatability are shown in Table 15C. Tolerances for conductivity tests completed on different submitted samples and in different laboratories, are shown in Table 15D.
For species in Table 15A.2:
Calculate the variance, standard deviation and coefficient of variation as follows
\[ \text{Variance} = \frac{N \sum x^2 - (\sum x)^2}{N(N-1)} \]

where
- \( x \) = conductivity of each replicate in μS cm\(^{-1}\) g\(^{-1}\)
- \( N \) = number of replicates
- \( \Sigma \) = sum of

Standard deviation \( s = \sqrt{\text{Variance}} \)

Coefficient of variation \( = \frac{s}{\bar{x}} \times 100 \)

where \( \bar{x} \) = mean conductivity of the sample

If the coefficient of variation does not exceed 9.0, the replicates are acceptable.
If the coefficient of variation is greater than 9.0, the test must be repeated.

When two tests are performed in different laboratories:
the maximum tolerance value for two test results = Mean conductivity reading x 0.3326

<table>
<thead>
<tr>
<th>Species</th>
<th>Containers to be used</th>
<th>Sample size</th>
<th>Seed moisture content</th>
<th>Water volume</th>
<th>Temperature</th>
<th>Soak time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>15A.1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cicer arietinum</td>
<td>Erlenmeyer flasks or beakers, capacity 400-500 ml with a base diameter of 80 mm (±5 mm)</td>
<td>4 weighed replicates of 50 seeds</td>
<td>Adjust to 10 – 14%</td>
<td>250 ml</td>
<td>20 °C</td>
<td>24 h</td>
</tr>
<tr>
<td>Glycine max,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phaseolus vulgaris,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pisum sativum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(garden peas only, excluding petit-pois varieties)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15A.2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raphanus sativus</td>
<td>Tubes 7-8 cm high with a diameter of 4 cm</td>
<td>4 weighed replicates of 100 seeds</td>
<td>No adjustment</td>
<td>40 ml</td>
<td>20 °C</td>
<td>17 h</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.15.6</td>
<td>39</td>
<td>0</td>
<td>ACCEPTED</td>
</tr>
</tbody>
</table>
C15.7 Change to validated tests listed in 15.3

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following ISTA vigour tests have completed validation:</td>
<td>The following ISTA vigour tests have completed validation:</td>
</tr>
<tr>
<td>Conductivity test: <em>Cicer arietinum</em> (Kabuli type), <em>Glycine max</em>, <em>Phaseolus vulgaris</em>, <em>Pisum sativum</em> (garden peas only, excluding petit-pois varieties)</td>
<td>Conductivity test: <em>Cicer arietinum</em> (Kabuli type), <em>Glycine max</em>, <em>Phaseolus vulgaris</em>, <em>Pisum sativum</em> (garden peas only, excluding petit-pois varieties); <em>Raphanus sativus</em></td>
</tr>
<tr>
<td>Accelerated ageing test: <em>Glycine max</em></td>
<td>Accelerated ageing test: <em>Glycine max</em></td>
</tr>
<tr>
<td>Tetrazolium vigour test: <em>Glycine max</em></td>
<td>Tetrazolium vigour test: <em>Glycine max</em></td>
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</tbody>
</table>

VOTE not needed as consequential change if the previous vote was for acceptance

C15.8 Changes to table numbers consequent to adding a table of conditions for the conductivity test completed on different species.

<table>
<thead>
<tr>
<th>CURRENT</th>
<th>PROPOSED</th>
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</thead>
<tbody>
<tr>
<td>Table 15A. Specific conditions for the radicle emergence test procedures</td>
<td>Table 15B. Specific conditions for the radicle emergence test procedures</td>
</tr>
<tr>
<td>Table 15B. Maximum tolerated range between four replicates within a conductivity test (5 % significance level).</td>
<td>Table 15C. Maximum tolerated range between four replicates within a conductivity test (5 % significance level).</td>
</tr>
<tr>
<td>Table 15C. Tolerances for two conductivity tests on the same submitted sample when tests are made in the same laboratory (two-way test at 5 % significance level).</td>
<td>Table 15D. Tolerances for two conductivity tests on the same submitted sample when tests are made in the same laboratory (two-way test at 5 % significance level).</td>
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<tr>
<td>Table 15D. Tolerances for conductivity tests on different submitted samples when tests are made in different laboratories (two-way test at 5 % significance level).</td>
<td>Table 15E. Tolerances for conductivity tests on different submitted samples when tests are made in different laboratories (two-way test at 5 % significance level).</td>
</tr>
<tr>
<td>Table 15E. Maximum tolerated range between two replicates of 100 seeds in one accelerated ageing germination test (two way test at 2.5 % significance level). The tolerances are extracted from Table G1, column L, in Miles (1963).</td>
<td>Table 15F. Maximum tolerated range between two replicates of 100 seeds in one accelerated ageing germination test (two way test at 2.5 % significance level). The tolerances are extracted from Table G1, column L, in Miles (1963).</td>
</tr>
<tr>
<td>Table 15E. Tolerance for two accelerated ageing tests on the same submitted sample when tests are made in the same laboratory each on 200 seeds (two-way test at 5 % significance level).</td>
<td>Table 15G. Tolerance for two accelerated ageing tests on the same submitted sample when tests are made in the same laboratory each on 200 seeds (two-way test at 5 % significance level).</td>
</tr>
<tr>
<td>Table 15G. Tolerance for accelerated ageing tests on different submitted samples when tests are made in different laboratories (two-way test at 5 % significance level).</td>
<td>Table 15H. Tolerance for accelerated ageing tests on different submitted samples when tests are made in different laboratories (two-way test at 5 % significance level).</td>
</tr>
</tbody>
</table>
laboratories each on 200 seeds (two-way test at 5 % significance level).

