MINUTES OF THE ISTA ORDINARY MEETING 2005

FOR CONSIDERATION AND DECISION AT THE ORDINARY MEETING 2006

MINUTES OF THE ORDINARY MEETING 2005

International Seed Testing Association (ISTA)
Zurichstrasse 50, P.O. Box 308
8303 Bassersdorf, CH-Switzerland

E-mail: ista.office@ista.ch • Url: http://www.seedtest.org

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INTRODUCTION

This document summarizes and concludes the discussions and decisions of the ISTA Ordinary Meeting 2005 in Bangkok, Thailand, April 27. The full spoken text of the meeting is not quoted in these Minutes. However, the whole Ordinary Meeting has been recorded on tape, and is at the disposal of any interested person.

These minutes contain a complete list of all participants of the meeting.

All documents and presentations mentioned in these minutes are available from the ISTA Secretariat.

THE ORDINARY MEETING OF THE ASSOCIATION

WEDNESDAY, APRIL 27, 2005

The morning programme started at 09:00 with the Opening Ceremony, introduced by Mr. Thammasak Thongket who started by informing the audience on the programme of the Opening Ceremony. Mr. Thongket then invited the honourable guests, the Director of Bureau of Technology Transfer Development under the Department of Agricultural Extension, Mr. Chulhathep Ponsroypech and the Director General of Agricultural Extension and Chaiperson of the Organising Committee, Mr. Thongchart Raksakul, and the ISTA Executive Committee Members to be seated on stage.

The President of ISTA, Mr. Pieter Oosterveld, welcomed the honoured guests and participants of the ISTA Ordinary Meeting 2005 and expressed his appreciation and thanks for being able to hold this meeting in Bangkok, the first ISTA Annual Meeting in Asia. He continued presenting some general information and figures on Thailand's agricultural situation and concluded that the country is an important seed producer.

Then Mr. Chulhathep Pongsroypech was invited to the speakers' desk to present his welcome address, followed by a speech from Mr. Thongchart Raksakul.

The President thanked the Thai colleagues for an impressive and pleasant Opening Ceremony for the ISTA Ordinary Meeting 2005. He then expressed appreciation to the many members, stakeholders and interested specialists for coming to this meeting, showing their interest in the work of the Association and participating in the discussions and the decision making process. In closing he emphasised his pleasure in being able to hold this ISTA Meeting in a region with increasing interest in the Association, as evidenced by an increase in the number of members and of laboratories that have already been accredited by ISTA, or would like to be in the near future.

(1) CALL TO ORDER

AGENDA OF THE ORDINARY MEETING OF THE ASSOCIATION

(1) Call to order
(2) President's Address
(3) Roll call of Designated Members entitled to vote
(4) Reading and acceptance of Minutes
(5) Report of the Executive Committee
(6) Report of the Secretary General
(7) Constitution Changes
(8) Consideration and Adoption of the Reports of the Technical Committees (and Proposed Rules Changes 2005)
(9) Announcement of the place and date of the next Ordinary Meeting
(10) 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
(11) Any other business raised by consent of the Executive Committee
(12) President's closing address
(13) Adjournment

(2) PRESIDENT'S ADDRESS

Before going into details on the work and future approach of the Executive Committee, the President spoke about the work of the ISTA Technical Committees, who are doing the technical work while the task of the Executive Committee is to make their work possible by setting some general guidelines, to regulate the finances and other work that is not of a technical nature. He stated that he was impressed by the work done by the Technical Committees during the year since the Congress in Budapest in 2004; the good programmes and results, and also a remarkable amount of work planned for the future. The President pointed out that the introduction of annual ISTA meetings has assisted the work of the Technical Committees by giving them shorter time frames between the progress reports, more opportunities to meet and to present their work and to get feedback on the work done or in progress.
One task for the Technical Committees is an important issue that will need a lot of work: not only to enhance the ISTA Rules, but also to consider content that has been in the Rules for a long time already, but may need re-evaluation.
A lot of Committees are working on new Handbooks. New ISTA Handbooks of course increase the sales of ISTA Handbooks. Also the number of ISTA Workshops has been increased. There has been an escalating demand for workshops and one of the tasks of the Executive Committee is to see how funding can be found for workshops.

The President stated that the finances of the Association are healthy for the time being, but that income does fluctuate, which is of concern to the Executive Committee who want ISTA to continue to be a viable organisation. Therefore funding opportunities must be explored.

The ISTA staff has been increasingly involved in the work of the Technical Committees, the Executive Committee, and with the financial work of the Association over the past 10 years; the President concluded that the collaboration between the Secretariat and the Association was very good.

The President furthermore noted that the Executive Committee, which was newly elected at the last ISTA Congress 2004 in Budapest, from the beginning was a very good team, and each member was prepared to participate in one or more Executive Committee Working Groups:

- Working Group on Tropical Seeds chaired by Mrs. Grethe Tarp
- Working Group on Accreditation chaired by Mr. Joël Léchappé
- Working Group on Validation chaired by Mr. John Hampton
- Working Group on Monitoring chaired by Mrs. Grethe Tarp (now dissolved)
- Working Group on the ISTA Constitution chaired by Mr. John Hampton
- Working Group on Fund Raising chaired by Mr. Pieter Oosterveld and Mr. Michael Muschick
- Working Group on Seed Analyst Training chaired by Mr. John Hampton
- Working Group on Certificates chaired by Mr. Joël Léchappé
- Working Group on ISTA Congresses chaired by Mrs. Katalin Ertsey

Furthermore the Executive Committee is working on a strategic document for 2007, of which a draft for discussion and consideration will be presented to the membership at the Ordinary Meeting 2006.

(3) ROLL CALL OF DESIGNATED MEMBERS ENTITLED TO VOTE

The President gave the floor to the Secretary General, Mr. Michael Muschick, for the roll call. The Secretary General read out the list of Designated Members entitled to vote as confirmed by the corresponding Designated Authority and approved by the Executive Committee on behalf of ISTA.

The Secretary General informed the audience that there would be a count of validated Designated Members at the beginning of the second day of the Ordinary Meeting and at any other time that it appeared that the number may have significantly decreased.

The roll call was read out in alphabetical order, following the ISO codes:

Albania (AL): (-); **Argentina (AR):** (-); **Austria (AT):** (-); **Australia (AU):** Mr. John M. Blackstock; **Bangladesh (BD):** (-); **Belgium (BE):** (-); **Bulgaria (BG):** Mrs. Bistra Pavlovska; **Bolivia (BO):** (-); **Brazil (BR):** Mr. Silmar T. Peske; **Canada (CA):** Mr. Ken Allison; **Switzerland (CH):** Mrs. Silvia Zanetti; **Chile (CL):** Mrs. Patricia Espinosa Sepulveda; **China (CN):** (-); **Colombia (CO):** (-); **Cyprus (CY):** (-); **Czech Republic (CZ):** Mrs. Zdenka Prochazkova; **Germany (DE):** Mr. Michael Kruse; **Denmark (DK):** Mrs. Grethe Tarp; **Estonia (EE):** Mr. Roland Nymann; **Egypt (EG):** (-); **Spain (ES):** Mr. Luis Martinez Vassallo; **Finland (FI):** Mr. Matti Puolimatka; **France (FR):** Mr. Joël Léchappé; **United Kingdom of Great Britain and Northern Island (GB):** Mr. Ronald Don; **Greece (GR):** (-); **Croatia (HR):** (-); **Hungary (HU):** Mrs. Katalin J. Ertsey; **Ireland (IE):** Mr. Thomas Cullen; **Israel (IL):** Mrs. Lea Mazor; **India (IN):** (-); **Iran (IR):** (-); **Italy (IT):** Mrs. Rita Zecchinelli; **Japan (JP):** (-); **Kenya (KE):** Mr. Joseph O. Ahenda; **Korea, D.P.R. of (KP):** (-); **Korea, Republic of (KR):** Mr. Min-Hee Jeong; **Sri Lanka (LK):** (-); **Lithuania (LT):** (-); **Luxembourg (LU):** (-); **Latvia (LV):** Mrs. Velta Evelone; **Malawi (MW):** (-); **Mexico (MX):** Mr. José Manuel Chavez Bravo; **The Netherlands (NL):** Mr. W. Joost van der Burg; **Norway (NO):** Mr. Hakon Tangerås; **Nepal (NP):** (-); **New Zealand (NZ):** Mr. John G. Hampton; **The Philippines (PH):** (-); **Pakistan (PK):** (-); **Poland (PL):** (-); **Portugal (PT):** (-); **Romania (RO):** (-); **Russia (RU):** (-); **Sweden (SE):** Mr. Jan Hyttring; **Slovenia (SI):** (-); **Slovakian Republic (SK):** (-); **Syrian Arab Republic(SY):** (-); **Thailand (TH):** Mrs. Atcharee Pornpinitsuwan; **Tunisia (TN):** (-); **Turkey (TR):** (-); **Separate Customs Territory of Taiwan, Penghu, Kinmen and Matsu (TW):** Mrs. Mei-Hsuan Lin; **Tanzania (TZ):** (-); **Ukraine (UA):** (-);**Uganda (UG):** Mr. James Bulegeya; **The United States (US):** Mrs. Susan Maxon; **Uruguay (UY):** (-); **Vietnam (VN):** Mr. Dung Dinh Nhat Tran; **Serbia and Montenegro (YU):** (-); **South Africa (ZA):** Mrs. Chantal Arendse; **Zambia (ZM):** Mrs. Mary M. Chipili; **Zimbabwe (ZW):** Mr. Claid Mujaju

The Secretary General asked if there was any country with Designated Members present that had not been called and apologised for any incorrect pronunciation of delegates names.

He then cited the Article X(d) of the ISTA Constitution 'Designated Members designated by forty percent of the Designated Authorities shall constitute a quorum at meetings of the Association. In determining the percentage, fractions less than 0.50 shall be dropped and those 0.50 or greater shall be regarded as a whole number'.

The Secretary General concluded that according to the roll, the total number of countries entitled to vote was 70, meaning that 28 voting delegates needed to be present at the meeting to reach the quorum. Therefore, with 34 voting delegates being present, the Secretary General declared the meeting quorate.

For clarification of the voting, the ISTA Constitution Article IX(a) was cited: 'Irrespective of the number of Designated Members designated by a single Government, only one vote may be cast on behalf of that Government'.

The Secretary General continued to give further clarification in regards to the voting procedure as determined by the Executive Committee: a majority will at all times be based on those actually voting on any motion, and not on those eligible to vote. The number deemed to be voting is the sum of the 'yes' and the 'no' votes. An abstention is a decision not to vote and therefore has no effect on the calculation of votes. The required majority, two third or simple, is calculated from the number of those voting. The actual number required for a two third majority may therefore differ for each motion.
For simple majority voting at Ordinary Meetings of the Association, if a clear majority of either 'yes' or 'no' cards can be identified by viewing the audience, the votes will not be counted. However, vote counts will be made in case of such a request from a member or on request of the President if in doubt.
He elucidated that with the right to vote goes the right to abstain from voting, but there will not be any call for abstentions.
All voting delegates received an envelope containing a green 'yes' card and a red 'no' card for the voting on all items proposed. According to Article IX(b) of the ISTA Constitution, the following categories of motions require for adoption a two thirds majority of those voting: motions to alter the Constitution, motions to dissolve the Association and motions arising during the meeting and relating to temporary adjournment, closing of debate or postponement of action. All other motions require a simple majority of those voting for adoption.
In closing the Secretary General appointed Mrs. Anne Bülow-Olsen and Ms. Martina Rösch to perform the counting of votes and drew the delegates' attention to the fact that all statements were recorded.

(4) READING AND ACCEPTANCE OF MINUTES

The minutes of the last Ordinary Meeting of the Association held on May 20 and 21, 2004 in Budapest, Hungary were published by the Secretariat as document 'Minutes of the ISTA Ordinary Meeting 2004' [document Internal Items/M/D(2004)33] and distributed to the membership, main stakeholders, the participants of the Meeting and were posted on the ISTA Website in November 2004.
The Secretary General declared that he had not received any comments from the membership on the minutes and then asked if there were any questions to the minutes from the audience, which was not the case.
Hence the minutes were unanimously accepted by the members by applause and the Secretary General declared the minutes as adopted.

(5) REPORT OF THE EXECUTIVE COMMITTEE

The President of the Association, reminded the participants that the report of the Executive Committee has been published by the Secretariat in the 'Activity Report 2004 of the ISTA Committees' [document Internal Items/M/D(2005)09] on pages 3 to 6 and distributed to the membership, main stakeholders, the participants of the Ordinary Meeting and posted on the ISTA Website.

The President asked the audience if there were any questions or comments to the report of the Executive Committee. Mr. Bernard Le Buanec from ISF then asked for the floor and started in congratulating ISTA for the good work done in the past two years. He then referred to a statement made during the President's address in which it had been mentioned that the Executive Committee is considering a change to having Ordinary Meetings only every second year instead of annually. Mr. Le Buanec commented that ISF had warmly welcomed the decision of ISTA to change to annual Ordinary Meetings in order to keep pace with world events and made his view clear that changing so that the Ordinary Meetings were held only biannually, would not be a step in the right direction.

The President thanked Mr. Le Buanec for these words. As there were no more questions or comments, the members were asked to accept the report by applause.

The floor was now given to Mrs. Grethe Tarp as chair of the Executive Committee Working Group on Tropical Seeds for her report on their activities.

Mrs. Tarp reported that a questionnaire on tropical seeds had been sent out to the ISTA Members. The outcome of this questionnaire has been summarised in a paper which was later distributed to the audience and can be found in this document as Annexe 1. As a result of the questionnaire, it was evident that there were a number of tropical species to be included in the ISTA Rules. For this the corresponding ISTA Technical Committees had been consulted to discuss within their committee on how to proceed with this work. The chair also noted that she expected more replies to be received, as there had been further discussions between some countries on this issue. A final report on this questionnaire including these new replies would be produced.

The floor was opened for questions and Mr. Joseph Ahenda from Kenya suggested to have local workshops on tropical seed in the regions concerned, and to start these on the species already suggested. Mrs. Tarp agreed to this proposal.

Mr. John Hampton from New Zealand suggested that the Seed Testing Committee of APSA may be able to provide some information to the Working Group.

The President thanked Mrs. Tarp and asked the audience to support the initiative of the working group by contacting the chair with ideas and offering assistance.

(6) REPORT OF THE SECRETARY GENERAL

The Secretary General of the Association, Mr. Michael Muschick, presented a report on the development, activities and finances of the Association for the calendar year 2004.
The report [document Internal Items/M/D(2005)09], pages 7 to 29, had previously been circulated to the membership, main stakeholders and the participants of the Ordinary Meeting and posted on the ISTA Website.

Mr. Muschick concluded that the year 2004 had been a very positive year for the Association from a number of different angles; these being firstly an encouraging development in the ISTA Membership, secondly vigorous activities in different business areas of the Association and in its Technical Committees and thirdly, ISTA had an excellent financial year with an unexpectedly high profit. Details of the report of the Secretary General can be found in his presentation published on the ISTA Website.

The financial statements of the Association including the report of the financial auditors are presented on page 26 to 29 in the report of the Secretary General. The finances of the Association were assessed by auditors of the BDO Visura, upon which BDO Visura recommended the approval of the financial statements of the Association by the ISTA Members.

Since there were no questions from the audience, the President asked the voting delegates to give their approval for the report of the Secretary General including the financial statement which was done by applause.

Finally BDO Visura were confirmed as external financial auditors for the year 2005 by the members by applause.

(7) CONSTITUTION CHANGES

The Constitution Change Proposals were laid down in detail in the document 'Proposed Changes to the ISTA Constitution – for consideration and decision at the Ordinary Meeting 2005' [document Internal Items/M/D(2005)01]. The Executive Committee recommended to the ISTA voting delegates to accept the three Constitution Change Proposals, which need a two third majority from the voting delegates for acceptance.

The three proposals were:

I. Fixation of the subscription fees on an annual basis
II. Publication of the statement showing the financial position of the Association
III. Changes in the submission and notification period for ISTA Constitution Change Proposals

The President repeated the voting procedure and clarified that according to Article XII (a) and (b) of the ISTA Constitution, modifications of the text presented in the Constitution Change Proposals could not be made during the Ordinary Meeting. Mr. John Hampton as chair of the Executive Committee Working Group on the ISTA Constitution was invited on stage to answer possible questions from the audience.

It was also explained that each proposal included the modification of more than one article of the current ISTA Constitution and that the vote should be made area by area for all three proposals and not constitution article by constitution article.

I. FIXATION OF THE SUBSCRIPTION FEES ON AN ANNUAL BASIS

Since there were no questions from the audience, the President asked the voting delegates to cast their vote on the presented proposal to amend the ISTA Constitution to allow for the fixation of the subscription fees on an annual basis.

