

# **GERMINATION COMMITTEE REPORT**

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Bangkok 2005

# Committee Membership

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Chair:	<b>Ronald Don</b>	United Kingdom
Vice-chair:	<b>Sylvie Ducournau</b>	France
Members:	<b>Doris Groth</b>	Brazil
	<b>Krystyna Kolasinska</b>	Poland
	<b>Joël Léchappé</b>	France
	<b>Lea Mazor</b>	Israel
	<b>Gillian McLaren</b>	United Kingdom
	<b>Günter Müller</b>	Germany
	<b>Enrico Noli</b>	Italy
	<b>Zdenka Procházková</b>	Czech Republic
	<b>Pamela Joan Strauss</b>	South Africa
	<b>Hakon Tangeras</b>	Norway
	<b>Grethe Tarp</b>	Denmark
	<b>Anny van Pijlen</b>	Netherlands

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# The aims of the Germination Committee are mainly:

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- ❑ To update and contribute to improve the test methods in application of the increasing knowledge, the technical and technological progresses or the regulations requests as ISTA standard of accreditation, ISO 17025...
  - ❑ To improve the rules in chapter 5 of the ISTA rules
  - ❑ To create training material e.g. Handbooks
  - ❑ To introduce method for species not covered by the rules. Specific attention to be paid to tropical and subtropical species.
  - ❑ To share the knowledge among laboratories and seed testing people to facilitate the exchange and improve the standardisation.
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# Specific Tasks of the Germination Committee

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- A Rules**
  - B Publications**
  - C Workshops and Seminars**
  - E Special Projects**
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# Tasks related to the Rules

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## A Introduction of New Methods

Testing Seed Mixtures

## B Introduction of New Species

**Crambe abyssinica**

## C Introduction of Rules Changes

1. **Revision of Substrate Definitions in line with European Standards definitions for Growing Media**
  2. **Use of Organic Growing Media (Compost) as a Primary substrate for the germination of Sunflower (*Helianthus annuus*)**
  3. **Revision of Germination Chapter and Seedling Evaluation Handbook to reflect Quality Assurance requirements, e.g. tolerances for normal seedlings or for abnormal seedlings and dead seed also; checking germination media for the presence of toxic materials**
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# Tasks Related to Publications

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## Scientific information publications

Method Validation Report of Investigation into substrate use for Sunflower seed Germination

## **SUPPORTING DATA AND EVIDENCE FOR THE PROPOSED RULE CHANGES 2005 – ITEM 4B**

**FOR INFORMATION AND CONSIDERATION AT THE  
ORDINARY MEETING 2004**



# Workshops and Seminars

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- ❑ Use of Seedling Evaluation Handbook
  - ❑ Quality Assurance in the Germination Laboratory
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# Special Projects

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1. **Effect of different temperature regimes on the germination of Sunflower**
  2. **Liaison with the FSC and FTS Committees**
  3. **The use of  $\text{KNO}_3$  for dormancy breaking in temperate cereals**
  4. Introduction and improvement of germination methods for tropical and sub-tropical species
  5. Evaluation of new Codification used in 2004 Seedling Evaluation Handbook and whether it should be used in the Rules
  6. **Questionnaire to African countries to find out which species need to be added the ISTA Rules and in which they have experience**
  7. The use of GA3 for dormancy breaking in *Eruca sativa*
  8. The evaluation of cotyledons in relation to discolouration and the 50% rule
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# Proposed Rule Changes

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- Clarification on how to report ungerminated seed
  - Give details as to tolerance checks to be carried out on Germination tests
  - To include Compost as a primary substrate for sunflower germination
  - Clarify terminology relating to media used in germination tests
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# Reporting of ungerminated seeds

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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.

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# Application of Tolerances

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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.

