

Seed Science Advisory Group Activity 2018-2019

Alison A Powell
Chair



Members

Chair: Alison Powell	GB
Vice Chair: Brigitte Hamman	ZA
Birte Boelt	DK
Laura Bowden	GB
Francoise Corbineau	FR
Fiona Hay	DK
Stan Matthews	GB
Alan Taylor	USA
Jane Thomas	GB
Adel Zayed	USA
ECOM liaison: Joel Lechappe	FR



SSAG Terms of Reference

TOR 1

- To link fundamental research and the use of that research to meet the needs of ISTA members.
 - The SSAG will identify research that may have potential for practical application
 - Collaborate with appropriate ISTA TCOM/s, identify appropriate ISTA laboratories
 - Overall aim: to be more proactive in new developments



ISTA Seed Symposium 2016

SSAG prize

- Identified:
 - Papers that showed Achievement in taking research towards practical application in seed quality evaluation
 - Prize awarded to work on Next Generation Sequencing
 - Could work from other papers be developed with a TCOM?



Prediction of normal germination by a single radicle emergence count

- Collaboration agreed with Germination Committee
- Volunteer participants
- Selection of species
- Single radicle emergence counts completed during routine testing of seed lots



Species and participants

Species	Laboratory
Perennial ryegrass	DLF, DK (Dot Vittrup Pedersen)
	DLF, NL (Margriet van Eekelen)
	NIAB, GB (Linda Maile)
	Oregon State University, USA (Sabry Elias)
	Agri Seed Testing, USA (Sharon Davidson)
Oilseed rape	SASA, GB (Gillian Musgrove)
	NIAB, GB (Linda Maile)
	Swedish Board of Agriculture, SW (Pernilla Anderssen).
	GEVES, FR (Marie-Hélène Wagner)
	Oregon State University, USA (Sabry Elias)
	Agri Seed Testing, USA (Sharon Davidson)
Cucumber	SPCRI, IR (Aidin Hamidi)
	GEVES, FR (Marie-Helene Wagner)



Preliminary work on other species

- Maize, Radish, Lettuce
 - GEVES, France
- Wheat
 - SASA, UK



Completed so far:

Species	Laboratory	Number of lots tested	Germination conditions and time of RE count
Oilseed rape			
	1	9	TP, 48 and 72 hours at 20°C
	2	23	TP, 72 hours at 20°C
	3	20	PP, 48 and 72 hours at 20°C
	4	10	TP, 48 and 72 hours at 20°C
	5	34	PP, 48 and 72 hours at 20°C
	6	10	PP, 48 and 72 hours at 20°C
Perennial ryegrass	1	21	72 hours 20↔30°C No pre-chill or KNO ₃
	2	20	
	3	19	
	4	21	
	5	56	
Cucumber	1	15	48 hours 20↔30°C
	2	8	48 hours 20°C



Oilseed rape

Summary of the relationship between both 48 and 72 hour radicle emergence (RE) and normal germination percentage.

Data is the combined data for six laboratories.

	No. of labs	No. of lots	r	R^2
All lots:				
48 h RE	5	85	0.751***	0.549
72 h RE	6	84	0.734***	0.539
Lots >65% normal germination:				
48 h RE	5	79	0.738***	0.548
72 h RE	6	79	0.823***	0.677