The President and the Secretary General acknowledged that the Constitution Change Proposal I. was accepted with 31 'yes' against 1 'no' vote.

II. PUBLICATION OF THE STATEMENT SHOWING THE FINANCIAL POSITION OF THE ASSOCIATION

There were no questions on this item, therefore the President asked the voting delegates to cast their vote on the presented proposal to amend the ISTA Constitution to allow the publication of the statement showing the financial position of the Association to be moved to the 'Activity Report of the ISTA Committees'.

The President and the Secretary General acknowledged that the Constitution Change Proposal II. was accepted with 34 'yes' against 0 'no' votes.

III. CHANGES IN THE SUBMISSION AND NOTIFICATION PERIOD FOR ISTA CONSTITUTION CHANGE PROPOSALS

There were no questions on the last proposal either, therefore the President asked the voting delegates to cast their vote on the presented proposal to amend the ISTA Constitution to allow for changing the submission and notification period for ISTA Constitution change proposals.

The President and the Secretary General acknowledged that the Constitution Change Proposal III. was accepted with 33 'yes' against 0 'no' votes.

In closing the President thanked the voting delegates for accepting all proposals and Mr. Hampton for the work done in his Working Group.

(8) Consideration and Adoption of the Reports of the Technical Committees (and Proposed Rules Changes 2005)

The Chair of the Rules Committee, Mr. Steve Jones, was called upon to lead the meeting through the consideration and adoption of the Proposed Rules Changes.

The rules changes had been presented in the Rules Committee session two days before and in the relevant document 'Proposed Rules Changes 2005' published by the Secretariat and distributed to the membership, main stakeholders, the participants of the Ordinary Meeting and posted on the ISTA Website.

Mr. Jones, explained that because of discussions during Technical Committee meetings of the past two days, some of the proposed Rules Changes had major or minor changes.
He had allowed for minor word changes or minor deletions or inclusions of sentences where it did not alter the sense of the original proposal.

The Chairman opened the session by reading the first item of the proposed rules changes.

Proposals of Amendments to the ISTA International Rules for Seed Testing, Edition 2005

~~Text proposed for deletion~~

Proposed new text

Text added or amended since printing

ITEM 1 GENERAL EDITING ISSUES FOR INFORMATION ONLY

Item 1 Corrections

Item 1a List of edits

Preface to 2005 edition p4 has 'number' 'percentage' for 13.5. It should be 'percentage' changing to 'number' as is correctly printed in section 13.5 of the 2005 amended rules.

No voting required editorial only item 1a

Editorial merger of Chapter 2

The report from Doug Ashton and Simon Cooper (scrutiny team) confirms that the editorial merger version of Chapter 2 only has editorial changes.

Vote to accept the report of the scrutiny team:
Proposal accepted by the Ordinary Meeting

ITEM 2 PROPOSALS FOR CHAPTER 2 AND ANNEXE, SAMPLING

Item 2a Amendments to Chapter 2 following amalgamation of the Rules and Annexes
NOTE: There will be one vote on items 2a to 2ag inclusive to accept or not all the changes.

There will be another separate vote on item 2ah.

CHAPTER 2: SAMPLING

2.1 Object

The object of sampling is to obtain a sample of a size suitable for tests, in which the probability of a constituent being present is determined only by its level of occurrence in the seed lot.

2.2 Definitions

Proposal 2a

It is proposed to change the definition of a seed lot to a purely technical one that is not linked to an ISTA certificate. This would be in line with the object of chapter 2

2.2.1 Seed lot

A *seed lot* is a specified quantity of seed that is physically and uniquely identifiable.

Proposal 2b

It is proposed to delete "small" since it is not very precise and samples may be great compared to the seed lot.

2.2.2 Primary sample

A *primary sample* is a portion taken from the seed lot during one single sampling action.

2.2.3 Composite sample

The *composite sample* is formed by combining and mixing all the primary samples taken from the seed lot.

Proposal 2c Editorial only

2.2.4 moved from 2.2.6 to here to have the definition of sub-samples before the definition of submitted and working samples in which sub-sample is mentioned.

2.2.4 Sub-sample

A *sub-sample* is a portion of a sample obtained by reducing a sample.

Proposal 2d

It is proposed to define "submitted sample" technically and to clarify the terminology for sub-samples in different containers.

2.2.5 Submitted sample

A *submitted sample* is a sample that is to be submitted to the testing laboratory and may comprise either the whole of the composite sample or a sub-sample thereof. The submitted sample may be divided into sub-samples packed in different material meeting conditions for specific tests (e.g. moisture or health).

Proposal 2e

It is proposed to include a definition of "Duplicate sample" for clarification purposes.

2.2.6 Duplicate sample

A duplicate sample is another sample obtained for submission from the same composite sample and marked "Duplicate sample".

Proposal 2f

It is proposed to change the definition of working sample by adding "the whole or" to include the other seed count – working sample and purity test working sample in case of 2.6.3 third bullet point. It is proposed to delete "in the laboratory" since technically, it is irrelevant where the working sample is drawn, as long as it is done properly. If the whole submitted sample is working sample, the obtaining of the working sample is done in the warehouse.

2.2.7 Working sample

The *working sample* is the whole of the submitted sample or a sub-sample thereof, on which one of the quality tests described in these Rules is made and must be at least the weight prescribed by the Rules for the particular test.

Editorial only, required as a result of Proposal 2c

2.2.6 moved to 2.2.4

Proposal 2g

It is proposed to delete the separation into "the container" and "individual containers" as it is not relevant for the definition.

2.2.8 Sealed

Sealed means that a container in which seed is held is closed in such a way, that it cannot be opened to gain access to the seed and closed again, without either destroying the seal or leaving evidence of tampering. This definition refers to the sealing of seed lots, as well as of seed samples.

Proposal 2h

It is proposed to shorten the definition of self-sealed containers since it is too specific for a definition and in national or other regulations there are specifications laid down that are more relevant for the seed trade than the definition in ISTA.

2.2.9 Self-sealing containers

The 'valve-pack' bag is a specific type of self sealing container. It is filled through a sleeve-shaped valve which is automatically closed by the completion of filling the bag.

Proposal 2i

It is proposed to delete the ISTA certificate from this paragraph since this is not relevant for the definition of marking/labelling. Marking of working samples is changed to marking of sub-samples as being more general.

2.2.10 Marked/labelled

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 sub-samples must ensure that there is always an unambiguous link between the seed lot and the samples and sub-samples.

Proposal 2j

It is proposed to enter a general definition of coated seeds, to specify the kind of material that may be added in this definition and to delete these sentences from the individual definitions. Since in encrusted seed "greater or lesser extend" is very imprecise, it is proposed to be replaced by "measurable". The definition of granules appear now clearer. The definition of treated seeds is proposed to be shortened and moved after "encrusted seed" to be in the sequence of decreasing mass added.

2.2.11 Coated seeds

Coated seeds are seeds covered with material that may contain pesticides, fungicides, dyes or other additives. The following types of coated seeds are defined:

Seed pellets. More or less spherical units, usually incorporating a single seed with the size and shape of the seed no longer readily evident.

Encrusted seed. Units more or less retaining the shape of the seed with the size and weight changed to a measurable extent.

Seed granules. Units more or less cylindrical, including types with more than one seed per granule.

Seed tapes. Narrow bands of material, such as paper or other degradable material, with seeds spaced randomly, in groups or in a single row.

Seed mats. Broad sheets of material, such as paper or other degradable material, with seeds placed in rows, groups or at random throughout the sheets.

Treated seed. Seeds with treatments, which have not resulted in a significant change in size, shape or addition to the weight of the original seed.

2.3 General principles

Proposal 2k

It is proposed to delete the following paragraph since it is only explanatory and is not a rule.

Proposal 2l

It is proposed to use the definitions given above in the following sentences. Since mixing is not obligatory in some sampling reduction methods, the third sentence is proposed for deletion.
Since the object of chapter 2 is not to obtain a sample for issuing ISTA certificates but to obtain a representative sample, the technical part of Chapter 2 is proposed to be free of specific, more regulative than technical requirements for issuing ISTA Certificates. These requirements are collected in paragraph 2.5.5, which might finally go to Chapter 17.
Reference is made to the new Handbook for obtaining further help and information.

A composite sample is obtained from the seed lot by taking primary samples from different positions in the whole seed lot and combining them. From this composite sample, sub-samples are obtained by sample reduction procedures at one or more stages forming the submitted sample and finally the working samples for testing. For issuing ISTA International Seed Analysis Certificates, specific requirements have to be fulfilled as given under 2.5.4. Further help in interpreting this chapter may be found in the current ISTA Handbook on Seed Sampling.

2.4 Apparatus

Proposal 2m

It is proposed to change the following sentence for clarification.

Sampling and sample reduction must be performed using appropriate techniques and equipment that is clean and in good condition as described in 2.5.1.4 and 2.5.2.2.

2.5 Procedures

Proposal 2n

It is proposed to delete the requirements concerning lot size from the technical part of Chapter 2 and to move this to 2.5.5 as it is technically possible to take samples from seed lots bigger than ISTA maximum lot size.

2.5.1 Procedures for sampling a seed lot

2.5.1.1 Preparation of a seed lot and conditions for sampling

Proposal 2o

It is proposed to shorten the following paragraphs to the important sentence and to delete the explanatory parts.

At the time of sampling, the seed lot shall be as uniform as practicable. ~~, i.e. there is only tolerable variation among different parts of the seed lot.~~ If there is documentary or other evidence of heterogeneity, or the seed lot is found to be obviously heterogeneous, sampling must be refused or stopped. In cases of doubt heterogeneity can be determined as described under 2.8.2.

Seed may be sampled in containers or when it enters containers. The containers must be ~~strong enough~~ fit for purpose, e.g. must not damage the seed, and must be clean to avoid cross contamination. ~~and can be breathable or not.~~ The containers must be labelled or marked before or just after sampling is completed.

The seed lot shall be so arranged that each part of the seed lot is conveniently accessible.

2.5.1.2 Sampling intensity

Proposal 2p

It is proposed to include coated seeds into the sampling schemes by the following changes without changing of how samples have to be taken.
Also, in the Tables 2.1 and 2.2 it shall be indicated that this is the minimum intensity.

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

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

Number of containers	Minimum number of primary samples to be taken
1 - 4 containers:	3 primary samples from each container
5 - 8 containers:	2 primary samples from each container
9 - 15 containers:	1 primary sample from each container

16 - 30 containers:	15 primary samples from the seed lot
31 - 59 containers:	20 primary samples from the seed lot
60 or more containers:	30 primary samples from the seed lot

For seed lots in containers smaller than 15 kg capacity, containers shall 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 shall be regarded as containers as described in Table 2.1.

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 shall 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.

Seed lot size	**Number of primary samples to be taken**
Up to 500 kg	At least five primary samples.
501-3,000 kg	One primary sample for each 300 kg, but not less than five.
3,001-20,000 kg	One primary sample for each 500 kg, but not less than 10.
20,001 kg and above	One primary sample for each 700 kg, but not less than 40.

When sampling a seed lot of up to 15 containers, regardless of their size, the same number of primary samples shall be taken from each container.

Sampling intensity for coated seeds is as described in Tables 2.1 and 2.2.

Proposal 2r

It is proposed to move the definition of the size of the submitted sample to 2.5.5 since technically there must only be seed enough for performing the test. If there are additional requirements, then they are not technically and therefore are proposed to move to 2.5.4.

2.5.1.3 Taking primary samples

Proposal 2s

It is proposed to change the following text in order to obtain a logic sequence of the content and to move the conditions for taking primary samples from the big containers for an ISTA certificate valid for the small containers to 2.5.4.

When defining the number and/or the size of primary samples, the seed sampler needs to ensure (besides meeting the minimum sampling intensity) that the minimum amount of seed required for the requested test(s) is sent to the testing laboratory and enough seed remains available for obtaining duplicate samples if requested.

Primary samples of approximately equal size shall be taken from a seed lot, irrespective of ~~regardless from~~ where in the lot or container it is taken.

When the seed lot is in containers, the containers to be sampled shall be selected at random or according to a systematic plan throughout the seed lot. Primary samples shall be drawn from top, middle and bottom of containers, but not necessarily from more than one position in any container, unless so specified in Tables 2.1 and 2.2.

When the seed is in bulk or in large containers, the primary samples shall be drawn from random positions.

Containers shall be opened or pierced for abstraction of primary samples. The sampled containers shall then be closed or the contents transferred to new containers.

When seed is to be packed in special types of containers (e.g. small, not penetrable, or moisture-proof containers), it should be sampled, if possible, either before or during the filling of the containers.

Sampling seed lots of seed tapes and seed mats should be done by taking packets or pieces of tape or mat.

The instruments being used must neither damage the seed nor select according to seed size, shape, density, chaffiness or any other quality trait. All sampling apparatus must be clean before use to prevent cross contaminations. Triers must be long enough so that the opening at the tip reaches at least half of the diameter of the container. When the container is not accessible from opposite sides, the trier must be long enough to reach the opposite side. Sampling seed lots may be done by one of the methods listed below.

Proposal 2t

The sampling from a seed stream automatically or by hand is included as a method and mentioned in the first place since it is the best method.

(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.

(b) Manual sampling from a seed stream. Seed streams may also be sampled by using manual instruments when fulfilling the requirements listed under (a).

Proposal 2u

The descriptions of the trier and the procedures how to use them are proposed to be shortened and to be of similar specificity. For further additional information reference is made to the ISTA Seed Sampling Handbook. Since the length of triers clearly depend on the dimensions of the containers, all values for the length are proposed to be deleted.

(c) Sampling stick (synonym: stick trier, sleeve type trier). The sampling stick consists of an inner tube which fits loosely inside an outer tube but tightly enough so that seed or impurities do not slip between them. The outer tube has a solid pointed end. Both tubes have slots cut into their walls so that the cavity of the inner tube can be opened and closed by twisting the tubes against each other. The sampling stick may be used horizontally, diagonally or vertically. However, when used vertically the sampling stick must have partitions dividing the instrument into a number of compartments. The minimum inside diameter should be about 25 mm for all species.

When using the sampling stick, insert it in the closed position into the container, gently push it so that the point reaches the required position, open the sampling stick, agitate it slightly to allow it to fill completely, gently close and withdraw it and empty the primary sample into a container. Care should be exercised in closing the sampling stick so that seeds are not damaged.

(d) *Nobbe trier.* The Nobbe trier (dynamic spear) is a pointed tube with an opening near the pointed end. Seed passes through the tube and is collected in a container ~~bucket or bag~~. The minimum internal diameter of the Nobbe trier should be about 10 mm for clovers and similar seeds, about 14 mm for cereals and about 20 mm for maize.

When using the Nobbe trier, insert it at an angle of about 30° to the horizontal plane with the opening facing down, push the trier until it reaches the required position and revolve it through 180°. Withdraw it with decreasing speed from the container, gently agitating the trier to help maintain an even flow of seed, and collect the seed sample coming from the trier in a suitable container.

(e) Sampling by hand. This method is sometimes the most satisfactory method as in the following examples *Agropyron, Agrostis, Alopecurus, Anthoxanthum, Arrhenatherum, Axonopus, Bromus, Chloris, Cynodon, Cynosurus, Dactylis, Deschampsia, Digitaria, Elymus, Elytrigia, Festuca, Holcus, Lolium, Melinis, Panicum, Pascopyrum, Paspalum, Poa, Psathyrostachys, Pseudoroegneria, Trisetum, Zoysia.*

Sampling by hand is also the most suitable method for seed that may be damaged by the use of triers e.g. in seed lots of large seeded legumes, for seed with wings or seeds which have a low moisture content or for seed tapes and seed mats.

For hand sampling seed in containers, all positions inside the containers must be accessible. Containers with layers which are not accessible from the regular opening may have to be cut open, sampled and repackaged. Containers may also be partially or completely emptied during the sampling process to gain access to all positions in the containers. For sampling by hand, clean the hand and roll the sleeve up if necessary, insert the open hand into the container to the required position, close and withdraw the hand, taking great care that the fingers remain tightly closed about the seeds so none may escape and empty the hand into a receiving pan.

2.5.1.4 Obtaining the composite sample

Proposal 2v

It is proposed to include the obtaining of the composite sample by collecting the primary samples in one container without inspection as usually done in the case of automatic seed sampler.

If the primary samples appear uniform they can be ~~are~~ combined to form the composite sample, if not, the sampling procedure must be stopped. When primary samples are collected directly into one container, the content of this container shall be regarded as the composite sample only if it appears uniform. If not, it must not be used for obtaining a submitted sample.

2.5.1.5 Obtaining the submitted sample

Proposal 2w

It is proposed to change the following text for better and more efficient wording.