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# Sunflower Germination Substrates

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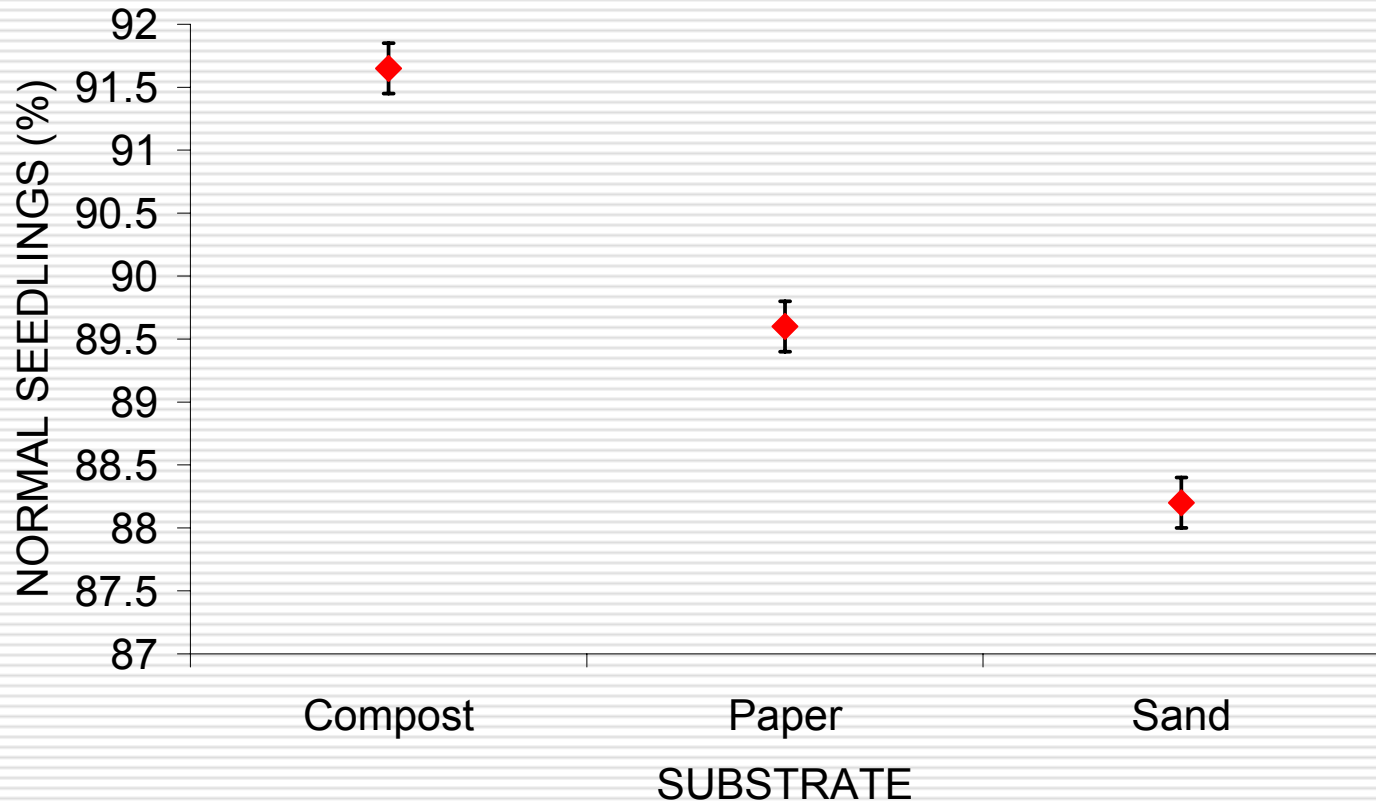
At the Budapest Congress, Sylvie gave details of the results of a comparative study on germination substrates for sunflower involving 10 ISTA and 6 AOSA laboratories. The ISTA Method Validation Program was followed throughout this comparative test.