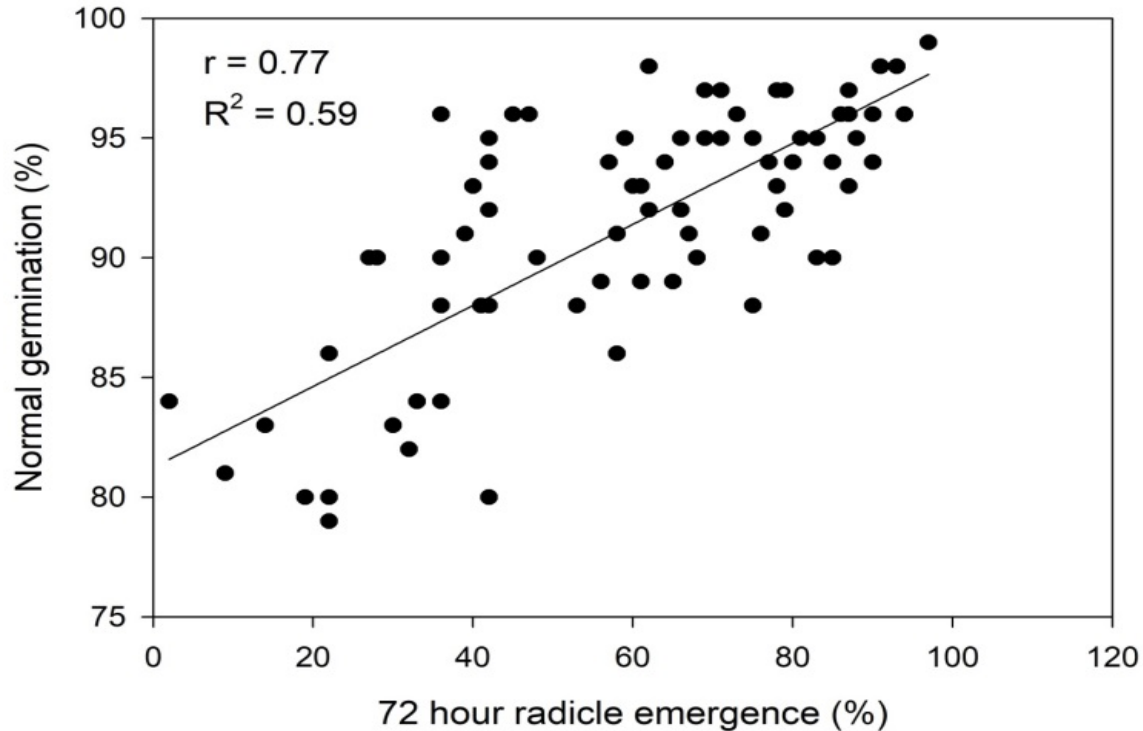
High early RE = high final normal germination

Low early RE = low final normal germination



Perennial ryegrass

72 hour RE predicts normal germination (5 labs)