Table 15A. Tolerances between highest and lowest radicle emergence of two replicates of 100 seeds in one radicle emergence test (two-way test at the 2.5 % significance level). Note: this table is a copy of Table 5B Part 2.

Table 15B. Tolerances between highest and lowest radicle emergence of two replicates of 100 seeds in one radicle emergence test (two-way test at the 2.5 % significance level). Note: this table is a copy of Table 5B Part 2.

Table 15C. Tolerances between results of two radicle emergence tests of 200 seeds on the same or a different submitted sample when tests are made in the same laboratory (two-way test at the 2.5 % significance level). Note: this table is a copy of Table 5C Part 2.

Table 15D. Tolerances between results of two radicle emergence tests of 200 seeds on the same or a different submitted sample when tests are made in the same laboratory (two-way test at the 2.5 % significance level). Note: this table is a copy of Table 5C Part 2.

VOTE not needed as consequential change if the previous vote was for acceptance

C15.9 Clarification of required procedure in 15.8.4.4.2.

<table>
<thead>
<tr>
<th>CURRENT</th>
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<tbody>
<tr>
<td>15.8.4.4.2 The radicle emergence test must be conducted at the temperature prescribed for the species in Table 15A. Temperature is the most important variable in the test. Monitoring of the temperature is desirable and rotation of seed lots and replicates is advised at time intervals of 24 h.</td>
<td>15.8.4.4.2 The radicle emergence test must be conducted at the temperature prescribed for the species in Table 15A. Temperature is the most important variable in the test, and each seed lot must be transferred to the test temperature within 15 minutes after being set to germinate. Monitoring of the temperature is desirable, and rotation of seed lots and replicates is advised at time intervals of 24 h.</td>
</tr>
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</table>

<table>
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<tr>
<th>VOTE TO ACCEPT ITEM</th>
<th>YES VOTES</th>
<th>NO VOTES</th>
<th>RESULT</th>
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<tbody>
<tr>
<td>C.15.9</td>
<td>40</td>
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</tbody>
</table>

[207 00:32] Part I

The President of ISTA, Joël Léchappé:

“I propose to thank again the Rules Committee, and to Steve as Chair of this Committee, this is really a very important committee in ISTA, as it's gathering all the Rules Proposal for all Committees. This Committee also includes all the Chairs from all Technical Committees, so that's all the core activity of ISTA which is summarized in these Rules Proposals, and it is really the main purpose of our Association. I would like that we all thank you again by applause.”

[207 02:48] Part II

The Secretary General, Dr. Beni Kaufman:

“The results of the 2016 Congress Election for ECOM Members at Large are the following:

- Ignacio Aranciaga from Argentina
- Valerie Cockerell from United Kingdom
- Berta Killermann from Germany
- Keshavulu Kunusoth from India
- Leena Pietilä from Finland
• Masatoshi Sato from Japan
• Mable Simwanza from Zambia
• Rita Zecchinelli from Italy

“Thank you.”

[207 04:15] Part III
The President of ISTA, Joël Léchappé:

“Thank you very much to all of you, and I will also like to say that, I wished that all the people who have candidate can in a way or another, be implied in ISTA activities, and everybody is welcome to contribute.”

11. Consideration and Adoption of the Reports of the Technical Committees

[208 00:00]
The President asked all Technical Committee Chairs to stand, thanked the Technical Committee Chairs for their work, and asked the Meeting to approve all the Reports together by applause, which was duly granted.

12. Announcement of the Place and Date of the next Ordinary Meeting

[209 00:00]
The President asked Ernest Allen to give a presentation on the 2017 ISTA Annual Meeting, which will take place in Colorado, United States, in June, next year.

13. Any other Business raised by a Member, of which notice in writing has been received by the Secretary General two months prior to the date of the Meeting

There was no such business.

14. Any other Business raised by consent of the Executive Committee

[210 01:20]
Rita Zecchinelli (Italy):

“Good afternoon. Under the Agenda Point 14 I am going to introduce the discussion about the new International Seed Sampling Certificate, proposed to be installed.

“In very few words, we can say that this is an experiment, which has been presented and discussed during the last OGM, in 2015, last year. The proposal to have such an experiment was received and informally approved during the OGM 2015, but during that meeting and later on as well, some ISTA colleagues expressed concern about possible consequences and misuses of this certificate.

“The ECOM recognized that a discussion on the concern that has been raised is needed, and the document OGM 16-10 that has been circulated to the Membership is intended to prepare the discussion from today. At the end of this session, after my presentation and the following discussion, the vote is scheduled, and this is the text of the motion:
- An International Seed Sampling Certificate, as described in Annex of the document OGM 16-10, be installed as an experiment. The experiment will finish on 30 June 2018, or even before if agreed by the Membership. At the conclusion of the experiment, the Membership will decide by another vote whether an International Seed Sampling Certificate will be installed permanently, and the condition for its use. If approved, a Rule Proposal will be presented to include the International Seed Sampling Certificate in the ISTA use. During the experiment, use of International Seed Sampling Certificate will not be compulsory."

