Germination test of *Solanum nigrum*

Mazor, L., Dekalo-Keren M., Abu-Aklin W., Berger V.
Volcani Center, ARO, Bet-Dagan, 50250, ISRAEL
The objective of this validation test

To introduce the species *Solanum nigrum* into Chapter 5 of ISTA Rules.

The genus *Solanum* is already represented in the ISTA Rules by the species *Solanum melongena* & *S. tuberosum*.
Introduction

*Solanum nigrum* (Black Nightshade) is a common plant utilized as a vegetable and fruit source in Africa, India, Indonesia etc.

The plant is cultivated as a food crop both for its fruit and its leaves and has medicinal usage. The unripe fruit may contain high concentration of toxins.

In many other countries it is considered as a common garden weed.
Preliminary experiments conducted in our lab confirmed the findings of laboratories in Kenya, Zambia, Sudan and Botswana that the *optimum germination temperature* for *Solanum nigrum* is $20^\circ\text{C} \leq 30^\circ\text{C}$ (with light for 8 h).

Germination of *Solanum nigrum* at $20^\circ\text{C}$, $25^\circ\text{C}$, $20^\circ\text{C} \leq 30^\circ\text{C}$ after 7 days.
Statistical analysis of the preliminary results

Appendix 1: Normal seedlings (%) at 20°C, 25°C, 20°C->30°C - 7 days

Appendix 2: Normal seedlings (%) at 20°C, 25°C, 20°C->30°C - 14 days
Material and methods

Seed material:
7 lots of untreated *Solanum nigrum* seeds were obtained from Mary Chipili (Zambia) and Joseph Ahenda (Kenya). 3 lots were selected (lot 4, 5, 6) and sent to the participant laboratories.

Participants:
Samples have been sent to 5 ISTA accredited laboratories: France (FRDL0200), Norway (NODL0100), Scotland (GBDL0400), Netherlands (NLDL0300) and Israel (ILDL0100).
Germination methods

• 3 seed lots were tested on top-of-paper (TP) medium, using alternated temperature regime $20\leq T \leq 30^\circ C$.

• For each lot, a total of 400 seeds were tested in replicates of 50-100 seeds. **Light** was supplied for 8 hours during the high temperature phase, and germination counts were made at 7 (first count) and 14 days (final count).

• The evaluation of the seedling was done in accordance with ISTA seedling evaluation criteria for *Solanum melongena*. Seedling evaluation group: A.2.1.1.1.

• The statistical analysis of the validation study was performed by Jean-Louis Laffont, Chair of the ISTA Statistical Committee.
1. **Data exploration with side by side box-plots.**

**Figure 1: Grouping factor: Lot**

Germination (percentage of normal seedlings) obtained by the participating labs from the 3 seed lots. Germination of Lots 4 and 5 were similar while the germination of Lot 6 was much lower and more dispersed.
Figure 2: Grouping factor: Lab

Germination results (normal seedling percentage) obtained by the participating labs were similar.
A strong lot effect is showed between lot 4 or 5 and 6, no Lot x Lab interaction was exhibited in these side-by-side boxplots (Figures 1-3).
2. **Data checking**
   The data were checked according to the ISTA Rules (ISTA, 2011) by calculating the tolerances for germination test replicates
   
   **Results**: All the results are within tolerance.

3. **Repeatability & Reproducibility**
   Repeatability and reproducibility showed no significant differences between the labs.

http://www.meemelink.com
Conclusions

• The statistical evaluation of this study shows that repeatability and reproducibility requirements are met.

• Results obtained in this validation test indicate that TP can be proposed as a suitable substrate and $20 \leq T < 30^\circ C$ as an optimum temperature for the germination of *Solanum nigrum*. 

css.msu.edu
Acknowledgements

• **Sincere thanks** to **Joseph Ahenda** (Kenya) who started the study and promote it and to **Mary Chipili** (Zambia). Special thanks are due to **Jean-Louis Laffont** for the statistical analysis and to **Ronald Don, John Hampton** for their support.

• We are grateful to **Sylvie Ducournau, Håkon Tangerås, Gillian McLaren, Gerarda de Boer-Raatgever** and **Karen Hill** for performing the tests, and to **Grethe Tarp, Joël Léchappé** for their assessment of the test plan and for their review of the validation report.
THANK YOU FOR YOUR ATTENTION