Perennial ryegrass

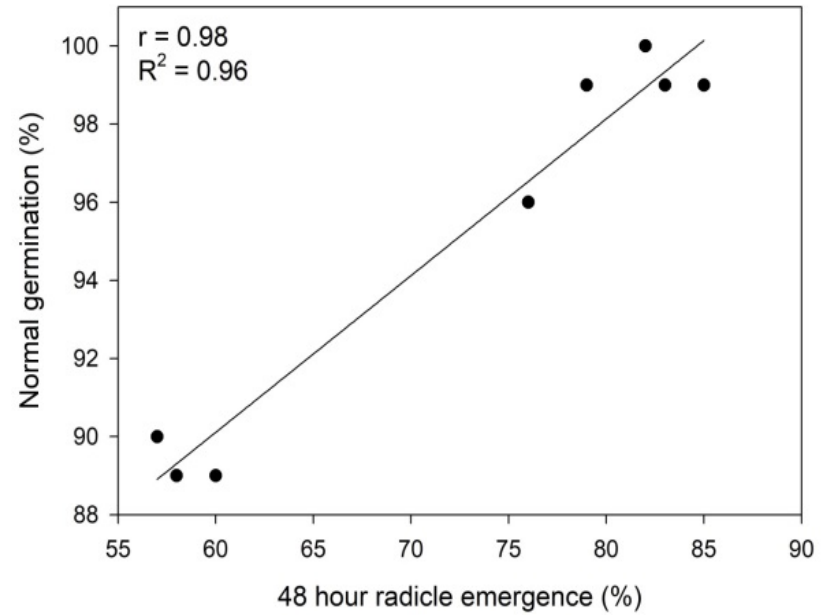
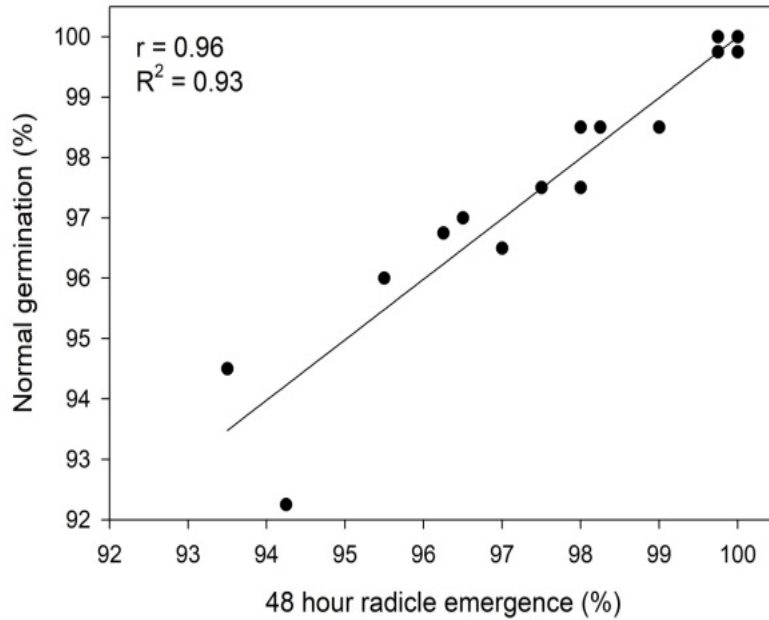
- Could automated counts of RE be used?
- DLF Denmark
 - Manual RE counts
 - Automated RE counts: Videometer
- Manual 72 hour RE vs 72 hour Videometer:
 - $r = 0.942, P \geq 0.001$.
- Both manual and Videometer counts
 - Very highly significant correlations with normal germination



Cucumber: 2 labs

Lab 1: Alternating temperature 20 ⇔ 30 °C

Lab 2: Constant 20°C



Summary so far

- A single early RE count can predict normal germination:
 - Oilseed rape
 - Perennial ryegrass
 - Cucumber
- Both manual and automated counts predict NG
 - Perennial ryegrass
- Test conditions (temperature) can influence RE count
 - But relationship with NG remains e.g. cucumber



The Future

- Radicle emergence and normal germination:
 - Maize, lettuce, radish: comparison of germination methods
 - Standardisation of method?
 - The role of RE as an assessment of normal germination
 - Further development: addition or alternative to standard germination test?
 - Could early RE be a substitute for the early normal germination count?
 - When could it be used ?
- Electrical conductivity?
 - Potential for prediction of normal germination
 - Evidence that EC measured after ≤ 24 hours predicts NG in radish, oilseed rape, leek, cabbage, cauliflower



Other roles of the SSAG

- TOR 2:
 - Appraisal of evidence for techniques/equipment available for use in seed testing laboratories
 - Are there new techniques or equipment being promoted?
 - SSAG would evaluate the evidence for their efficacy
 - **Please inform us if you become aware of anything new**
- TOR 3
 - Respond to requests from ECOM and TCOM Chairs for advice related to scientific issues
- **Feedback from ISTA members and TCOMs will help us be effective!**



Thank You!

- All SSAG members
- All participants in the RE / NG project:
Sylvie Ducournau and Germination committee; in particular:
 - Pernilla Anderssen
 - Sharon Davidson
 - Sabry Elias
 - Aidin Hamidi
 - Linda Maile
 - Dot Vittrup Pedersen
 - Margriet van Eekelen
 - Marie-Hélène Wagner
- Nadine Ettel
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