The submitted sample shall be obtained by reducing the composite sample to an appropriate size by one of the methods referred to in 2.5.2.2. Obtaining sub-samples such as for moisture testing must be carried out in such a way that changes in moisture content are minimal.

The composite sample can be submitted to the seed testing laboratory if it is of appropriate size or if it is difficult to mix and reduce the composite sample properly under warehouse conditions.

Duplicate samples, which were requested not later than at the time of sampling shall be prepared in the same way as the submitted sample.

2.5.1.6 Dispatch of the submitted sample

The submitted sample must be marked ~~in a way that establishes the connection between the seed lot and sample~~ with the same identification as the seed lot. For an ISTA International Seed Lot Certificate, the sample must be sealed. The additional information required according to 17.4.2 and 17.4.3, as well as the name of any chemical treatment applied must be provided.

Submitted samples shall be packed so as to prevent damage during transit. Submitted samples should be packed in breathable containers.

Sub-samples for moisture testing, and samples from seed lots which have been dried to low moisture content, shall be packed in moisture proof containers which contain as little air as possible. Submitted samples for germination tests, viability tests and health tests may only be packed in moisture proof containers if suitable storage conditions can be assured.

Submitted samples shall be dispatched by the sampler to the seed testing laboratory without delay.

2.5.1.7. Storage of submitted samples before testing
Every effort must be made to start testing a submitted sample on the day of receipt. Storage of orthodox seeds, when necessary, should be in a cool, well-ventilated room.

Non-orthodox (i.e. recalcitrant or intermediate) seeds should be tested as soon as possible after obtaining the submitted sample from the composite sample without any storage. Handling of the submitted sample and, if necessary, storage should be done under species specific optimum conditions.

2.5.2 Procedure for obtaining the working sample

2.5.2.1 Minimum size of working sample

Minimum sizes of working samples are prescribed in the appropriate chapter for each test. The working sample weights for purity analyses given in Table 2A are calculated to contain at least 2500 seeds. These weights are recommended for normal use in purity tests, see 3.5.1.

The sample weights in column 5 of Table 2A, Part 1, for counts of other species are 10 times the weights in column 4, subject to a maximum of 1000 g.

Working samples of ~~coated seeds~~ all coated seeds except those defined as treated seed in 2.2.11 ~~pelleted seed, encrusted seed, seed granules, seed tapes and seed mats~~ shall contain at least the number of pellets, seeds or granules indicated in column 3 of Table 2B, Part 1 and Part 2. If a smaller sample ~~of pelleted seed~~ is used, the actual number of pellets, ~~or~~ seeds or granules in the sample shall be reported.

2.5.2.2 Sample reduction methods

If the seed sample needs to be reduced to a size equal to or greater than the size prescribed, the seed sample shall first be thoroughly mixed. The submitted/working sample shall then be obtained either by repeated halving or by abstracting and subsequently combining small random portions. The apparatus and methods for sample reduction are described in 2.5.2.2.1. to 2.5.2.2.4. One, two or more of these methods may be used in one sample reduction procedure. When using one of the dividers described for seed pellets the distance of fall must not exceed 250 mm.

Except in the case of seed health, the method of hand halving shall be restricted to certain genera listed in 2.5.2.2.4. Only the spoon method and the hand halving method may be used in the laboratory to obtain working samples for seed health testing where other samples or equipment may be contaminated by spores or other propagating material.

For seed tapes and mats take pieces of tape or mat at random, to provide sufficient seeds for the test.

After obtaining a working sample or half-working sample the remainder shall be re-mixed before a second working sample or half-working sample is obtained.

Proposal 2x

It is proposed to add the following paragraph for taking moisture samples which is the procedure as described in 9.1.5.3. For moisture samples the need to produce a sample without exposing it too the air for more than 30 seconds is important.

Sub-samples for moisture content determination may be taken in the following way: Before taking the sub-sample, mix the sample by either stirring the sample in its container with a spoon or place the opening of the original container against the opening of a similar container and pour the seed back and forth between the two containers. Take at minimum three sub-samples with a spoon from different positions and combine them to the sub-sample of the required size. The seed may not be exposed to the air during sample reduction for more than 30 seconds.

2.5.2.2.1 Mechanical divider method

This method is suitable for all kinds of seeds except some very chaffy seeds. The apparatus divides a sample passed through it into two or more approximately equal parts. The submitted sample can be mixed by passing it through the divider, recombining the parts and passing the whole sample through a second time, and similarly, a third time if necessary. The sample is reduced by passing the seed through repeatedly and removing parts on

each occasion. This process of reduction is continued until a working sample of approximately, but not less than, the required size is obtained.

The dividers described below are examples of suitable equipment.

(a) *Conical divider.* The conical divider (Boerner type) consists of a hopper, cone, and series of baffles directing the seed into two spouts. The baffles form alternate channels and spaces of equal width. They are arranged in a circle and are directed inward and downward, the channels leading to one spout and the spaces to an opposite spout. A valve or gate at the base of the hopper retains the seed. When the valve is opened the seed falls by gravity over the cone where it is evenly distributed to the channels and spaces, then passes through the spouts into the seed pans.

The following dimensions have been found suitable: About ~~19~~ 38 channels ~~and 19 spaces~~, each about 25 mm wide for large seeds and about ~~22~~ 44 channels ~~and 22 spaces~~, each about 8 mm wide for small free-flowing seeds.

(b) *Soil divider (synonym: riffle divider).* The soil divider consists of a hopper with about 18 attached channels or ducts alternately leading to opposite sides.

A channel width of about 13 mm was found to be suitable.

In using the divider the seed is placed evenly into a pouring pan and then poured in the hopper at approximately equal rates along the entire length. The seed passes through the channels and is collected in two receiving pans.

(c) *Centrifugal divider.* In the centrifugal divider (Gamet type) the seed flows downward through a hopper onto a shallow cup or spinner. Upon rotation of the spinner by an electric motor the seeds are thrown out by centrifugal force and fall downward. The circle or area where the seeds fall is equally divided into two parts by a stationary baffle so that approximately half the seeds fall in one spout and half in the other spout.

The centrifugal divider tends to give variable results unless the spinner is operated after having poured the seed centrally into the hopper.

(d) *Rotary divider.* The rotary divider comprises a rotating crown unit with 6 to 10 attached sub-sample containers, a vibration chute and a hopper. In using the divider the seed is poured into the hopper and the rotary divider is switched on so that the crown unit with the containers rotates with approx. 100 rpm and the vibration chute starts to feed the seed into the inlet cylinder of the rotating crown. The feeding rate and therefore the duration of the dividing operation can be adjusted by the distance between the funnel of the hopper and the chute and the vibration intensity of the chute. There are two principles: (i) The inlet cylinder feeds the seed centrally onto a distributor within the rotating crown distributing the seed to all containers simultaneously. (ii) The inlet cylinder feeds the seed de-centrally into the inlets of the containers rotating underneath the inlet cylinder so that the seed stream is subdivided into a lot of sub-samples.

(e) *Variable sample divider.* The variable sample divider consists of a pouring hopper and a tube underneath that rotates with about 40 revolutions per minute. The tube distributes the seed stream from the pouring hopper onto the inner surface of a further hopper, which is well fitted into a third hopper all being concentric. In the second and the third hopper there are slots that comprise 50% of the perimeter of the hoppers. 50% of the seed will pass through the two hoppers into a collecting pan. The other 50% will stay within the hoppers and will then go into a second collecting pan. The two hoppers can be twisted against each other resulting in more narrow slots. The effect is that a smaller percentage will pass the slots. Either the smaller sample outside the hoppers or the bigger sample inside the hoppers can be used as the required sample. The position of the two hoppers in relation to each other can be adjusted accurately, resulting in pre-determined sub-sample sizes.

2.5.2.2.2 Modified halving method

The apparatus comprises a tray into which fits a grid of equal-sized cubical cells, open at the top and every alternate one having no bottom. After preliminary mixing, the seed is poured evenly over the grid. When the grid is lifted, approximately half the sample remains on the tray. The submitted sample is successively halved in this way until a working sample, of approximately but not less than the required size, is obtained.

2.5.2.2.3 Spoon method

Proposal 2y

It is proposed to delete the restriction to "single seeded species" since there is doubt about the meaning and background of this definition. The assumption that species containing MSU would not fall under this definition is often found, but there was no reference available to the BSC, why they are excluded. Therefore, it is proposed to delete "single" and to specify the maximum size of seed by adding "*Triticum* sp." as the often used threshold in seed size. The Moisture Committee also suggests the method as described should **not** be allowed for moisture content determinations.

The spoon method is recommended for sample reduction for seed health testing (7.4.1). For other tests it is restricted to species with seeds smaller than *Triticum* sp.. A tray, a spatula and a spoon with a straight edge are required. After preliminary mixing, pour the seed evenly over the tray; do not shake the tray thereafter. With the spoon in one hand, the spatula in the other, and using both, remove small portions of seed from not less than five random places. Sufficient portions of seed are taken to constitute a sub-sample of the required size.

2.5.2.2.4 The hand halving method

This method is restricted to the following genera of chaffy seeds:

Agrimonia	*Cenchrus*	*Melinis*
Andropogon	*Chloris*	*Oryza*
Anthoxanthum	*Dichanthium*	*Pennisetum (*non *glaucum)*
Arrhenatherum	*Digitaria*	*Psathyrostachys*
Astrebla	*Echinochloa*	*Scabiosa*
Beckmannia	*Ehrharta*	*Sorghastrum*
Bouteloua	*Elymus*	*Stylosanthes* (non *guianensis*)
Brachiaria	*Eragrostis*	*Taeniatherum*
Briza	*Gomphrena*	*Trisetum*

and to the following genera of tree and shrub seeds:

Acer	*Corylus*	*Populus*
Aesculus	*Fraxinus*	*Quercus*
Ailanthus	*Juglans*	*Salix*
Castanea	*Liriodendron*	*Tectona*
Cedrela	*Platanus*	*Ulmus*

For all other species it can be used only to obtain working samples in the laboratory for seed health tests (7.4.1).

Proposal 2z

It is proposed to re-arrange the following paragraph to be formally in line with the descriptions of how to use the other sampling tools.

For applying the hand halving method, pour the sample evenly onto a smooth clean surface, thoroughly mix the seed into a mound with a flat-edged spatula, divide the mound into half and halve each half again - giving four portions - and halve each portion again - giving eight portions -, arrange the portions in two rows of four, combine and retain alternate portions: e.g. combine the first and third portions in the first row with the second and fourth in the second row, remove the remaining four portions. Repeat the procedure using the retained portions until obtaining the required sample size.

Proposal 2aa

It is proposed to move the heterogeneity test to the end of chapter 2 into the Annex 2.8 behind tables 2A and 2B.

2.5.3 Storage of samples after testing

Proposal 2ab

It is proposed to describe here the technical requirements for sample on a general level and to move the time period to 2.5.4. From the technical point of view, a differentiation between orthodox and recalcitrant/intermediate seeds is necessary.

The primary aim of storage of samples after testing is to be able to repeat the original tests carried out on the submitted sample. Therefore, storage conditions should be such that changes in the seed quality traits tested are minimal. E.g. in the case of purity test or other seed count, the sample should be stored in such a way that the physical identity is kept. In the case of germination, viability or health test ~~in~~ of orthodox seeds the sample should be stored under cool and dry conditions. For such tests in recalcitrant and intermediate seeds of tropical and sub-tropical species, long term storage is not possible. For such seed of temperate species storability is depending on the fungal status and to some extent whether the seed is dormant or not. All factors pertaining to storage need to be determined on a species basis. Protection against insects and rodents may be necessary.

When a re-test in a different testing laboratory is required, a portion shall be drawn from the stored sample in accordance with 2.5.2.2, and submitted to the designated testing laboratory. The remainder shall be retained in store.

Proposal 2ac

The following paragraph contains those conditions that were deleted in the paragraphs below as being not related to the technical method of sampling and sampling reduction.

2.5.4. *Conditions for issuing ISTA International Seed Lot Certificates*

The sampling methods laid down in the ISTA Rules shall be followed when seed samples are drawn for the issue of ISTA International Seed Lot Certificates. Further conditions have to be fulfilled as listed below.

2.5.4.1. Seed lot size

The seed lot shall not exceed the quantity indicated in column 2 of Table 2A, subject to a tolerance of 5% with the exception of

(i) herbage and amenity seed being transported loose in bulk containers. The conditions under which this exception may be permitted are laid down in Appendix B.

(ii) seed pellets, seed granules, seed tapes or seed mats. The maximum number of seeds that a seed lot of seed pellets, seed granules, seed tapes or seed mats may contain is 1,000,000,000 (10,000 units of 100,000) except that the weight of the seed lot, including the coating material may not exceed 40,000 kg subject to a tolerance of 5% (42,000 kg). When seed lot size is expressed in units the total weight of the seed lot must be given on the ISTA International Seed Lot Certificate.

Maximum lot size for treated and encrusted seeds is defined by applying the quantities indicated in Table 2.A to the seeds without coating material.

A seed lot in excess of the prescribed quantity shall be subdivided into seed lots not larger than the prescribed quantity, each of which shall be labelled or marked with a separate seed lot identification.

2.5.4.2 Marking/labelling and sealing of containers

The seed lot shall be in marked/labelled containers which are self-sealing, sealed (or capable of being sealed) or under the control of the seed sampler.

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.

Proposal 2ad Editorial change

Correction: "unsealed" before submitted sample is unnecessary as 'unless they are sealed' qualify it.

The samplers are personally responsible for the seals, labels and bags supplied to them and it is their duty to ensure that primary, composite or submitted samples shall never be left in the hands of persons not authorised by the seed testing laboratory unless they are sealed in such a way that they cannot be tampered with.

2.5.4.3 Sampling from the seed lot

For sampling from the seed lot methods listed under 2.5.1.4.1 must be used. Automatic seed samplers must be approved by the ISTA seed testing laboratory.

Proposal 2ae

It is proposed to allow the so-called "re-sealing" that is allowed in several national and international seed certification systems. This is an extension of the former rule for small moisture proof containers (2.6.4, fifth paragraph).

An ISTA International Seed Lot Certificate issued on a seed lot (see 2.2.1) is still valid after re-packaging the seed lot in new containers provided that:

- The identity of the seed in the initial seed lot is preserved.
- The seed lot designation (see 2.2.10) ~~identification code of the seed lot~~ is not changed.
- The moving of the seed into the new containers is done under the control of an ISTA seed sampler.
  - There is no processing of the seed during filling of the new containers.

Proposal 2af

It is proposed to delete the following paragraph since the topic is covered be the ISTA Laboratory Accreditation Standard (see definition of seed sampler, 3.5, 3.6, 3.7, 6.1.2, 6.1.4) .

Proposal 2ag

It is proposed to add a reference to moisture meters to be in line with 9.2.2.5.2.

2.5.4.4 Submitted sample

Minimum size of submitted samples are as follows:

– For moisture determination - 100 g for species that have to 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.

– For verification of species and variety ~~cultivar~~ - As prescribed in Chapter 8.

– 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 shall 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 shall contain not less than the number of pellets or seeds indicated in column 2 of Table 2B, Part 1 and Part 2.

~~In case~~ If the submitted sample is smaller than prescribed, the sampler shall be notified accordingly and analysis withheld until sufficient seed is received in a single submitted sample; except that in the case of very expensive seed, the analysis may be completed to the extent possible and the following statement inserted on the certificate: "The sample submitted weighed only ..... g [or in the case of pelleted seeds 'contained only .... pellets (seeds)'] and is not in accordance with the International Rules for Seed Testing."

The submitted sample must be sealed and labelled or marked.

2.5.4.5 Sample reduction

For sample reduction, methods listed under 2.5.2.2 must be used.

2.5.4.6 Storage of submitted samples after testing

To provide for re-testing by the original or by another seed testing laboratory, submitted samples on which ISTA International Seed Analysis Certificates have been issued shall be stored for one year from the date of issue of the certificate. 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.

2.6. Calculation and expression of results

See under 2.8.2 for calculating the results of heterogeneity tests.

2.7 Reporting of results

See under 2.8.2 for reporting the results of heterogeneity tests.

2.8 Annexe

2.8.1 Tables for lot size and sample sizes

Table 2A

Note: Table 2A is not included here as it remains unchanged from the 2005 edition except for those suggested in Proposal 2ah which follows.

Table 2B Part 1 Sample sizes of pelleted seeds, encrusted seed and seed granules as a ~~in~~ number~~s of pellets~~

Determinations	Submitted samples not less than	Working samples not less than
1	2	3
Purity analysis (including verification of species)	7500	2500
Weight determination	7500	Pure pellet fraction
Germination	7500	400
Determination of other seeds	10000	7500

Determination of other seeds (encrusted seeds and seed granules)	25000	25000
Size grading	10000	2000

Table 2B Part 2 Sample sizes of seed tapes and mats

Determinations	Submitted samples not less than	Working samples not less than
1	2	3
Verification of species	2500 seeds	100 seeds
Germination	2500 seeds	400 seeds
Purity analysis (if required)	2500 seeds	2500 seeds
Determination of other seeds	10000 seeds	7500 seeds

2.8.2 Heterogeneity testing for seed lots in multiple containers
The object of heterogeneity testing is to detect the presence of heterogeneity which makes the seed lot technically unacceptable for sampling according to the ~~a~~object as defined in 2.1.