I want to remember you what are in my opinion the main points:

• Background to have such an experiment
• International Seed Sampling Certificate in the frame of ISTA strategy
• The use
• The proposed instruction
• Possible issues that have been raised
• Conclusion

Background

“The Sampling Certificate experiment has been proposed by the Executive Committee of ISTA. The proposal has been raised after a discussion that went on among the working group, including representative ECOM members, representative persons from TCOM, in particular the bulking and sampling committee, representative from ISTA Auditors, and from the Secretariat. This new certificate is intended as an additional tool for accredited members, its use will not be compulsory during the experiment, and after the experiment is concluded, another decision will be voted on by the Membership. This decision will be necessary to decide if this certificate is transforming in an permanent tool, if we should continue or not to have such a certificate, if its use should be compulsory in certain situations, the cost of the certificate, rules changes and maybe also articles changes.

International Seed Sampling Certificate in the frame of ISTA strategy:

“We know that Sampling is a major strength in ISTA and in the ISTA Accreditation System. This certificate should become part of the ISTA strategies goals, addressing the needs of the seeds sector and facilitating the seed trade. The certificate should strengthen the ability of seed sampling, to increase transparency and facilitate communication within ISTA community and even externally. It is also intended to strengthen the Accreditation System, and in particular Accreditation of Sampling on entities.”

The use:

“It is intended to be used by entities accredited for sampling only, as a tool to ensure traceability of their accredited works, to be used by ISTA members, laboratories or entities, for sampling in order to provide evidence that sampling is performed in the frame of a QA System accredited by ISTA, and of course in accordance with the ISTA views. It is not intended to be used when an Orange International Certificate is issued.”

General instructions, as well as guidance for completing the ISSC are given in Annex 16-10. This certificate is intended to be issued by the accredited member, entity or laboratory, not by the sampler, therefore the maximum interval between the sampling operation and the issuing of certificate must be defined by the issuing authority. During the experiment the certificate uses will be asked by ISTA, to keep records, for example number of certificates, how many certificates have been issued, on which species, which locations, the type of lots that have been sampled, and also to collect suggestions and complains. On the Annex of the document, you see also some limitations, so the validity of the Sampling Certificate issued during the experimental time will expire at the end of the experiment and they will remain valid only for internal use, as internal records for their issuing laboratory or entity. Is good to remind that the certificate can only be used to drive sample in accordance with the ISTA rules, and by an ISTA accredited laboratory or entity, that the weight of the lot and of the samples must be stated on the certificate, and in case the seed lot is repossessed or repackaged, the certificate is no longer valid.
Possible issues that have been raised:

- The ISTA International Seed Sampling Certificate shall and will facilitate the international movement of seed, without quality test results - that is a possible negative consequence.
- The ISTA International Certificate is promoting to disconnect responsibilities for and the business of sampling and testing.
- The ISTA International Seed Sampling Certificate facilitates the samples taken, in an ISTA certified way, and are tested by non ISTA methods.
- The accreditation for sampling only, together with the ISTA International Seed Sampling Certificate, offers a great opportunity for companies to take over the sampling business done nowadays by the ISTA laboratories.
- We don’t need an ISTA International Seed Sampling Certificate for insuring audit trace, a good sampling report standardized and published by ISTA is sufficient and accepted in ISTA audits.

Conclusion:

“In the opinion of the ISTA Executive Committee, the concerns expressed by some members about the new ISTA International Seed Sampling Certificates deserve further discussion among the ISTA members. For this reason, the ECOM approve the decision that the experiment on the establishment of the International Seed Sampling Certificate is submitted for a vote to the Membership, during today’s Ordinary General Meeting.

I thank you for your attention and now the discussion is open.”

[211 00:08] Part I

There were members who had questions:

Unknown 1:

Q: “You said that during this experimental phase, the issue of the certificate is not compulsory. But what will happen with the Accreditation of the sampling entity? It will be compulsory to be accredited?”

Rita Zecchinelli (Italy):

“No, it will not be compulsory, what will be compulsory for them is to use, to produce a document that keeps traces of the work done, so the informations that are on the certificate are available at the sampling entity.”

The President of ISTA, Joël Léchappé:

“If I understand correctly your question, you also asked if the entity should be accredited?”

Unknown 1:

Q: “Exactly. If I understand well, during this experimental phase of 3 years, it will not be compulsory to generate the certificate. But the experiment is also opening the opportunity or the possibility for external entities to get Accreditation for sampling only.”

Rita Zecchinelli (Italy):

“This is already possible, it is not something new.”

Unknown 1:

Q: “The second point, and this is just a personal observation, my feeling is that doing this, you are giving more importance at the sampling phase, putting on second level the testing phase, that is the headline of ISTA, today’s uniformity in seed testing. Now, you are doing Uniformity in Seed Sampling.”

Rita Zecchinelli (Italy):

“Do you think that Uniformity in Seed Testing is affected?”
Q: “No, I am saying that you are putting more emphasis on the sampling phase than on the testing one, because as I saw in the comments, somebody is concerned that some of the testing that today is performed by the ISTA labs, will be done somewhere else.”

Rita Zecchinelli (Italy):

“This is something that is already possible, because already I think many of us, we are already testing samples that have been drawn by different accredited laboratories, and we are reporting the results on an ISTA certificate, on an OIC.”

Q: “But within the ISTA system?”

Rita Zecchinelli (Italy):

“Yes.”

Q: “This will open the door to a non-ISTA system, is what I understood from a question that was on the screen before.”

Rita Zecchinelli (Italy):

“This will open the door to non-ISTA entities, let’s put it in this general way, to become ISTA entities. Because a must is to be ISTA accredited.”

