# ISTA GERMINATION COMMITTEE ACTIVITY REPORT

# 2023 – 2024

Gillian Musgrove

# OUTLINE

- Germination Committee Members
- Rules Proposals
- Method Development
- Proficiency Testing
- Publications
- Workshops
- Germination Presentations
- Acknowledgments

# Membership of the Germination Committee

| CHAIR | Gillian Musgrove | United Kingdom |
|---|---|---|
| VICE-CHAIR | David Johnston | United States of America |
| | Ignacio Aranciaga | Argentina |
| | Janek Bartel | Canada |
| | Sarah Dammen | United States of America |
| | Gill Durrant | United Kingdom |
| | Meriam Dekalo-Keren | Israel |
| | Sylvie Ducournau | France |
| | Erik van Egmond | Netherlands |
| | Lesly Gonzalez | Chile |
| | Aidin Hamidi | Iran |
| | Andrea Jonitz | Germany |
| | Augusto Martinelli | Argentina |
| | Takayuki Okuda | Japan |
| | Dot Vittrup Pedersen | Denmark |
| | Melissa Phillips | United States of America |
| | Elena Perri | Italy |

## ECOM Liaison Officers:

Sylvie Ducournau

Ruel Gesmundo

# Germination Rules Proposals

- C.5.1 Clarifying the use of various paper growing media in germination testing
- C.5.2 Expansion of list of species that exhibit hard seeds
- C.5.3 Addition of presoaking method for *Beta vulgaris*
- C.5.4 Merger of Table 5A Part 1 and Part 3 into Table 5A Part 1
- C.5.5 Additional advice for testing *Spinacia oleracea*
- C.5.6 Clarifying temperature variation requirements for germination

# C.5.1 Clarifying the use of various paper growing media in germination testing

- **Revision of the wording at 5.4 Growing Media to improve the wording that paper can be used as a base medium with any other combination of growing media prescribed in Table 5A for a particular species.**

PROPOSED VERSION

**5.4 Growing media**

**5.4.1 Definition**

Growing media used for germination tests are products which provide sufficient pore space for air and water, for the growth of the root system and for contact with solutions (water) needed for plant growth.

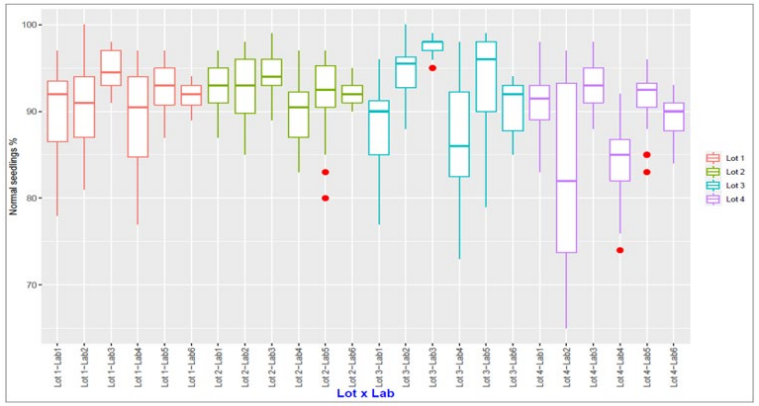
Additional paper growing media types listed in 5.4.3.1 (i.e. filter papers, blotters, towels and crepe cellulose) are allowed to be used as a base medium, to help ensure adequate moisture is provided during the germination test. Each paper growing medium type must be verified and meet the specifications prescribed in 5.4.2.

# C.5.2 Expansion of list of species that exhibit hard seeds

- The current ISTA Rules only include Fabaceae as a family that may exhibit hard seeds during germination testing.
- This proposal is to expand the list of families that may have hard seeds.
- Also include some families that do not exhibit hard seeds (e.g. Brassicaceae, Poaceae, etc.).
- This proposal harmonizes with the AOSA Rules.

# C.5.3 Addition of presoaking method for *Beta vulgaris*

- **Current ISTA Rules allow prewashing as a procedure to remove inhibitory substances before the germination of *Beta vulgaris*.**
- **Method Validation Study carried out showed presoaking results to be as good as prewashing.**
- **Reduction in the amount of water required.**
- **This proposal harmonizes with the AOSA Rules.**
- **Seed Testing International, 167, April 2024**




prewashing

presoaking

# C.5.4 Merger of table 5A Part 1 and Part 3 into Table 5A Part 1

- **Merger of Table 5A of Part 1 and Part 3.**
- **Part 2 Trees and Shrubs to remain unchanged.**
- **This proposal originates from a discussion during the ISTA Annual Meeting in Verona, regarding the merger of other tables e.g. Table 9A.**