2.8.2.1 The H-value test
2.8.2.1.1 Definitions of terms and symbols

Note: Numbering only changed no textual changes so editorial only and not included. Table headings follow for reference only.

Table 2C Sampling intensity and critical H-values

Table 2D Part 1Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of purity analyses as indicating attribute in non-chaffy seeds.

Table 2D Part 2 Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of purity analyses as indicating attribute in chaffy seeds.

Table 2E Part 1 Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of germination tests as indicating attribute in non-chaffy seeds.

Table 2E Part 2 Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of germination tests as indicating attribute in chaffy seeds.

Table 2F Part 1 Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of other seed count analyses as indicating attribute in non-chaffy seeds.

Table 2F Part 2 Maximum tolerated ranges for the R-value test at a significance level of 1% probability using components of other seed count analyses as indicating attribute in chaffy seeds.

Note: this ends the proposals to the text of Chapter 2 following amalgamation of the Rules and Annexes and the subsequent review of the text.

Voting results items 2a-2ag:
Proposals accepted by the Ordinary Meeting

Separate vote required on Proposal 2ah

Following the presentations and discussion during the Meeting in Budapest (2004), the BSC was proposing to increase seed lot size for some species from 25 to 30 tonne.

Table 2A Part 1:

1	2	3	4	5
Avena sativa L.	30 000	1000	120	1000
Avena strigosa Schreb.	30 000	500	50	500
Hordeum vulgare L.	30 000	1000	120	1000
Oryza sativa L.	30 000	700	70	700
Secale cereale L.	30 000	1000	120	1000
x*Triticosecale* Wittm. ex A. Camus	30 000	1000	120	1000
Triticum aestivum L.	30 000	1000	120	1000
Triticum durum Desf.	30 000	1000	120	1000
Triticum spelta L.	30 000	1000	270	1000

Voting result item 2ah:
Proposal accepted by the Ordinary Meeting

ITEM 3 PROPOSALS FOR CHAPTER 3, PURITY

Item 3a *Cuscuta* spp. seeds as inert matter

For harmonisation with statement in 3.2.3 *Inert matter*: "6. Seeds of *Cuscuta* spp. which are fragile or ashen grey to creamy white in colour"

3.2.2 Other seeds

…

3. *Cuscuta* spp. seed units which are fragile ~~and~~ or ashen grey to creamy white in colour are classified as inert matter.

Item 3b Sieving reference

For harmonisation with rule change for beet adopted in: no sieving is now obligatory.

3.5.2 Separation

1. The working sample (or sub-sample) after weighing, shall be separated into its component parts as defined in 3.2. In general, the separation shall be based on an examination of each particle in the sample, but in certain cases special procedures are obligatory, such as uniform blowing ~~or sieving.~~

Item 3c Hordeum no longer considered as chaffy species

Hordeum are no longer considered as chaffy

3.2.1.A.1 Part 1 Pure seed definition numbers by genus and family.

…

Hordeum	Poaceae (Gramineae)	62	~~C~~

Changes to PSDs 3.2.1.A.2 Part 2 Numbered Pure Seed Definitions

Item 3d PSD 1

Some samples present bracts attached to the seed and removing bracts is very time consuming. Cannabis is the only *Cannabaceae* genus taken into account in the PSD and no other *Cannabaceae* are included in other PSD. Other genera taken into account in PSD 1 are not concerned by bracts.

1. Achene, with or without bracts, unless it is obvious that no seed is present.
Piece of achene larger than one-half the original size, unless it is obvious that no seed is present.

Seed, with the pericarp/testa partially or entirely removed.
Piece of seed larger than one-half the original size, with the pericarp/testa partially or entirely removed.

No voting: Proposal 3d withdrawn by Purity Committee

Item 3e PSD 4

Some samples of *Cichorium* present bracts attached to the achene and removing bracts is very time consuming. Bracts can be attached to the achene, but PSD 4 mentions only the pappus and the beak as appendages to be found on the achene. Other PSDs mention appendages for genera of *Asteraceae* family. In these cases, both the presence and the absence of appendage (bract, wing, pappus, bristle, and calyx) are accepted.

4. Achene, with or without beak, ~~or with or without~~ pappus or bracts, unless it is obvious that no seed is present.
Piece of achene larger than one-half the original size, unless it is obvious that no seed is present.
Seed, with the pericarp/testa partially or entirely removed.
Piece of seed larger than one-half the original size, with the pericarp/testa partially or entirely removed.

Item 3f PSD 10

Pinaceae can be removed as there are no members of the family listed in Table 3.2.1.A.1 that refer to this PSD.

10. Seed, with or without testa.
Piece of seed larger than one-half the original size, with or without testa.
Fabaceae (Leguminosae), Brassicaceae (Cruciferae), Cupressaceae, ~~Pinaceae~~, Taxaceae, Taxodiaceae: seeds and pieces of seed without testa are regarded as inert matter. For *Fabaceae (Leguminosae):* separated cotyledons are regarded as inert matter irrespective of whether or not the radicle-plumule axis and/or more than half of the testa may be attached.

Item 3g PSD 21

- In some samples of *Onobrychis viciifolia* seeds with the calyx attached to the fruit can be found. The addition of "with or without calyx" could save very time consuming work during the analysis of this kind of samples. In other PSD when calyx is mentioned (6, 7 and 22) presence or absence is accepted on pure seed.
- Considering that all genera covered by PSD 21 (Coronilla, Melilotus, Onobrichis) belong to the Fabaceae family, "only" is not necessary.

21. Pod, with or without calyx, with seed(s).
Seed, provided a portion of the testa is attached.
Piece of seed larger than one-half the original size, provided a portion of the testa is attached.
Seeds and pieces of seed without testa are regarded as inert matter. Separated cotyledons are regarded as inert matter irrespective of whether or not the radicle-plumule axis and/or more than half of the testa may be attached.

Item 3h PSD 23

- Considering the difficulty of evaluating the presence of the seed without opening the fruit, it would be useful for routine analysis to avoid this work by adding "unless it is obvious that no seed is present" to the definition.

23. One-seeded segment of pod or siliqua, with or without stalk or terminal beak, unless it is obvious that no seed is present.
Seed, provided a portion of the testa is attached.
Piece of seed larger than one-half the original size, provided a portion of the testa is attached.
For *Ornithopus compressus* only, one-seeded pod segment, with or without attached empty pod segments or partial segments.
Fabaceae (Leguminosae) and Brassicaceae (Cruciferae): Seeds and pieces of seed without testa are regarded as inert matter. For Fabaceae (Leguminosae) only: Separated cotyledons are regarded as inert matter irrespective of whether or not the radicle-plumule axis and/or more than half of the testa may be attached.

Item 3i PSD 25

Sometime, seeds with pedicels and stalk fragments are present on the samples of *Valerianella* genus. To detach these appendages is a very time consuming work for purity analyst. Another genus of *Valeranaceae* family is taken into account on PSD 7, where the presence of the calyx attached to the achene is accepted.

25. Dry, indehiscent fruit with one-three loculi, with or without calyx or pedicel or stalk fragment, unless it is obvious that no seed is present.
Seed, with or without testa.
Piece of seed larger than one-half the original size, with or without testa.

Item 3j Weighing

Harmonisation with the paragraph 3.5.1 of the Rules (see below) where is specified that the number of decimal places indicated is a minimum. It will result in more uniform interpretation of the Rule.

3.5.1 Working sample
…

The working sample (or each sub-sample) shall be weighed in grams to the minimum numbers of decimal places necessary to calculate the percentage of its component parts to one decimal place (3.5.1.A).

3.5.1.A Weighing

The minimum number of decimal places necessary for weighing, in order to calculate percentages to one decimal place, is indicated below.

Weight of working sample or half working sample in grams	*Weigh the working sample or half working sample and its components to the following number of decimal places*

Item 3k Magnification

Remove the reference to magnification: use of magnification is current in purity analysis. The previous statement does not correspond to the actual situation of laboratories.

3.5.2.A.1 All families except Poaceae (Gramineae)
Achenes, schizocarps and mericarps, other fruits and seeds are to be examined superficially only, without the use of pressure, ~~magnification,~~ a diaphanascope or other special equipment. If it is obvious on such an examination that there is no seed in the structure, it is to be regarded as inert matter.

Voting result item 3a - 3k (without 3d):
Proposals accepted by the Ordinary Meeting

ITEM 4 PROPOSALS FOR CHAPTER 5, GERMINATION, ANNEXE

Item 4a Clarification of how to report ungerminated seeds

Proposal from the Germination Committee.
If more than 5% ungerminated seeds are found at the end of the germination test a method is required to check whether they are fresh or dead. It needs to be made clear in the rules that whatever method is used the subsequent classification should be into fresh or dead. Also x-ray tests will only determine if seeds are full or empty, they will not determine if the seed is viable, hence this term is deleted as an appropriate method.

5.6.5.A.3. Ungerminated seeds:
.....

2. Fresh seeds: when ~~more than~~ 5% or more of fresh seeds are believed present, their ~~the~~ potential ~~for these alleged fresh seeds~~ to germinate must be determined by dissection, tetrazolium, or excised embryo. Those determined to have the potential to germinate are reported as fresh. Those determined to not have the potential to germinate are reported as dead. ~~measures as described in Annexe 5.6.3.A. must be taken to induce germination, especially if large numbers are found. If fresh seeds are to be reported at a rate of 5% or more, it must be verified that these seeds have the potential to produce a normal seedling. This may be done with a tetrazolium test (Chapter 6) or other appropriate method (such as dissection, embryo excision or x-ray).~~ If there is any doubt as to whether the seed is fresh or dead, then it must be classified as dead. If not already applied, measures described in Annexe 5.6.3.A.

must be taken to break dormancy ~~induce germination~~ if ~~more than~~ 5% or more of fresh ungerminated seeds are found.

……

New section would read as:

2. Fresh seeds: when 5% or more of fresh seeds are believed present, their potential to germinate must be determined by dissection, tetrazolium, or excised embryo. Those determined to have the potential to germinate are reported as fresh. Those determined to not have the potential to germinate are reported as dead. After this determination, if there is any doubt as to whether the seed is fresh or dead, then it must be classified as dead. If not already applied, measures described in Annexe 5.6.3.A. must be taken to break dormancy if 5% or more of fresh ungerminated seeds are found.

Voting result item 4a:
Proposal accepted by the Ordinary Meeting

Item 4b Addition of Organic Growing Medium as a primary substrate for sunflower germination

~~**5.4 Materials**~~
~~Paper or sand are commonly used substrates according to Table 5A. Soil or artificial compost are not recommended primary testing substrates. They are, however, permitted in special cases only as indicated in 5.6.2.A.1. Specifications and instructions as to permissible substrates, their preparation and use are given in 5.4.A and 5.6.A. Specifications as to water quality and substrate moisture content are given in 5.4.A and 5.6.A.~~

5.4 Growing media: substrates and water

Growing media used for germination tests are commonly paper, sand and organic growing media according to Table 5A.
~~Soil is not permissible.~~
Water: demineralised, de-ionised, tap water and spring water are commonly used; specifications are given in 5.4.5.

5.4.1 Definition

Product used as growing media for plants. This provides ~~Its use results in the development of~~ media with sufficient pore space for air and water, for the anchorage of the root system and for contact with solutions (water) needed for plant growth.

5.4.2 Specifications

The following general specifications apply for all growing media: paper, sand or organic growing media.

- *Composition*: the growing medium can be paper, ~~pure~~ sand or mixtures of organic compounds with added mineral particles
- *Water retention characteristics*: when the appropriate amount of water is added, the particles of the growing medium should have the capacity to hold sufficient water to provide continuous movement of water to the seeds and seedlings, but also provide sufficient pore space for aeration required for optimal germination and root growth. *A priori*, the water content of the growing medium shall be adjusted to the maximal water holding capacity. When necessary, for certain species, it can be adjusted to correspond to the particular species. The water retention shall then be expressed as a percentage of the maximum retention.
- *pH:* The growing medium must have a pH value within the range 6.0-7.5 when checked in the substrate.
- *Conductivity:* The salinity must be as low as possible and no more than 40 milliSiemens per meter.
- *Cleanliness and ~~inocuity:~~ freedom from toxicity:* The growing medium must be free from seeds, fungi, bacteria or toxic substances, which may interfere with the germination of seeds, the growth of seedlings or their evaluation.
- *Re-use of substrates:* It is strongly recommended that the growing medium is only used once

Alternative. It may be difficult to check all the specifications or to get growing media from suppliers with the requested specifications. It is permissible to replace the measure of conductivity with biological tests ~~such as~~ for phytotoxicity ~~and innocuousness~~. If not, all the characteristics described in 5.4.2 must be verified.

5.4.3. Growing Media Characteristics

(1) Paper Growing Media

The paper should be wood, cotton or other purified vegetable cellulose. The paper may take the form of filter papers, blotters or towels. The paper should be such that:
- the roots of the seedlings will grow on and not into the paper.
- it possesses sufficient strength to enable it to resist tearing when handled during the test.

(2) ~~Pure~~ Sand Growing Media

The sand should be reasonably uniform and free from very small and large particles Round particles are preferable and it is recommended that sand with sharp particles, which may impair seedling development, is avoided. It is recommended that 90% of the particles should pass through a sieve having holes or meshes of 0.8mm width and be retained on a sieve having holes or meshes of 0.05 mm width.

(3) Organic Growing Media

The mixtures are defined as containing the following elements in known proportions and fitting the requirements of 5.4.2:

- **Organic compounds:** Fibres such as peat, coconut fibres and wood fibres, with a size less than 5 mm.
- **Mineral particles:** for example sand, perlite and vermiculite. The proportion should be around 20% in volume. It is recommended that 90% of the particles should pass through a sieve having holes or meshes of 2 mm width and be retained on a sieve having holes or meshes of 0.05 mm width.

5.4.4 Water

(1) General specifications

Cleanliness: The water used to moisten the substrate should be reasonably free from organic or inorganic impurities.

pH: The pH value should be within the range 6.0-7.5 when checked in the substrate, or there must be evidence based on statistical data there is no influence of a pH ~~outwith~~ outside this range of values on the germination test results.

5.4.5. Quality control

Objective: to ensure that new deliveries of growing media meet the requirements for the principal physical characteristics and are free of negative effects due to toxic substances or noxious microorganisms.

The following characteristics: composition, water retention characteristic, pH, cleanliness and innocuousness (freedom from phytotoxic effects and negative effects due to microorganisms) should be controlled [1].Quality control tests can be performed by the seed testing laboratory or by laboratories specialising in soil analyses or microbiology tests.

[1] Examples of methods used to measure these quality attributes are given in the current ISTA Handbook on Seedling Evaluation

5.5 Material and apparatus

Containers: all kinds of plastic, glass ~~(transparent or translucent)~~, metal or pottery ~~transparent or~~ containers can be used provided there are no toxic emanations and they are clean and free from microorganisms.
Types of counting equipment and germination apparatus are described in 5.5.A.

5.6 Procedure

……

5.6.2 Test conditions

Permissible substrates, temperatures, duration and additional directions, including recommended special treatments for dormant samples, are indicated in Table 5A. Substrates, temperatures and duration of test indicated are prescriptive and no others may be used. ~~if an ISTA International Seed Analysis Certificate is issued.~~

…..

5.6.5 Evaluation

Every seedling must be evaluated in accordance with the general principles laid down in 5.2.3 and 5.2.4. For evaluation, the essential structures must be sufficiently developed to permit detection of any abnormality. For further details see 5.6.5.A.

When samples tested on paper produce seedlings which cannot readily be evaluated, a retest should be made in sand or organic growing media at the temperature indicated in Table 5A and under favourable conditions of moisture and light.

…

NOTE: All sections of 5.4.A must be deleted as the information is now in 5.4

….

5.6.2.A Test conditions

5.6.2.A.1 Growing Media

Methods using paper

…..

Methods using Sand or organic growing medium

Sand and organic growing media are used as follows:

1. TS (T~~t~~op of S~~s~~and) or TO (Top of Organic growing medium)
The seeds are pressed into the surface of the sand or the organic growing media.

2. S (in S~~s~~and) or O (Organic growing media)
The seeds are planted on a level layer of moist sand or organic growing medium and covered with 10-20 mm of uncompressed ~~sand~~ substrate depending on the size of the seed. To ensure good aeration it is recommended that the bottom layer ~~of sand~~ be loosened by raking before sowing.