The results have been analysed and a report published by ISTA

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# The effect of substrates on Sunflower Germination

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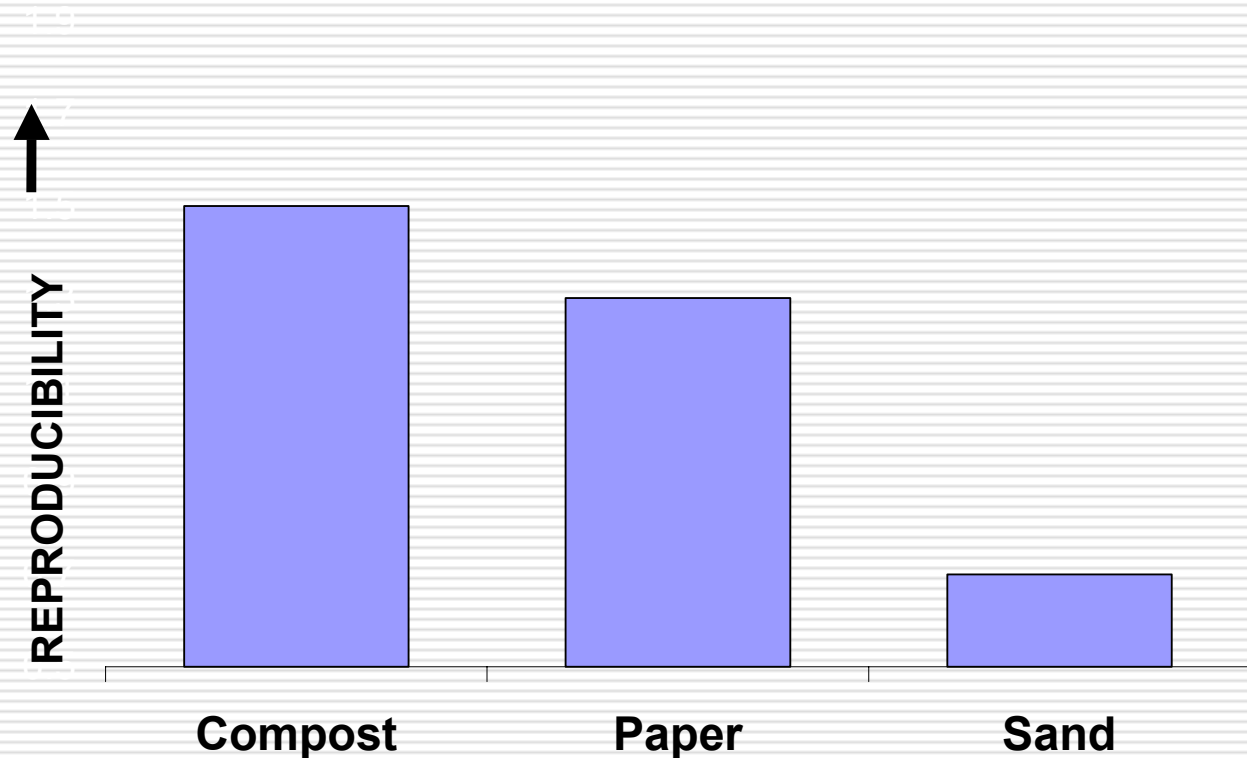


**Germination was highest in Compost**

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# The effect of substrates on Sunflower Germination