**PROPOSED VERSION**

**Table 5A Part 1**. Detailed methods for germination tests: agricultural, vegetable, flower, spice, herb and medicinal species

| Species | Substrate | Temperature* (°C) | First count (d) | Final count (d) | Recommendations for breaking dormancy | Additional directions | Additional advice | Seedling Evaluation Group |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Abelmoschus esculentus | TP; BP; S | 20<=>30 | 4 | 21 | – | – | – | A-2-1-1-2 |
| Abutilon ×hybridum | TP; BP | 20<=>30; 20 | 5–7 | 21 | – | - | - | A-2-1-1-2 |
| Achillea clavennae | TP; BP | 20<=>30; 20 | 5 | 14 | Light | - | - | A-2-1-1-1 |
| Achillea millefolium | TP | 20<=>30 | 5 | 14 | – | – | – | A-2-1-1-1 |

# C.5.5 Additional Advice for testing *Spinacia oleracea* (Spinach)

- **ISTA Proficiency Test PT22-2 *Spinacia oleracea* highlighted germination results can be affected by conditions that are too moist.**
- **Further investigation showed Spinach to be water sensitive.**
- **Table 5A 'Additional advice' updated with 'low moisture level advisable'.**
- **Seed Testing International, 167, April 2024.**

**PROPOSED VERSION**

**Table 5A Part 1**. Detailed methods for germination tests: agricultural, vegetable, flower, spice, herb and medicinal species

| Species | Substrate | Temperature* (°C) | First count (d) | Final count (d) | Recommendations for breaking dormancy | Additional directions | Additional advice | Seedling Evaluation Group |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Spinacia oleracea | TP; BP | 15; 10 | 7 | 21 | Prechill | – | Low moisture level advisable | A-2-1-1-1 |

# C.5.6 Clarifying temperature variation requirements for germination

- **Make it clearer the temperature range allowed in germination is ±2.0 °C (to one decimal place) rather than 2 °C.**

| CURRENT VERSION | PROPOSED VERSION |
|---|---|
| **5.6.2.3 Temperature**<br><br>**……**<br><br>**For any test, whether in darkness or under artificial light or indirect daylight, variation from the prescribed temperature must not be more than ±2°C.**<br><br>**…….** | 5.6.2.3 Temperature<br><br>……<br><br>For any test, whether in darkness or under artificial light or indirect daylight, variation from the prescribed temperature must not be more than ±2.0 °C.<br><br>……. |

WITHDRAWN

# Editorial Changes to the ISTA Rules

ISTA ANNUAL MEETING 2024
01-04 JULY
CAMBRIDGE, UNITED KINGDOM

**ISTA Rules references for editorial changes:**

- **5.4.5 Quality control – wording updated to be clear that the ISTA Handbook on Seedling Evaluation is a guide and not the ISTA Rules.**

- **5.6.2.1.2 Methods using sand or organic growing media – clarification that top of sand (TS) and top of organic growing medium (TO) cannot be used unless prescribed in Table 5A.**

- **5.6.5.3 Ungerminated seeds – clarification on when other information is requested on other categories of ungerminated seeds.**

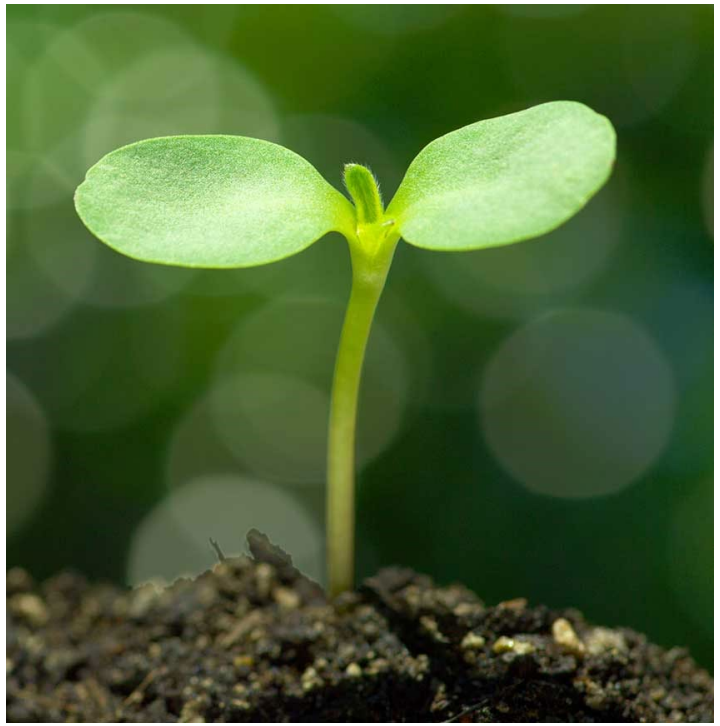
- **5.7 Retesting – re-lettering of this section due to a change from a rule proposal approved at the 2023 OGM in Verona.**

# Method Development - ongoing

- **Method Validation Study for a germination method for *Diplotaxis* spp. (Erik van Egmond, Netherlands) – seed analysis complete.**