Sand or organic growing media may be used instead of paper, even if not prescribed in Table 5A,:
- when the evaluation of a diseased sample proves impracticable because of ~~contamination of~~ the spread of infection between seeds and seedlings on paper substrate;
- ~~Sand is sometimes used~~ for investigative purposes and to confirm evaluation of seedlings in cases of doubt; ~~though for these objectives soil is the preferred medium.~~
- when seedlings show phytotoxic symptoms

~~*Methods using soil, compost*~~

~~Soil and compost are generally not recommended as a primary testing substrate. However, it may be necessary to use them, for example when seedlings show phytotoxic symptoms or if evaluation of seedlings is in doubt on paper or sand. Soil or compost is commonly used for comparative or investigative purposes.~~

Methods using soil

Soil is generally not recommended as a primary growing medium. However, it may be used as an alternative to organic growing media when seedlings show phytotoxic symptoms or if the evaluation of seedlings is in doubt on paper or sand. If soil is used it must meet the specifications given in 5.4.2.

5.6.2.A.2 Moisture and aeration

~~The substrate must at all times contain sufficient moisture to meet the requirements for germination. However, moisture content must not be excessive, or aeration may be limited.~~

~~The initial quantity of water to be added will depend on the nature and dimensions of the substrate and also on the size and species of the seed to be tested. The optimum amount should be determined by experiment.~~

~~Therefore, p~~Precautions should be taken to ensure that the ~~substrate~~ medium cannot dry out and that sufficient water is supplied continuously during the test period. Subsequent watering should be avoided wherever possible as it is likely to increase variability between replicates and between tests.

Special measures for aeration are not usually necessary for TP and PP tests enclosed in boxes or petri dishes. For BP however, care should be taken that envelopes and towel rolls are loose enough to allow for sufficient air around the seeds. For the same reason the material covering the seeds in sand and ~~soil~~ organic growing media tests should not be compressed.

……

Table 5A. Germination methods

….

Substrates	The sequence…… TP; BP; S; O

….

The abbreviations have the following meanings:

TP	top of paper
BP	between paper
PP	pleated paper
S	sand
TS	top of sand
O	organic growing medium
TO	top of organic growing medium

….

Table 5A, amend entry for *Helianthus annuus*

Species	Prescriptions for:				Additional directions including recommendations for breaking dormancy
	Substrate	Temperature °C	First count (days)	Final count (days)	
1	2	3	4	5	6
Helianthus annuus	BP; S; O	20-30; 25; 20	4	10	Preheat, prechill

Voting result item 4a - 4b:
Proposals accepted by the Ordinary Meeting

Item 4c To include details of the tolerances checks to be made on replicate results.

Proposal from the Germination Committee.
ISTA auditors have stated that the Rules 5.8.A "Calculation and expression of results – *Tolerances"* are not clear. The Germination Committee discussed this in Budapest and decided that the statement "Tolerances are to be applied at least on the category of normal seedlings" should be added to make it clear that only the number of normally germinated seedlings in the replicates need to be checked using tolerances.

5.8.A Calculation and expression of results

The result .....

Tolerances
The result of a germination test can be relied upon only if the difference between the highest and the lowest replicates is within accepted tolerances. To check the reliability of a test result, the average percentage of the replicates is calculated and compared with Table 5.1 of Chapter 16: Tolerances. The result is considered reliable, if the difference between the highest and the lowest replicate does not exceed the tolerance indicated. Tolerances ~~are to~~ must be applied to at least the category of normal seedlings.

To decide.....

Voting result item 4c:
Proposal accepted by the Ordinary Meeting

Item 5 Proposals for Annexe to Chapter 7, Seed Health testing methods

Item 5a: Modifications and additions to the validated seed health testing methods.

The following method sponsored by ISHI-Veg has been validated by the Seed Health Committee, and is submitted for acceptance by the membership to be included in Annexe to Chapter 7 of the International Rules for Seed Testing as Method 7-020.
Any problems or errors should be directed to the Chairpersons of the Seed Health and Rules Committees.

New Method:

7-020 Detection of *Xanthomonas hortorum* pv. *carotae* (bacterial leaf blight) on carrot (*Daucus carota*)

Crop: *Daucus carota*
Pathogen: *Xanthomonas hortorum* pv. *carotae*

Background:
There is no validated method for *Xanthomonas hortorum* pv. *carotae* on carrot seed. The most commonly used method in seed health testing laboratories is based on a seed wash dilution-plating assay. This method involves washing seeds in buffer and plating serial dilutions of the extract on a semi-selective medium. Various semi-selective media are currently used as described or adapted from the following papers: Cubeta and Kuan, (1986); Williford and Schaad, (1984); Kim *et al.*, (1982); and McGuire *et al.*, (1982). These media have been tested by ISHI-Veg and ISHI-Veg/ISTA in a number of comparative studies (Asma, 1999, Asma, 2000a and Asma, 2000b). In addition to comparing selective media the latter comparative study (Asma, 2000b) concluded that the confirmation method chosen had an affect on test results, with ELISA and IF giving false positive confirmations due to poor specificity of antisera. The 2000 study (Asma, 2000b) also looked at the effect of antibiotics and agar source on the performance of the test. Further work by Asma *et al*., (2002) has shown PCR to be a reliable and quick confirmation method when compared to pathogenicity tests.

This method is derived from the previous comparative tests and the validation studies carried out by ISHI-Veg in 2003 (Asma, 2005). For routine testing of carrot seed a combination of two semi-selective media, MKM/MD5A or MKM/mTBM is recommended. If nystatin at a concentration of 35 mg/l is not enough to completely inhibit fungal growth, cycloheximide should be used. Either a pathogenicity test or a PCR test is used to confirm suspect isolates.

Method Abstract:
Seeds are suspended in saline plus Tween 20 in a conical flask, soaked overnight at 4-7°C. The flask is then shaken at room temperature for 5 minutes and the extract diluted. The diluted extracts are plated on either MKM and MD5A or MKM and mTBM media. Plates are incubated at 28°C for 4-8 days and then examined for the presence of suspect colonies of *Xanthomonas hortorum* pv. *carotae.* Suspect colonies are sub-cultured to plates of YDC medium and their identity confirmed by a pathogenicity test on susceptible carrot seedlings or using PCR with *X. hortorum* pv. *carotae* specific primers.

Voting result item 5a:
Proposal accepted by the Ordinary Meeting

ITEM 8 PROPOSALS FOR CHAPTER 8, VERIFICATION OF SPECIES AND CULTIVAR

Item 8a Revised Chapter 8

Chapter 8: Species and Variety ~~Cultivar~~ Testing

8.1 Objects

8.1.1 Verification of species and variety ~~cultivar~~
The object is to determine the extent that the submitted sample conforms to the species or variety ~~cultivar~~ as requested by the applicant using methods not permissible in a purity test according to Chapter 3.

8.1.2 Testing for the presence of specified traits
The object is to test for the presence of traits in the submitted sample as specified by the applicant (for examples see 8.2.2) using methods not permissible in a purity test according to Chapter 3.

8.2 Definitions

8.2.1 Authentic standard sample
An authentic standard sample is a valid seed sample of species or variety ~~cultivar~~ ~~or species~~ identity or a valid sample with presence of the specified traits.

8.2.2 Standard reference
A standard reference is a valid descriptive attribute of a species or variety ~~cultivar~~ ~~or species~~, e.g. ploidy level, zygosity; isozyme, protein or DNA banding pattern produced by gel electrophoresis or similar techniques; allelic profile or nucleotide sequence.

8.2.3 Performance approved methods
Performance approved methods are evaluated, approved and implemented by the testing laboratory ~~approved~~ according to the principles of the performance based approach as laid down in the relevant ISTA ~~accreditation~~ document. ~~under the responsibility of the laboratory.~~ They are restricted to bio-molecular tests and bioassays for the object of testing for the presence of specified traits. ~~The laboratory is responsible for approving these methods.~~ Performance approved methods can only be applied when no standardised method is included in this chapter for the test required by the applicant.

8.3 General principles

8.3.1 Field of application

8.3.1.1 Verification of species and variety ~~cultivar~~
The determination is valid only if the species or variety ~~cultivar~~ is stated by the applicant and an authentic standard sample of the species or variety ~~cultivar~~ is available for comparison to ensure the certainty of the determination. The traits compared may be morphological, physiological, cytological or chemical.

8.3.1.2 Testing for the presence of specified traits
The determination is valid only if the trait is specified by the applicant and either an authentic standard sample or a standard reference for that specified trait is available for comparison to ensure the certainty of the determination. The trait specified by the applicant may be morphological, physiological, cytological or chemical including bio-molecular.

8.3.2 Testing principles
The determination is carried out, depending on the species or variety ~~cultivar~~ or specified trait in question on seeds, seedlings or more mature plants grown in a laboratory, a glasshouse, a growth chamber or a field plot.

When an authentic standard sample is available, the working sample is compared with the authentic standard sample. Whenever possible, the working sample and the authentic standard sample shall be handled in the same way, e.g. in field plots they shall be grown contemporaneously, near-by and in identical environmental conditions and the evaluation shall be done at the same stage of development.

When a standard reference is available, the test is done by comparing the traits of the seeds, seedlings or plants of the working sample with the standard reference.

8.3.2.1 Principles for verification of species and variety ~~cultivar~~

In the case of species or variety ~~cultivar~~ that are sufficiently uniform in one or more traits (e.g. in self-pollinated species), the conformity of the working sample with an authentic standard sample can be determined and if possible, the degree of conformity may be quantified. If the species or variety ~~cultivar~~ is not sufficiently uniform (e.g. in cross-pollinated species), the proportion of any obvious off-types is calculated and the conformity of the working sample is expressed.

8.3.2.2 Principles for testing for the presence of specified traits

A test is performed to determine either the proportion of that specified trait in the working sample based on number or mass of seeds or on extracted components, and/or the confidence probability by which the seed lot meets a specification. The test can be either a qualitative test, in which the presence or absence of the specified trait in the working sample is determined or a quantitative test in which the proportion of the specified trait is determined. The laboratory must ensure that the selected methods meet the request of the applicant. Appropriate controls must be included.

8.4 Personnel and Equipment

The determination shall be made by a specialist familiar with the morphological, physiological, bio-molecular or other trait of seeds. The specialist must possess specific knowledge of procedures, apparatus and equipment required for determining species and variety ~~cultivar~~. It may be necessary to consult the international scientific literature, official government documents, other laboratories or other resources for guidance.

Appropriate facilities and equipment must be available as specified in detail in 8.8 for testing the specified trait, and in general as follows:

(a) In the laboratory - apparatus and reagents for morphological, physiological, cytological or bio-molecular examinations, chemical tests and germination of seeds as appropriate.
(b) In glasshouses and growth chambers - provision of controlled environmental conditions adequate to induce the development of the trait.
(c) In field plots - climatic, soil and cultural conditions to permit normal development of the trait and sufficient protection against pests and diseases.

8.5 Procedures

8.5.1 Submitted sample

The testing laboratory shall ensure that the size of the submitted sample is sufficient to perform the tests as requested by the applicant.

Guiding values for the size of the submitted sample for tests covered by this chapter are as follows:

	Laboratory only (g)	Field plot and laboratory (g)
Glycine, Lupinus, Phaseolus, Pisum, Vicia, Zea and species of other genera with seeds of similar size	1000	2000
Avena, Hordeum, Secale, Triticum and species of other genera with seeds of similar size	500	1000
Beta and species of other genera with seeds of similar size	250	500
All smaller seeded ~~other~~ species ~~genera~~	100	250

Depending on the method and the degree of precision required, more seeds or less seeds than the amount listed above may be necessary.

8.5.2 Working sample
The size of the working sample and the number and size of replicates will depend on the object, the method to be used and the degree of precision as requested by the applicant. If technically possible and justified, replicates should be tested to improve the reliability of the test result. Preparation of the working sample and the replicates shall be done according to procedures described under 2.7.2.

8.5.2.1 Working samples for testing for the presence of specified traits
Tests can be performed with seeds from the pure seed fraction (according to Chapter 3) or the whole working sample with the exclusion of the inert matter (according to Chapter 3). The working sample shall be washed to remove dust, treatments or in the case of coated seeds, pelleting material or tapes if these materials may affect the test result. The kind of preparation of the working sample must be reported according to 8.7.

8.5.3 Examination of seeds
There may be different procedures for examining seeds:
For testing morphological traits, the seeds shall be examined with the aid of a suitable magnifying apparatus when necessary. For testing colour traits, the seeds may be examined under full daylight or light of limited spectrum, e.g. ultra-violet. For testing chemical traits, the seeds shall be treated with the appropriate reagent and the reaction of each seed noted. For a determination of ploidy level, tissue is excised and processed for analysis. For testing bio-molecular traits, DNA, RNA, protein or other specific metabolic products are extracted from the seeds and the traits may be detected, elucidated and quantified.
Standardised methods for examining seeds listed under 8.8.1 are applicable to both objects according to 8.1. For the application of performance approved methods see 8.2.3.

8.5.4 Examination of seedlings
The seeds shall be germinated on an appropriate medium. When the seedlings have reached a suitable stage of development, they are examined in whole or in part, with or without further treatment. For a determination of ploidy level, a root tip or other tissue is excised and processed for ploidy analysis. For testing bio-molecular traits, DNA, RNA, protein or other specific metabolic products are extracted from the seedlings and the traits may be detected, elucidated and quantified. In bioassays, seeds may be treated before germination or the seedlings may be treated to induce the expression of the traits if present.
Standardised methods for examining seedlings listed under 8.8.2 are applicable to both objects according to 8.1. For the application of performance approved methods see 8.2.3.

8.5.5 Examination of plants in glasshouse or growth chamber
The seeds shall be sown in suitable containers and maintained in environmental conditions necessary for the development of the traits. When the plants have reached a suitable stage of development, the traits shall be observed on each plant and noted. For testing bio-molecular traits, DNA, RNA, protein or other specific metabolic products are extracted from the plants and the traits may be detected, elucidated and quantified. In

bioassays, seeds may be treated before germination or the seedlings or plants may be treated directly to induce the expression of the traits if present.
Standardised methods for examining plants listed under 8.8.2 are applicable to both objects according to 8.1. For the application of performance approved methods see 8.2.3.

8.5.6 Examination of plants in field plots
Each working sample shall be sown in at least two replicate plots. As insurance against failure the replicates should be situated in different fields or different parts of the same field. The plots may be of any convenient size that will provide enough plants for the determination to be of the accuracy required. If the seed is sown *in situ*, it shall be sown in rows, mechanically if possible. Spacing between rows and between plants shall be sufficient to allow development of the traits. Both transplanting and thinning are possible sources of error and the sowing rate shall be adjusted to produce approximately the same number of plants in the plots produced from the working sample and the authentic standard sample. When absolutely necessary, thinning or transplanting of seedlings from elsewhere into the plot is permitted.

Observations shall be made during the whole growing period, but particularly at times indicated in 8.8.3. Plants showing the traits shall be counted and recorded.
When practical, either an actual count or an estimate of the number of plants in the plot shall be made, preferably at the time the plants are examined.
Standardised methods for examining plants listed under 8.8.3 are applicable to both objects according to 8.1. For the application of performance approved methods see 8.2.3.

8.6 Calculation and expression of results

The calculation and expression of results depends on the object, the method used, the testing plan and whether a qualitative or quantitative result or a confidence probability for meeting a threshold is requested by the applicant. The mean and other statistics may be calculated and reported when results of replicates are within the range of expected variability. Methods for determining tolerances may be found in the ISTA Handbook of Variety Testing (Electrophoresis Testing) as well as in the ISTA Handbook on Statistics in Seed Testing (Appendix II).
In the case of verification of species and variety ~~cultivar~~, the determined proportion of other species, other varieties ~~cultivar~~ or aberrant (e.g. fatuoid oats, speltoid wheat) is calculated and expressed.
In the case of testing for the presence of specified traits the result shall be expressed as agreed with the applicant by either

- reporting whether the trait is present or not,
- calculating and expressing the proportion of the trait or
- calculating and expressing the confidence probability that the true proportion of the trait meets or exceeds a specification on the basis of the test result.

8.6.1 Examination of individual seeds, seedlings or plants
Whenever possible, the number of divergent seeds, seedlings or plants or those with the trait under test shall be calculated as a percentage of the number of seeds, seedlings or plants examined.
When testing seedlings, the result is expressed as the proportion of the number of normal seedlings (as defined in Chapter 5). If the applicant requested reporting in a different way, it shall be given in addition.
When testing plants in field plots in rows without wide spacing, it may be difficult to estimate the total number of plants examined per plot. The result may be expressed as the number of divergent plants or plants with the trait under test produced by the mass of seed sown.