Q: “If the seed company will be happy with sampling, and doesn’t require an orange, because the destination, so, the customer or the country where the seed will be shipped doesn’t require an ISTA OIC - this is one of the comments that I saw on the screen, so I am not making it and just calling the attention on that: that you are putting more emphasis on the sampling part, which is fine, because this is the most important part, and as we heard also this morning, this is the difference that we have between ISTA and other systems that today are available.

If seed is reprocessed, repacked, the certificate is no more valid - how can we conciliate this with the proposal that maybe is amended somehow of not writing on the OIC the number of containers, so that the seed lot that has been sampled, tested, and has an OIC can be reprocessed?”

Rita Zecchinelli (Italy):

“My answer is that at this stage, this is something that we are not going to consider. This is an experiment, we want to see a possible standard use of the certificate. Then, in the future, of course, if the experiment is successful, this could be improved, or changed, will be looked at, but I don’t think that this is something for today, in my opinion.”

[211 05:04]

Ray Shillito (USA)

“I just wanted to answer some of the questions that you had. Today, we can sample using a non ISTA entity, to have material, sample tested. So, this doesn’t change anything. What it does, it allows us to set up a sampling process within a business, where we can then submit a sample to an ISTA laboratory for testing. We are not going to do that internally, but we do want to be able to sample and send the sample, so this enables us to do that. Whether we do that with certificate or report, we can do it today. This might not be a problem in a small country like Lithuania, or even Germany, but for a country as large as Brazil, or the USA, or Canada, this is a real problem, because I’ve got a lab let’s say in the Eastern part of Canada, then I need to send somebody over to Western Canada to sample something, because is no sampling entity there. And, if we have a sampling entity there, they can do it. So, is not a problem for a small country like in Europe, compared to some other countries that are out there. If we were in the USA, and we have to send a sample from Florida to California, a bag of seed, it doesn’t make any sense. I think this is really driven by places where we have very large countries, with very low population, like Canada, where are huge spaces and we want to have sampling entity in more than one place. We want to be able to sample and send it to an ISTA lab without having people travelling across the country for 2 days there and back, to get the sample. I think your
worries about whether we are going to switch to some other entity are unfounded, because we can do that today, there is nothing stopping us.

I do have a question regarding the repackaging, because that could be an issue, in the way that is formulated right now. So, I think this is something we have to revise maybe. Thank you.”

[211 08:43] Part II

Michael Kruse (Germany):

“I do have a few comments. The first one - Europe is smaller but we also have situations, when there is one Seed Testing Laboratory in one location, and the company is somewhere else, and there is a person that is part of the ISTA Laboratories Quality Assurance System, and this person is employed by the seed company. Is 200 km far away, which is not far for you, but for us. And this person is doing sampling in that company, every day, and sending samples to the Seed Testing Laboratory for testing, together with the Sampling Report that is used at the moment. This person has to come to the laboratory maybe once a year, for training, for test, and this included in review, in the audit system that is part of the Auditing of ISTA laboratories. So, we have already persons across the country that take samples, and I think this should also be possible in the USA, even when the distances are greater, but this does not mean that you need to be in contact for every sampling job that this person is doing, but it needs to be included into the Quality Assurance System of the laboratory sufficiently enough. Maybe there is also some room to discuss, whether there is travelling really important. I think sampling is done somewhere, continuously in one company, and testing is done somewhere else - is not really a reason. I think there are solutions that are even better, because when this person is included into the Quality Assurance System of the laboratory there is no accreditation fee to be paid by the company. Only the travelling, maybe once a year, and this is for sure cheaper, even in the US. And when there are two ISTA entities, one for sampling and one for testing, then the sample that goes to the testing laboratory should carry all the information that you need for issuing the certificate, but this is an internal ISTA phase between 2 seed testing laboratories, and I do not really understand why we need a certificate for this, because the certificates are made for the market. We issue a certificate to facilitate international trade. When you look at all the documents, I think we had one decided this morning, in which we characterized the basis of the certificate: the certificate is made for leaving the control area of ISTA, this is the reason. When we now offer the possibility to issue a certificate, then we may not, but others, may expect that this certificate on the market is for developing options and processes, to make use of this. As far as I hear the discussion, our expectation is that certificate should facilitate or improve the sample transfer from one ISTA member to another ISTA member. I think this is something else for which we do not need a certificate, we need a standardized protocol. But we should not open this as a signal to the market that everybody can think about how to make use of ISTA samples coming with an ISTA certificate to be tested somewhere according to whatever rules. The idea is good to standardize the information transfer from one member to another member, by standardized document, but I would not give the signal to the market that this is a certificate. Thank you.”

David Johnston (USA):

“I agree totally on the debate whether we need a certificate, I am totally with you Michael. The situation we are dealing with, maybe a little different, we may need only occasionally an ISTA certificate. I wouldn’t have somebody from a laboratory in Brookings living in my lab just in case I need a sample once a week. In that case, is not something that they are doing every day. So, that is a situation where it becomes much more sensible to have an ISTA Sampling Accreditation. At the moment, if we do that, we do have to pay a fee to the laboratory, we may have to. Is not that somebody is taking samples all day, every day, and therefore is not somebody that belongs to the laboratory, but is the occasional sample that we need to send. In those situations it would make more sense to be accredited, and then you won’t have a person from another entity living in your laboratory.”

Unknown 2:
“My question is how we are going to measure if this new process is successful? What will be the standard or the decision made upon, if is considered successful?”