- **Method Validation Study to examine a new method for breaking dormancy in *Helianthus annuus* [Sunflower] (Audrey Dupont & Sylvie Ducournau, France) – test plan approved.**

- **Method Validation Study for a germination method for Moringa *oleifera* (Sue Cousins, New Zealand) – test plan approved and seed preparation to begin.**



# Method Development – ongoing

- **Preliminary work on *Zea mays* [Maize] to examine the possibility of defining evaluation criteria of the secondary root system, identifying a minimum number and length of secondary roots to allow a seedling to be normal (Marija Milivojevic, Republic of Serbia & Aidin Hamidi, Iran) with Melissa Phillips leading for GER COMM).**

- **Method Validation Study (Peer Validated Test Method) for the addition of 20°C for *Solanum tuberosum* [True Potato Seed] (Erik van Egmond, Netherlands) – test plan prepared and seed lots to be sourced.**

- **Method Validation Study germination method for *Vachellia erioloba* [Persian Camelthorn] (Aidin Hamidi, Iran) – seed lots from different areas to be sourced and a draft test plan to be written.**

# ISTA Proficiency Tests

| Round | Species | Test round scope | Crop group number | Crop group |
|---|---|---|---|---|
| PT23-1 | *Vicia villosa* | PUR, OSD, GER | 4 | Pulses |
| PT23-2 | *Raphanus sativus* | PUR, OSD, GER, MOI, VIG, OIC, Seed Mixture | 5 | Other agricultural species |
| PT23-3 | *Trifolium hybridum* | PUR, OSD, GER, TSW | 3 | Small legumes |

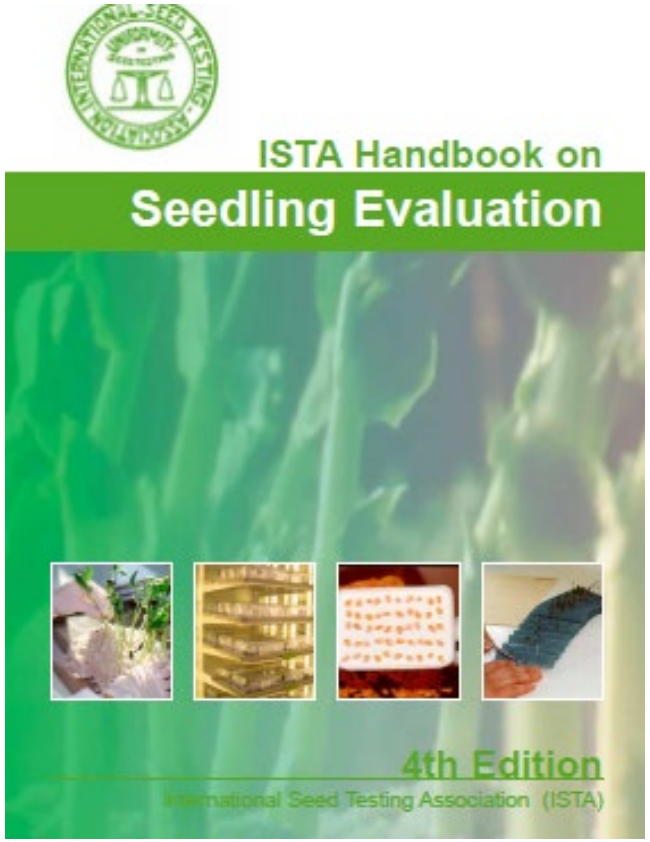
**Thank you to the organisers of each round**
**suppliers of the seed**
**Didier Demilly**
**Branka Opra**

# Publications

**Currently revising the**

**ISTA Handbook on Seedling Evaluation,**

**4th Edition.**



# Workshops

## Taken place:

- **Germination**

  **Bucharest, Romania, 4 – 7 September 2023**

  **Augusto Martinelli & Janek Bartel**

## To come:

- **Germination and Tetrazolium**

  **Lincoln, New Zealand, 4 – 8 November 2024**

  **Augusto Martinelli & Sergio Pasquini**

# Presentations to follow

- **Takayuki Okuda – Influence of substrate water level for germination of *Spinacia oleracea***
- **Lesly Gonzalez – Introduction of a new pretreatment for *Beta vulgaris***
- **Melissa Phillips – Defining evaluation criteria of the secondary root system of *Zea mays***
- **Sylvie Ducournau – Introduction of a new method for breaking dormancy for sunflower seeds**

# Acknowledgements

## Special thanks to…

- All members of the Germination Committee
- The ISTA Secretariat
- The Statistics Committee, Proficiency Test Committee, Flower Seed Committee and all the other Committees for their support and collaboration
- ECOM
- Our ECOM Liaison Officers, Sylvie Ducournau and Ruel Gesmundo

ISTA ANNUAL MEETING 2024
01-04 JULY
CAMBRIDGE, UNITED KINGDOM

# Thank you