8.6.2 Tests for traits of bulk samples
Tests may be done by measuring traits of a bulk sample that do not allow a reference to individual seeds, seedlings or plants. There are various different principles for calculation and expression of test results of such measurements. The result shall be expressed as agreed with the applicant.

8.6.3. Calculation of the confidence probability that the seed lot meets or exceeds a specification
For the calculation of the confidence probability the software “SeedCalc” in the latest version available on the ISTA homepage or other means with appropriate algorithms must be used.

8.7 Reporting results

The results shall be reported under 'Other Determinations' on an ISTA International Seed Analysis Certificate and in addition the following information shall be given:

- The request of the applicant.
- The trait(s) and the method(s) used.
- The kind of preparation of the working sample (e.g. the whole working sample excluding the inert matter or only the pure seed fraction, washing).
- Whether an authentic standard sample or a standard reference was used. In case of the use of a standard reference, its origin must be indicated.
- The number of seeds, seedlings or plants examined. When it is difficult to determine the total number of plants examined in field plots, the mass of seed sown must be reported.

8.7.1 Reporting results of verification of species and variety ~~cultivar~~

8.7.1.1 Results of examination of individual seeds or seedlings

Suggested phrases for reporting divergent seeds or seedlings depending upon the result are as follows:

- If none was found: "The test performed revealed nothing indicating that the species (and/or variety ~~cultivar~~) stated by the applicant is incorrect."
- If non-conforming seeds were found: "Out of .... seeds examined .... seeds do not conform to the authentic standard sample of the species (and/or variety ~~cultivar~~) stated by the applicant."
- If non-conforming seedlings were found: "Out of .... seeds producing normal seedlings, ...% do not conform to the authentic standard sample of the species (and/or variety ~~cultivar~~) stated by the applicant."
- If the total working sample was found to be of a species and/or variety ~~cultivar~~ other than that stated by the applicant: "The sample does not conform to the authentic standard sample of the species (and/or variety ~~cultivar~~) stated by the applicant."

8.7.1.2 Results of a field plot examination

The results shall, whenever possible, be reported as a percentage of each other species, other varieties ~~cultivars~~ or aberrant found. When the expression of the result as a percentage is not possible, appropriate comments regarding the conformity of the sample may be reported.

If nothing worthy of special comment was found the following statement is suggested: "The results of a field plot examination of this sample revealed nothing indicating that the species (and/or variety ~~cultivar~~) stated by the sender is (are) incorrect."

8.7.1.3 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 ~~cultivar~~) purity with …% confidence."

8.7.2 Reporting test results of presence of specified traits

8.7.2.1 Qualitative test results

Suggested phrases for reporting depending upon the result are as follows:

- If the specified trait was not found: "The test performed revealed nothing indicating the presence of the trait specified by the applicant."
- If the specified trait was found: "The presence of the trait specified by the applicant was detected."

The limit of detection of the method used should be provided.

8.7.2.2 Quantitative results obtained by multiple qualitative tests of individual or bulks of seeds or seedlings

Results may be reported as the percentage of seeds or seedlings showing the trait specified by the applicant. Suggested phrases for reporting depending upon the result are as follows:

- If none was found: "The test performed revealed nothing to indicate ~~indicating~~ the presence of the trait specified by the applicant."

- If seeds showing the trait were found: "Out of .... seeds examined .... seeds showed the trait specified by the applicant."
- If seedlings showing the trait were found: "Out of .... seeds producing normal seedlings, …. % showed the trait specified by the applicant."

8.7.2.3. *Quantitative measurements of traits in bulk samples*

Units may be percent seeds by number, percent seeds by mass, percent by protein, percent by number of DNA copies, or any other determinant by percent. The limit of detection (LOD) and the limit of quantification (LOQ) of the method used, the testing plan (e.g. number of replicate seed samples, number of replicate flour samples per seed sample, number of extracts per flour sample, number of replicate measurements per extract) and the standard deviation of the test result should be provided.

Suggested phrases for reporting depending upon the result are as follows:

- If the specified trait was not found: "The test performed revealed nothing to indicate ~~indicating~~ the presence of the trait specified by the applicant at a level above LOD."
- If the specified trait was found at a level above LOD and below LOQ: "The trait specified by the applicant was present at a level below the LOQ of the method used."
- If the specified trait was found at a level above LOQ: "The trait specified by the applicant was found at a percentage of ….. % [units] ~~number of DNA copies~~." Where [units] are the units of measurement of the test used.

8.7.2.4 Reporting probabilities of meeting or exceeding specifications

Independent of the type of method used, a suggested phrase for reporting the results is: "For the trait specified by the applicant, the seed lot meets the specification of …% (maximum or minimum) with …% confidence."

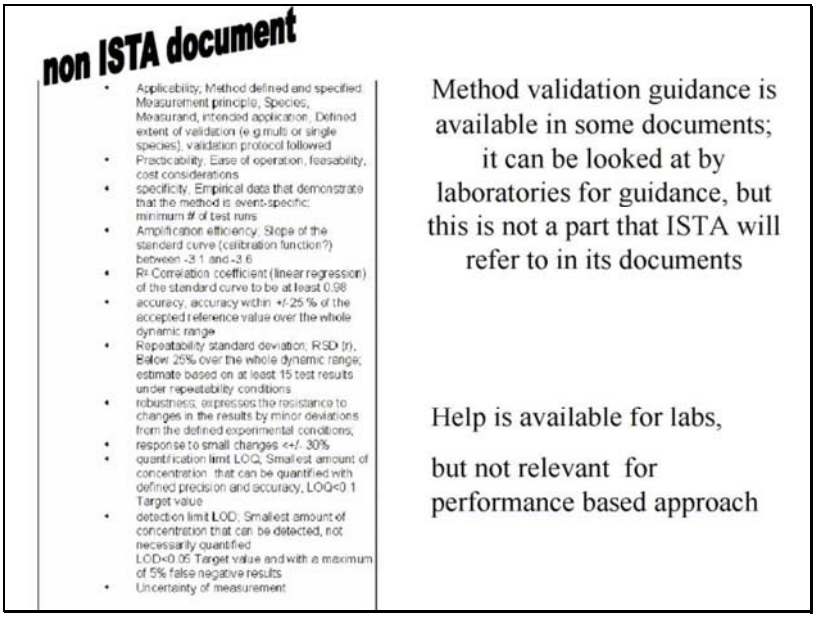
~~8.8 Annexes~~

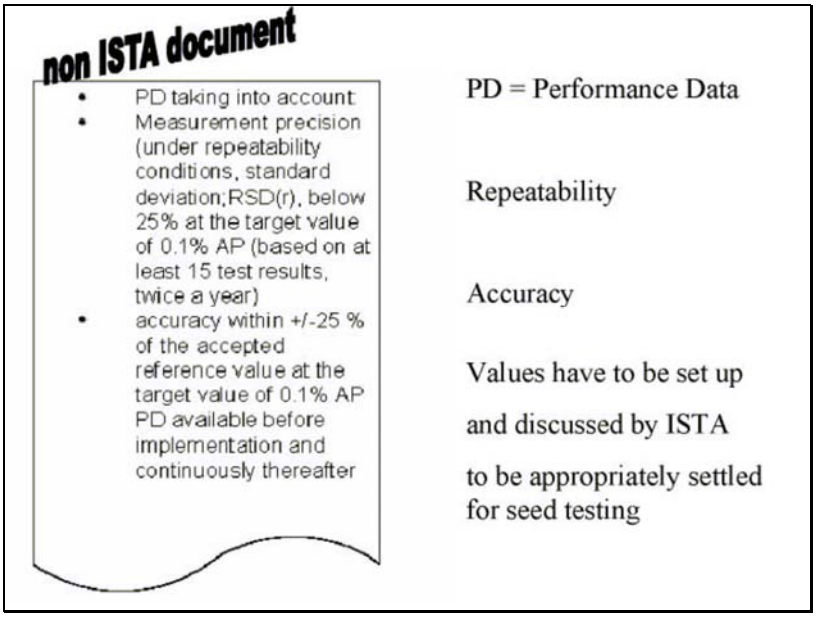
8.8~~.1~~ Standardised methods for examination of seeds

Note: Numbering only changed in this section no textual changes so editorial changes only.

Before going to the vote on Chapter 8 after the technical discussion on the text, the President asked if there were any further comments on the contents of the proposal, which was not the case. He then asked whether there were any comments regarding the accreditation of laboratories on the basis of this proposal, upon which some representatives stated the view of their country.
The President thanked the representatives for their statements, and summarised that the Executive Committee had presented a concept as a basis for the relevant documents to be elaborated for the Accreditation of GMO testing laboratories to the members the day before. He emphasised that the Executive Committee is aware of the importance of the accreditation documents. However, despite the fact that these documents are not yet available, the voting delegates would be asked to cast their votes for the inclusion of the proposed Chapter 8 into the Rules. If accepted this would be under the proviso that the Chapter would only come into force 6 months after the corresponding accreditation documents have been released by the Executive Committee and published on the ISTA Website. He explained that the concept of the Executive Committee, as the responsible body for the ISTA Accreditation, for the accreditation of GMO testing laboratories will be based on the current ISTA Accreditation Standard, including proficiency testing and auditing, and will be carefully elaborated in collaboration with experts from outside the Executive Committee to come to a good solution.

The following documentation has been distributed to the audience previously, in elucidation of the concept the accreditation documents would be based on:





After this explanation, the President again asked for comments or questions. He then asked if there was agreement to go ahead with the voting on this proposal and handed over to the Chairman of the Rules to ask for a vote on the proposed item.

Voting result item 8a:
Proposal accepted by the Ordinary Meeting by count (26 'yes' / 2 'no' votes) under the provision that this Rules Proposal will come into force 6 months after the corresponding documents on the procedure for accreditation under the performance based approach have been published.

After item 8a the Rules Chairman closed the session and handed over to the President who thanked him for his work and for leading through the Rules Proposals, and thanked

the audience for their participation, comments and patience on this important item, also complimenting the corresponding Working Group for their enormous work done.

At the end of the session, Mr. John Hampton asked for the floor in order to invite and encourage people to help enhance the clarity of the Rules, in particular with regards to the ongoing amalgamation work. The Rules Chairman thanked Mr. Hampton for this suggestion which he fully supported and invited people to send such comments or suggestions to him or the ISTA Secretariat.

Reports from the Technical Committees

The Technical Committees' work had been presented previously and in the 'Activity Report 2004 of the ISTA Committees' [document Internal Items/M/D(2005)09] published by the Secretariat and distributed to the membership, main stakeholders and the participants of the Meeting and posted on the ISTA Website.

The President of the Association proceeded to thank each of the Technical Committees, the Editorial Board and the GMO Task Force for their excellent work and called the corresponding representatives on stage to personally show gratitude and hand over a present to each of them.

Bulking and Sampling Committee - represented by Mr. Michael Kruse, Chair
Purity Committee - represented by Mrs. Maria-Rosaria Mannino, Chair
Germination Committee - represented by Mr. Ronald Don, Chair
Tetrazolium Committee - represented by Mr. Norbert Leist
Vigour Committee - represented by Mr. Michael Kruse, Vice-Chair
Moisture Committee - represented by Mr. Harry Nijënstein, Chair
Editorial Board - represented by Mrs. Anne Bülow-Olsen, Chief Editor
Statistics Committee - represented by Mr. Sylvain Grégoire, Chair
Seed Health Committee - represented by Mrs. Valerie Cockerell, Chair
Proficiency Test Committee - represented by Mr. Günter Müller, Chair
Variety Committee - represented by Mr. Rainer Knoblauch, Chair
Flower Seed Committee - represented by Mrs. Rita Zecchinelli, Vice-Chair
Tree and Shrub Seed Committee - represented by Mrs. Zdenka Prochazkova, Chair
Nomenclature Committee - represented by Mr. Ken Allison, Member
Seed Storage Committee - represented by Mr. David Mycock, Chair
Rules Committee - represented by Mr. Steve Jones, Chair
GMO Task Force - represented by Mr. Norbert Leist, Chair

(9) ANNOUNCEMENT OF THE PLACE AND DATE OF THE NEXT ORDINARY MEETING

The place and date of the next annual meeting of ISTA was announced by the Secretary General to be Glattbrugg/Zurich, Switzerland from Monday, June 26 to Thursday, June 29, 2006.

(10) 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

The Secretary General declared that no due notice of any business to be discussed at the meeting had been received.

(11) ANY OTHER BUSINESS RAISED BY CONSENT OF THE EXECUTIVE COMMITTEE

The President declared that there was no business to be discussed at the meeting by consent of the Executive Committee.

(12) PRESIDENT'S CLOSING ADDRESS

The President started by thanking the ISTA Secretariat for the good quality and timely preparation of all meeting documents and generally for the support the Association receives from the Secretariat in all areas. He continued to thank his colleagues in the Executive Committee for their help and teamwork. Furthermore the hotel management and staff was thanked for all their great support in organising the meeting, setting up the meeting rooms with wonderful fresh flowers and bottled water always available for the participants.
Finally he asked the representatives of the local organising team, Khun Puanthong, Khun Punee and Khun Ladda, on stage, with the cordial applause of the audience, to thank them wholeheartedly for all their valuable support, making this meeting a success.

In closing the President thanked the members for coming to the meeting, for contributing to finding solutions bringing closer the Associations' vision of uniformity in seed testing and for their support in the proposals brought before the Ordinary Meeting.

(13) ADJOURNMENT

The meeting was adjourned on April 27, 2005 at 17:30.

Annexe 1

ISTA Questionnaire on Tropical Seeds

Name of ISTA member laboratory:
a) Bangladesh, b) Bolivia, c) Kenya, d) Zambia, e) Thailand f) India

1. List in alphabetical order by scientific names the tropical species tested by your laboratory where ISTA certificates are issued by your laboratory:

c)

Species:	Number of ISTA certificates issued during:			
	2000	2001	2002	2003
Amaranthus spp.	1			
Avena sativa		1		
Cajanus cajan		2		
Chloris gayana	27	41	45	31
Pennisetum glaucum	2	1		8
Phaseolus vulgaris	2			3
Sorghum x almum	8	1		
Sorghum bicolor		3	1	8
Vigna radiata				1
Vigna unguiculata				1
Zea mays	41	3	3	7

d)

Species:	Number of ISTA certificates issued during:			
	2000	2001	2002	2003
Abelmoschus esculentus	-	-	-	1
Arachis hypogaea L.*	-	-	-	-
*Capsicum spp. (Paprika)**	-	-	-	-
Chloris gayana	-	3	-	-
*Eleusine coracana **	-	-	-	-
Glycine max	10	-	5	-
Gossypium spp.	-	-	-	75
*Helianthus annuus**	-	-	-	-
*Phaseolus vulgaris **	-	-	-	-
*Sorghum bicolor**	-	-	-	-
*Vigna unguiculata**	-	-	-	-
Zea mays	184	46	-	156

* The SCCI has tested and issued ISTA certificates on the above species prior to the period stated above.

f)

Species:	Number of ISTA certificates issued during:			
	2001	2002	2003	2004
Abelmoschus esculentus (L.) Moench			1	6
Allium cepa L.			2	4
Beta vulgaris L.				1
Brassica oleracea L.				1
Capsicum spp.			5	2
Citrullus lanatus (Thunb.) Matsum. & Nakai				2
Coriandrum sativum L.				1
Cucurbita pepo L.				2
Lens culinaris Medik.				30
Luffa acutangula (L.) Roxb.			2	
Lycopersicon esculentum Mill.			6	7
Pisum sativum L.				1
Phleum pratense L.				1
Raphanus sativus L.			4	1
Solanum melongena L.			2	6
Zea mays L.				35
Total			**22**	**100**

2. List in alphabetical order by scientific names the tropical species tested by your laboratory where national seed testing reports are issued because the species are not included in the ISTA Rules:

c)

Species:	Number of seed testing reports issued during:			
	2000	2001	2002	2003
Cleome hassleriana	16			
Solanum nigrum	10	3		
Physalis peruviana			2	1
Passiflora edulis			1	
Carica papaya	1	2	2	
Bupleurum rotundifolium		4	4	4
Zantedeschia spp.				6

d)

Species:	Number of seed testing reports issued during:			
	2000	2001	2002	2003
Capsicum spp (is part of ISTA rules)	-	39	30	-
*Cleome gynandra**	-	-	-	-
Jatropha curcas L**	-	-	-	-

* Species were being tested during the 1990s

* * Species will soon become an important crop in Zambia and in the southern region

e)
Here are the examples of species that we need to test for moisture test but there are no precribed methods : Canavalia ensiformis, Crotalaria juncea, Cajanus cajan.

f)