Ernest Allen (USA):

“There are several states in the United States that have no ISTA Sampling. We have people calling our laboratory all the time, wanting the ISTA certificates so they can ship internationally. They can’t do that, because we don’t have samplers in that area that can get to them. Over a period of a year, there are a lot of seeds that are not going to the international market because there is no way to get them there. There are some other ways, but most would prefer to go the ISTA road. Having this Sampling Certificate would open new markets for a lot of people in the United States, and facilitate seed trade. I think you have to look at it on the larger scale.

“In terms of costs for the laboratories, we have samplers on the opposite coast from where we are in California. California is a very long state. We have samplers up and down that state. We are responsible right now for all of their training. In order to train them we have to go there, watch them, and that costs a tremendous amount of money. If you multiply that by the larger amount of companies that are all across the United States, that’s a lot of sampling, a lot of travelling, a lot of money for that laboratory when they are couple of samples per year, per sampler. This would make it a lot easier for larger countries like United States.”

Rita Zecchinelli (Italy):

“Regarding the question about how to evaluate the result of this experiment, I think that we will evaluate at first the number, how many, because now we are discussing but maybe tomorrow no one will use this certificate. And then we will collect information from the users of the certificate, during the experimental time, but I think we will collect also comments and possible requests of information for the non-users, so we will have this set of information to look at and analyze.”

Eddie Goldschagg (South Africa):

“I cannot see how the issuing of a Sampling Certificate would make any change regarding sampler at a remote place. That sampler must be ISTA accredited, so exactly the same requirements as now would be valid. There will be no difference by issuing the Sampling Certificate. That sampler will not be able to issue the Sampling Certificate, that certificate must be issued by the Head of the Sampling entity, the same way as an OIC is issued, so that would change nothing. Just for the record, speaking as Chair of the Bulking and Sampling Committee, the BSC is not in favour of the Sampling Certificate. Thank you.”

Ernest Allen (United States):

“There is already the infrastructure in the United States, for example states, they have their own samplers throughout the states, so it would make a difference in the United States in terms of costs, because I could go to a state that have their own samplers already in place, they can train their own samplers, which would be much less of a cost than me trying to train them from my state. So, there would be a tremendous cost saving, because infrastructures are already there within the United States to do this.”

Piero Sismondo (ISF):

“I agree that we have this challenges, and I have heard from our members the challenge that they have when are only two official labs in the United States, and the states are 12 000 km wide, so it is a huge distance and we understand the problem. So I am not against this initiative, I am just willing to make some comments on the practical implementation of it. I think it would be very good to start the experiment, first of all to start having these accredited entities that would work, because it would be excellent if you can have a central entity accredited in Ottawa or wherever, and then a certain number of samplers that are under the responsibility of this accredited entity, so this accredited entity will be responsible also of the training and for the verification of the training of these people, and the performance of these people. But this is not our problem, so it would be on their shoulders.
I think is an initiative that deserves to be tested, as you said is an experiment of 3 years, so I am very fine with it, I am in favour of it. It would be important to measure what is the effectiveness and what will be the use, because I am sure that in North America it will have a very important use. Maybe in Europe we will have 2 certificates/year, or maybe less, so let’s give a chance. This is my position.”

Michael Kruse (Germany):

“I think we should clarify the difference between accreditation as a sampling entity or as a laboratory, and the issuance of the Sampling Certificates. I think most arguments that are here refer to the accreditation of a sample entity within a state also, and that they control the samplers around. This is a question about accreditation. When you have already a lab in the United States, this one seed testing laboratory could include all the samplers through the whole United States in their quality assurance system. They could all work under this control, and take samples and send them with sampling protocol to an ISTA laboratory. This could be possible, this is not the issue. The question is whether for sending the sample from the location where it is taken, to the ISTA laboratory, we need a certificate that also allows that the samples are tested according to other rules, somewhere else. I do not really believe that it is clever to provide a certificate for ISTA samples that they are tested somewhere, by somebody, according to whatever rules. A sampling protocol would be a clear signal that this is a sample to be tested in an ISTA laboratory.

“We should try to keep the link between sampling and testing as far as we can, because our issue is Uniformity in Seed Testing, and if we establish a system that allows that our ISTA samples are tested according to something, I think this is not really a contribution to Uniformity in Seed Testing.”

Jette Nydam (Denmark):

“I think that is a very good idea. I have experience from some audits, some years ago, where a laboratory or more than one laboratory had problems when they received samples from an entity that had another laboratory to sample. They had to come back, find out who had sampled, was that sample really approved, so it was a lot of contact, and the issuing laboratory had to do a lot of research to find out who had really sampled that one. There were some initials on the samples, and sometimes they had to find out which was the laboratory and if the sampler was approved. I think this certificate will facilitate the work between two laboratories or entities, so it should be much easier for the issuing laboratory on OIC to do the work, because they are now sure. Thank you.”

Ernest Allen (USA):

“I think they were 16 laboratories in the United States, most of those laboratories are located within the same state, so even if they work together, they are not going to have enough samplers to cover all the regions which are producing agricultural products that could be under ISTA’s preview if we had the certificates. So, it is not going to cover the United States, and there will still be huge areas that will not be able to go to the international market.

Again, I don’t think they will be tested just under any rules; they will still need to be tested according to ISTA Rules and ISTA Sampling Protocols. This is the way I understood it.”