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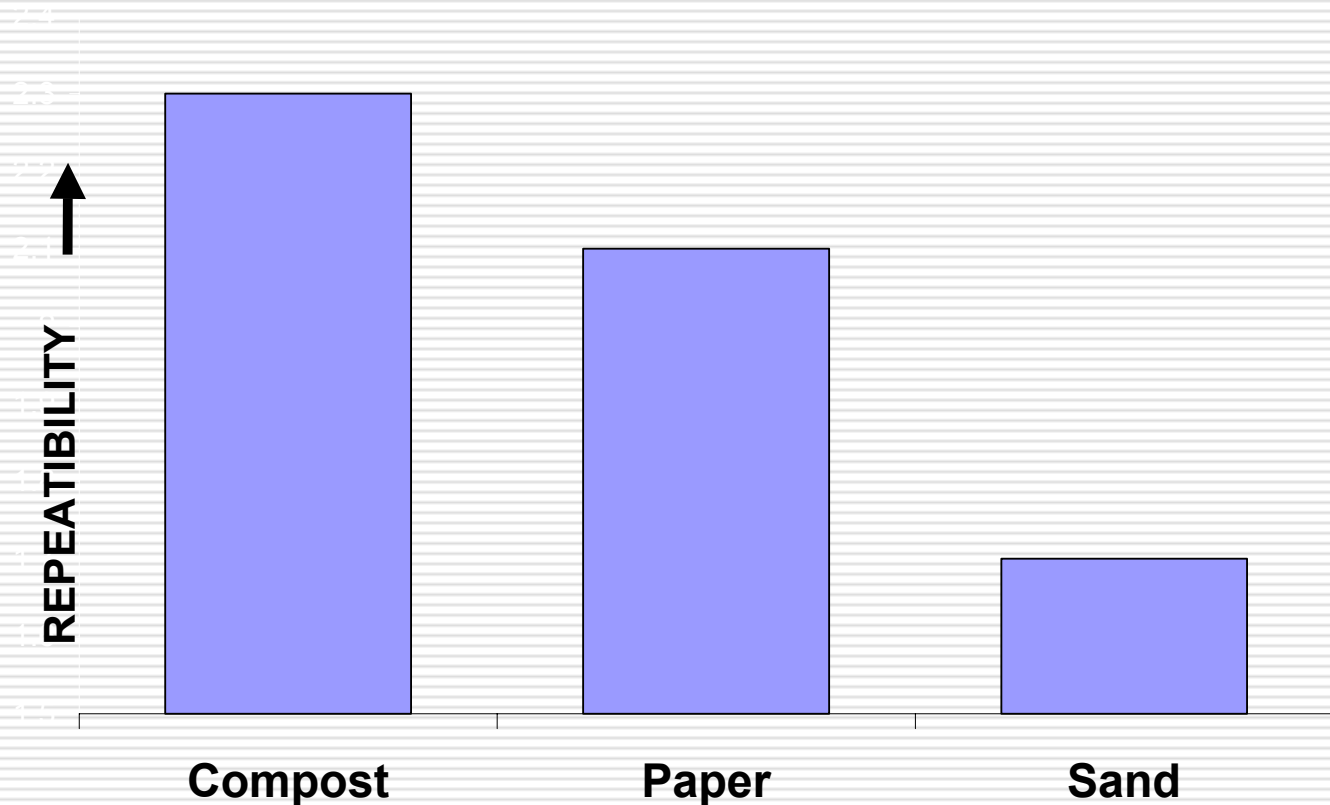


**Reproducibility was highest in Compost**

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# The effect of substrates on Sunflower Germination

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**Repeatability was highest in Compost**

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# **Sunflower Germination Rules Proposal**

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**As a result of the comparative test we are proposing that compost is included in the ISTA Rules as a primary substrate for the germination of sunflower seed.**

The addition of compost as a primary substrate gave us an opportunity to review the section within the rules dealing with substrates. We decided to provide better definitions based on International standards.

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# New Germination Media

## Definitions

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The proposal is then to use “**Growing Media**” as a generic term for all substrates – paper, sand and other media such as the organic mixtures of peat, sand, perlite, etc. It is also proposed to refer to mixtures of peat, sand perlite, etc as “**Organic Growing Media**” rather than Compost since the meaning of the term compost is difficult to translate in some languages.

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# Germination Media Parameters

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General definitions are given for the main parameters to be taken into account for all the media. The parameters we deal with are:

- ❑ **Water retention;**
- ❑ **pH;**
- ❑ **Conductivity; and**
- ❑ **Cleanliness and Innocuity**

According to the soil scientists, the same parameters can be applied to all media and it should be easier to fulfil these requirements for the Organic Growing Media than it is for the pure Sand.