Species	Common name	Number of seed testing reports issued during			
		2001	2002	2003	2004
Benincasa hispida (Thunb.)Cogn.	Ashgourd	3	3	3	
Brassica rapa L.	Pakchoi	9	12	19	10
Catharanthus roseus	Vinca	40	10		10
Centaurea cineraria L.	Dusty Miller	1			
Kochia prostrata (L.)	Kochia			2	2
Luffa cylindrica (L.)M.Roem.	Spongegourd			3	
Praecitrullus fistulosus Pang.	Tinda	11	18	17	10
Sesbania spp. *S. exaltata*	Sesbania	5	5		5
Tropaeolum spp. 3 spp	Nasturtium	2			
Vigna umbellata (Thunb.)	Rice bean	2		3	

3. List in alphabetical order by scientific names the tropical species not tested by your laboratory because no methods are available:

c)

Species:
NONE, BECAUSE WE ADOPT METHODS FROM SIMILAR SPECIES AND AT TIMES FROM AOSA METHODS. IN SUCH CASES WE ISSUE ONLY NATIONAL SEED TESTING REPORTS.

d)

Species:
Tree seeds – *Anacardium occidentale* L. *(Cashewnut*)
Coffea arabica L. *(Coffee)*
Jatropha curcas L.

f)

Species	PP & G	M	TZ
Benincasa= hispida (Thunb. ex Murray)Cogn.	No	No	No
Chrysopogon fulvus	No	No	No
Coccinia grandis (L.)Voigt	No	No	No
Colocasia esculenta (L.)Schott	No	No	No
Dichanthium annulatum (Forssk.)Stapf	No	No	No
Dioscorea esculenta (Lour.)Burkill	No	No	No
Echinochloa colona (L.)Link	No	No	Yes
Euchlaena mexicana = Zea mays L.	No	No	No
Guizotia abyssinica	No	No	No

Species	PP & G	M	TZ
Ipomoea batatas	No	No	Yes
Manihot esculenta	No	No	No
Panicum sumatrense Roth ex Roem. & Schult.	No	No	Yes
Pennisetum =glaucum (L.)R.Br.	No	No	Yes
Pennisetum pedicellatum Trin.	No	No	Yes
Pennisetum purpureum Schumach.	No	No	Yes
Petroselinum crispum	No	No	Yes
Praecitrullus fistulosus (Stocks)Pangalo	No	No	No
Sechium edule (Jacq.)Sw.	No	No	No
Setaria anceps	No	No	No
Trichosanthes =cucumerina L.	No	No	No
Trichosanthes dioica	No	No	No
Trigonella foenumgraecum	No	No	No
Vigna umbellata	No	No	No

PP – Physical Purity, G – Germination, M – Moisture test, TZ – Tetrazolium test

4. List tropical species (by scientific names) and methods your laboratory proposes to be included into the ISTA Rules. Please list in order of priority:

c)

Species:	Methods in order of priority:			
	Purity:	**Germination viability:**	**Moisture:**	**Other methods, please specify:**
Cleome hassleriana	PSD NO. 10	TP:20-30^{0}C; 7, 21 days	Grind, low const. temp. oven method	
Solanum nigrum	PSD NO. 10	TP:20-30^{0}C; 7, 14 days	"	
Physalis peruviana	PSD NO. 10	TP:20-30^{0}C; 7, 21 days	"	
Passiflora edulis	PSD NO. 10	Sand: 20-30^{0}C; 7, 14 days	"	
Carica papaya	PSD NO. 10	Sand: 20-30^{0}C; 7, 28 days	Cut into pieces, dry at high const. temp. oven method	
Bupleurum rotundifolium	PSD NO. 15	TP:20-30^{0}C; 7, 28 days; KNO_3; pre-chill	Grind, low const. temp. oven method	
Zantedeschia spp.	PSD NO. 10	TP:20-30^{0}C; 7, 42 days	Grind, low const. temp. oven method	

d)

Species:	Methods in order of priority:			
	Purity:	**Germination viability:**	**Moisture:**	**Other methods, please specify:**
Amaranthus spp.	1. Pure seed definition as for ISTA PSD 2. Submitted sample 3. Purity working sample 4. Maximum weight of lot 5. Working sample for count of other species	1. TP method 2. 20-30°C	None	None

f)

Species	Purity	Germination	Moisture	TZ
Abelmoschus esculentus			Yes	
Lagenaria siceraria			Yes	
Lens culinaris			Yes	
Luffa acutangula			Yes	
Luffa aegyptiaca			Yes	
Momordica charantia			Yes	
Coriandrum sativum			Yes	
Cajanus cajan			Yes	
Cyamopsis tetragonoloba			Yes	
Eleusine coracana			Yes	
Lablab purpureus			Yes	
Amaranthus			Yes	
Trigonella foenum-graecum			Yes	Yes
Trichosanthes anguina	Yes	Yes	Yes	Yes
Benincasa hispida	Yes	Yes	Yes	Yes
Manihot esculenta	Yes	Yes	Yes	Yes
Solanum tuberosum			Yes	Yes
Trichosanthes dioica	Yes	Yes	Yes	Yes
Apium graveolens				Yes
Asparagus officinalis				Yes
Coccinia grandis	Yes	Yes	Yes	Yes
Colocasia esculenta	Yes	Yes	Yes	Yes
Dichanthium annulatum	Yes	Yes	Yes	Yes
Dioscorea esculenta	Yes	Yes	Yes	Yes
Echinochloa colona	Yes	Yes	Yes	Yes
Euchlaena mexicana	Yes	Yes	Yes	Yes
Guizotia abyssinica	Yes	Yes	Yes	Yes
Ipomoea batatas	Yes	Yes	Yes	Yes
Panicum sumatrense	Yes	Yes	Yes	Yes
Pennisetum americanum	Yes	Yes	Yes	Yes
Pennisetum pedicellatum	Yes	Yes	Yes	Yes
Pennisetum purpureum	Yes	Yes	Yes	Yes
Petroselinum crispum				Yes

Species	Purity	Germination	Moisture	TZ
Praecitrullus fistulosus	Yes	Yes	Yes	Yes
Sechium edule	Yes	Yes	Yes	Yes
Setaria anceps	Yes	Yes	Yes	Yes

5. Which training needs does your station have? Please list a maximum of five items in order of priority:

a)

Items:	Number of persons who needs training
1. Moisture content test	10 (Ten)
2. Viability test	Do
3. Seed health test	Do
4. Variety test	Do
5. GMO test	Do

b)

Items:	Number of persons who needs training:
Seedling evaluation	2
Moisture test by the oven method	2

c)

Items:	Number of persons who needs training:
Purity Analysis	8
Sampling	10
Seed Health Testing	6
Variety Identification & GMO Testing	6
Vigour/Tetrazolium Testing	4

d)

Items	Number of persons who needs training:
-Advances in Seed Technology (Diploma, BSc, MSc)	3
- Seed identification,	5*
- Statistical analysis	4 *
- Laboratory instrumentation	4 *
- Seed Pathology	3 *

f)

Items	No. of persons who needs training
GMO testing	2
Identification of species	1
Tetrazolium testing	1

6. Please list any other constraint in testing tropical seeds relevant for ISTA:

c)

- Lack of standardised seed sampling and testing methods
- Non inclusion in ISTA Proficiency tests
- Lack of technical information on how to address the unique challenges associated with tropical seeds such as their physiology and morphology

d)

Seed lots of *Arachis hypogaea* L. are sampled and tested shelled. SCCI has observed that such seed lots lose its viability at a faster rate. Studies have been carried out to test unshelled seed lots of the species.

f)

There are no constraints in testing of tropical seeds since the laboratory is situated in the Subtropical country, wherein species for which ISTA recommendation is not given or tested and the specifications of the media, substrate, optimum temperature requirement, days for first and final count and special treatments required could be studied and proposed to ISTA. Our laboratory has facility to take these studies.

7. Please specify the need for regional workshops and indicate specifically the training needed (sampling, purity, germination, moisture) and the group of species, for which you need training (cereals, grasses, legumes etc).

a) Workshops and training are to be needed for the group of species cereals, grasses and legumes crops for sampling, purity, germination and moisture content test.

b) Forest seeds and legume seeds germination tests and purity analysis on forests seeds

c)

1. African regional workshop on seed sampling and testing tropical crops
2. Sampling and testing of grasses and flowers
3. Training in seed laboratory accreditation and audits

d)

(i) Similar problems in seed testing are experienced within the region –
(ii) Training in sampling, purity, germination and statistical analysis is needed.

Training need	**Species**
Sampling	*Chloris gayana,Gossypium spp (*fuzzy seed*)*
Purity	*Chloris gayana*
Germination	*Glycine max*, *Chloris gayana Helianthus spp*
Seed identification	*Chloris gayana*

e) Seed Health test 25 - 30 persons
T.Z 25 - 30
Seed Sampling 25 – 30
Seed Vigour 25 - 30

It would be very useful if ISTA is going to organize the regional workshop, but the problem is that the announcement always comes in such a short notice so that we will be not able to join. In our case, the budget must to propose 1 year. So event the workshop is very useful, we can not attend because there is no budget.

f)
Training is required for GMO testing of seeds
Training is required for Germination analysis and TZ test of grasses and flower seeds.

LIST OF PARTICIPANTS

(in alphabetical order by country, by participant name)

AT-AUSTRIA

RATZENBOECK Andreas
AGES, Spargelfeld strasse 191, 1220 Vienna
Phone: +43 50 555 34 810 Fax: +43 50 555 34 808
E-mail: andreas.ratzenboeck@ages.at

AU-AUSTRALIA

BLACKSTOCK John M. and Alison
Australian Seeds Authority Ltd, PO Box 488, 3054 Carlton North VIC
Phone: +61 3 9381 2373 Fax: +61 3 9381 2373
E-mail: john@aseeds.org.au

SMITH Graeme
Pacific Seeds, 268 Anzac Av, 4350 Toowoomba QLD
Phone: +61 7 4690 2666 Fax: +61 7 4630 1063
E-mail: graeme.smith@pacseeds.com.au

BE-BELGIUM

JOOS Henk
Bayer BioScience N.V., Technologiepark, 9052 Gent
Phone: +32 9 243 0429 Fax: +32 9 224 0496
E-mail: henk.joos@bayercropscience.com

BG-BULGARIA

GLUHCHEVA Velichka
Executive Agency for Variety Testing Field Inspection and Seed Control, 125 Tzarigradsko Shosse Blvd., 1113 Sofia
Phone: +359 2 870 0375 Fax: +359 2 870 6517
E-mail: iasas@spnet.net

PAVLOVSKA Bistra
Executive Agency for Variety Testing Field Inspection and Seed Control, 125 Tzarigradsko Shosse Blvd., 1113 Sofia
Phone: +359 2 870 0475 Fax: +359 2 870 6517
E-mail: iasas@spnet.net

BR-BRAZIL

PESKE Silmar T.
UFPEL, Fac. De Agronomia Eliseu Maciel, Depto. De Fitotecnia, Rua Maestro Bandeira, 96055-650 Pelotas RS
Phone: +55 53 273 1642 Fax: +55 53 273 2827
E-mail: peske@ufpel.tche.br

CA-CANADA

ALLISON Ken J.
Canadian Food Inspection Agency, Carling Ave 960, ON K1A 0C6 Ottawa
Phone: +1 613 759 1289 Fax: +1 613 759 7316
E-mail: kallison@inspection.gc.ca

CH-SWITZERLAND

ZANETTI Silvia and WINZELER Michael
Agroscope FAL, Reckenholzstrasse 191, 8046 Zurich
Phone: +41 44 377 7284 Fax: +41 44 377 7201
E-mail: silvia.zanetti@fal.admin.ch

CL-CHILE

ESPINOSA SEPULVEDA Patricia
Servicio Agricola y Ganadero, KM 22, Ruta 68, Santiago
Phone: +56 2 345 1830 Fax: +56 2 345 1833
E-mail: patricia.espinosa@sag.gob.cl

CZ-CZECH REPUBLIC

PROCHAZKOVA Zdenka
FGMRI, Jiloviste-Strnady, 156 04 Praha 5 - Zbraslav
Phone: +420 632 420 917 Fax: +420 632 549 119
E-mail: prochazkova@vulhmuh.cz

DE-GERMANY

KILLERMANN Berta
Bayerische Landesanstalt für Landwirtschaft (LfL), Lange Point 6, Labor II, 85354 Freising
Phone: +49 8161 71 3953 Fax: +49 8161 71 4407
E-mail: berta.killermann@lfl.bayern.de

KNOBLAUCH Rainer
LUFA Augustenberg, Nesslerstrasse 23, 76227 Karlsruhe
Phone: +49 721 946 8203 Fax: +49 721 946 8387
E-mail: rainer.knoblauch@lufa.bwl.de

KRUSE Michael
University of Hohenheim, Fruwirthstrasse 21, 70593 Stuttgart
Phone: +49 711 459 2706 Fax: +49 711 459 2343
E-mail: mkruse@uni-hohenheim.de

LEIST Norbert
LUFA Augustenberg, Nesslerstrasse 23, 76227 Karlsruhe
Phone: +49 721 946 8150 Fax: +49 721 946 8387
E-mail: norbert.leist@bio-geo.uni-karlsruhe.de

MÜLLER Günter and Birgit
Thüringer Landesanstalt für Landwirtschaft, Camburger Strasse 74, 07743 Jena
Phone: +49 364 145 4213 Fax: +49 364 142 6224
E-mail: g.mueller@jena.tll.de

DK-DENMARK

BOEHM Christian
Hunsballe Frø A/S, Hunsballevej 6, 4200 Slagelse
Phone: + 45 585 71 479 Fax: +45 585 71 489
E-mail: cb@hunsballe.dk

BÜLOW-OLSEN Anne
Seed Science and Technology, Furesø Parkvej 23, 2830 Virum
Phone: +45 45 85 5954 Fax: +45 45 85 5954
E-mail: sst@ista.ch

NYDAM Jette
Danish Plant Directorate, Skovbrynet 20, 2800 Kgs. Lyngby
Phone: +45 4526 3730 Fax: +45 4526 2610
E-mail: jnh@pdir.dk

PEDERSEN Dot Vittrup
DLF-TRIFOLIUM A/S, Ny Østergade 9, 4000 Røskilde
Phone: +45 46 330 330 Fax: +45 46 320 830
E-mail: dot@dlf.dk

TARP Grethe
Danish Plant Directorate, Skovbrynet 20, 2800 Kgs. Lyngby
Phone: +45 4526 3710 Fax: +45 4526 3617
E-mail: gta@pdir.dk

EE-ESTONIA

NYMANN Roland and LEPP Ene
Estonian Plant Protection Directorate, Teaduse 2, 75501 Harjumaa
Phone: +372 671 2600 Fax: +372 671 2604
E-mail: roland.nymann@plant.agri.ee

ES-SPAIN

MARTINEZ VASSALLO Luis
INIA, Carretera de la Coruna KM 7.5, 28040 Madrid
Phone: +34 91 3 474 171 Fax: +34 91 3 471 488
E-mail: luismv@inia.es

FI-FINLAND

PUOLIMATKA Matti
Plant Production Inspection Centre, Seed Testing Department, 32200 Loimaa
Phone: +358 2 760 561 Fax: +358 2 760 56 214
E-mail: matti.puolimatka@kttk.fi

FR-FRANCE

GREGOIRE Sylvain
GEVES, La Minière, 78285 Guyancourt Cedex
Phone: +33 1 30 83 36 00 Fax: +33 1 30 57 0147
E-mail: sylvain.gregoire@geves.fr

LAFFONT Jean-Louis
Pioneer Génétique, Chemin de l'Enseigure, 31840 Aussonne
Phone: +33 561 06 20 27 Fax: +33 561 85 14 22
E-mail: jean-louis.laffont@pioneer.com

LECHAPPE Joël
GEVES–SNES, Rue Georges Morel, BP 24, 49071 Beaucouzé Cedex
Phone: +33 2 41 22 58 10 Fax: +33 2 41 22 58 01
E-mail: joel.lechappe@geves.fr

MANNINO Maria-Rosaria
GEVES–SNES, Rue Georges Morel, BP 24, 49071 Beaucouzé Cedex
Phone: +33 2 41 22 58 40 Fax: +33 2 41 22 58 01
E-mail: maria-rosaria.mannino@geves.fr

GB-UNITED KINGDOM

COCKERELL Valerie
Scottish Agricultural Science Agency, Official Seed Testing Station for Scotland, 82 Craigs Road, East Craigs, EH12 8NJ Edinburgh
Phone: +44 131 244 8900 Fax: +44 131 244 8971
E-mail: valerie.cockerell@sasa.gsi.gov.uk

DON Ronald
Scottish Agricultural Science Agency, Official Seed Testing Station for Scotland, 82 Craigs Road, East Craigs, EH12 8NJ Edinburgh
Phone: +44 131 244 8891 Fax: +44 131 244 8971
E-mail: ronald.don@sasa.gsi.gov.uk