Steve Jones (Canada):

“To answer Ernest’s question: they would have the option to issue an AOSA certificate based on it, which is some of the issues for people, or they would have the option to issue an ISTA Certificate. Just speaking on behalf of Canada, a few people have mentioned Canada already so I have to wave the flag for Canada, yes we are the biggest nation, but I really welcome going to the USA meeting there next year. I think that is going to be a fantastic meeting. We are a science-based organization and this is
an experiment. What is wrong with an experiment, what is wrong with the use, and the people at the end making the decision to actually see if they want to make use of it? Although I am a member of the Bulking and Sampling Committee, I was involved coming up with the idea of certificate, and I support the idea. I don’t see what is wrong with seeing it, trying it, testing it, seeing what happens at the end of it.”

President of ISTA, Joël Léchappé:

“I would like to prolong what Steve says - we are discussing the risks and the advantages of this option. I would also suggest that we look outside of the ISTA world today, and we started with mentioning the AOSA under this possibilities, but I think there are other areas where some organizations are looking at having sampling methods for Seed Health, and either they look at the ISTA Rules or they just reinvent their own method for sampling on seeds, for phytosanitary purposes, they are going their parallel path to ISTA. I think it is important for ISTA to look outside the framework of the seed sector, and the way to do that is to offer sampling when sampling on seeds may be necessary or useful. In other areas where ISTA is not yet used, if we stay in our own framework, if we don’t try anything else, it is quite sure that others will move, if necessary. If we try we have risks, but if we don’t try, we are sure that we will never get anything. The first question we have to answer is a general strategy question – should we move forward and try with the experiment, or should we stay in our wall today and we don’t take any risk, but we don’t take any chance?”

Ray Shillito (USA):

“If I want a sample taken according to ISTA in the USA, I have 4 entities that can do that for me. There are 6 accredited laboratories, out of which 4 would take sample from somebody else, just to give you an idea of that. Now obviously, it is up to ISTA to try and extend to have more accredited laboratories in USA. There are 2 challenges: one is to get ISTA samples and the second challenge is – can we get more ISTA accredited labs?”

Axel Göritz (Germany)

“I agree 100% with Jette that it would be very useful to have a sampling procedure written down on the protocol that gives the information that the lab receives the samples from another place, not on its own area, but on its own samplers, that the information that is needed is on the certificate. It is really important that the testing laboratories have the information, to state this on the certificate, on the ISTA OIC. Until now, I do not understand why it must be a certificate, and in my opinion, the Sampling Report could give the same information if ISTA would standardize it, and then we could do this experiment with the Sampling Report, and not with the certificate.”

The President of ISTA, Joël Léchappé:

“It is time for coffee break, and what I propose is not to go for the vote right now, we have time during the coffee break to exchange opinions, to make up your mind, and if Rita agree with that, when we come back from the coffee break, then we go for the vote.

Thank you very much.”

[213  00:45] Part I

Lotta Claesson (Sweden)

“I am Lotta Claesson from Sweden, from the Sampling Committee. I am talking for myself and some of the other members. We are not against, we should think of new things, new ways of doing things, but I think this is too immature proposal, it needs more thinking, we need good test plan of validation process. And what are the criteria for approving this one, I really don’t understand that yet. What is the need? Is it the certificate or is the sampling form we need? I don’t think is good for ISTA, since are so many people that have strong feelings against it.

My suggestion is to redraw it and work it through for next year, and bring it up in the next year’s meeting.”
The President of ISTA proposed to move a motion for withdrawing the proposal.

[213 03:43] Part II

Rita Zecchinelli (Italy):

“Whatever the result of this vote, on behalf of myself and the other old Executive Committee colleagues, I want to say that we have been working on this project and it’s very good that if some of the members don’t agree on this proposal they came and raised questions. I think this is very important for an Association: to not matter who is winning, who is losing; the matter is to decide together. It is not necessary to have an aggressive way, we are here for speaking, discussing and deciding together, and so I thank our colleagues for coming and raising questions and concerns. Thank you.”

The President of ISTA, Joël Léchappé:

“I would like to add that the working group was very enthusiastic with the idea, and that’s why it was proposed and moved as fast as it could be moved, but I totally support what Rita said, that is very important to have a dialogue within the Association. It is not the first time a proposal is withdrawn. While we wait for the text of the motion, I would like to thank very much the working group and their efforts to first make a proposal, second to review the proposal, and now to move to a motion to withdraw the proposal. I suggest that we give 5 minutes to all the delegates to discuss with their colleagues, in order to decide how they will vote.”

[214 01:10] Part I

The President of ISTA, Joël Léchappé:

“The motion is that the proposal to implement the experiment on the International Seed Sampling Certificate be withdrawn, and the new proposal will be submitted for consideration, at the 2017 ISTA Ordinary General Meeting. This motion has been moved by Lotta Claesson from Sweden, and seconded by Leena Pietilä, from Finland. Are you ready to vote? Let’s open the vote.

“As it is a motion which does not affect the Articles, a simple majority is looked at.”

[214 03:30] Part II

The motion which was proposed on the International Seed Sampling Certificates is withdrawn, and with this withdrawn the experiment is stopped. A new proposal will be presented next year - 2017, at the Denver Ordinary General Meeting. The President of ISTA thanked everybody for the debate.

15. President’s closing address

[215 01:40] Part I

The President:

“Ladies and gentlemen, dear colleagues, dear friends: we are now coming to the end of our meeting here in Tallinn. As you know, the event started with two pre-congress workshops, on Germination and Quality Assurance in Seed Testing. The attendance has been beyond expectations and demonstrates the recognition by the seed sector of the importance of Germination Test and Quality Assurance. Workshops are places where experts share their knowledge for the benefit of the Seed Testing community. I would like to acknowledge the work and commitment of Sylvie Ducournau, Christine Herzog, Florina Palada, Ronald Don, and the colleagues from Estonia, who have prepared the workshops.”