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# How to measure the Parameters

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In addition to providing specifications for these parameters the Germination Committee is preparing demonstration SOPs that will be included as a supplement to the Germination Handbook. These SOPs will give full details of how measurements can be made.

STANDARD OPERATING PROCEDURE	ISTA GERM 01	v 1.0
	Page 1 of 2	
International Seed Testing Association	Issue No. 1	
Germination Procedures – Growing Media Specification Checks – Water Retention	Date: May 2005	

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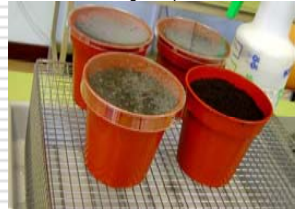
# The SOPs have illustrated flowcharts



The Moisture Content of the Germination media is measured using the ISTA Constant Temperature Oven method at 130°C



The germination media is weighed. For sand and organic growing media a waterproof container with drainage is required. The drainage holes are covered using a material that allows water drainage but prevents the loss of material



The Germination media is saturated with water and allowed to freely drain for 12 hours with measures being taken to prevent evaporation. The saturated media is then weighed and the maximum amount of water held in the growing media as percentage of its dry weight is calculated



For Paper Media samples are moistened, with water that is to be used for germination tests<sup>1</sup> and the pH is measured on the surface of the paper.



The pH is measured using a calibrated pH meter or pH paper



Using pH paper to measure the pH of paper germination media.

# Flowchart for Water Retention I

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The Moisture Content of the Germination media is measured using the ISTA Constant Temperature Oven method at 130°C

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# Flowchart for Water Retention II

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The germination media is weighed. For sand and organic growing media a waterproof container with drainage is required. The drainage holes are covered using a material that allows water drainage but prevents the loss of material

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# Flowchart for Water Retention III

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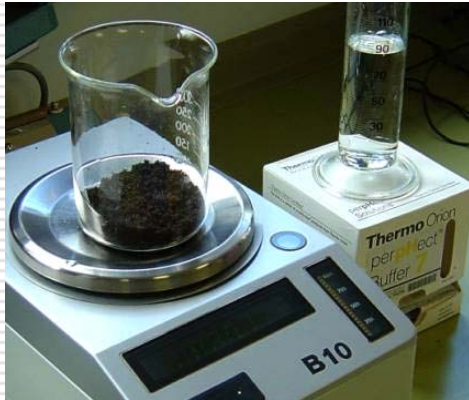


The Germination media is saturated with water and allowed to freely drain for 12 hours with measures being taken to prevent evaporation. The saturated media is then weighed and the maximum amount of water held in the growing media as percentage of its dry weight is calculated

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# Flowchart for Conductivity

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20g of media are mixed with 100ml of water, which is used for germination tests, at  $20^{\circ}\text{C} \pm 1^{\circ}\text{C}$ . This is mixed and left for 30 minutes before filtering.



The conductivity of the filtrate is measured using a calibrated conductivity meter using a dip cell

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# Flowchart for pH I



For Sand and Organic Growing Media, one volume of media are mixed with 5 volumes of water that is to be used for germination tests. The mixture is stirred for 5 min and then allowed to stand for a minimum of 2 hours and a maximum of 24 hours. After standing the mixture is stirred and the stabilised pH value of the suspension solution measured.



For Paper Media samples are moistened, with water that is to be used for germination tests and the pH is measured on the surface of the paper.

# Flowchart for pH II

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The pH is measured using a calibrated pH meter or pH paper



Using pH paper to measure the pH of paper germination media.

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# Flowchart for pH III

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For paper media when using a pH meter a specific probe manufactured for measuring the pH on the surface of paper must be used.



Surface (left) and dip (right) probes for pH meter



Surface probe for measuring the pH of paper

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# Work on Crambe and Barley Dormancy

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- Günter will give brief presentations
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# Work on Questionnaire to laboratories in Developing Countries

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- Lea will give a brief presentation
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