JONES Steve K.
NIAB, Official Seed Testing Station for England and Wales, Huntingdon Road, CB3 0LE Cambridge
Phone: +44 1223 342 263 Fax: +44 1223 342 244
E-mail: steve.jones@niab.com

HU-HUNGARY

ERTSEY Katalin
OMMI Vetömagfelügyeleti Föosztály, Keleti Karoly ú 24, 1024 Budapest
Phone: +36 1 336 9114 Fax: +36 1 336 9096
E-mail: ertseyk@ommi.hu

IE-IRELAND

CULLEN Thomas
Seed Testing Station, Department of Agriculture, Food and Rural Development, Abbotstown, Castleknock
Phone: +353 1 607 2617 Fax: +353 1 821 7037
E-mail: thomas.cullen@agriculture.gov.ie

IL-ISRAEL

MAZOR Lea
Israel Official Seed Testing Laboratory, P.O. Box 6, 50250 Bet Dagan
Phone: +972 3 9683 637 Fax: +972 3 9683 889
E-mail: leamazor@volcani.agri.gov.il

IN-INDIA

RAO S.V.R. and SREEKANTAM Naga Prasuna
JK AGRI GENETICTS Ltd., Varun Towers, Begumpet, 500016 Hyderabad
Phone: +91 40 5531 6858 Fax: +91 40 2776 4943
E-mail: svrrao@jkseeds.net

IT-ITALY

ZECCHINELLI Rita
E.N.S.E., Laboratorio Analisi sementi, Via Emilia km 307, LO 26838 Tavazzano
Phone: +39 371 761 919 Fax: +39 371 760 812
E-mail: ense-tavazzano@ense.it

JP-JAPAN

SHIZKA Takeuchi
SAKATA SEED Corp., 1660, Hazawa-cho, Kanagawa-ku, 221 0863 Yokohama
Phone: +81 45 383 1660 Fax: +81 45 371 9366
E-mail: shizka@sakata-seed.co.jp

TERUO Miyagawa
ISS Japan, 538-1 Kitakaname, 259 1207 Hiratsuka
Phone: +81 90 4810 7561 Fax: +81 46 3586 225
E-mail: info@greensprout.jp

KE-KENYA

AHENDA Joseph O.
Kenya Plant Health Inspectorate Service (KEPHIS), Nakuru Regional Office, P.O. Box 1679, Nakuru
Phone: +254 51 850 106 Fax: +254 51 851 268
E-mail: kephissq@africaonline.co.ke

LEBO Elisabeth J.
Kenya Seed Company Limited, Wamalwa, P.O. Box 553, Kitale 254
Phone: +254 54 20941 Fax: +254 54 20458
E-mail: info@kenyaseed.co.ke

KR-KOREA, SOUTH

JEONG Min-hee
National Agricultural Products Quality Management Service, 560, 3-Ga, Dangsan-Dong, Yeongdeungpo-Gu, 150 043 Seoul
Phone: +82 2 2165 6041 Fax: +82 2 2165 6005
E-mail: miniya@naqs.go.kr

KIM Seung-tae
National Agricultural Products Quality Management Service, 560, 3-Ga, Dangsan-Dong, Yeongdeungpo-Gu, 150 043 Seoul
Phone: +82 2 2165 6041 Fax: +82 2 2165 6005
E-mail: kimst@naqs.go.kr

LEE Sang-Keun
National Agricultural Products Quality Management Service, 433-2, Anyang 6-Dong, Manan-Gu, 430 016 Anyang
Phone: +82 31 446 0128 Fax: +82 31 443 4091
E-mail: carrot@naqs.go.kr

LV-LATVIA

EVELONE Velta
State Plant Protection Service, Seed Control Department, Lubanas 49, 1073 Riga
Phone: +371 711 3262 Fax: +371 711 3085
E-mail: velta.evelone@vaad.gov.lv

MX-MEXICO

CHAVEZ BRAVO Jose Manuel
National Seed Inspection and Certification Service, Presidente Juárez 13, 54000 Tlalnepantla
Phone: +52 55 5384 2213 Fax: +52 55 5390 1441
E-mail: manuel.chavez@sagarpa.gov.mx

NL-THE NETHERLANDS

DE BOER-RAATGEVER Gerarda and husband
NAK, P.O. Box 1115, 8300 BC Emmeloord
Phone: + 31 527 635 400 Fax: + 31 527 635 411
E-mail: gboer@nak.nl

NIJËNSTEIN Harry
Cebeco Seeds BV, PO Box 10 000, 5251 GA Vlijmen
Phone: +31 7351 88650 Fax: +31 7351 17628
E-mail: harry.nijenstein@cebeco-seeds.com

OOSTERVELD Pieter
NAK, P.O. Box 1115, 8300 BC Emmeloord
Phone: + 31 527 635 400 Fax: + 31 527 635 411
E-mail: poosterveld@nak.nl

REMEEUS Petra
Naktuinbouw, Sotaweg 22, 2371 GD Roelofarendsveen
Phone: +31 71 3326 202 Fax: +31 71 3326 363
E-mail: p.remeeus@naktuinbouw.nl

SCHIPPER Job
Naktuinbouw, Sotaweg 22, 2371 GD Roelofarendsveen
Phone: +31 71 3326 235 Fax: +31 71 3326 366
E-mail: j.schipper@naktuinbouw.nl

VAN DER BURG W. Joost
Plant Research International, P.O. Box 16, 6700 AA Wageningen
Phone: +31 317 476 984 Fax: +31 317 423 110
E-mail: joost.vanderburg@wur.nl

VAN PIJLEN Anny
NAK, P.O. Box 1115, 8300 BC Emmeloord
Phone: + 31 527 635 400 Fax: + 31 527 635 411
E-mail: apijlen@nak.nl

NO-NORWAY

TANGERÅS Hakon
Kimen Seed Laboratory, P.O. Box 164, 1431 Ås
Phone: +47 64 97 0666 Fax: +47 64 97 0663
E-mail: ht@kimen.no

NZ- NEW ZEALAND

HAMPTON John G.
Bio-Protection and Ecology Division, P.O. Box 84, Lincoln University, 8001 Canterbury
Phone: +64 3 325 2811 Fax: +64 3 325 3864
E-mail: hamptonj@lincoln.ac.nz

SE-SWEDEN

BLOMQVIST-LJUNG Helena B.
Statens Utsädeskontroll, Onsjövägen, 268 81 Svalöv
Phone: +46 46 418 667 406 Fax: + 46 46 418 667 408
E-mail: helena.blomqvist-ljung@su-kontroll.se

HYTTRING Jan
Statens Utsädeskontroll, Onsjövägen, 268 81 Svalöv
Phone: +46 46 418 667 411 Fax: + 46 46 418 667408
E-mail: jan.hyttring@su-kontroll.se

KJELLSTRÖM Ulf R.
Statens Utsädeskontroll, Onsjövägen, 268 81 Svalöv
Phone: +46 46 418 667 420 Fax: + 46 46 418 667 408
E-mail: ulf.kjellstrom@su-kontroll.se

NYMAN Ulf
Statens Utsädeskontroll, Onsjövägen, 268 81 Svalöv
Phone: +46 46 418 667 402 Fax: + 46 46 418 667 408
E-mail: ulf.nyman@su-kontroll.se

SPERLINGSSON Karin
Statens Utsädeskontroll, Onsjövägen, 268 81 Svalöv
Phone: +46 46 418 667 421 Fax: + 46 46 418 667 408
E-mail: karin.sperlingsson@su-kontroll.se

TH-THAILAND

EUATRAKOOL Oratai
Department of Agriculture, 50 Paholyothin Road, 10903 Bangkok
Phone: +66 2 579 85 76 Fax: +66 2 579 50 84
E-mail: oratаie@hotmail.com

NISAKORN Mankrathok
Pioneer Hi-Bred Thailand, 84 Moo 4 Northern Region Ind. Estate, 15100 Lampoon
E-mail: nisakorn.mankrathok@pioneer.com

PONGSROYPECH Chulhathep
Bureau of Technology Transfer Development, 2143/1 Paholyothin Road, Chatuchak, 10700 Bangkok
Phone: +66 2 5793 008 Fax: +66 2 5793 008
E-mail: chulhathep@hotmail.com

PORNPINITSUWAN Atcharee
Department of Agriculture, 50 Paholyothin Road, 10903 Bangkok
Phone: +66 2 579 02 29 Fax: +66 2 579 02 29
E-mail: atchareep@doa.go.th

THONGCHART Raksakul
Seed Division, Dept. of Agri. Extension, 2143/1 Phaholyotin Road, Chatuchak, Bangkok 10900

TW-TAIWAN

HWU Kae-Kang
Department of Agronomy, National Taiwan University, Roosevelt Road 1, Section 4, 106 Taipei
Phone: +886 2 236 20 879 Fax: +886 2 236 20 879
E-mail: khwu@ntu.edu.tw

LIN Mei-Hsuan
Agriculture and Food Agency, Council of Agriculture, Executive Yuan, Kuang-Hwa Road 8, Chung-Hsing Village, 054-44 Nantou
Phone: +886 49 2341 051 Fax: +886 49 2341 166
E-mail: u1051@mai.afa.gov.tw

UG-UGANDA

BAZAALE Joseph
Ministry of Agriculture, Animal Industry and Fisheries, National Seed Certification Services, P.O. Box 7066, Kampala
Phone: +256 41 320 115 Fax: +256 41 320 642
E-mail: maaif-uqis@infocom.co.ug

BULEGEYA James Komayombi
Ministry of Agriculture, Animal Industry and Fisheries, National Seed Certification Services, P.O. Box 7065, Kampala
Phone: +256 41 320 115 Fax: +256 41 320 642
E-mail: maaif-uqis@infocom.co.ug

US-UNITED STATES

BROWNFIELD Patricia R. and DANIELS Tom
AOSA Representative
Syngenta Seeds, 6338 Highway 20-26, ID 83687 Nampa
Phone: +1 208 465 8533 Fax: +1 208 467 4559
E-mail: pat.brownfield@syngenta.com

DIXON Doris A.
Monsanto Company, 800 N. Lindbergh, E2SA, 63141 St. Louis
Phone: +1 3144 694 7496 Fax: +1 314 694 2074
E-mail: doris.a.dixon@monsanto.com

JONES Randall D.
US Department of Agriculture, Agricultural Marketing Service, 1400 Independence Avenue, DC 20250 SW Washington
Phone: +1 202 72 5705 Fax: +1 202 720 3499
E-mail: randall.jones@usda.gov

KARRFALT Robert
National Tree Seed Laboratory, 5675 Riggins Mill Road, 31020 Dry Branch, Gastonia
Phone: +1 478 751 3551 Fax: +1 478 751 41 35
E-mail: rkarrfalt@fs.fed.us

KAUFMAN Benjamin and Bruria
Pioneer Hi-Bred, Int., 10700 Justin Dr., IA 50322, Urbandale
Phone: +1 515 334 6478 Fax: +1 515 334 6431
E-mail: benjamin.kaufman@pioneer.com

LOEFFLER Tim
Seminis Vegetable Seeds, Inc., 2700 Camino del Sol, Oxnard, CA 93030-7967
Phone: +1 805 918 2337 Fax: +1 805 9182424
E-mail: tim.loeffler@seminis.com

MAXON Susan R.
US Department of Agriculture, Agricultural Marketing Service, Seed Regulatory and Testing Branch, 801 Summit Crossing Place, Suite C, 28054 Gastonia
Phone: +1 704 810 8874 Fax: +1 704 852 4189
E-mail: susan.maxon@usda.gov

REMUND Kirk M.
Monsanto Company, 800 North Lindbergh Blvd, 63167 St. Louis, Missouri
Phone: +1 314 694 6673 Fax: +1 314 694 2074
E-mail: kirk.m.remund@monsanto.com

STESSENS Koen
Astec World Wide, P.O. Box 6766, 82801, Sheridan, Wyoming
Phone: +1 307 674 8970 Fax: +1 307 673 1265

SUSSMAN Michael D.
US Department of Agriculture, Agricultural Marketing Service, ST, NSL, 801 Summit Crossing Place, NC 28054 Gastonia
Phone: +1 704 867 3873 Fax: +1 704 852 4109
E-mail: michael.sussman@usda.gov

VAN ASBROUCK Johan
Astec World Wide, P.O. Box 6766, 82801, Sheridan, Wyoming
Phone: +1 307 674 8970 Fax: +1 307 673 1265
E-mail: jvanasbrouck@astecnet.com

VN-VIETNAM

NGUYEN Quoc Ly
National Center for Variety Evaluation and Seed Certification (NCVESC), 135 Pasteur, Ho Chi Minh City
Phone: +84 8 822 90 85 Fax: +84 8 827 2425
E-mail: ncvesc-hcmc@hcm.vnn.vn

TRAN Dung Dinh Nhat
National Center for Variety Evaluation and Seed Certification (NCVESC), Ngoc Ha, 10000 Hanoi
Phone: +84 4 971 9801 Fax: +84 4 971 2054
E-mail: ncvesc-dung@fpt.vn

TURNER Michael Roy
DANIDA - ASPS, MARD, (A6), 2 Ngoc Ha, Ba Dinh Hanoi
Phone: +84 4 733 7996 Fax: +84 4 733 8207
E-mail: seed-turner@fpt.vn

ZA-SOUTH AFRICA

ALLISON Izelle
Pannar Seed (Pty) Ltd., P.O. Box 2814, 0158 Centurion
Phone: + 27 11 748 3503 Fax: + 27 11 748 3505
E-mail: izelle.allison@pannar.co.za

ARENDSE Chantal
National Department of Agriculture, Plant Production Systems, Private Bag X250, 0001 Pretoria
Phone: +27 12 319 6110 Fax: +27 12 319 6372
E-mail: chantala@nda.agric.za

ERWEE Daleen
Pioneer Hi-Bred RSA (Pty) Ltd., 97 Sloan Street, Rosslyn, 200 Pretoria, Gauteng
Phone: +27 12 564 0338 Fax: +27 12 541 40 48
E-mail: daleen.erwee@pioneer.com

MARAIS Frikkie
Pannar Seed (Pty) Ltd., P.O. Box 49, 1620 Kempton Park
Phone: + 27 11 748 3514 Fax: + 27 11 748 3505
E-mail: frikkie.marais@pannar.co.za

MYCOCK David J.
University of the Witwatersrand, 1 Jan Smuts Ave, Private Bag 3, 2050 Johannesburg
Phone: +27 11 717 6427 Fax: +27 11 403 1429
E-mail: dave@biology.biol.wits.ac.za

RAMASHALA Thabo Charles
Department of Agriculture, Private Bag X250, 0001 Pretoria
Phone: +27 12 319 6079 Fax: +27 12 319 6372
E-mail: smpps@nda.agric.za

STRAUSS Pamela Joan
National Department of Agriculture, Plant Production Systems, Private Bag X250, 0001 Pretoria
Phone: +27 12 8085 395 Fax: +27 12 8085 383
E-mail: pgrc@nda.agric.za

ZM-ZAMBIA

CHIPILI Mary M.
Seed Control and Certification Institute, Mt. Makulu, 13201 Lusaka
Phone: +260 1 278 112/170 Fax: +260 1 278 170/836
E-mail: seedresearch@zamnet.zm

ZW-ZIMBABWE

MUJAJU Claid
Seed Services, P.O. Box CY550, Causeway, 550 Harare
Phone: +263 4 720 370 Fax: +263 4 791 223
E-mail: seedserv@mweb.co.zw

MUTANGABENDE Necia
Seed Services, P.O. Box CY550, Causeway, 550 Harare
Phone: +263 4 720 370 Fax: +263 4 791 223
E-mail: seedserv@mweb.co.zw

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS (FAO)

LARINDE Michael
FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy
Phone: +39 065 70 51 Fax: +39 065 7053152
E-mail: michael.larinde@fao.org

INTERNATIONAL SEED FEDERATION (ISF)

LE BUANEC Bernard
International Seed Federation, Chemin du Reposoir 7, 1260 Nyon, Switzerland
Phone: +41 22 365 4420 Fax: +41 22 365 4421
E-mail: isf@worldseed.org

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD)

DEBOIS Jean-Marie
OECD 2 rue André-Pascal, 75775 Paris Cedex 16, France
Phone: +33 1 45 24 95 48 Fax: +33 1 44 30 61 17
E-mail: jean-marie.debois@oecd.org

SECRETARIAT OF THE INTERNATIONAL SEED TESTING ASSOCIATION (ISTA)

MUSCHICK Michael

RAUBO Patricia

RÖSCH Martina

ISTA Secretariat, Zürichstrasse 50, PO Box 308, 8303 Bassersdorf, Switzerland
Phone: +41 44 838 60 00 Fax: +41 44 838 60 01
E-mail: ista.office@ista.ch