“The Congress started with the Seed Symposium, which was so successfully organized by Laura Bowden. Laura started organizing the Scientific Program just after the congress in Antalya; she was very efficiently assisted by the chairs of the sessions, together with the Judging Committee, for the best presentation and best posters. I
would like to thank you Laura for all the hard work, and congratulate you on the success of this event; I wish you best success for the next one you will prepare.

“I would like to take this opportunity to thank the Technical Committee Members for their presentations on Saturday, Sunday and Monday; this appreciation is also extended to the organizations they belong to. The presentations they made highlighted the contribution of the Technical Committee Members. Firstly, with regard of their proposals for development of new rules based on robust validation of methods, secondly, with regard to their innovative projects which promote the use of new technology in Seed Testing; thirdly, their organization on workshops and training during the year - these workshops and training sessions show the depth of their acknowledge and experience, and their willingness to share expertise with others.”

“I would like to thank all of you for your very active participation during the 10 days of the Congress, and also for your contribution to the discussions on important topics such as strategy that will direct the work of our Association for the next 3 years; and the recent issue on Seed Sampling Certificate - the motion. Of course I thank you for your discussions during the program on Method Development, including the discussion on new technologies. Your contribution has been very much appreciated during the official program, as well as in your attendance on the side meetings. Thank you all for your participation, thank you very much.

“I am sure that all the colleagues are honoured, together with me, to see the commitment on the work that you have done, which lead to the success of this congress. A special mention to Margus, as Margus has been representing your organizing committee in the Executive Committee - not only your efficiency but also your wonderful Estonian sense of humour has been greatly appreciated by all of us. On behalf of ISTA, I congratulate you all on your excellent organization and on the quality of the facilities here. The hard work and dedication of all you as organizers has resulted in a very constructive and friendly meeting. The Scientifically Technical Programs have been very successful – thank you for the organization of it; we have all appreciated your Estonian warm welcome and outstanding hospitality throughout the official dinner, and the social events that you have organized. I think we will all remember the place where we had the dinner, which was really wonderful. Each of us will go back home with very nice memories of this Congress. As a token of our appreciation for your involvement in the organization of the Congress, including the social events, ISTA would like to offer you some small gifts. While we do this ceremony of the gifts, may I ask you all to applause very warmly our colleagues from Estonia? Thank you very much for what you did.”

[215 09:36] Part II
Organizer of the Congress:

“I would also say a few words on behalf of Estonian Organizing Committee: we did our best to organize you this; unfortunately we failed, in some days, in negotiating with our weather service, but is the typical Estonian summer weather. I hope you enjoyed the conference and I would like to thank you once again for trusting us. We also have some small presents for you. They are small in size but the size doesn’t always matter.

I wish you a good trip home and you are always welcome to Estonia. Thank you.”

The President:

“Thank you very much once again – we appreciate it very much; I would also add that the facilities here have been excellent, and I would like to highlight the excellent performance of the Technical Staff for the sound and lighting, and the Technical Assistance – you have done such a tremendous job. Sound and lighting are always working very well and it seems obvious and easy, but I can tell you that is not. I have some names of technicians and please forgive me if the pronunciation is not the correct one. If somebody is missing, please tell them how much we appreciated them: Tönis Riisalu, Aare Shrak, Margus Kaukes, Virgo Vellend, Aivar Hannolainen. Many thanks to these technicians for the work they have done.
“The organization of ISTA Events is strongly supported by the ISTA Secretariat, who not only do such a good job on a daily basis, but who have also contributed so much to the organization of this meeting; I would like to thank all Secretariat colleagues, leaded by Beni Kaufman, and let’s thank them by applause.

“Now, you may have noticed it - this is the end of my role as President of ISTA; first of all, I am very grateful to my family: Veronique, Simon (I was speaking about light because he is an engineer in lighting, that’s how I know how difficult it is), Juliette and Pauline, for their support during my 6 years of Presidency. I am very pleased and honoured to have served with the Executive Committee for the two terms 2010-2013 and 2013-2016. I would like to express my deep appreciations and thanks to all the members of the Executive Committee; it has been a great team experience, and I have learned a lot, including English – at least to some extent. The work of the Executive Committee has been supported by Secretary General and the colleagues of the Secretariat, who have demonstrated the outmost professionalism in issuing the tasks, and I extend a big thank you to all from Secretariat again. I sincerely thank the Technical Committee Members, members of ISTA, for their continual support and dedication to our Association. I am very grateful to the Designated Authorities, whose support is a crucial contribution to the ISTA. I also thank the International and Regional Organization for your productivity, for your positive contribution.”

“All my best wishes for success go to the newly elected Executive Committee, under the Presidency of Craig McGill; you all have my support. Now, I will ask Beni to discharge and install the Executive Committees.”

The Secretary General, Dr Beni Kaufman:

“Before discharging the ECOM, there is one more matter that we need to settle here, and for that I would like to call Steve Jones to the podium.”

Steve Jones:

“Bonjour Madame et Monsieur, excuse-moi, Monsieur Le Président, et mon amie. Nous avons prépare une surprise pour vous. C’est une appréciation pour le magnifique travail que vous avez accompli pour ISTA. I have just put together some photographs of your time with ISTA, with the help of some of your colleagues. When I asked to be given some pictures, to kind of capture your time with ISTA, the overall flavor of the pictures is team-work and leadership; this is one of the things you have inspired me with, and I think your leadership has been exemplary.”

“Joël, mon amie - enjoy and live long and prosper.”

The Secretary General installed the new ECOM for 2016-2019 and invited on the stage the new elected members, inviting Joël Léchappé as well, as Immediate Past President.

The new President of ISTA, Craig McGill:

“It is my great pleasure to be able to address you as your incoming President. We are now coming to the end of the 31st ISTA Congress; the end of the Congress marks the beginning of the 2016-2019 triennium. As always, the coming triennium will bring opportunities and challenges; some of these have been discussed over the past 3 days within the Technical Committees, and today during the Ordinary Meeting. I would touch on some of them again, in the remaining of my speech.

This morning, the ISTA Strategy for 2016-2019 was adopted; this sets a clear set of goals for the Association for the coming triennium. These goals are:

1. Develop Scientifically Sound Rules and Methods for Seed Sampling and Testing that meet the needs of the seed sector – this is the heart of the work of ISTA, and is predominantly achieved through the work of the ISTA Technical Committees; in the triennium just concluded, a new policy where Technical Committees can apply to the Executive of Funds to support the work of their committees begin. For the coming triennium, I believe that it will be important for the Executive Committee, in discussion with the Technical Committees, to further strengthen the support for the work of the Technical Committees - including financial support.
2. **Contribute and Develop collaborations** to increase Seed Sampling and Testing capacities worldwide. The 2017 Annual Meeting of the Association will be in Denver, in collaboration with the Association of Official Seed Analyses and Society of Commercial Seed Technologies; this will strengthen the links between ISTA and these 2 organisations, with the aim of promoting harmonization of the rules. ISTA will continue to work with international, regional and national organizations in areas of common interest to facilitate the international movement of seed.

3. **Strengthen and Adapt the Accreditation System** to ensure that meets the needs of stake holders and accredited laboratories. Earlier this afternoon, the Membership decided to withdraw the proposal to implement the ISTA International Seed Sampling Certificate, so the new proposal could be developed for the 2017 ISTA Ordinary General Meeting. This is the strength of our Association: we disagree, discuss and debate, and keep looking for solutions. The ISTA Executive Committee will work with the Membership and stake holders on a new proposal for 2017.

4. **Strengthen the Science and Technology** - ISTA shall support innovative research and should link scientific developments in applications in Seed Sampling and Testing, to allow the requirements of the seed sector to be made. The current theme of this congress has been New Technologies, and how these can be brought into the ISTA Rules - this topic was subject of considerable debate during the discussion formed on Method Development. I believe that ISTA needs to move forward with the Assessment and Adoption of Scientifically Sound New Technologies; this is a topic on which the new Executive Committee will need to work on – with the help and advice from the ISTA Technical Committees and Advisory Groups in ISTA.

5. **Seek and understand the needs of members and stake holders** in order to respond to those needs. Last night, the Executive Committee met informally with Designated Members attending the Congress on behalf of the Designated Authorities; the purpose of this was to discuss current issues facing ISTA, the comments received by the Executive Committee members during the meeting will be collected and provided to the newly Executive Committee for response. The plan is that the meeting with the voting members to become a regular event; this is the first step in strengthening the involvement of the ISTA Designated Authorities in ISTA.

6. **Manage ISTA affairs** – there are a number of projects in the Association that enhance the management of ISTA’s affaires; one of these is the development of the new ISTA website. The new website will facilitate the work of the Technical Committees and Advisory Groups and enhance the services provided through the Secretariat to the Membership. The aim is also to raise the wings of the work, and the role of ISTA in support of the marketing actions, to attract new members and contributors to ISTA. The work of the website will continue to be a priority for the coming triennium.

I would like to conclude by firstly acknowledging the 2013-2016 Executive Committees: you have been a fantastic group of people to work with, and can be justifiably proud of all you achieved for the Association. Of course, this has been achieved under the leadership of Joël. I feel very privileged to being able to work with Joël, I have learned so much from your leadership. On behalf of the Association, I would like to thank you for the service you have given to the Association with the Presidency, and also to thank your family: to Veronique, Simon, Juliette and Pauline, for giving some of their time with you to us, and allowing you to serve us as President. You will take on the newly created role of Immediate Past President and I look forward working with you.

I am also looking forward to work with the newly elected Vice President - Steve Jones, with the elected Executive Members for 2016-2019, and continuing to work with the Secretariat under the leadership of the Secretary General.

There is much work to be done, but together, I am confident we can continue to make progress for the Association.
Finally, I would like to leave you with a challenge: the 31st ISTA Congress began 8 days ago; one thing is certain: none of us are as young as we were at the beginning of the Congress. ISTA has a long and successful history; to continue this success, we must continue to build and encourage new people to contribute to the Association. So I ask you to think to who in your organization you can encourage to contribute to the ISTA community.

I look forward to seeing you at the 2017 Annual Meeting in Denver/Colorado. Thank you.”

16. Adjournment

The Immediate Past President of ISTA, Joël Léchappé:

“Thank you again for the surprises, for the nice photos, thank you very much Craig for your words and I wish you again, all my best wishes for success.”

“Formally now, I adjourn the 31st ISTA Congress, and with this adjournment in the Article 13 of the Association, the President and the Vice President of ISTA are installed as officers.

“I wish you all a safe journey back home and all the best for you. Thank you very much.”